TABLE OF CONTENTS

Keep Records!

In order to fulfill your responsibility for planning your education, you should keep an up-to-date academic portfolio containing the following kinds of information:

- transcripts from all schools attended;
- test results from entrance exams, language exams, placement exams, and advanced placement;
- copies of communications to and from the university;
- contact information for your advisers and faculty members;
- statements of account showing registration, housing, and other charges and payments.

You are responsible for responding to all communications sent to you by the university.

Check the *MyUCSC portal* and your UCSC e-mail account often.

Make use of the *UCSC General Catalog*, *Schedule of Classes*, and *The Navigator* undergraduate handbook, or the *Graduate Student Handbook*.

ONLINE RESOURCES

A–Z Index
www.ucsc.edu

Academic & Administrative Calendar
reg.ucsc.edu/calendar

Bay Tree Bookstore
slugstore.ucsc.edu

Campus Cashier
sbs.ucsc.edu

Campus Ombuds
www2.ucsc.edu/ombuds/

Career Center
www2.ucsc.edu/careers/

Course Fees
reg.ucsc.edu/coursefees.html

Online Class Search
https://pisa.ucsc.edu/class_search/

E-mail Accounts
its.ucsc.edu/services/help_desk

General Catalog
reg.ucsc.edu/catalog

ITS Help Desk
itshelp.ucsc.edu

Navigator
reg.ucsc.edu/Navigator

OPERS
www2.ucsc.edu/opers/

Office of the Registrar
reg.ucsc.edu

Rape Prevention and Education
www2.ucsc.edu/rape-prevention

Schedule of Classes
reg.ucsc.edu/soc

Student Business Services
sbs.ucsc.edu

Student Judicial Affairs
http://www2.ucsc.edu/judicial/

Title IX/Sexual Harassment
www2.ucsc.edu/title9-sh/

Transfer Course Agreements
www.assist.org

ACADEMIC AND ADMINISTRATIVE CALENDAR 2011–12

Please read and follow registration and enrollment instructions and deadlines contained in this schedule. It is the student's responsibility to pay fees, enroll in classes, confirm enrollments and grading options, and file petitions by the stated deadlines.

Key Dates

	Fall '11	Winter '12	Spring '12
QUARTER BEGINS	Sept 17 Sat	Jan 6 Fri	April 2 Mon
ORIENTATION See orientation schedule for details (*orientation.ucsc.edu*).			
INSTRUCTION BEGINS	Sept 22 Thur	Jan 9 Mon	April 2 Mon
INSTRUCTION ENDS	Dec 2 Fri	Mar 16 Fri	June 8 Fri
FINAL EXAMINATIONS	Dec 5–8 Mon–Thur	Mar 19–22 Mon–Thur	June 11–14 Mon–Thur
QUARTER ENDS	Dec 8 Thur	Mar 22 Thur	June 14 Thur
NUMBER OF DAYS OF INSTRUCTION	M-10, T-10, W-10 Th-10, F-9	M-8, T-10, W-10 Th-10, F-10	M-9, T-10, W-10 Th-10, F-10
TOTAL DAYS OF INSTRUCTION	**49**	**48**	**49**
COMMENCEMENTS			June 15–17 Fri–Sun

HOLIDAYS OBSERVED

Sept. 5–Labor Day
Nov. 11–Veterans Day
Nov. 24-25–Thanksgiving Holidays
Dec. 23, 26, 30, Jan. 2–Winter Holidays
Jan. 16–Martin Luther King, Jr. Day
Feb. 20–Presidents' Day
March 30–César Chávez Day
May 28–Memorial Day
July 4–Independence Day

CAMPUS CLOSURE DATES–The campus is closed from Friday, Dec. 23 through Monday, January 2 (pending approval).

Advising and Advance Enrollment

Continuing and Readmitted Students (includes visitors)

	Fall '11	Winter '12	Spring '12
ADVISING WEEK Continuing and readmitted undergraduates.	May 9–13 Mon–Fri	Nov 3–9 Thur–Wed	Feb 22–28 Wed–Tues
PRIORITY ENROLLMENT BEGINS Continuing and readmitted graduate and undergraduate students, by appointment.	May 16 Mon	Nov 14 Mon	Feb 29 Wed

Enrollment continues following priority enrollment. For more information, see the online *Schedule of Classes* at *reg.ucsc.edu/soc.htm*.

New Students

PRIORITY ENROLLMENT	Fall '11	Winter '12
New graduate students.	June 16 Thur	TBD
Undergraduates: priority groups and those who attend orientation, by appointment	July 18–29 Mon–Fri	TBD
Undergraduates new to UCSC who do not attend orientation	Aug 1 Mon	

Enrollment continues following priority enrollment. For more information, see the online *Schedule of Classes* at *reg.ucsc.edu/soc.htm*.

	Fall '11	Winter '12	Spring '12
BILLING STATEMENTS AVAILABLE ON PORTAL Including registration and housing fees.	Aug 25 Thur	Nov 28 Mon	Feb 23 Thur
STUDENT HEALTH INSURANCE Deadline to apply for waiver. Cowell Student Health Center.	Sept 1 Thur	Dec 1 Thur	Mar 1 Thur
MINIMUM CREDIT LIMIT ENFORCED Twelve credits for undergraduates and five credits for graduates.	Sept 13 Tues	Dec 15 Thur	Mar 20 Tues
FINANCIAL AID DISBURSED TO STUDENT ACCOUNTS	Sept 14 Wed	Dec 27 Tues	Mar 27 Tues
HOUSING AND DINING FEES DUE Late housing fee of $25 assessed after this date. Cashier's Office.	Sept 15 Thur	Dec 21 Wed	Mar 21 Wed
UNDERGRADUATE REGISTRATION FEES DUE Late registration fee of $50 assessed after this date. Cashier's Office.	Sept 15 Thur	Dec 21 Wed	Mar 21 Wed
WITHDRAW FROM THE UNIVERSITY Deadline to file to withdraw during quarter and receive full registration fees refund. College/Division of Graduate Studies.	Sept 22 Thur	Jan 9 Mon	Apr 2 Mon
UNDERGRADUATE ENROLLMENT DEADLINE Students must be enrolled in one class by this date, or $50 late enrollment fee assessed.	Sept 26 Mon	Jan 11 Wed	Apr 4 Wed
GRADUATE STUDENT ENROLLMENT AND FEE PAYMENT DEADLINE $50 late enrollment fee after this date. Cashier's Office.	Sept 30 Fri	Jan 13 Fri	Apr 6 Fri
GRADUATE STUDENT PART-TIME STATUS Deadline to apply for a reduced class load and fees. Department.	Sept 30 Fri	Jan 13 Fri	Apr 6 Fri
CLASS PERMISSION NUMBERS REQUIRED	Oct 1 Sat	Jan 18 Wed	Apr 11 Wed
ADD/DROP/SWAP CLASSES ENDS Deadline to process enrollment transactions.	Oct 12 Wed	Jan 30 Mon	Apr 20 Fri
GRADE OPTION Deadline to change grade option.	Oct 12 Wed	Jan 30 Mon	Apr 20 Fri
UNDERGRADUATE PART-TIME PROGRAM Deadline to apply for a reduced class load and fees. Office of the Registrar.	Oct 12 Wed	Jan 30 Mon	Apr 20 Fri
ADD BY PETITION BEGINS First day to add a class by petition ($10 fee). Office of the Registrar.	Oct 13 Thur	Jan 31 Tues	Apr 23 Mon
UNDERGRADUATE WITHDRAW FROM A CLASS BEGINS Students petition for a W (Withdraw) notation. College.	Oct 13 Thur	Jan 31 Tues	Apr 23 Mon
DECLARATION/CHANGE OF MAJOR/MINOR Deadline to file petition. Contact your department for major/minor declaration information.	Oct 21 Fri	Feb 10 Fri	Apr 27 Fri
UNDERGRADUATE WITHDRAW FROM A CLASS ENDS Deadline to petition for a W (Withdraw) grade notation, except for emergency reasons. College.	Nov 2 Wed	Feb 21 Tues	May 11 Fri

ACADEMIC AND ADMINISTRATIVE CALENDAR 2011–12

Please read and follow registration and enrollment instructions and deadlines contained in this schedule. It is the student's responsibility to pay fees, enroll in classes, confirm enrollments and grading options, and file petitions by the stated deadlines.

	Fall '11	Winter '12	Spring '12
UNDERGRADUATE CREDIT BY PETITION ENDS Deadline to file petition to challenge a class ($10 fee). Office of the Registrar.	Nov 2 Wed	Feb 21 Tues	May 11 Fri
ADD BY PETITION ENDS Deadline to add a class by petition ($10 fee). Office of the Registrar.	Nov 2 Wed	Feb 21 Tues	May 11 Fri
WITHDRAW FROM THE UNIVERSITY Deadline to file to withdraw during the quarter, except for emergency reasons. College/Division of Graduate Studies.	Nov 2 Wed	Feb 21 Tues	May 11 Fri
CHANGE OF COLLEGE Deadline to file petition to be effective the following quarter. College.	Nov 30 Wed	Feb 29 Wed	May 3 Thur
UNDERGRADUATE REMOVAL OF INCOMPLETE Deadline to file petition ($10 fee) and submit class work for Incomplete grade from preceding quarter. Office of the Registrar.	Dec 8 Thur	Mar 22 Thur	June 14 Thur
GRADUATE STUDENT REMOVAL OF INCOMPLETE Deadline to file petition ($10 fee) and submit class work for Incomplete grade within the last three quarters. Office of the Registrar.	Dec 8 Thur	Mar 22 Thur	June 14 Thur
LEAVE OF ABSENCE Deadline to petition for leave beginning the next quarter. College/Division of Graduate Studies.	Dec 8 Thur	Mar 22 Thur	Aug 31 Fri
GRADES DUE From instructors.	Dec 13 Tues	Mar 27 Tues	June 19 Tues
EVALUATIONS DUE From instructors. Undergraduate optional.	Jan 9 Mon	Apr 13 Fri	July 6 Fri

Announcing Candidacy for Degree/Apply to Graduate

	Fall '11	Winter '12	Spring '12	Summer '12
UNDERGRADUATES Apply to graduate on portal.*	Sept 17– Oct 21 Sat–Fri	Jan 6– Feb 6 Fri–Mon	April 2– May 2 Mon–Wed	June 25– Aug 3 Mon–Fri
*Students who apply after the deadline are billed a $40 late application fee.				
UNDERGRADUATES Deadline to complete all requirements for degree and for the Office of the Registrar to receive transcripts from other institutions.	Dec 8 Thur	Mar 22 Thur	June 14 Thur	Aug 31 Fri
GRADUATE STUDENTS Deadline to announce for certificate, master's, or Ph.D., or pay for filing fee, if applicable.	Sept 29 Thur	Jan 12 Thur	Apr 5 Thur	June 28 Thur
GRADUATE STUDENTS Deadline to complete all requirements for degree.	Dec 8 Thur	Mar 22 Fri	May 31* Thur	Aug 31 Fri
* Students not participating in June commencement have until June 14 to complete all requirements for degree.				

Intercampus Visitor/Exchange Programs

UNDERGRADUATES Deadline to file application. Office of the Registrar.	Apr 30	Oct 31	Jan 31 (Oct 1, UC Berkeley, UC Merced)
GRADUATE STUDENTS Deadline to file application. Division of Graduate Studies.	Aug 16 (Apr 30, 2011, UC Berkeley, UC Merced)	Nov 15	Feb 15

Financial Aid

FINANCIAL AID APPLICATION FOR UNDERGRADUATES

- Submit the free Application for Federal Student Aid (FAFSA) by March 2 prior to each academic year at *http://www.fafsa.ed.gov/*
  for enrollment in fall 2011, file by March 2, 2011
  for enrollment in fall 2012, file by March 2, 2012
- Complete your financial aid application by providing all supporting documentation requested on your MyUCSC To Do List by June 1 prior to the year for which you are applying.
- Applications received after the March 2 priority deadline and completed after the June 1 deadline will be considered for aid on a funds-available basis.

FINANCIAL AID APPLICATION FOR GRADUATES

- To apply for federal student loans, submit the Free Application for Federal Aid (FAFSA) each year at *http://www.fafsa.ed.gov/*. Applications are accepted throughout the academic year in which you are enrolled.
- To apply for other types of graduate support, contact your academic department.

Readmission

READMISSION APPLICATION
Undergraduates
Filing deadline for priority enrollment.
Office of Admissions.

Fall '11	Winter '12	Spring '12
Apr 1, 2011 Fri	Oct 1, 2011 Sat	Jan 1, 2012 Sun

READMISSION APPLICATION FINAL FILING DEADLINE
Undergraduates: Office of Admissions.
Graduates: Division of Graduate Studies.

July 31, 2011 Sun	Oct 31, 2011 Mon	Jan 31, 2012 Tues

For more information on procedures and deadlines, including links to the UCSC *General Catalog* and *Navigator Undergraduate Handbook,* go to *reg.ucsc.edu.*

For information on Summer Session procedures and deadlines, go to *summer.ucsc.edu*.

Graduate students may also refer to the *Graduate Student Handbook* at *graddiv.ucsc.edu/regulations/handbook/*

A printable version of this calendar is available at *reg.ucsc.edu/calendar/calendar.pdf;* for key dates, go to *reg.ucsc.edu/calendar/2011_12.htm*

Published by the Office of the Registrar

Key Dates for Undergraduate Registration and Enrollment

(Refer to the Academic and Administrative Calendar, pages 2 and 3, for complete deadline information.)

Priority Enrollment Begins By Appointment
Continuing and Readmitted Undergraduates
May 16

New Enrollment Begins
Enrollment Closed to Continuing Undergraduates
July 14 – August 7

Wait List Appointment
Sign up for courses with wait list (applies only to classes with wait listing through MyUCSC)
August 8

Registration Fees Dues
September 15**

Enrollment Deadline
September 26†

Permission Numbers Required
October 1

Add/Drop/Swap Ends
October 12

Grade Option Deadline
October 12

Withdraw from a Class (W grade)
October 13 – November 2

Add by Petition Period
October 13 – November 2

** If payment is not received by the cashier by 4:00 P.M., you will be assessed a $50 late registration fee.
† You must be enrolled in at least one course or the $50 late enrollment fee is assessed.

Breakdown of Registration Fees

The fees for the 2011-12 academic year had not been determined at the time of posting of the fall *Schedule of Classes*. The fees in place for spring quarter 2011 are posted at right. Check this web site for updated information on any changes to registration fees for fall 2011, or follow the Fees link on the MyUCSC page. Fees, tuition, and other charges are subject to change through action by the UC Regents.

See Courses With Fees, page 16, for more information about course fees.

Spring 2011 Registration Fees

The fees for the 2011-12 academic year had not been determined at the time of posting of the fall *Schedule of Classes*. The fees for spring quarter 2011 are listed below. Fees, tuition, and other charges are subject to change through action by the UC Board of Regents. For more information, refer to reg.ucsc.edu/fees/fees.html.

Required Fees	Undergraduate	Graduate
Student Services Fee	$ 300.00	$ 300.00
Educational Fee	3,134.00	3,134.00
Campus Fees	357.67*	323.66*
Total (residents)	**$ 3,791.67**	**$ 3,757.66**
Nonresident Tuition	7,341.00	4,898.00
Educational Fee Differential	286.00	136.00
Total (nonresidents)	**$11,418.67**	**$ 8,791.66**

See Courses With Fees, page 14, for information about course fees.

* Does not include Health Insurance fee, which can be waived if student has own insurance. Also, campus elections are scheduled for May 18-25. Several measures on the ballot may impact campus fees.

REGISTRATION PAYMENT INFORMATION

Billing Statements

You can view your account activity on MyUCSC by selecting Account Inquiry. At the end of each month, an invoice (also referred to as statement of account) for unpaid charges is viewable on the portal and a copy is mailed. Fall charges will be on the invoice available on Aug. 25, 2011.

The Statement of Account is no longer mailed. It will be available on SallieMae or the student portal. Students can sign up for SallieMae e-bill and e-check payment by visiting their portal, clicking on Accounts and Billing, then clicking on SallieMae.

Once a student has enrolled, they may invite a parent or other payer to SallieMae. The parent/payer will receive an e-mail with instructions on how to enroll themselves. Students do not need to give up access to their student portal! See http://sbs.ucsc.edu/SallieMae_Student.html or http://sbs.ucsc.edu/SallieMae_Other_Payer.html for more information.

Payment of Fees

Deadline to pay registration fees is Thursday, September 15, for undergraduates and Friday, September 30, for graduate students. A $50 late registration fee is assessed if payment is not received by the cashier by 4:00 P.M. on the due date. Postmarks will not be used to validate on-time payment.

See the Financial Aid section on the following page if:

- you applied for financial aid, but have not been notified of your eligibility; or
- you received your financial aid Offer Letter, but financial aid credits do not appear on your account summary on the MyUCSC portal.

See Withdrawal, Leave of Absence, and Readmission in *The Navigator* for information about refunds for registration fees.

Health Insurance

The University of California requires that all students be covered by health insurance and UCSC offers plans specifically designed to meet the needs of students. The Undergraduate Student Health Insurance Plan (USHIP) and the Graduate Student Health Insurance Plan (GSHIP) are affordable plans featuring excellent year-round, worldwide coverage with low deductibles and prepaid access to Student Health Center care for illness or injury. The brochures describing the benefits and conditions are available at http://www2.ucsc.edu/healthcenter/billing/insurance.shtml.

Students are automatically enrolled in the plans and billed in three quarterly installments that will appear on the University billing statement. The USHIP plan includes medical coverage only, while the GSHIP plan includes medical, dental, and vision coverage. The premiums for the 2011-12 USHIP and GSHIP plans had not been set as of the posting of the *Schedule of Classes*. For 2010-11 the USHIP premium was $1,353 ($451 per quarter) for undergraduate students, and the GSHIP premium was $2,616 ($872 per quarter). Check the *Schedule of Classes* for updates or e-mail insure@ucsc.edu for more information.

To opt out of the UCSC-sponsored health insurance plan, you must complete the online waiver on the Student Portal, under Academic News. Approved waivers are valid for the quarter submitted and the remainder of the academic year. A new waiver must be submitted each academic year. Students who waive the university-sponsored student health insurance plan may purchase CruzCare, which provides prepaid access to basic Student Health Center Care for illness or injury. The premium for CruzCare for fall 2011 had not been set as of the posting of the *Schedule of Classes*. CruzCare was $75 per quarter for 2010-11. Check the *Schedule of Classes* for updates.

For information on how to submit an online waiver, healthcenter.ucsc.edu/billing/insurance.shtml, call (831) 459-2389, or e-mail insure@ucsc.edu.

Part-Time Study for Undergraduates

If you are unable to maintain a full-time program of study because of employment responsibilities, family obligations, or a medical condition, or you are in your final quarter before graduation, you may be eligible for a 50 percent reduction in the educational fee and in the nonresident tuition fee (if applicable). To qualify for reduced fees, you must be approved for the Part-Time Program and be enrolled in 10 quarter credits or fewer. If you exceed 10 credits in a quarter, you must pay full fees. The last day to apply for the Part-Time Program for fall quarter 2011 is October 12.

For information regarding the Part-Time Program, check reg.ucsc.edu/students/part-time.html, or call the Office of the Registrar at (831) 459-4412 before the deadline listed above.

Financial Aid

Read the sections below which apply to your circumstances:

You have not received your financial aid disbursement.

The first thing to check is your enrollment. The Financial Aid and Scholarship Office will not disburse until you are enrolled in six or more units. Next, check the MyUCSC portal for financial aid awards. Once you are in the Student Center, look under the Finances section, click on Accept/Decline Awards, then click on Aid Year 2011. You should review each award and click on the awards with hyperlinks to learn about important actions you may need to take to receive those funds. You can accept/decline any or all awards available and "Submit" your changes. Financial aid will not disburse until you have successfully completed the accept/decline awards process.

If there are no financial awards posted, check your "To Do List" on your portal. From the tabs found in the upper right hand corner of the Student Center, you can see your Holds and any outstanding To Dos. Click on the item listed to determine what is being requested. You may download requested forms using the Financial Aid Forms link.

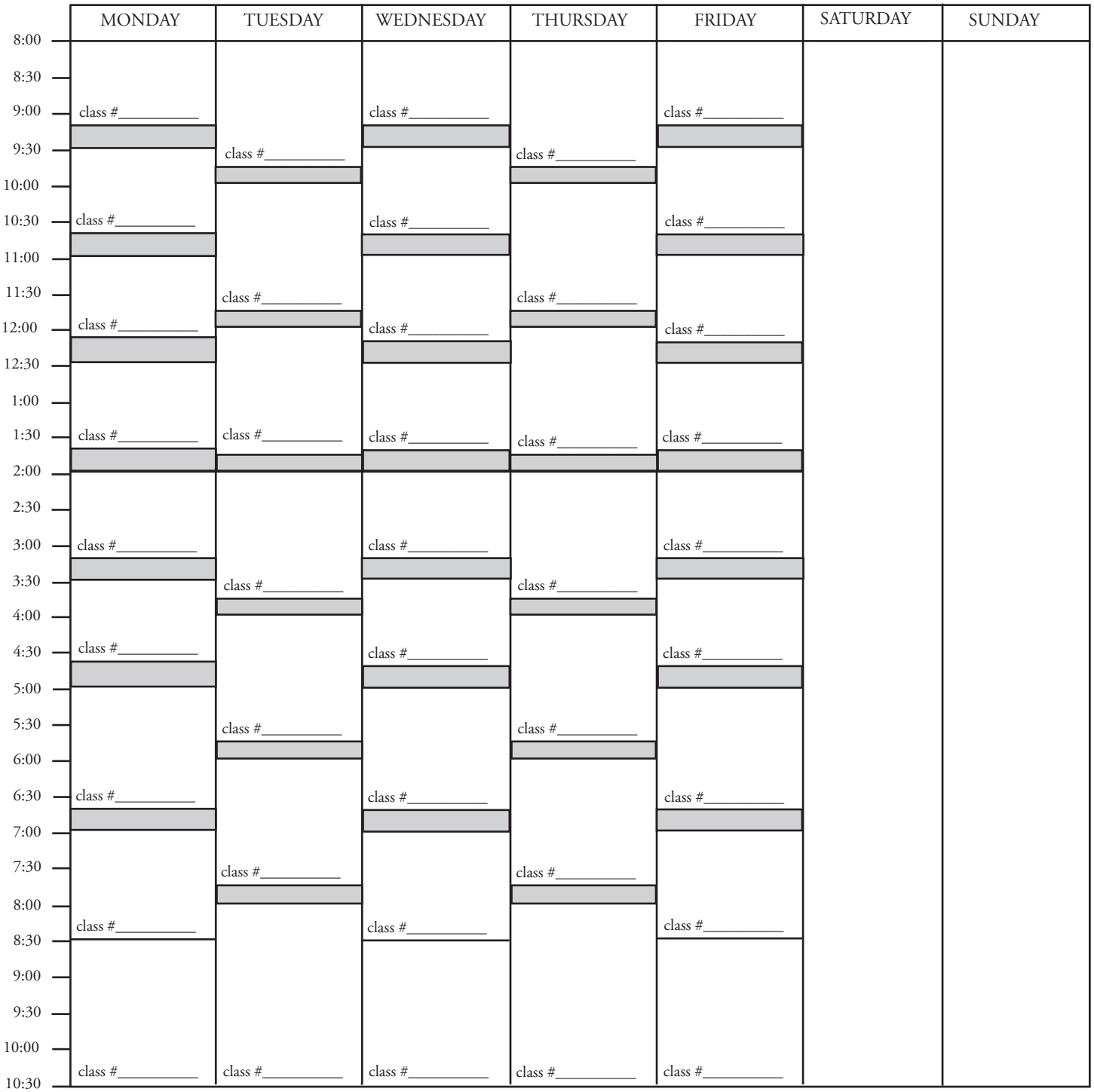
Your financial aid has been disbursed and you have a balance owed on your account.

If your charges exceed the amount of aid you were awarded, you must use your own resources to pay any balance owed by the deadline to avoid a late fee. Please reference the Payment of Fees section on this page for the deadline to pay registration fees.

If your aid exceeds the charges on your account, this is the amount we owe you. If you have authorized electronic funds transfer (EFT), the funds will be disbursed directly to your personal bank account the first week of the quarter; otherwise, a check will be mailed to your mailing address during the first week of the quarter.

If you still have questions, contact the Financial Aid and Scholarship Office at (831) 459-2963 between 8 A.M. and 5 P.M. The Financial Aid and Scholarship Office is located at 205 Hahn Student Services and is open weekdays from 8 A.M. to 5 P.M.

SCHEDULE PLANNER



MWF 8:00–9:10 A.M.
MWF 9:30–10:40 A.M.
MWF 11:00 A.M.–12:10 P.M.
MWF 12:30–1:40 P.M.
MWF 2:00–3:10 P.M.
MWF 3:30–4:40 P.M.
MW 5:00–6:45 P.M.
MW 7:00–8:45 P.M.

(20-minute breaks between classes)

TTH 8:00–9:45 A.M.
TTH 10:00–11:45 A.M.
TTH 12:00–1:45 P.M.
TTH 2:00–3:45 P.M.
TTH 4:00–5:45 P.M.
TTH 6:00–7:45 P.M.
TTH 8:00–9:45 P.M.

(15-minute breaks between classes)

Saturday meeting times vary.

ENROLLMENT INFORMATION

Student Responsibility

You are responsible for ensuring the accuracy of your enrollments. Your instructors, academic advisers, and the Office of the Registrar cannot enroll on your behalf. Be sure to verify your classes and grade options prior to the enrollment deadlines listed in the Academic and Administrative Calendar.

Get Prepared

Use the following helpful hints to assist you in completing your enrollment. It is recommended that you consult with your academic preceptor or major adviser prior to selecting your classes. Review the Enrollment FAQs at http://reg.ucsc.edu/faqs/enrollment.htm.

1. Check the listing of courses offered this quarter in this *Schedule of Classes*, and make some preliminary selections.

2. Use the Schedule Planner found in this *Schedule of Classes*. Complete the planner with your preliminary selections of classes, making sure the classes you have selected do not conflict with each other or with any other time commitments (i.e., work or extracurricular activities).

3. Enter the five-digit class numbers into the Schedule Planner. Make sure to have class numbers for mandatory sections and alternates in case the section is full.

Completing the above steps will help you to complete your enrollment.

Holds on Enrollment

A hold may be placed on your enrollment for various reasons, including unpaid debts, junior standing without a declared major, and others. When you attempt to enroll in MyUCSC, a hold creates an error message. Students may view their holds by logging on to the MyUCSC portal and clicking on the Student Center. Information on how to remove each hold is included.

Appointment Times

Students may view their priority enrollment appointment time by logging into the MyUCSC portal and clicking on the Student Center.

Appointment Time Problems

If you are not eligible to enroll, consider the following circumstances:

- verify your appointment time;
- if you were anticipating transfer credit to change your academic level, or if you check your credits and still believe the academic level is wrong, call the Registrar's office;
- if you planned to study abroad with the Education Abroad Program (EAP) but your plans have changed, contact your EAP adviser;
- if you applied to graduate and your plans have changed, reapply to graduate. For more information, see Apply/Reapply to Graduate.
- if you are barred or disqualified, contact your college.

If you cannot determine the reason for your appointment time problem, contact the Registrar's office.

Minimum/Maximum Credits

Standard course loads for UCSC students

Undergraduate students are expected to take a minimum of 15 credits and may enroll in up to 19 credits. Graduate students are expected to enroll in at least 10 credits and no more than 19 credits. Undergraduates who have a 3.0 cumulative grade point average may enroll in up to 22 credits beginning the first day of instruction. If you wish to take a nonstandard course load, meet with your college academic preceptor or graduate adviser who will update the system if the nonstandard courseload is approved so that you can complete enrollment.

When minimum credits are enforced

Minimum credits are not enforced until a few days prior to the start of instruction. (For the date, see the Academic and Administrative Calendar.) Once minimum credits are enforced, you will not be able to drop below the minimum unless you obtain approval from your academic preceptor or graduate adviser. To drop a course and add another, use the swap function. Financial aid recipients should be cautious; certain aid will not be disbursed if enrollment is less than full-time.

When maximum credits are enforced

Students may enroll in no more than 19 credits prior to the first day of instruction.

Class Numbers

Every course has a five-digit class number which is used for enrollment. The class number appears at the top in the MyUCSC Class Search. The Class Detail page of a Class Search indicates whether the course is an Interview Only course requiring instructor consent. To enroll in one of these classes, read the section on Enrollment Conditions for Interview Only courses on page 12. Obtain a permission number from the instructor or department in order to enroll.

To enroll in independent study, you must first pick up a petition for independent study at the department, college, or division office and obtain the approval of the UCSC instructor who will supervise your study. Next, the sponsoring agency will assign a class number for you to use to enroll online.

Requirements (Prerequisites and Restrictions)

- A class that has a prerequisite means that other courses must be completed or a placement exam must be satisfied before the course can be taken. Classes for which a "D," "F," "NP," "W," or "I" is received do not satisfy prerequisite requirements.
- A class that has restrictions is available only to certain categories of students.

Refer to the Programs and Courses section of the *UCSC General Catalog* to determine the prerequisites or restrictions of a class.

Prerequisites satisfied at other institutions

If you believe course work completed at another institution satisfies a prerequisite, contact the department sponsoring the class.

Secondary Discussion Sections/ Labs

What is a secondary discussion section/lab?

A section is a smaller discussion group or lab class which is taken as part of a credit course, but no credit is awarded. Secondary sections/labs are listed with the main lecture in AIS. Not all secondary sections require enrollment.

Swapping Sections

To swap sections it is not necessary to drop the class. Use the edit function. For more information, see How to Change a Grade Option or Secondary Section.

When the lecture or sections are closed (full)

If there is space in the lecture, but you cannot find an open section, you cannot enroll in the class. If you have a permission number for the lecture and all the sections are full, contact the department offering the course.

Concurrent Enrollment

The Enrollment Information box in a MyUCSC Class Search will indicate previous or concurrent enrollment in another class is required. For example, if you enroll in BIOL-130L-01, you should concurrently enroll in the associated class, which is BIOL-130-01.

The term, "concurrent enrollment," can be confusing. Please note:

- it is not the same as a discussion section (see Secondary Discussion Sections/Labs above);
- it is not the same as concurrent enrollment through UC Extension, in which a person enrolls in a regular Open University course as an Extension student.

Wait Lists

Students may sign up for a wait list after all students, new and continuing, have had the opportunity to enroll.

Beginning August 8, students may sign up for up to 10 wait list credits. You should see a Wait List Appointment period on MyUCSC with you other enrollment appointments. Departments that do not have a wait list in MyUCSC may have an internal wait-list process.

For more information, including instructions and

participating departments and classes, please visit the Office of the Registrar's frequently asked questions at http://reg.ucsc.edu/faqs/index.htm. Be sure to check the FAQ web site prior to August 8 for updated wait-list information.

Class Permission Numbers

A class permission number is an assigned number that allows you to enroll in a class. It is specific to a class and can be used only once. After an unsuccessful attempt to add a class, the number may be used again.

To obtain a class permission number, consult with the instructor or department.

What a class permission number can override

A class permission number overrides course restrictions and/or prerequisites, and overrides the closed (full) status of a class.

What a class permission number CANNOT override

Class permission numbers cannot override time conflicts, your maximum allowed units, holds, or a closed (full) discussion section.

Time Conflicts

Why you might have a time conflict

Courses which have the same start and end times are considered a time conflict. Check the Schedule of Classes for the most up-to-date class information.

How to resolve a time conflict

If your classes overlap but you and your instructors believe that you can complete both classes in spite of the conflict, you should call the Office of the Registrar at 459-4412 for assistance. Some classes require written approval from the faculty.

Retaining Enrollments

To retain a seat in your classes, you **must** attend the first class meeting. Instructors **may** administratively drop anyone who does not attend.

Enrolling after Instruction Begins

Attend the first class meeting of any classes you want to add. Permission numbers are required for all classes after the seventh day of instruction but may be required earlier. If necessary, the instructor will issue a class permission number.

Verify Your Enrollments

It is recommended that you verify your classes and grade options, via MyUCSC, after you complete your enrollment transactions. It is also recommended that you verify your enrollments and print your Class Schedule before the end of the Add/Drop/Swap period. Print your Class Schedule from the Student Center by clicking on Enroll and then clicking on the My Class Schedule tab.

Pass/No Pass Grading Option

Students in good academic standing may elect the Pass/No Pass grading option and may change their grading option in a course up to the 15th day of instruction. For the Pass/No Pass option, students receive a P for work that is performed at C or clearly passing level or better. For work that is not clearly passing, no academic credit is awarded; and students receive a NP (No Pass). **Beginning fall 2001, the grade notation NP appears on the official transcript in all cases, regardless of when a student was admitted**. For work that is passing, but incomplete, the grade notation I (Incomplete) may be issued.

Students on probationary academic standing who elect the Pass/No Pass grading option will have their grading option changed back to graded after the Add by Petition deadline.

The following courses are not available for a letter grade:

Student Directed Seminars: Courses Numbered 42
College Eight 10
College Ten 80C, 110, 110B
Cowell 10, 184A, 184B, 184C
Biology: Ecology and Evolutionary Biology 190
Biology: Molecular, Cell and Developmental Biology 189F, 190
Earth Sciences 190
Economics 93, 191, 193, 193F, 198, 198F
Environmental Studies 83, 84, 183, 184
Film 198, 198F
History of Art and Visual Culture 198
Linguistics 190
Merrill 10, 85B, 85C
Physical Education (all courses)
Psychology 193, 198
Social Sciences 194B
Stevenson 10
Theater Arts 45
Writing 11A-B-C, 20, 21, 22A-B, 180, 191D

Graduate Student Enrollment Appointment Schedule

- View your appointment time(s) on MyUCSC. Click on My Student Center.
- Students may begin enrolling for classes at the designated appointment time(s).
- There are no enrollment appointments on weekends and holidays.
- Appointments are randomly assigned.
- Enrollment Appointment FAQs: ***http://reg.ucsc.edu/enrollment_appointments/faqs.html***

5/16	5/17	6/16	9/30
Graduate Students 19-unit limit Appointments at 9:00 A.M.	Enrollment continues for graduate students	New graduate student enrollment	Graduate student enrollment fee deadline (must be enrolled in at least one course)

Undergraduate Two-Pass Enrollment Appointment Schedule on Page 10

Undergraduate Two-Pass Enrollment Appointment Schedule

- Get advising during Advising Week, May 9–May 13.
- View your appointment time(s) on MyUCSC. Click on the Student Center, then click on Details in the Enrollment Dates Section.
- Students may begin enrolling in classes at the designated First-Pass appointment time(s).
- There are no enrollment appointments on weekends and holidays.
- Appointments are randomly assigned within each class level.
- Fall enrollment will be closed to continuing undergraduates July 15–August 7.
- Wait-list enrollment available for all undergraduates beginning August 8. Applies only to classes with wait listing through MyUCSC.
- Enrollment Appointment FAQs: ***http://reg.ucsc.edu/enrollment_appointments/faqs.html***

5/16	5/17	5/18–7/14	7/15–8/7	8/8–10/12
Priority Groups 19-unit limit 10:00 A.M.–1:00 P.M. Appts. every 1/2 hr.	**Seniors** 19-unit limit 9:00 A.M.–4:30 P.M. Appts. every 1/2 hr.	Enrollment continues for priority groups and seniors.	New Student Enrollment. Enrollment closed to continuing students.	Enrollment continues for all undergraduate students. Wait lists available on MyUCSC

First-Pass Appointments		Second-Pass Appointments			Enrollment Continues
5/18	5/19–5/24	5/25	5/26–7/14	7/15–8/7	8/8–10/12
Juniors 14-unit limit 9:00 a.m.–4:30 P.M. Appts. every 1/2 hr.	Enrollment remains open to juniors until 11:59 P.M. on May 24.	**Juniors** 19-unit limit 9:00 A.M.–4:30 P.M. Appts. every 1/2 hr.	Enrollment continues for juniors.	New Student Enrollment. Enrollment closed to continuing undergraduate students.	Enrollment continues for all undergraduate students. Wait lists available on MyUCSC.
5/19	5/20–5/24	5/26	5/27–7/14	7/15–8/7	8/8–10/12
Sophomores 14-unit limit 9:00 a.m.–4:30 P.M. Appts. every 1/2 hr.	Enrollment remains open to sophomores until 11:59 P.M. on May 24.	**Sophomores** 19-unit limit 9:00 A.M.–4:30 P.M. Appts. every 1/2 hr.	Enrollment continues for sophomores.	New Student Enrollment. Enrollment closed to continuing undergraduate students.	Enrollment continues for all undergraduate students. Wait lists available on MyUCSC.
5/20	5/21–5/24	5/27	5/28–7/14	7/15–8/7	8/8–10/12
Frosh 14-unit limit 9:00 a.m.–4:30 P.M. Appts. every 1/2 hr.	Enrollment remains open to frosh until 11:59 P.M. on May 24.	**Frosh** 19-unit limit 9:00 A.M.–4:30 P.M. Appts. every 1/2 hr.	Enrollment continues for frosh.	New Student Enrollment. Enrollment closed to continuing undergraduate students.	Enrollment continues for all undergraduate students. Wait lists available on MyUCSC.

Determining Your Academic Level

Freshman: 0–44.9 credits **Sophomore: 45–89.9 credits** **Junior: 90–134.9 credits** **Senior: 135+ credits**

Placement Exams

Language placement exams are necessary for students who have not passed the prerequisite UCSC course. Students do not take a placement exam when enrolling at level 1 in a language they have never studied, EXCEPT FOR SPANISH. Students must take the placement exam to gain entry into Spanish level 1. Students who have had language instruction prior to UCSC must take the placement exam if they intend to continue study in that language.

CHINESE LANGUAGE

Continuing students: for Priority Enrollment, see the Chinese instructors during their office hours for placement. See Language Program web site, *http://language.ucsc.edu*, for office hours and locations.

Sept. 20, 1:00–2:00 P.M., see faculty in 212 and 222 Cowell. Approximately 15 minutes to complete the interview-style placement exam.

FRENCH LANGUAGE

Continuing students: for Priority Enrollment, see the French instructors during their office hours for placement. See the Language Program web site, *http://language.ucsc.edu*, for office hours and locations.

Sept. 21, 1:00–1:30 P.M., 131 Cowell. Orientation begins promptly at 1:00 P.M. (a brief orientation to French study at UCSC); individual exams begin immediately after the orientation (1:30–4:30 P.M.; interviews are 10-15 minutes in faculty offices at Cowell). Students will sign up for an exam time slot during the orientation session.

GERMAN LANGUAGE

Continuing students: for Priority Enrollment, see the German instructors during their office hours for placement. See Language Program web site, *http://language.ucsc.edu*, for office hours and locations.

Sept. 19, 1:00–2:00 P.M., see faculty, 250 Humanities and Social Science. Approximately 15 minutes to complete the interview-style placement exam.

GREEK LANGUAGE

No placement exam is required for entry into Greek 1.

HEBREW LANGUAGE

No placement exam is required for entry into Hebrew 1. Continuing students: for Priority Enrollment, see Hebrew instructor during office hours for placement into level 4. See Language Program web site, *http://language.ucsc.edu* for office hours and locations.

ITALIAN LANGUAGE

Continuing students: for Priority Enrollment, see the Italian instructors during their office hours for placement. See the Language Program web site, *http://language.ucsc.edu*, for office hours and locations.

JAPANESE LANGUAGE

Continuing students: for Priority Enrollment, see the Japanese instructors during their office hours. See the Language Program web site, *http://language.ucsc.edu*, for office hours and locations.

Sept. 20, 10:00–11:30 A.M., 134 Cowell. Arrive promptly at 10:00 A.M. Written exam and short oral interview.

LATIN LANGUAGE

No placement exam for entry into Latin 1.

MATHEMATICS

Students *must* arrive at the test site 15 minutes before the scheduled time. Testing begins promptly, and *late admittance is not permitted. Students must have valid ID and a No. 2 pencil. Calculators are NOT allowed.*

Orientation Week Exams; no pre-registration required.

September 19, 1:45–3:45 P.M.,
Thimann Lecture Hall 3
September 20, 1:45–3:45 P.M.,
Thimann Lecture Hall 3
September 21, 12:45–2:45 P.M., and
2:45–4:45 P.M.,
Thimann Lecture Hall 3
October 22, 9:30–11:45 A.M.,
Thimann Lecture Hall 3
October 29, 9:30–11:45 A.M.,
Thimann Lecture Hall 3
February 4, 2012, 9:30–11:45 A.M.,
Thimann Lecture Hall 3
February 11, 2012, 9:30–11:45 A.M.,
Thimann Lecture Hall 3

No pre-registration required, but space is limited so arrive early to secure your space:

Special Accommodations:

If you have disability-related needs that require accommodations, Physical and Biological Sciences Undergraduate Affairs requires one of the following:

1) If you are a UCSC-registered student, you must request that the Disability Resource Center (DRC) send certification to Physical and Biological Sciences Undergraduate Affairs. Contact the DRC at 459-2089. Physical and Biological Sciences Undergraduate Affairs must receive your request at least **two weeks in advance** of the scheduled examination date.

or

2) If you are not a UCSC-registered student, complete the Mathematics Placement Examination Request for Testing Accommodations (PDF) form (*http://undergrad.pbsci.ucsc.edu/advising/exams/mpe-accommodations.html*) and return it to the Physical and Biological Sciences Undergraduate Affairs office with supporting documentation at least **two weeks in advance** of the scheduled examination date.

MUSIC

Core Curriculum Placement Exam: September 20, 10:00 A.M.–12:30 P.M., Music Center Recital Hall.

PORTUGUESE LANGUAGE

No placement exam is required for entry into Portuguese 1A. Continuing students: for Priority Enrollment, see the Portuguese instructor during office hours for placement into Portuguese 60A. See Language Program web site, *http://language.ucsc.edu*, for office hours and locations.

RUSSIAN LANGUAGE

No placement exam is required for entry into Russian 1. Contact Russian instructor for placement into level 4. See Language Program web site, *http://language.ucsc.edu*, for office hours and locations.

SPANISH LANGUAGE

The placement exam is an online exam and can be taken at any time. The Spanish placement exam is at *www.ic.ucsc.edu/~test/*. **Note:** It takes three to four days to post exam results. Make sure you complete the placement exam a minimum of one week prior to your designated appointment time for Priority Enrollment.

SPANISH FOR SPANISH SPEAKERS (SpSS)

See information posted at *http://language.ucsc.edu*. Once at this site, click on Placement at the top of the screen, then select Spanish for Spanish Speakers to view the Self-Placement Guidelines for SpSS.

ORIENTATIONS

AMERICAN STUDIES
Sept. 20, 10:00 A.M., 245 Humanities 1

ART
Sept. 20, 10:00 A.M..–12:00 P.M.,
Art Department, D-101 (Seminar Room)

ANTHROPOLOGY
Sept. 20, 9:00 A.M–12:00 P.M., 110 Social Sciences I

BIOLOGICAL SCIENCES: DEPARTMENTS OF ECOLOGY AND EVOLUTIONARY BIOLOGY, AND MOLECULAR, CELL, AND DEVELOPMENTAL BIOLOGY
Biology BA, BS; Human Biology BS; Marine Biology BS; Plant Sciences BS; Molecular and Cellular Biology BS; Neuroscience BS; Ecology and Evolutionary Biology BS
Sept. 20, 10:00–11:00 A.M., 3 Thimann Lecture Hall

CHEMISTRY, AND BIOCHEMISTRY AND MOLECULAR BIOLOGY
Chemistry BS, BA; Chemistry BS with Environmental Chemistry Concentration; Chemistry BS with Biochemistry Concentration; Biochemistry and Molecular Biology BS
Sept. 20, 9:00–10:00 A.M., 240 Physical Sciences Building

EARTH AND PLANETARY SCIENCES
Earth Sciences BS; Earth Sciences BS with Environmental Geology Concentration; Earth Sciences BS with Ocean Sciences Concentration; Earth Sciences BS with Planetary Sciences Concentration; Earth Sciences BS with Science Education Concentration; Earth Sciences/Anthropology BA; Earth Sciences/Environmental Studies BA
Sept. 20, 11:00 A.M.–12:00 P.M., A340 Earth and Marine Sciences

ECONOMICS
Sept. 20, 9:30–11:00 A.M.,
Classroom Unit 1

ENVIRONMENTAL STUDIES
Sept. 20, 9:00–10:00 A.M.,
Junior Transfers: 10:00–11:00 A.M.
221 Interdisciplinary Sciences Building (ISB)
Sept. 21, Meet the Faculty Open House,
10:00 A.M.–12:00 P.M., ISB 22
Sept. 21, ENVS walk-about tour of ENVS resources, 1:00–3:00 P.M.,
ISB 491

FEMINIST STUDIES
Sept. 20, 11:00 A.M.–12:00 noon,
131 Cowell

FILM AND DIGITAL MEDIA
Sept. 20, 10:00 A.M.–12:00 noon,
150 Communications, Studio C

HISTORY
Sept. 21, 10:00–11:30 A.M., Stevenson Fireside Lounge

HISTORY OF ART AND VISUAL CULTURE
Sept. 21, 10:00 A.M.–12:00 P.M.,
245 Porter

LATIN AMERICAN AND LATINO STUDIES
Sept. 21, 10:00–11:30 A.M., Charles E. Merrill Lounge, Merrill College

LEGAL STUDIES
Sept. 20, 10:00–11:00 A.M., Charles E. Merrill Lounge, Merrill College

LINGUISTICS
Sept. 21, 10:00–11:00 A.M., 175 Stevenson

LITERATURE
Sept. 20, 10:00–11:30 A.M., 206 Humanities Lecture Hall

MATHEMATICS
Sept. 20, 11:00 A.M.–12:00 P.M., 391 Thimann

MUSIC
Sept. 20, 9:00–9:45 A.M., Music Center Recital Hall

PHILOSOPHY
Sept. 20, 10:00 –11:00 A.M., Humanities 250

PHYSICS
Physics BS; Applied Physics BS; Physics Education BS; Astrophysics BS
Sept. 20, 11:00 A.M.–12:00 P.M., 391 Thimann

POLITICS
Sept. 20, 9:00–10:00 A.M., Charles E. Merrill Lounge, Merrill College

PSYCHOLOGY
Sept. 20, Frosh: 9:00–10:00 A.M.;
Junior Transfers: 10:00–11:00 A.M.
B206 Earth and Marine Sciences
Psychology Advising Fair, 1:30–3:00 P.M.,
Sept. 21, outside Social Sciences 1 and 2

SCHOOL OF ENGINEERING
Bioengineering, Biomolecular Engineering (Bio-informatics), Computer Engineering, Computer Science, Computer Science: Computer Game Design, Electrical Engineering, Engineering and Computing Cluster, Information Systems Management, Robotics Engineering
Sept. 20, 9:30–11:30 A.M.,
101 Jack Basin Auditorium

SOCIOLOGY
Sept. 20, 11:00 A.M.–12:00 P.M.,
240 College Eight Academic

THEATER ARTS
Sept. 20, 10:00–11:00 A.M., Second Stage

FINAL EXAMINATION POLICIES AND SCHEDULE

Final Examination Policies

Final examinations are given during the exam week period at the time announced in the *Schedule of Classes,* usually in the same room used for class meetings during the quarter. Final examinations are required in all undergraduate courses unless the department or other agency sponsoring the course has obtained permission from the Committee on Educational Policy to evaluate students in another manner. No change in the time or date of a final examination may occur unless the course sponsoring agency has obtained the approval of the Committee on Educational Policy. When finals are administered, they must be completed at the scheduled exam time and may not require more than the scheduled three-hour time block. If a take-home examination is not assigned until the week designated for final exams, it cannot require more than three hours to complete.

Many students prefer enrolling in courses so as to avoid more than two final examinations on the same day. Instructors may bar students from taking the examination if they arrive late. If a student misses an examination due to an unavoidable emergency, the instructor may agree to give an Incomplete and schedule a makeup examination provided that the student's work is passing up to that point. Travel plans for vacation are not an emergency, and should not be made without checking the final examination schedule. When a final examination is one of the regular requirements in a course, no one taking the course may be individually exempted from it.

Fall 2011 Final Examination Schedule

Class	Start	Exam Date	Exam Times
MWF	8:00 A.M.	Wednesday, December 7	8:00–11:00 A.M.
MWF	9:30 A.M.	Wednesday, December 7	4:00–7:00 P.M.
MWF	11:00 A.M.	Thursday, December 8	4:00–7:00 P.M.
MWF	12:30 P.M.	Monday, December 5	8:00–11:00 A.M.
MWF	2:00 P.M.	Tuesday, December 6	12:00–3:00 P.M.
MWF	3:30 P.M.	Thursday, December 8	12:00–3:00 P.M.
MW	5:00 P.M.	Tuesday, December 6	4:00–7:00 P.M.
MW	7:00 P.M.	Monday, December 5	7:30–10:30 P.M.
TuTh	8:00 A.M.	Monday, December 5	4:00–7:00 P.M.
TuTh	10:00 A.M.	Tuesday, December 6	8:00–11:00 A.M.
TuTh	12:00 noon	Monday, December 5	12:00–3:00 P.M.
TuTh	2:00 P.M.	Thursday, December 8	8:00–11:00 A.M.
TuTh	4:00 P.M.	Tuesday, December 6	7:30–10:30 P.M.
TuTh	6:00 P.M.	Wednesday, December 7	12:00–3:00 P.M.
Non-Standard 1*		Wednesday, December 7	7:30–10:30 P.M.
Non-Standard 2**		Thursday, December 8	7:30–10:30 P.M.

*Non-Standard 1: classes which have their first meeting M or W or F and do not begin at 8:00 A.M., 9:30 A.M., 11:00 A.M., 12:30 P.M., 2:00 P.M., 3:30 P.M., 5:00 P.M., or 7:00 P.M.
**Non-Standard 2: classes which have their first meeting T or Th and do not begin at 8:00 A.M., 10:00 A.M., 12:00 noon, 2:00 P.M., 4:00 P.M., or 6:00 P.M.

Fall 2011 Final Exam Schedule by Time Block

Exam Day/ Exam Time	Monday December 5	Tuesday December 6	Wednesday December 7	Thursday December 8
Exam Period 8:00–11:00 A.M.	Mon, Wed, Fri 12:30 P.M.	Tues, Thur 10:00 A.M.	Mon, Wed, Fri 8:00 A.M.	Tues, Thur 2:00 P.M.
Exam Period 12:00–3:00 P.M.	Tues, Thur 12:00 P.M.	Mon, Wed, Fri 2:00 P.M.	Tues, Thur 6:00 P.M.	Mon, Wed, Fri 3:30 P.M.
Exam Period 4:00–7:00 P.M.	Tues, Thur 8:00 A.M.	Mon, Wed 5:00 P.M.	Mon, Wed, Fri 9:30 A.M.	Mon, Wed, Fri 11:00 A.M.
Exam Period 7:30–10:30 P.M.	Mon, Wed 7:00 P.M.	Tues, Thur 4:00 P.M.	Non-Standard 1	Non-Standard 2

Closed Week

No examinations or tests other than laboratory exams or individual makeup exams may be given during the last week of instruction.

Examination Retention

An instructor may release to individual students the original final examinations (or copies). Otherwise, the instructor will retain final examination materials at least until the end of the next regular term. During that time students will be allowed to review their examinations.

Religious Observance

Given the diversity of religious practice within the campus community, academic and administrative units are encouraged to make reasonable accommodation when the schedule of a required campus event conflicts with an individual's religious creed. It is the official policy of the University of California, Santa Cruz, to accommodate, without penalty, requests for alternate examination times in cases where the scheduled time for the examination violates a student's religious creed.

Requests for accommodation for religious observance must be made directly to the faculty member in charge of the course within the first two weeks of the term or as soon as possible after an examination date is announced. Instructors are expected to make reasonable accommodation for such requests. Students who are unable to reach a satisfactory arrangement with an instructor should consult the head of the unit sponsoring the course or the campus ombudsman.

Accommodations for Disability

Students with registered disabilities that require examination modifications will be accommodated in compliance with state and federal laws. Reasonable accommodations will be made based on recommendations from the Disability Resource Center.

FINAL EXAMINATION POLICIES AND SCHEDULE

Spring 2011 Final Examination Schedule

Class	Start	Exam Date	Exam Times
MWF	8:00 A.M.	Tuesday, June 7	4:00–7:00 P.M.
MWF	9:30 A.M.	Tuesday, June 7	7:30–10:30 P.M.
MWF	11:00 A.M.	Thursday, June 9	8:00–11:00 A.M.
MWF	12:30 P.M.	Monday, June 6	4:00–7:00 P.M.
MWF	2:00 P.M.	Tuesday, June 7	8:00–11:00 A.M.
MWF	3:30 P.M.	Wednesday, June 8	4:00–7:00 P.M.
MW	5:00 P.M.	Monday, June 6	7:30–10:30 P.M.
MW	7:00 P.M.	Thursday, June 9	4:00–7:00 P.M.
TuTh	8:00 A.M.	Monday, June 6	12:00–3:00 P.M.
TuTh	10:00 A.M.	Thursday, June 9	12:00–3:00 P.M.
TuTh	12:00 NOON	Monday, June 6	8:00–11:00 A.M.
TuTh	2:00 P.M.	Wednesday, June 8	12:00–3:00 P.M.
TuTh	4:00 P.M.	Tuesday, June 7	12:00–3:00 P.M.
TuTh	6:00 P.M.	Wednesday, June 8	8:00–11:00 A.M.
Non-Standard 1*		Thursday, June 9	7:30–10:30 P.M.
Non-Standard 2**		Wednesday, June 8	7:30–10:30 P.M.

*Non-Standard 1: classes which have their first meeting M or W or F and do not begin at 8:00 A.M., 9:30 A.M., 11:00 A.M., 12:30 P.M., 2:00 P.M., 3:30 P.M., 5:00 P.M., or 7:00 P.M.
**Non-Standard 2: classes which have their first meeting T or Th and do not begin at 8:00 A.M., 10:00 A.M., 12:00 noon, 2:00 P.M., 4:00 P.M., or 6:00 P.M.

MyUCSC Portal Password

Your password is required each time you use the MyUCSC portal. Your password is assigned to you when you receive your student identification number.

We strongly suggest that you change your password and set up a password hint the first time you access the MyUCSC portal. You may select a minimum of eight characters (one character must be a numeral) as your new password. You may also change your password any time thereafter.

It is extremely important that your password remain confidential. Do not give it to anyone. If you forget your password or believe the privacy of your password has been compromised, e-mail *help@ucsc.edu* to reset your password.

Name Change

Name Change petitions are available at the Office of the Registrar. A student who is currently enrolled or has applied to graduate and is requesting an official name change on his or her academic records must complete this form and present it, in person, at the Office of the Registrar. You must submit documentation showing legal change of name (court order) or use of requested name on official documentation (e.g., drivers license, social security card, passport, marriage certificate, etc.). You may also correct your name at the Office of the Registrar if, for example, it is misspelled or the punctuation is incorrect. Be prepared to show proof of the correctly spelled name.

When you file a Name Change petition, you may also order and pay for a new student ID card at the Bay Tree Bookstore Building.

Nonrelease of Public Information

The following information is considered public information and may be disclosed: name, college or local address, e-mail address, local telephone number, college and major field of study, dates of attendance, class level, enrollment status, intercollegiate athlete's height and weight, and degrees and honors received.

To have this information withheld from release, go to the Personal Information area on the MyUCSC portal and select privacy settings from the drop-down menu. Be sure that you understand the implications of filing this request. Every single item listed above will be withheld.

Once a Request for Nonrelease of Public Information is filed, it remains in effect—even after you are no longer attending UCSC—until you request to rescind it via the MyUCSC portal, or by letter.

Transcript Information

A transcript is an official copy of a student's academic history at UCSC. Transcript requests are not processed if you have outstanding financial obligations to the university. If you received a message after ordering your transcripts that indicates you have a hold on your transcripts, please contact Student Business Services via e-mail at *oarinfo@ucsc.edu*. Two versions of your official UCSC student records are available from the Office of the Registrar: with or without evaluations. See *reg.ucsc.edu/students/ordering.htm* for information about ordering transcripts and for transcript fees.

Transcripts with evaluations include:

Courses graded P, A, B, C, D, F, W, or I. NP will appear for courses taken fall 2001 and after. The grades of A and B may be modified by a plus (+) or minus (-). The grade C may be modified by a plus (but not by a minus). Incompletes lapse at the end of the subsequent quarter; in letter-graded courses, the I lapses to an F, in Pass/No Pass grading, to a No Pass.

Degrees awarded, honors, number of transfer credits, evaluations of courses, and an evaluation of comprehensive examination or senior thesis also appear.

Transcripts without evaluations include:

Courses graded P, A, B, C, D, F, W, or I. NP will appear for courses taken fall 2001 and after. The grades of A and B may be modified by a plus (+) or minus (-). The grade C may be modified by a plus (but not by a minus). Incompletes lapse at the end of the subsequent quarter; in letter-graded courses, the I lapses to an F, in Pass/No Pass grading, to a No Pass.

Degrees awarded, honors, and number of transfer credits also appear.

Requesting a Transcript

The fastest way to order a transcript is via the web with a credit or debit card. Credit/debit card orders must be requested through Credential Solutions, a vendor that provides this service through an agreement with UC Santa Cruz. To use the online ordering system, go to *reg.ucsc.edu* and click on Ordering UCSC Transcripts. Under Ordering by Credit Card, select the Credential Solutions icon. This is a secure, encrypted site. There is an additional $2.50 service charge to use this service.

Transcript Availability

Transcripts are available as follows:

- approximately 10 days after the end of the quarter to include grades, or
- approximately six weeks after the end of the quarter to include evaluations or a degree if applicable.

Processing/Mailing Time

Allow one to two weeks for processing from the time your request is received by our office. During the peak period (November through February), processing may take longer.

Rush Service: For an additional $15, you may request rush service. Rush service ensures your transcript order will be mailed no later than two business days from the day you receive the "Order Complete" e-mail (excluding weekends, holidays, and campus closures).

You may request and pay an additional fee for your transcript to be mailed via next-day service. This service provides fast delivery and a receipt that the transcript was received by the recipient. This service expedites transit time, not processing time. Federal Express is used for all destinations, and it will not deliver to post office box addresses or on weekends. The additional charge for Federal Express within the U.S. is $20 for up to three transcripts going to the same address. The additional charge for Federal Express outside the U.S. is $30 per transcript (with or without evaluations). Please note that if the appropriate fee has not been received for next-day service, you transcript will be sent via regular mail.

UCSC Extension Transcripts

Transcripts for UCSC Extension courses must be ordered from UCSC Extension, 1101 Pacific Ave, Suite 200, Santa Cruz, CA 95060, (831) 427-6600, or via the web at *www.ucsc-extension.edu*.

Sexual Harassment and the Title IX/Sexual Harassment Office

For a copy of the UCSC Policy on Sexual Assault, the UC Policy on Sexual Harassment and Procedures For Reports of Sexual Assault(s) and Sexual Harassment go to *www2.ucsc.edu/title9-sh/*.

UC Santa Cruz takes the issues of sexual assault and sexual harassment seriously and is committed to ensuring that our campus responds appropriately to harassment and/or discrimination.

The goal of the Title IX/Sexual Harassment Office (SHO) is to ensure that students, staff, faculty, and persons participating in university sponsored programs and events can learn, work, and/or enjoy the benefits and opportunities offered by the campus free from any uninvited, unwelcome, unsolicited, and unwanted conduct directed at them because of their sex. The Title IX/SHO is authorized by the chancellor to conduct the administrative investigation of all reports of sexual assault filed by students, staff, and faculty. Additionally, the Title IX/SHO receives and resolves reports and complaints of sexual harassment.

Any person who is the target of sex discrimination including sexual assault and/or sexual harassment should consult with the Title IX/Sexual Harassment Officer at (831) 459-2462, or by e-mail at *rew@ucsc.edu*, to receive information and advice about your options and/or to file a report or complaint.

COURSES WITH FEES

The following is a list of the Campus Course Materials Fees that have been approved by the Miscellaneous and Course Materials Fee Advisory Committee to be charged for courses in 2011–12. Contact the departments for more information. This list is also available on the web at *reg.ucsc.edu/coursefees.html*. **Note for financial aid recipients:** A modest allowance for course materials fees is included in the cost of attendance budget on which your financial aid is based. If high course material fee costs are preventing you from enrolling in a course(s) and you need additional assistance, contact the Financial Aid and Scholarship Office to discuss your options.

Anthropology

ANTH 110 *Comparative Functional Anatomy*..... $45
ANTH 180 *Ceramic Analysis in Archaeology* $25
ANTH 190B *Primate Field Ecology: Field Methods in Primatology* $1700
ANTH 290B *Primate Field Ecology: Field Methods in Primatology* $1700

Art

ART 10G *2D Foundation*..... $5
ART 10H *3D Foundation* $30
ART 20 *Introduction to Drawing for Majors*.... $25
ART 22 *Intro to Electronics for Intermedia*..... $45
ART 23 *Intermedia I* $32
ART 24A *Introduction to Painting (Oil)*..... $50
ART 24B *Introduction to Painting: Acrylic*..... $50
ART 25 *Relief Printmaking*..... $65
ART 26 *Introduction to Printmaking*..... $70
ART 27 *Monoprinting/Mixed Media Printing*.. $65
ART 28 *Introduction to Figurative Sculpture*.... $75
ART 29 *Begin Intermedia: 3D Approaches*..... $42
ART 30 *Intro to Photography for Art Majors* $67
ART 32 *Beginning Digital/Film Photography*... $75
ART 33 *Introduction to Screenprinting* $65
ART 36 *Relief/Mixed-Media Printing*..... $65
ART 37 *Material Metaphor I* $42
ART 38 *Digital Printmaking* $67
ART 39 *Public Art I: Community, Site, & Place*.. $65
ART 40 *Sculpture I*..... $65
ART 80A *Introduction to Drawing–Non-Majors* . $10
ART 80D *Introduction to Photography* $25
ART 101 *Intermediate/Advanced Drawing* $35
ART 102 *Figure Drawing*..... $40
ART 103 *Intermediate/Advanced Painting*..... $48
ART 104 *Special Topics in Painting*..... $48
ART 105 *Special Topics in Drawing* $60
ART 106A *Sr. Studio in Draw/Paint*..... $48
ART 107 *Mixed Media Works on Paper*..... $25
ART 108A *Inter-Arts Senior Studio*..... $65
ART 109 *Intermedia II*..... $32
ART 110 *Special Topics: Interactive Art* $32
ART 112 *Intaglio I*..... $70
ART 113 *Intaglio II*..... $70
ART 114 *Lithography I*..... $60
ART 115 *Lithography II*..... $70
ART 116A *Sr. Studio Printmaking*..... $70
ART 117 *Special Topics in Printmaking*..... $70
ART 118 *Computer Art: Theories, Methods, and Practices* $45
ART 120 *Adv Projects in Computer Art I*..... $45
ART 123 *Digital Printmaking in Contemporary Art Practice* $67
ART 125 *Print Media in Visual Communication* .. $70
ART 126 *Art of Bookmaking*..... $55
ART 127A *Visiting Artist Special Topics: A* ... $55-$75
ART 129 *Photo-Based Printmaking*..... $70
ART 130 *Intermediate Photography*..... $75
ART 131 *Advanced Photography* $75
ART 132 *Color in Photography* $77
ART 133A *Sr. Studio in Photography*..... $75
ART 134 *Special Topics in Photography*..... $75
ART 135 *Intro Digital Photography*..... $75
ART 136 *Adv Digital Photography* $75
ART 138 *Darkroom Practices*..... $65
ART 139 *Intermed/Adv Sculpture Foundry* $150
ART 140 *Metal Sculpture* $95
ART 141 *Sculpture II* $75
ART 143 *Adv Intermedia: 3D Approaches* $42
ART 144 *Site Works*..... $42
ART 145 *Material Metaphor II*..... $20
ART 146 *Special Topics Intermedia/ Conceptual and Process-Oriented Approaches* $65
ART 148 *Special Topics Sculpture/Public Art*.... $65
ART 156 *Topics in Public Art: Memory, Landscape, and Artist as Activist*..... $50
ART 159A *Senior Studio in Intermedia, Sculpture, and Electronic Art* $65
ART 160 *Forms and Ideas*..... $15
ART 161 *Picturing Identity: Document and Culture* $65
ART 199 *Tutorial*..... $50

Biochemistry and Molecular Biology

BIOC 110 *Biochemistry Lab* $80

Biology: Ecology and Evolutionary

BIOE 75 *Scientific Diving Certification*..... $335
BIOE112L *Ornithology Field Studies* $50
BIOE 114L *Field Methods in Herpetological Research* $50
BIOE 117L *Systematic Botany of Flowering Plants Laboratory* $25
BIOE 120L *Marine Botany Laboratory* $40
BIOE 122L *Invertebrate Zoology Laboratory*.... $20
BIOE 127L *Ichthyology Laboratory* $15
BIOE 129L *Biology of Marine Mammals Lab*.. $45
BIOE 131L *Animal Physiology Laboratory* $20
BIOE 141L *Behavioral Ecology Field Course*.... $65
BIOE 145L *Field Methods in Plant Ecology*..... $45
BIOE 150L *Ecological Field Methods Lab*..... $60
BIOE 151 *Ecology and Conservation in Practice Supercourse* $1,597
BIOE 158L *Marine Ecology Laboratory*..... $40
BIOE 159A *Marine Ecology Field Quarter* $3,000
BIOE 161L *Kelp Forest Ecology Laboratory*.... $100
BIOE 170L *Molecular Ecology/Evolution Lab*.... $10

Biology: Molecular, Cell, and Developmental

BIOL 20L *Experimental Biology Laboratory* $20
BIOL 100K *Biochemistry Laboratory*..... $35
BIOL 100L *Biochemistry Laboratory*..... $25
BIOL 105L *Eukaryotic Genetics Laboratory* $35
BIOL 105M *Microbial Genetics Laboratory*..... $25
BIOL 109L *Yeast Molecular Genetics Lab*..... $50
BIOL 110L *Cell Biology Laboratory*..... $60
BIOL 111L *Immunology Laboratory* $75
BIOL 115L *Eukaryotic Molecular Biol Lab* $60
BIOL 119L *Microbiology Laboratory*..... $40
BIOL 120L *Development Laboratory*..... $60
BIOL 121L *Environmental Phage Biology Laboratoryy*..... $100
BIOL 128L *Neural Genetics Laboratory* $40
BIOL 130L *Human Physiology Laboratory*..... $15
BIOL 135L *Human Functional Anatomy Lab* $60
BIOL 187L *Molecular Biotechnology Lab*..... $60

Biomolecular Engineering

BME 123A *BME Senior Design Project I*..... $40
BME 123B *BME Senior Design Project II* $40
BME 140 *Bioinstrumentation* $40

Chemistry

CHEM 1M *General Chemistry Laboratory*..... $18
CHEM 1N *General Chemistry Laboratory*..... $20
CHEM 80H *Introduction to Wines and Wine Chemistry*..... $25
CHEM 108L *Organic Chemistry Lab* $45
CHEM 108M *Organic Chemistry Lab*..... $50
CHEM 112L *Organic Chemistry Lab* $45
CHEM 112M *Organic Chemistry Lab*..... $50
CHEM 112N *Organic Chemistry Lab* $88
CHEM 122 *Principles Instrumental Analysis* ... $60
CHEM 146A *Adv Lab Organic Chemistry* $75
CHEM 146B *Adv Lab Inorganic Chemistry* $85
CHEM 146C *Adv Lab Physical Chemistry*..... $75
CHEM 151L *Inorganic Chemistry Lab* $50
CHEM 164B *Physical Chemistry Lab II*..... $35

Computer Engineering

CMPE 100L *Logic Design Laboratory* $31
CMPE 117L *Embedded Software Laboratory* ... $30
CMPE 118L *Intro. to Mechatronics Lab* $146
CMPE 121L *Microprocessor Sys. Design Lab* . $205
CMPE 123A *Engineering Design Project I* $40
CMPE 123B *Engineering Design Project II* $40
CMPE 125L *Logic Design w/ Verilog Lab* $25
CMPE 126L *Advanced Logic Design Lab* $25
CMPE 150 *Introduction to Computer Networks* $30
CMPE 151 *Network Administration*..... $30
CMPE 156L *Network Programming Lab*..... $30
CMPE 163L *Multimedia Processing/App. Lab* . $25
CMPE 167L *Sensing and Sensor Technologies Laboratory* $47
CMPE 173L *Hi Speed Dig Design Lab*..... $25
CMPE 174 *Intro. to EDA Tools for PCB Design* . $25
CMPE 218L *Mechatronics Laboratory* $146
CMPE 225 *Introduction to ASIC Systems Design* . $15

Computer Science

CMPS 170 *Game Design Studio I*..... $25
CMPS 171 *Game Design Studio II*..... $65
CMPS 172 *Game Design Studio III* $25

Cowell College

COWL 70A *Bookbinding*..... $60
COWL 70B *Printing I: Elements of Printing* ... $60
COWL 70C *Printing II: Typography and Book Design* $60

Digital Arts and New Media

DANM 219 *Intro. to Electronics for Artmaking* . $50

Earth Sciences

EART 5L *California Geology Laboratory*..... $20

Continued on next page

EART 10L *Geologic Principles Laboratory*..... $30
EART 20L *Environmental Geology Laboratory* . $20
EART 80B *Earthquakes*..... $25
EART 100 *Vertebrate Paleontology*..... $10
EART 101 *The Fossil Record*..... $40
EART 104 *Geologic Hazards*..... $10
EART 105 *Coastal Geology* $10
EART 109 *Elements of Field Geology*..... $120
EART 110C *The Dynamic Earth* $10
EART 116 *Hydrology*..... $10
EART 117 *Paleomagnetism*..... $25
EART 120 *Sedimentology and Stratigraphy*..... $40
EART 125 *Geographic Information Systems*..... $20
EART 130 *Magmas and Volcanoes*..... $40
EART 140L *Geomorphology Laboratory*..... $45
EART 142 *Engr. Geology for Enviro. Scientists* . $85
EART 146 *Groundwater*..... $10
EART 148 *Glaciology* $85
EART 150 *Structural Geology* $60
EART 152 *Tectonics*..... $15
EART 188A-B *Senior Field Internship*
UCSC Students..... $2,200
Non-UCSC Students $2,400
UCSC Students 1 Session..... $1,100
Non-UCSC Students 1 Session $1,200
EART 205 *Introductory Graduate Seminar*..... $30
EART 263L *Planetary Field Course*..... $20

Education

EDUC 221 *Science Teaching and Earning in Elementary Classrooms*..... $10
EDUC 231 *Teaching Science in Secondary Classrooms*..... $10

Electrical Engineering

EE 101L *Intro Electronic Circuits Lab* $43
EE 103L *Signals and Systems Lab* $10
EE 115 *Introduction to MEMS Design* $15
EE 123A *Engineering Design Project I* $40
EE 123B *Engineering Design Project II*..... $40
EE 130L *Intro to Optoelectronics Lab*..... $20
EE 135L *Electromagnetic Flds & Waves Lab*..... $40
EE 145L *Properties of Materials Lab*..... $30
EE 157L *RF Hardware Design Lab* $25
EE 171L *Analog Electronics Lab* $38
EE 175L *Energy Generation and Control Lab* .. $25
EE 176L *Energy Conversion and Control Lab* .. $25
EE 177L *Power Electronics Lab* $25
EE 211 *Introduction to Nanotechnology* $36
EE 215 *MEMS Design*..... $15

Engineering

For information on fees for School of Engineering courses, see *www.soe.ucsc.edu/administration/lab-support/fees.*
ENGR 50L *Engineering Mechanics Lab* $23

Environmental Studies

ENVS 107A *Natural History Field Quarter*... $650
ENVS 109B *Ecology and Conservation in Practice Supercourse:*..... $1,597
ENVS 115L *Exercises in Geographic Information Systems*..... $20
ENVS 215L *Exercises in Geographic Information Systems*..... $20

Film and Digital Media

Fees for film courses may be less than published or not charged for a particular quarter. Contact the Film and Digital Media Department for information.
FILM 20A *The Film Experience* $2
FILM 20B *Intro to TV Culture and Society*..... $2
FILM 20C *Intro to Digital Media* $2
FILM 20P *Intro to Production Technique*..... $15
FILM 80A *Technothrillers* $1
FILM 120 *Intro to Film Theory and Criticism*.... $2
FILM 130 *Silent Cinema*..... $4
FILM 132A-B *International Cinema to 1960*.... $4
FILM 132C *Gender and Global Cinema* $5
FILM 134A *American Film, 1930–1960* $4
FILM 134B *American Film, 1960–Present*..... $4
FILM 136A *Experimental Film and Video*..... $12
FILM 136B *History of Television*..... $5
FILM 136C *Visual Culture and Technology*..... $8
FILM 136D *Documentary Film and Video*..... $10
FILM 142 *Beyond Cybernetics: Adv Topics in New Media Technologies* $15
FILM 160 *Film Genres*..... $8
FILM 162 *Film Authors* $8
FILM 165A *Film, Video, and Gender*..... $15
FILM 165B *Race on Screen*..... $15
FILM 165C *Lesbian, Gay, Queer Film & Video*... $15
FILM 165D *Asian Americans and Media* $15
FILM 168 *National Cinema and Culture* $15
FILM 170A *Intro to Digital Media Production* .. $35
FILM 170B *Fundamentals Film/Video Prod.* ... $190
FILM 171A *Sound*..... $161
FILM 171F *Special Topics Workshop: Autobiographical Film* $210
FILM 172 *Film/Video Studio*..... $292
FILM 173 *Narrative Workshop*..... $210
FILM 175 *Documentary Video Workshop*..... $210
FILM 176 *Experimental Video Workshop*..... $210
FILM 177 *Digital Media Workshop*..... $20
FILM 178A *Personal Computers in Film/Video*.. $147
FILM 185D *Sound/Image in Theory, Criticism* .. $12
FILM 185E *Chicana/o Cinema, Video*..... $12
FILM 185R *The Film Remake*..... $12
FILM 185S *Advanced Topics in Film Studies*.... $12
FILM 185X *Eye Candy Seminar*..... $12
FILM 187 *Adv Topics in TV Studies* $8
FILM 189 *Adv Topics in Digital & Electronic Media Studies*..... $5
FILM 194A *Film Theory Seminar* $15
FILM 194B *Electronic Media Theory Seminar* . $15
FILM 194C *New Media Theory Seminar* $15
FILM 194D *Film History Seminar*..... $12
FILM 194E *International Cinemas* $15
FILM 194F *Film and Other Arts: Music/Dance* . $15
FILM 194G *New(s) Media*..... $15
FILM 194S *Special Topics Seminar*..... $12
FILM 196A *Sr. Project Film/Video Producn*... $292
FILM 196C *Sr. Documentary Workshop* $292
FILM 197 *Sr. Digital Media Workshop*..... $20
FILM 200C *Theory and Praxis of Film and Digital Media, Part 2*..... $292
FILM 283 *New Media Art and Digital Culture* $20

History

HIS 7 *Archives and Public History*..... $20

Microbiology and Environmental Toxicology

METX 119L *Microbiology Laboratory*..... $40

Music

MUSC 1A *Women's Chorale*..... $10
MUSC 1C *University Concert Choir*..... $10
MUSC 2 *University Orchestra*..... $10
MUSC 3 *Large Jazz Ensemble*..... $10
MUSC 9 *Wind Ensemble*..... $10
MUSC 60 *Group Piano*..... $100
MUSC 61 *Indv Lessons (½hr)* $350
MUSC 62 *Indv Lessons (1hr)*..... $650
MUSC 63 *Group Instrumental/Vocal* $100
MUSC 102 *University Orchestra*..... $10
MUSC 103 *University Concert Choir*..... $10
MUSC 159A-B *Opera Workshop* $10
MUSC 160 *University Opera Theater* $10
MUSC 161 *Indv Lessons (1hr)*..... $650
MUSC 162 *Adv Lessons (1hr)*..... $650
MUSC 166 *Chamber Singers* $10
MUSC 196B *Sr. Recital Prep. (indiv. lessons)*. $650
MUSC 261 *Grad. Applied Inst.(1 hr) Major* . $650

Physical Education

PHYE 5A *Aquatics: Swimming Level I* $20
PHYE 5B *Aquatics: Swimming Level II*..... $20
PHYE 5C *Aquatics: Swimming Level III* $20
PHYE 5D *Aquatics: Swimming Level IV*..... $20
PHYE 5E *Aquatics: Lifeguard Training*..... $90
PHYE 5F *Water Safety Instructor*..... $55
PHYE 5G *Aquatics: Swimming/Conditioning*.. $20
PHYE 5H *Aquatics: Competitive Swimming*.... $20
PHYE 5R *Aquatics: Basic Scuba Diving* $150
PHYE 5S *Aquatics: Adv Scuba Diving*..... $125
PHYE 5T *Scuba Rescue Diving*..... $165
PHYE 5U *Aquatics: Scuba Divemaster* $265
PHYE 9B *Boating: Beginning Dinghy Sailing*.. $55
PHYE 9C *Boating: Intermed Dinghy Sailing*... $55
PHYE 9D *Boating: Adv Dinghy Sailing* $55
PHYE 9E *Boating: Competitive Sailing* $60
PHYE 9H *Boating: Basic Rowing*..... $50
PHYE 9J *Boating: Intermed Rowing*..... $50
PHYE 9K *Boating: Ocean Kayaking*..... $50
PHYE 9S *Boating: Intermed Keelboat Sailing* .. $60
PHYE 9T *Boating: Adv Keelboat Sailing* $60
PHYE 15B *Court Sports: Basketball* $20
PHYE 15H *Court Sports: Racquetball*..... $20
PHYE 15N *Court Sports: Tennis* $20
PHYE 15T *Court Sports: Volleyball*..... $20
PHYE 20A *Dance: Ballet*..... $22
PHYE 20B *International Folk Dance*..... $20
PHYE 20C *Dance: Jazz*..... $20
PHYE 20D *Dance: Modern* $22
PHYE 25A *Fencing: Épée* $20
PHYE 25B *Fencing: Foil*..... $20
PHYE 25C *Fencing: Sabre*..... $20
PHYE 28K *Field Sports: Soccer* $20
PHYE 30G *Fitness Activity: Phys. Conditioning*. $20
PHYE 30H *Fitness Activity: T'ai Chi Ch'uan* .. $20
PHYE 30J *Fitness Activity: Strength Training*... $20
PHYE 30L *Fitness Activity: Yoga Exercises*..... $20
PHYE 43A *Martial Arts: Aikido* $20
PHYE 43G *Martial Arts: Tae Kwon Do (Karate)* $20

Physics

PHYS 160 *Practical Electronics* $40

Theater Arts

THEA 12 *Production Management*..... $10
THEA 14 *Drawing* $20
THEA 17 *Costume Construction*..... $25
THEA 18 *Drafting for Theatrical Production*... $25
THEA 18C *Drafting: Computer Aided*..... $20
THEA 19 *Design Studio: Lighting Studio A* $20
THEA 30 *Intro: Mod. Dance Theory, Technique*... $21
THEA 31C *Dance Studio I*..... $21
THEA 32 *Introduction to Ballet*..... $21

Continued on next page

THEA 33 *Advanced Intro Modern Dance* $21
THEA 36 *Introduction to Dance Composition* .. $21
THEA 37 *African Dance* $45
THEA 80Y *The Broadway Musical* $21
THEA 107 *Design Studio: Masks/Makeup* $25
THEA 110 *Advanced Stage Technology* $20
THEA 114 *Design Studio: Sound* $20
THEA 115A *Design Studio: Scenic Design* $15
THEA 116A *History of Clothing/Costume* $25
THEA 117 *Design Studio: Costume* $25
THEA 118 *Design Studio: Scene Painting* $25
THEA 119 *Design Studio: Lighting Studio B* ... $25
THEA 129 *Advanced Ballet* $21
THEA 130 *Int. Modern Dance Theory/Technique* $21
THEA 131 *Adv. Modern Dance Theory/Technique* $21
THEA 131C *Dance Studio II* $21
THEA 132 *Modern Dance Studio* $21
THEA 135 *Dance Improvisation and Theory* $21
THEA 136 *Intermediate Ballet* $21
THEA 136C *Dance Studio III* $21
THEA 137 *Studies in Performance (Dance)* $21
THEA 138 *Movement Research in New Arts Praxis* $21
THEA 139 *Random: With a Purpose* $21
THEA 158 *Chautauqua Workshop* $5
THEA 161V *The Broadway Musical* $21

Undergraduate Students

Pass/No Pass Grading Option

Students may elect the Pass/No Pass grading option and may change their grading option in a course up to the 15th day of instruction. For the Pass/No Pass option, students receive a P for work that is performed at C or clearly passing level or better. For work that is not clearly passing, no academic credit is awarded; and students receive a NP (No Pass). **Beginning fall 2001, the grade notation NP appears on the official transcript in all cases, regardless of when a student was admitted**. For work that is passing, but incomplete, the grade notation I (Incomplete) may be issued.

The following courses are not available for a letter grade:

Student Directed Seminars: Courses Numbered 42
College Eight 10
College Nine 80C
College Ten 110, 110B
Cowell 10, 184A, 184B, 184C
Biology 189, 190
Earth Sciences 190
Economics 93, 191, 193, 193F, 198, 198F
Environmental Studies 83, 84, 183, 184
Film 198, 198F
History of Art and Visual Culture 198
Linguistics 190
Mathematics 1, 1E
Merrill 10, 85A, 85B, 85C
Oakes 10, 80C
Physical Education (all courses)
Politics 191
Psychology 193, 198
Social Sciences 194B
Stevenson 10
Theater Arts 45
Writing 10A-B-C, 11A-B-C, 20, 21, 22, 180, 191D

Letter Grading Option

Before the Grade Option deadline (the 15th day of instruction), confirm your letter grade request for each course on the MyUCSC portal.

In Progress Notations

The notation IP (In Progress) is reserved for a single course extending over two or three terms of an academic year. The grade for such a course may be awarded at the end of the course and shall then be recorded as applying to each of the terms of the course. A student satisfactorily completing only one or two terms of a course, extending over two or three terms of an academic year, will be given grades for those terms. The grade option selected in the first quarter of the multiple term sequence applies to all quarters of the sequence.

Grade Changes

Incomplete grade notations of "I" must be changed to final grades, based upon work submitted to the instructor, within the deadline for Incompletes. Other grade changes can be made by the instructor only on the basis of clerical or procedural error and never on the basis of reexamination or completion of additional work.

Accessing Grades

You may access your grades for any quarter via the MyUCSC portal. Grades are usually available about one week after the end of the quarter.

Catalog Rights

Effective for all undergraduates who entered in fall quarter 1993 or after, students may follow the degree requirements from either the UCSC General Catalog published at the time of entering UCSC or subsequent catalog(s). Students need not follow a catalog in its entirety, but may elect to follow different catalog years for their college requirements, university and general education requirements, the requirements of their major(s), and the requirements of any minor(s).

Catalog year will initially be set for the first year of enrollment at UCSC. Students may elect to follow requirements from other catalog year(s) when filing the Proposed Study Plan/Declaration of Major/Minor. All requirements for graduation outlined in the catalog(s) selected must be met before graduation. Changing catalog year(s) is done by submitting a new Proposed Study Plan/Declaration of Major/Minor.

Students transferring from other collegiate institutions may elect to meet as graduation requirements one of the following:

- those in effect at the time of transfer to UCSC;
- those subsequently established; or
- those in effect when the student entered a previous collegiate institution, provided that entry was not more than three years prior to the time of transfer to UCSC.

Students who seek readmission to UCSC after a break in attendance greater than two years (six regular quarters) must adhere to the graduation requirements in effect at the time of readmission or those subsequently established.

Students who entered prior to 1993 should see an adviser. Their catalog year(s) for graduation, whether the year they entered UCSC or subsequent year(s), will be decided at the discretion of their major department and/or their college.

Undergraduates Who Entered UCSC Prior to Fall 1997

Guidelines for undergraduates who entered UCSC between fall 1997 and spring 2001 also apply to undergraduates who entered UCSC prior to fall 1997, with the following exception: those who entered prior to fall 1997 may elect letter grades, but a grade-point average will not be displayed on the official transcript. All undergraduates, regardless of when they entered UCSC, must meet the UC minimum GPA requirement in order to receive a degree from the University of California: 2.0 calculated from all UCSC letter-graded courses and from all letter-graded courses taken at other UC campuses and through the Education Abroad Program.

Grade Point Average

The grade point average is determined by dividing the number of grade points earned by the number of credits attempted for a letter grade. The number of grade points earned for a course equals the number of grade points assigned multiplied by the number of course credits. For example, suppose a student takes three 5-credit courses and receives grades of A-, B-, and C+.

Grade	Grade Points*	Course Credits	Total Grade Points*
A-	3.70	5	18.50
B-	2.70	5	13.50
C+	2.30	5	11.50
Total		15	43.50

43.50 divided by 15 = 2.90 GPA

Grade points are assigned to each letter grade as shown below.
Grades shown in bold (W, I, IP, P, NP) are not included in the UCSC GPA.

A+ = 4.00	B+ = 3.30	C+ = 2.30	F = 0.00	**IP = 0.00**
A = 4.00	B = 3.00	C = 2.00	**W = 0.00**	**P = 0.00**
A- = 3.70	B- = 2.70	D = 1.00	**I = 0.00**	**NP = 0.00**

*UCSC calculates grade point average to the second decimal place only.

Graduate Students

Satisfactory/Unsatisfactory Grading and the Letter Grade Option

Beginning fall 1997, all graduate students in graduate or undergraduate courses will be graded Satisfactory (S) (equivalent to a B or better), Unsatisfactory (U), or Incomplete (I). Graduate students also have the option of receiving a letter grade of A, B, C, D, or F in most courses. The grades of A or B shall be awarded for satisfactory work. Grades of C or D will not satisfy any course requirement for a graduate degree at UCSC.

In order to receive a letter grade, you must enter your letter grade request no later than the 15th day of instruction for **each class** in **each quarter.**

Evaluations

Graduate students receive an evaluation for all courses except those with no credit value.

Incompletes

An Incomplete (I) grade notation may be assigned when the graduate student's work is of passing quality but is incomplete. See the *Graduate Student Handbook* for complete instructions about arrangements to receive and to remove an Incomplete grade notation.

In Progress

The notation IP (In Progress) is restricted to certain sequential courses that extend over two or three quarters of an academic year. The grade option you select in the first quarter of the multiple term sequence applies to all quarters of the sequence. You receive the same notation for each course upon completion of the two- or three-quarter sequence, and the final grade is applied to all quarters.

Repeating Courses

Graduate students may repeat a course in which they earn a grade of C, D, F, or U. Degree credit for a repeated course will be granted only once, and the most recently earned grade will be used to determine whether a degree requirement has been met.

UCSC Graduate Grading Policies

	Satisfactory/Unsatisfactory Grading	If You Elect a Letter Grade
Enrollment	You must request Satisfactory/Unsatisfactory grading by the published deadline.	You must request a letter grade by the published deadline.
Available Grades	You will be graded S (equivalent to a B or better), U (unsatisfactory), or I (Incomplete).	You will be graded A, B, C, D, F, or I (Incomplete).
Degree Requirements	If you receive a U, the course cannot be used to satisfy a degree requirement.	If you receive a C, D, or F, the course cannot be used to satisfy a degree requirement.
Incompletes	An I (Incomplete) may be assigned if your work is of passing quality, but is incomplete. You must petition to remove the I and submit the completed course work to the instructor by the end of the third quarter following that in which the grade notation I was received unless the instructor or department specifies an earlier date. If you fail to file the petition and complete the work, or if the instructor does not submit an S, the Incomplete will be changed to a U.	An I (Incomplete) may be assigned if your work is of passing quality, but is incomplete. You must petition to remove the I and submit the completed course work to the instructor by the end of the third quarter following that in which the grade notation I was received unless the instructor or department specifies an earlier date. If you fail to file the petition and complete the work, or if the instructor does not submit an A, B, C, or D, the Incomplete will be changed to an F.
Repeats	You may repeat courses graded Unsatisfactory.	You may repeat courses graded C, D, or F. Credits are counted once, and the most recently earned grade determines whether a degree requirement has been met.

Either way

- Graduate students enrolled in physical education courses will be graded Pass/No Record.
- Graduate students enrolling in undergraduate courses will be graded as outlined above.

UCSC Undergraduate Grading Policies

	❶ Undergraduates Entering UCSC Fall 2001 and After	❷ Undergraduates Entering UCSC Fall 1997–Spring 2001
Enrollment	❶ The Pass/No Pass option is available only to students in good academic standing.	❷ When enrolling, students choose either letter grading or Pass/No Pass grading.
	❶❷ The grading option may be changed up to the 15th day of instruction.	
Withdrawal	❶❷ After the last day to drop a course, students may withdraw from a course whether enrolled for a letter grade or for Pass/No Pass grading. The Academic and Administrative Calendar lists deadlines for withdrawing from a course.	
Grades	❶❷ If enrolled in a course for a letter grade, students will receive a grade of A+, A, A-, B+, B, B-, C+, C, D, F, W (Withdraw), I (Incomplete), or IP (In Progress). If enrolled in a course for Pass/No Pass, students will receive a grade of P (Pass), NP (No Pass), W (Withdraw), I (Incomplete), or IP (In Progress). ***Note:*** **beginning fall 2001, NP grades earned appear on official transcripts like all other grades.**	
Evaluations	❶❷ For each course in which credit is earned, whether letter graded or Pass/No Pass, all students will receive an evaluation. Evaluations are a permanent part of the academic record. All students may request transcripts either with or without evaluations.	
UCSC Grade Point Average	❶ For all students, a UCSC GPA is calculated from UCSC courses, courses taken through the Education Abroad Program, and courses taken on another UC campus in an intercampus exchange program. The UCSC GPA is displayed on the official transcript. Courses taken through the Domestic Exchange Program and UC Extension are not calculated in the UC or UCSC GPA.	❷ Students who have received a letter grade in at least two-thirds of their credits attempted at UCSC have a UCSC GPA calculated and displayed on their official transcripts. Students who receive letter grades in fewer than two-thirds of their UCSC credits attempted are not eligible for a UCSC GPA. Courses taken through the Domestic Exchange Program and UC Extension are not calculated in the UC or UCSC GPA.
UC Grade Point Average	❶❷ All students have a UC GPA calculated from courses taken for a letter grade at UCSC, at other UC campuses, and through the Education Abroad Program. Your UC GPA must be at least 2.0 in order to graduate. Courses taken through the Domestic Exchange Program and UC Extension are not calculated in the UC or UCSC GPA.	
Satisfying Requirements	❶ Departments may require that some or all courses used to satisfy the major must be taken for a letter grade.	
	❶❷ A course graded D or F cannot be used to satisfy a course prerequisite or to satisfy major or general education requirements. Credits earned with a D will not count toward satisfactory academic progress. Any course graded P is equivalent to a C or better and can be used to satisfy general education requirements and will count towards satisfactory academic progress.	
Incompletes	❶❷ The notation I (Incomplete) may be assigned when work for a course is of passing quality but is not complete. Prior arrangements must be made with the instructor for a grade notation of I. To remove the Incomplete, the student must file a petition and the completed course work by the deadline on the last day of the following quarter. If an I is not removed by the deadline, it will lapse to F or NP, depending on the grading option in effect. The F and the NP will appear on official transcripts, along with the removal of Incomplete notation.	
Repeats	❶❷ Undergraduates may repeat courses in which they earn a D, F, or No Pass. Courses in which a D or F is earned may not be repeated on a Pass/No Pass basis. Courses in which a grade of No Pass is earned may be repeated on the same basis or for a letter grade. Students may only repeat a maximum of 15 credits for courses in which a grade of D or F was received. In computing the GPA for these repeats, only the grade and corresponding grade points earned the last time the course was taken will be used. After the 15-credit maximum is reached, the GPA will be based on all grades assigned and total credits attempted. To repeat a course more than once, consult with your college adviser. Credit is not awarded more than once for the same course, but the grade assigned each time the course is repeated will be permanently recorded on the official transcript.	
Graduation Requirements	❶ No more than 25 percent of the UCSC credits applied toward graduation may be graded on a P/NP basis. This includes any credits completed in the Education Abroad Program or on another UC campus in an intercampus exchange program. Departments may require that some or all courses used to satisfy the major must be taken for a letter grade.	❷ There is no limit on the number of credits graded Pass/No Pass which may be applied toward graduation.
	❶❷ Students must complete all requirements for the major with a grade of P, C (2.0), or better. All undergraduates, regardless of when they entered UCSC, must meet the minimum UC GPA requirement of 2.0 in order to receive a degree from the University of California. See the statement of catalog rights regarding graduation requirements in effect for each student.	

GENERAL EDUCATION REQUIREMENTS BEGINNING FALL 2010

Overview of New General Education Requirements for Students Entering Beginning Fall 2010

All new students are required to fulfill a new set of guidelines for general education requirements that were approved by the UCSC Academic Senate in 2009. Continuing students and transfer students may opt to change to the new requirements or fulfill the previous general education requirements. See *Catalog Rights* for more information. Contact your college adviser if you have questions.

The general education requirements are meant to accomplish several goals:

* Provide students with a base of knowledge and skills that future learning can build on.

* Expose students to a broad range of disciplines and methodologies, to better prepare them for a world of complex problems and rapid changes.

* Enhance the abilities of students to approach problems in appropriately analytical ways.

* Prepare students to function as responsible and informed participants in civic life, considering pressing societal issues (such as the environment, the economy) productively and from a variety of perspectives.

Each area has a general education code associated with it, and only those courses carrying that code satisfy the requirement. The codes appear in the course descriptions in the *General Catalog* online and in the "General Education" field on the MyUCSC Class Search page. Students entering using the new general education requirements should review the requirements for their proposed or declared major(s) to establish if some of their general education requirements will be fulfilled by completing their major. As a general rule, each course satisfies only one of the new general education requirements.

Overview of General Education Requirements for Students Entering Prior to Fall 2010

Designed to expose students to diverse subject areas, the general education requirements also stress a variety of approaches to acquiring knowledge. A description of the general education requirements and a complete list of current courses that satisfy general education requirements under the pre-2010 general education reform are included. The requirements fall into nine areas and are described below.

Each area has a general education code associated with it, and only those courses carrying that code satisfy the requirement. The codes appear in the course descriptions in the *General Catalog* online and in the "General Education" field on the MyUCSC Class Search page. Some courses satisfy more than one of the former general education requirements, so the total number of required courses may be as few as 10 or as many as 15. Courses from the Arts Division of 1, 2, or 3 credits may be combined to satisfy the arts general education requirement if they have the appropriate code and total at least 5 credits.

Transfer Credits

Transfer credits may satisfy some of the general education requirements. The Admissions Office will evaluate your transfer course work and determine which general education requirements you have satisfied. The information is available online through MyUCSC.

Planning Your General Education Courses

Students entering using the new general education requirements should review the requirements for their proposed or declared major(s) to establish if some of their general education requirements will be fulfilled by completing their major.

If you have consulted with your academic adviser and feel you have an unusually strong case for an exception to a general education requirement, you may obtain a Substitution of General Education Requirement form at your college. Do not wait until the quarter you expect to graduate. These petitions are carefully screened by the Academic Senate Committee on Educational Policy; specific and rigorous criteria are used. If the petition is approved, your academic record will be changed to reflect the exception. If you have taken a course through UNM, UNH, EAP, or UCDC, or as an ICV, and you think it will satisfy a general education requirement, you may initiate review of the course by completing a Review of Transfer Credit form at the Admissions Office.

Quick Reference to New General Education Requirements

The result of a three-year reform effort, UCSC's general education requirements were extensively revised last year. This page provides information about the new general education requirements. There are 10 categories of general education requirements, plus the Disciplinary Communication requirement. Specific information regarding how general education requirements fit into bachelor's degree requirements can be found in the *UCSC General Catalog*.

CC **Cross-Cultural Analysis.** (one 5-credit course or equivalent) Courses in Cross-Cultural Analysis prepare students for a world with increased interaction and integration among peoples, companies, and governments. These courses encourage a broader and deeper understanding of cultures and societies outside the United States. Such courses might focus on an in-depth examination of one culture, or one aspect of such culture (for example, art, music, history, language). Alternatively, these courses help students develop skills of cross-cultural comparison and analysis. A third option is courses that explore topics that are inherently cross-cultural such as international relations or the processes of economic globalization. Whatever the approach, these courses all aim to help students develop the openness and sensitivity necessary for cross-cultural understanding.

ER **Ethnicity and Race.** (one 5-credit course or equivalent) Courses in Ethnicity and Race prepare students for a state and a world which are increasingly multi-ethnic and multi-racial. Beyond familiarizing students with the culture and/or history of one or more ethnic or racial groups, these courses also aim to develop theoretical and practical understanding of questions such as (but not limited to): how categories of ethnicity and race are constructed; the role they can play in identity formation; how ethnicity and race have historically been used to justify forms of enforced inequality; and the contributions of people of various ethnicities to society and to political change. These courses are particularly concerned with how ethnicity and race may intersect with other categories, such as gender, class, or sexual orientation, to shape self-understanding and patterns of human interaction.

IM **Interpreting Arts and Media.** (one 5-credit course or equivalent) Interpreting Arts and Media courses explore the complex ways in which information of all kinds is represented by visual, auditory, or kinesthetic means, or through performance. These courses build in-depth understanding of one or

Quick Reference to New General Education Requirements

more forms of artistic media: that is, media in which non-textual materials play primary roles. They offer skills in the practice, analysis, interpretation and/or history of one or more of these media, as well as the ability to analyze the means by which they encode and convey information.

MF **Mathematical and Formal Reasoning.** (one 5-credit course or equivalent) In a world in which much thinking and discourse is directed by emotion and association, formal or mathematical models teach the value of dispassionate analysis. Mathematical and Formal Reasoning courses emphasize the development of mathematical, logical, and/or formal reasoning skills. Mathematics-based courses that satisfy this requirement are focused on teaching significant problem-solving skills, and are often oriented towards particular application areas. Other courses that satisfy this requirement train students in formal reasoning skills and/or in the construction and use of formal models. Formal reasoning domains include mathematical proof, logic, and applied logic. Some examples of formal models are: computer programming languages, generative grammars (from linguistics), supply and demand models, and formal music theory.

SI **Scientific Inquiry.** (one 5-credit course or equivalent) Courses in Scientific Inquiry teach students about the essential role of observation, hypothesis, experimentation and measurement in the physical, social, life, or technological sciences. In these courses, students acquire key concepts, facts, and theories relevant to the scientific method. By the end of the course students should be able to articulate an understanding of the value of scientific thinking in relation to issues of societal importance.

SR **Statistical Reasoning.** (one 5-credit course or equivalent) In today's globalized, media-saturated information society, we are continually presented with–or asked to present–numerical data. Statistical Reasoning courses prepare students to interpret quantitative claims and make judgments in situations of statistical uncertainty. The goal of Statistical Reasoning courses is to teach skills for effective reasoning about probability and the use of quantitative information. Students acquire an understanding of making informed decisions in the presence of uncertainty. Topics addressed in Statistical Reasoning courses include ways of (mis)representing data; correlation vs. causation; statistical inferences; experimental design and data analysis; understanding orders of magnitude.

TA **Textual Analysis and Interpretation.** (one 5-credit course or equivalent) Even in our current multi-media world, the written word remains a major vehicle of communication. Many fields, from literature and history to law, government, science, and religion, depend heavily upon the understanding and interpretation of written documents. Textual Analysis and Interpretation courses have as their primary methodology the interpretation or analysis of texts. The aim of these courses is to develop higher-order reading skills and to train students how to read attentively, to think critically and analytically, to produce and evaluate interpretations, to assess evidence, and to deploy it effectively in their own work. These abilities are not only necessary for academic success, but also for full participation in civic life at every level.

Perspectives (one 5-credit course or equivalent from any of the three following categories):

PE-E **Perspectives: Environmental Awareness.** The interactions between people and the earth's environments are subtle, complex, and influenced by a variety of natural, scientific, economic, cultural, and political factors. Courses satisfying the Environmental Awareness requirement teach students about the complexity of particular ecosystems and/or people's interactions with nature so that they will better understand the environmental issues and trade-offs that are likely to arise in their lifetimes.

PE-H **Perpectives: Human Behavior.** Courses in Human Behavior help students to prepare for a world in which many of the most pressing challenges (such as genocide, environmental degradation, poverty) are impacted by human thoughts, decisions, or practices. As well, they provide a kind of "owner's manual" for students to assist them in understanding themselves, their roles (for example, parent, partner, leader), and their social groups (family, workplace, neighborhood, nation).

PE-T **Perspectives: Technology and Society.** The study of technology helps satisfy the need of society for knowledgeable people able to understand, participate, and guide the rapid technological advances that play such a vital role in our world. Technology and Society courses focus on understanding technological advances, how they are developed, and their impacts on society.

Practice (one minimum 2-credit course from any of the three following categories):

PR-E **Practice: Collaborative Endeavor.** Students learn and practice strategies and techniques for working effectively in pairs or larger groups to produce a finished product. For example, students might learn specialized practical information such as how to use change-management software to monitor and manage changes initiated by multiple group members. Alternatively, they might learn basic information about leadership, teamwork, and group functioning, which they can incorporate into their own group process. What is common to all courses is that some instruction regarding the process of collaboration is provided, in addition to instruction specific to the academic discipline and the products being produced.

PR-C **Practice: Creative Process.** Creative Process courses teach creative process and techniques in a context of individual or collaborative participation in the arts, including creative writing. Courses may combine theory and experiment in the creation of a new artwork, or new interpretation(s) of an existing artwork. Creative Process courses include studies in individual or group creativity or improvisation, and/or ensemble rehearsal and performance.

PR-S **Practice: Service Learning.** Service Learning courses provide students with an opportunity to integrate their academic coursework with community involvement. Such courses provide supervised learning experiences where students reflect on, communicate, and integrate principles and theories from the classroom in real-world settings. Students gain valuable practical skills while giving back to the community.

C1 **Composition:** Composition requirements (C1 and C2). (Two 5-credit courses or equivalent) C1 and C2 typically are fulfilled by your college core course and Writing 2, *Rhetoric and Inquiry*. Students must complete the Entry Level Writing Requirement to satisfy the composition requirements.

C2

DC **Disciplinary Communication (DC) requirement.** The goal of this requirement is to ensure that students acquire the skills in writing and other forms of communication appropriate for their discipline. Students satisfy the DC requirement by completing 1-3 upper-division courses required for their major, totaling a minimum of five credits. The DC requirement is automatically fulfilled by the completion of major requirements.

Courses That Fulfill General Education Requirements for Students Beginning Fall 2010

Refer to the course listings beginning in the Class Listings section to identify general education courses offered.

Cross-Cultural Analysis (CC code)—One course required (5 credits)

One five-credit course or equivalent is required that emphasizes understanding of one or more cultures and societies outside the United States.

Anthropology 130A, 130B, 130C, 130E, 130F, 130H, 130I, 130J, 130L, 130M, 130O, 130T
Community Studies 136, 185
Education 170, 171
Feminist Studies 1, 80B, 80F, 80S, 120
French 4, 5, 6
German 4, 5, 6
History of Art and Visual Culture 10, 20, 24, 70, 80, 110, 111, 122A, 122B, 123B, 124A, 124B, 124C, 124D, 127B, 143C, 162A, 162B, 172, 180
History 2A, 2B, 5A, 5B, 11A, 11B, 20, 30, 40A, 40B, 41, 43, 45, 62A, 62B, 63, 65A, 70A, 70B, 70C, 80H, 80N, 80Y, 101A, 101B, 102A, 102C, 103, 106A, 107, 134B, 137A, 137B, 137C, 140B, 140C, 140D, 147A, 147B, 150A, 150C, 155, 160A, 160C, 163B, 178C
Italian 4, 5, 6
Japanese 6
Jewish Studies 101
Latin American and Latino Studies 80B, 80D, 80H, 80I, 80Q, 80S, 80W, 80X, 140, 145, 152, 165, 169, 170, 194G, 194L, 194M, 194Q
Linguistcs 80C
Modern Literary Studies 155B, 155E, 155J
Pre- and Early Modern Literature 102, 107A, 107B, 167C
Spanish/Latin American/Latino Literature 102A, 130E, 131B, 131H, 134G, 153
Music 11D, 80A, 80I, 80P, 80S
Philosophy 22
Politics 43, 60, 166
Portuguese 65A, 65B
Russian 4, 5, 6
Sociology 15, 188A
Spanish 4, 5, 6, 156A
Spanish for Spanish Speakers 61, 62, 63, 125
Theater Arts 22, 80Z, 122, 161D

Ethnicity and Race (ER code)—One course required (5 credits)

One five-credit course or equivalent is required that focuses on issues of ethnicity and/or race.
American Studies 10, 80E, 112, 126A
Anthropology 130N, 159
Community Studies 80A, 123, 152
Education 128, 177, 181
Feminist Studies 80A, 115, 139, 145
Film and Digital Media 165D
History of Art and Visual Culture 60, 140C, 140D, 170, 190J, 190X, 191C
Hebrew 106
History 14, 74, 75, 80W, 106B, 109A, 110A, 111, 115A, 115B, 121A, 121B, 123, 125, 126, 127, 128, 134A, 178E, 185A, 185B, 185E, 185F
Latin American and Latino Studies 1, 80F, 80G, 80J, 80K, 100, 143, 150, 166, 175, 178
Literature 80L, 80N
English-Language Literatures 150A, 155D
Modern Literary Studies 144A, 144B, 144D, 144H
World Literature and Cultural Studies 127
Sociology 156
Spanish 156G
Theater Arts 80A, 80M

Interpreting Arts and Media (IM code)—One course required (5 credits)

One five-credit course or equivalent is required that focuses on the practice, analysis, interpretation, and/or history of one or more artistic or mass media (media in which non-textual materials play primary roles).

American Studies 80F, 123M
Anthropology 120
Art 10G, 10H, 80C, 80D, 80F, 80V
Community Studies 80L, 154
Computer Science 80K
Crown College 60
Education 102, 120
Film and Digital Media 80S, 80X, 134B
Feminist Studies 80P, 126
History of Art and Visual Culture 22, 27, 30, 31, 40, 41, 43, 45, 50, 51, 81, 117, 122D, 127A, 127C, 135B, 135D, 135E, 137B, 137C, 137D, 137E, 140A, 140B, 141A, 141B, 141C, 141E, 141F, 141H, 141I, 143A, 143B, 143D, 151, 153, 154, 160A, 160B
Latin American and Latino Studies 128, 129, 176
English-Language Literatures 140I
Pre- and Early Modern Literature 137
Spanish/Latin American/Latino Literature 135F
Music 11A, 80N
Porter College 180
Theater Arts 10, 20, 31P, 32, 40, 61A, 80D, 80L, 80O, 80P, 80Q, 80U, 113, 116A, 117, 130, 131P

Mathematical and Formal Reasoning (MF code)—One course required (5 credits)

One five-credit course or equivalent is required that emphasizes university-level mathematics, computer programming, formal logic, or other material that stresses formal reasoning, formal model building, or application of formal systems.
Applied Mathematics and Statistics 2, 3, 10, 11B, 15A, 15B, 20, 114, 147
Astronomy and Astrophysics 2, 3, 4, 5, 12, 13, 15, 16
Biology: Molecular, Cell, and Developmental 180
Biomolecular Engineering 60, 160
College Eight 81B
Computer Engineering 8, 16
Computer Science 5C, 5J, 5P, 10, 11, 12B
Earth and Planetary Sciences 11, 12, 81B
Economics 11B
Mathematics 3, 11A, 11B, 19A, 19B, 20A, 20B, 21, 22, 23A, 23B, 100
Music 100A, 100B, 100C
Philosophy 8, 9
Physics 5A, 6A

Scientific Inquiry (SI code)—One course required (5 credits)

One five-credit course or equivalent is required that focuses on the essential roles of observation, hypothesis, experimentation and measurement in the sciences.
Anthropology 1, 3
Astronomy and Astrophysics 1, 80A
Biology: Molecular, Cell, and Developmental 80A, 80E, 80J
Chemistry and Biochemistry 1A
Earth and Planetary Sciences 2, 3, 5, 7, 8, 10, 20, 65
Electrical Engineering 80T
Environmental Studies 24
History 142
Linguistics 50
Ocean Sciences 1, 80A
Physics 1, 2, 5B, 5C, 6B, 6C
Psychology 150

Statistical Reasoning (SR code)—One course required (5 credits)

One five-credit course or equivalent is required that focuses on developing skills in approaching quantitative data and statistical reasoning.

Applied Mathematics and Statistics 5, 7, 80A, 118, 131, 132
Computer Engineering 107
Earth Sciences 125
Economics 113
Linguistics 157
Mathematics 4
Psychology 2
Sociology 103A

Textual Analysis and Interpretation (TA code)—One course required (5 credits)

One five-credit course or equivalent is required that has as its primary methodology the interpretation or analysis of texts.

American Studies 126L, 145
Biology: Molecular, Cell, and Developmental 114, 126, 127
College Eight 80A, 80B
Crown College 80F
History 1, 13, 100
History of Consciousness 105, 112
Japanese 105
Latin American and Latino Studies 144, 180
Linguistics 108
Literature 1, 80G, 80Z, 102
English-Language Literatures 102A, 103A, 110A, 120H, 170A, 170C, 170F, 180B, 180H, 180K
Modern Literary Studies 103, 124A, 145A, 145B, 167K

Pre- and Early Modern Literature 183
Spanish/Latin American/Latino Literature 60
World Literature and Cultural Studies 115A
Mathematics 181
Philosophy 11
Politics 4, 10, 20, 25, 75
Spanish 114, 156F
Stevenson College 81A, 81B
Theater Arts 61B, 61C, 80K, 80X

Perspectives (5 credits)

Choose one five-credit course or equivalent from any of the three following categories: PE-E, PE-H, PE-T.

Environmental Awareness (PE-E code)

Courses focus on humankind's interactions with nature.
Anthropology 146
Community Studies 149
Crown College 80L
Earth and Planetary Sciences 1, 4, 9, 110A
Electrical Engineering 80J, 80S, 180J
Environmental Studies 25, 80A, 80B
Latin American and Latino Studies 80P, 164, 167
Ocean Sciences 80B
Philosophy 28
Sociology 125, 173, 185

Human Behavior (PE-H code)

Courses focus on aspects of individual human behavior or the operation of human groups.
Community Studies 156
Economics 1, 2
Latin American and Latino Studies 149, 163, 174, 194F
Philosophy 24
Politics 1, 70
Psychology 1
Sociology 136, 137, 172

Technology and Society (PE-T code)

Courses emphasize issues raised by the prevalence of technology in society.
Biomolecular Engineering 5, 80G, 80H
Computer Engineering 80A, 80E, 80N
Computer Science 2, 80J, 80S
Crown College 80J
Film 80T
Philosophy 80G
Politics 15
Sociology 115

Practice (minimum 2 credits)

Choose one minimum two-credit course from any of the three following categories: PR-E, PR-C, PR-S

Collaborative Endeavor (PR-E code)

Courses provide significant experience with collaboration on a project.
Biomolecular Engineering 123T
Computer Engineering 123A
Computer Science 20
Earth and Planetary Sciences 109L, 110L, 188A
Electrical Engineering 123A
Environmental Studies 100L
Mathematics 30
Music 1C, 2
Theater Arts 50

Creative Process (PR-C code)

Courses teach creative process and techniques in the arts (including creative writing), at an individual or a collaborative level.
Anthropology 81A, 81B, 81C, 154
Art 20, 22, 23, 24A, 24B, 26, 27, 28, 30, 32, 33, 37, 39, 40, 80A, 102, 107, 107A, 109, 112, 113, 114, 118, 119, 125, 126, 129, 135, 136, 138, 141, 161
Computer Science 25, 80V
Film and Digital Media 170A, 170B,
Latin American and Latino Studies 81A, 81B, 81C
Creative Writing 10, 52, 53
Music 9, 10, 163, 166
Porter College 21C, 23B, 34B, 39
Theater Arts 14, 15, 17, 19, 30, 35, 36, 37, 114, 115A, 115B, 119, 156

Service Learning (PR-S code)

Courses provide the opportunity for supervised campus or community service that contributes to a student's overall education.
Biology: Molecular, Cell, and Developmental 182
Chemistry and Biochemistry 182
Crown College 70
Education 50A, 50B, 50C
Environmental Studies 83, 184
History 129
Mathematics 189
Merrill College 85B, 85C
Psychology 193, 193A, 193B, 193C, 193D
Writing 169

Composition (C1 and C2 code) (10 credits)

Two five-credit courses.

C1

College Eight 80A
College Nine 80A, 80D
College Ten 80A, 80D
Cowell College 80A
Crown College 80A
Kresge College 80A
Merrill College 80A, 80X
Oakes College 80A, 80D
Porter College 80A
Stevenson College 80A

C2

College Eight 80B
College Nine 80B
College Ten 80B
Cowell College 80B
Crown College 80B
Kresge College 80B
Merrill College 80B, 80Z
Oakes College 80B
Porter College 80B
Stevenson College 80B, 81B
Writing 2

Disciplinary Communication (DC code)

Students satisfy the DC Requirement by completing 1-3 upper-division courses required for their major totaling a minimum of five credits.

Quick Reference to General Education Requirements

General education requirements were devised and are reviewed by the Santa Cruz Division of the Academic Senate through the Committee on Educational Policy. There are nine categories of general education requirements. Specific information regarding how general education requirements fit into bachelor's degree requirements can be found in the *UCSC General Catalog*.

IH, IN, IS Introductions to Disciplines: These courses inform students of a discipline's scope or methodology, prepare students effectively for advanced classes, or both. Students are advised about a discipline's suitability as a major or are prepared for advanced course work in the field. Most of these courses are required of majors. Most do not require prerequisites. The three categories are Introduction to Humanities and Arts (IH code), Introduction to Natural Sciences (IN code), and Introduction to Social Sciences (IS code).

T Topical requirements (T code): The topical requirement is intended to show students how disciplines outside their own affect public life, how different disciplines approach a common topic, and the richness in the areas of study that lie outside or between academic disciplines. Topical courses address a topic of broad intellectual or social relevance—instead of a discipline—and study it from a broad or interdisciplinary perspective. They can provide a place for discussion of values and assumptions at an introductory level not usually found in introductory courses. They are not designed to introduce the discipline to non-majors.

C1/C2 Composition requirements (C1 and C2): C1 and C2 are typically fulfilled by your college core course and Writing 2, *Rhetoric and Inquiry*. Students must complete the Entry Level Writing Requirement to satisfy the composition requirements.

W Writing-intensive requirement (W code): These courses often require more writing than other classes, but they also stress explicit attention to the craft of writing in the subject matter of the course or discipline. Papers are assigned throughout the quarter and editorial comment is provided by the instructor. Students must complete the Entry Level Writing Requirement (formerly Subject A) and satisfy the Composition requirement before enrolling in a course which satisfies the writing-intensive requirement.

Q Quantitative requirement (Q code): This requirement involves acquisition of technical skill in mathematics or practice in the ability to apply that mathematical skill in specific contexts, or both. A quantitative course must involve the use of advanced algebra, statistics, or calculus. These courses provide instruction in quantitative reasoning rather than merely evaluating students' mathematical ability.

A Arts requirement (A code): This requirement was established in recognition of the differences between the humanities and the arts, and of the necessity of both in liberal arts education. One 5-credit course or the equivalent is required in the performance, theory, or history of the arts.

E U.S. Ethnic Minorities/Non-Western Society requirement (E code): This requirement is intended to increase student and faculty knowledge of non-Western cultures (in the U.S. and elsewhere); to improve cross-cultural awareness, skills, and sensitivity; and to explore relationships between ethnicity and other topics of liberal arts curriculum.

Courses That Fulfill General Education Requirements for Students Entering Prior to Fall 2010

Refer to the course listings in the Class Search in MyUCSC to identify general education courses offered.

Introductions to Disciplines, Humanities, and Arts (IH code)—Two courses from different departments required (10 credits)

Only one IH requirement may be satisfied with a course (equivalent to 5 credits) from the Arts Division (art, film and digital media, history of art and visual culture, music, theater arts); only one language course may be used to satisfy an IH requirement; and only one literature course may be used to satisfy an IH requirement. *Note:* Transfer courses designated IH from English departments are considered to be literature courses for general education purposes.

American Studies 10
Chinese 4, 5, 6, 107, 108
Cowell 118B
Crown 60
Feminist Studies 1
French 4, 5, 6
German 4, 5, 6
Hebrew 4, 5
History 1, 2A, 2B, 5A, 5B, 10A, 10B, 11A, 11B, 13, 14, 30, 40A, 40B, 41, 43, 62A, 62B, 65A, 70A, 70B, 70C
History of Art and Visual Culture 20, 24, 30, 31, 43, 80
Italian 4, 5, 6
Japanese 4, 5, 6
Linguistics 50, 53, 111, 112
Literature 1, 61F, 61J, 61M
Greek Literature 100
Latin Literature 100
Spanish Literature 60
Music 11A, 11B, 11C, 11D
Philosophy 9, 11, 22, 24, 26, 28
Portuguese 60B, 65A, 65B
Russian 4, 5, 6
Spanish 4, 5, 5M, 6
Spanish for Spanish Speakers 61, 62, 63
Theater Arts 10, 19, 20, 30, 32, 33, 36, 40, 61A, 61B, 61C, 122, 136

Introductions to Disciplines, Natural Sciences and engineering (IN code)—Two courses from different departments required (10 credits)

Transfer courses designated IN from anatomy, botany, physiology, and zoology departments are considered to be biology courses.

Anthropology 1
Applied Mathematics and Statistics 5, 7, 11A, 11B, 15A, 15B
Astronomy and Astrophysics 1, 2, 3, 4, 5, 12, 13, 15, 16, 18
Biology: MCD 20A
Biomolecular Engineering 5
Chemistry and Biochemistry 1A, 1B, 1C
College Eight 81B
Computer Engineering 3, 8, 12
Computer Science 2, 5C, 5J, 5P, 10, 12A, 12B, 13H, 20
Earth Sciences 1, 3, 5, 6, 7, 10, 20, 65, 81B, 119
Economics 11A, 11B
Environmental Studies 23, 24
Mathematics 11A, 11B, 19A, 19B, 20A, 20B
Ocean Sciences 1
Physics 1, 5A, 5B, 5C, 6A, 6B, 6C

Introduction to Disciplines, Social Sciences (IS code)—Two courses from different departments required (10 credits)

Anthropology 2, 3, 4
Community Studies 10
Economics 1, 2
Education 60
Environmental Studies 25
Latin American and Latino Studies 1, 126A, 126B
Legal Studies 10
Politics 1, 3, 4, 7, 15, 17, 20, 25, 43, 60, 70, 75
Psychology 1, 65
Sociology 1, 10, 15

Topical Courses (T code)—Three courses required (15 credits)

Students entering UCSC with fewer than 45 transferable credits must take three topical courses in residence at UCSC. UCSC Summer Session courses can be used to satisfy topical requirements.

Choose one course from each academic area: natural sciences (2), social sciences (3), and humanities and arts (4). Courses labeled 5, 6, and 7 satisfy topical requirements in two different academic areas; students can apply this kind of topical course to either academic area indicated. The three topical course requirements must be satisfied with three different courses. In the Schedule of Classes, courses that carry a T general education code are listed as follows:

2–Natural Sciences Area
3–Social Sciences Area
4–Humanities and Arts Area
5–Humanities and Arts *or* Social Sciences Area
6–Natural Sciences *or* Humanities and Arts Area
7–Natural Sciences *or* Social Sciences Area

T2–Natural Sciences

Astronomy and Astrophysics 80A
Biology: E&E 80N, 80P
Biology: MCD: 80A, 80E, 80J,
Biomolecular Engineering 80H
Chemistry and Biochemistry 80A, 80H
College Eight 81C
Computer Engineering 80H, 80N, 80U
Computer Science 80B, 80G, 80K, 80V
Crown 80S
Earth and Planetary Sciences 2, 4, 8, 9, 11, 12
Electrical Engineering 80J, 81C
Linguistics 80G
Microbiology and Environmental Toxicology 80E
Ocean Sciences 80A, 80B
Physics 80A

T3–Social Sciences

Anthropology 80C, 80G, 80H, 80I, 80J, 80K, 80L, 80N, 80P, 80Y, 80Z
College Eight 80A, 80B
College Nine 80A, 80B
College Ten 80A, 80B
Community Studies 80A, 80B, 80L
Economics 80A, 80G, 80H
Latin American and Latino Studies 80B, 80D, 80F, 80G, 80H, 80I, 80J, 80K, 80P, 80Q, 80R, 80S, 80T
Merrill College 80A, 80B, 80X
Psychology 80A

T4–Humanities and Arts

Art 80A, 80C, 80D, 80V
Cowell College 80A, 80B
Feminist Studies 80S
Hebrew 80
History 80H, 80K, 80N, 80W, 80Y
History of Consciousness 80A, 80B, 80H, 80U
Languages 80D
Latin American and Latino Studies 80E
Linguistics 80B, 80V
Literature 80G, 80I, 80L, 80N, 80Z
Music 80A, 80F, 80G, 80H, 80I, 80J, 80M, 80N, 80O, 80P, 80Q, 80S, 80V, 80X
Oakes College 80H
Philosophy 80E, 80F, 80L
Porter College 80A, 80B, 80E, 80W
Stevenson College 80H
Theater Arts 80A, 80B, 80D, 80E, 80G, 80H, 80K, 80L, 80M, 80N, 80O, 80P, 80Q, 80S, 80U, 80V, 80W, 80X, 80Y, 80Z

T5–Humanities and Arts or Social Sciences

American Studies 80E, 80F, 80G
Crown College 80J
Feminist Studies 80A, 80B, 80F, 80K, 80P
Film and Digital Media 80A, 80S, 80X
History of Art and Visual Culture 81
History of Consciousness 80C, 80J, 80Q
Kresge College 80A, 80B, 80H, 80T
Latin American and Latino Studies 80X
Linguistics 80C, 80D
Merrill College 80C, 80Z
Oakes College 80A, 80B
Philosophy 80M
Porter College 80L
Stevenson College 80A, 80B, 80T

T6–Natural Sciences or Humanities and Arts

Art 80F
Biomolecular Engineering 80G
Computer Engineering 80E
Crown 80A, 80B
Music 80C, 80L, 80R
Philosophy 80G, 80S
Physics 80D
Porter College 80K

T7–Natural Sciences or Social Sciences

Applied Mathematics and Statistics 80A
Computer Engineering 80A
Computer Science 80J, 80S
Crown College 80F, 80L
Electrical Engineering 80S, 80T
Environmental Studies 80A, 80B

Information Systems Management 80C
Sociology 80V

Composition Courses (C1 and C2 code)—One course each required for students entering fall 2005 (5 credits)

C1

College Eight 80A
College Nine 80A, 80D
College Ten 80A, 80D
Cowell College 80A
Crown College 80A
Kresge College 80A
Merrill College 80A, 80X
Oakes College 80A, 80D
Porter College 80A
Stevenson College 80A

C2

College Eight 80B
College Nine 80B
College Ten 80B
Cowell College 80B
Crown College 80B
Kresge College 80B
Merrill College 80B, 80Z
Oakes College 80B
Porter College 80B
Stevenson College 80B, 81B
Writing 2

Writing-Intensive Courses (W code)—One course required (5 credits)

American Studies 100, 105A, 114B, 125H
Anthropology 150, 152, 170, 172, 194A, 194B, 194D, 194F, 194G, 194H, 194I, 194K, 194L, 194M, 194N,194P, 194Q, 194R 194S, 194T, 194U, 194V, 194W, 194X, 194Y, 194Z
Applied Mathematics and Statistics 156
Art 149A, 149B, 150C
Astronomy and Astrophysics 80D
Biochemistry 110
Biology: E&E 141L, 145L, 150L, 151B, 158L, 159A, 161L, 183L, 188
Biology: MCD 100L, 105L, 105M, 109L, 110L, 115L, 119L, 186L
Chemistry and Biochemistry 122
Community Studies 114, 194
Computer Engineering 185
Computer Science 166B
Crown College 123
Earth Sciences 195
Economics 128, 142, 165, 166B, 183, 184, 188, 195
Education 164
Environmental Studies 104A, 109B, 156, 157, 172
Feminist Studies 194I, 194N, 195
Film and Digital Media 120, 150, 196B
History 190A, 190B, 190C, 190D, 190E, 190F, 190I, 190K, 190L, 190M, 190N, 190O, 190P, 190Q, 190R, 190S, 190T, 190U, 190V, 190X, 190Y, 194A, 194B, 194E, 194G, 194H, 194M, 194N, 194R, 194S, 194U, 194X, 194Y, 195B, 196A, 196B, 196C, 196E, 196G, 196I, 196J, 196K, 196M, 196N, 196O, 196P, 196R, 196S, 196U, 196Y
History of Art and Visual Culture 100A, 172
Information Systems Management 158
Kresge College 80T
Latin American and Latino Studies 100W, 194H, 194P
Legal Studies 128, 183, 196
Linguistics 101, 113, 114, 197
Literature 1, 101
Microbiology and Environmental Toxicology 119L, 151
Oakes College 112
Philosophy 120, 127, 190L, 190M, 190S, 190Y
Physics 195B
Porter College 80W
Psychology 110, 119A, 119G, 119H, 119M, 125, 140G
Science Communication 160
Sociology 103B, 134, 195C
Stevenson College 80T
Theater Arts 157, 159
Writing 64, 101, 102, 103, 104, 110A, 161, 163, 165, 166A, 166B, 166D, 167

Quantitative Courses (Q code)—One course required (5 credits)

Applied Mathematics and Statistics 2, 3, 5, 7, 10, 11A, 11B, 15A, 15B, 80A, 131
Astronomy and Astrophysics 2, 3, 4, 5, 12, 13, 15, 16, 18
Chemistry and Biochemistry 1A, 1B, 1C
College Eight 81B
Computer Engineering 8, 12, 16
Computer Science 80B
Earth and Planetary Sciences 11, 12, 81B, 111
Economics 11A, 11B, 113
Electrical Engineering 80T
Mathematics 3, 4, 11A, 11B, 19A, 19B, 20A, 20B, 21, 110
Ocean Sciences 1
Philosophy 8, 9
Physics 1, 5A, 6A, 80A, 80D
Psychology 2, 181
Sociology 103A, 103B

Arts Courses (A code)—One course or equivalent required (5 credits)

Courses carrying fewer than five credits may be combined for credit toward satisfaction of the A requirement if they total at least five credits. Some two-credit music courses must be taken in sequence to fulfill the A requirement.

Anthropology 81A, 81B, 81C
Art 10G, 10H, 20, 21, 22, 23, 24A, 24B, 26, 27, 28, 30, 39, 40, 80A, 80C, 80D, 80F, 80V, 102, 107, 109, 112, 113, 114, 118, 119, 126, 135, 136, 141, 160, 161
Community Studies 154
Cowell College 70A, 70B, 70C
Feminist Studies 80S, 123
Film and Digital Media 80A, 80S, 80X, 132A, 132B, 136A, 136B, 151, 160, 165A, 170A, 170B, 176, 185D
History of Art and Visual Culture 20, 22, 24, 27, 30, 31, 40, 41, 43, 50, 51, 60, 70, 80, 81, 100A, 110, 111, 115, 116, 117, 118, 122A, 122B, 122C, 122D, 123A, 123B, 124C, 127A, 127B, 127C, 127D, 135B, 135D, 135E, 135F, 137A, 137B, 137C, 137D, 137E, 140A, 140B, 140C, 140D, 141A, 141B, 141C, 141E, 141F, 141H, 141I, 143A, 143C, 151, 153, 154, 160A, 160B, 162A, 163, 170, 172, 180, 190A, 190B, 190D, 190E, 190F, 190G, 190J, 190M, 190O, 190P, 190Q, 190R, 190U, 190V, 190W, 190X, 191A, 191B, 191C, 191D, 191E, 191F
Kresge College 80H
Latin American and Latino Studies 81A, 81B, 81C, 161P, 171
Literature/Creative Writing 10, 52, 53, 170, 180, 183
Music 1A, 5A, 5B, 5C, 6, 10, 11A, 11B, 11C, 11D, 51, 54, 75, 80A, 80C, 80F, 80G, 80H, 80I, 80J, 80L, 80M, 80N, 80O, 80P, 80Q, 80R, 80S, 80V, 80X, 102, 103, 159A, 159B, 160, 180A, 180B
Music Sequence Courses: 1C-1C-1C, 2-2-2, 3-3-3, 4A-4A-4A, 4B-4B-4B, 4A-4A-4B, 4A-4B-4B, 8-8-8, 9-9-9, 166-166-166
Philosophy 152
Porter College 14, 20A, 20C, 20D, 21A, 21C, 22, 22A, 22F, 22G, 23A, 23B, 23C, 28, 32A, 33, 33A, 34B, 35, 38B, 39, 80E, 80G, 80L, 83, 120, 121, 121C
Theater Arts 10, 12, 14, 15, 17, 18, 18C, 19, 20, 21A, 21B, 22, 23, 30, 31P, 32, 33, 35, 36, 37, 40, 50, 52, 61A, 61B, 61C, 80A, 80B, 80D, 80E, 80G, 80H, 80K, 80L, 80M, 80N, 80O, 80P, 80Q, 80S, 80U, 80V, 80W, 80X, 80Y, 80Z, 100A, 100B, 100C, 100G, 100H, 100I, 100L, 100M, 100W, 104, 105, 106, 110, 113, 114, 115A, 115B, 116A, 117, 117A, 118, 119, 121, 122, 124, 126, 128, 129, 130, 131, 131C, 131P, 132, 135, 136, 136C, 137, 138, 139, 142, 151, 152, 155, 157, 159, 160, 161A, 161C, 161D, 161M, 161P, 161Q, 161R, 161S, 161T, 161U, 161Y, 162, 163A, 163E, 163G, 164, 165, 193, 193F

U.S. Ethnic Minorities/Non-Western Society Courses (E code)—One course required (5 credits)

American Studies 10, 80E, 121C, 123F, 123H, 123M, 123T, 123X, 123Z, 125A, 125E, 125G, 125H, 125X 126B, 126C, 126L, 127A, 127C, 127D, 127E, 127F, 127K, 172
Anthropology 80G, 80I, 80P, 130A, 130B, 130C, 130E, 130F, 130G, 130H, 130I, 130L, 130M, 130N, 130O, 130T

GENERAL EDUCATION REQUIREMENTS

Community Studies 80A, 80B, 100E, 100J, 110, 122, 152, 185
Computer Science 80S
Economics 120, 128
Education 60, 128, 141, 164, 181
Feminist Studies 80F, 80P, 102, 115, 120, 123, 124, 132, 139, 145, 151A, 194F, 194M
Film and Digital Media 132C, 165B, 165D, 185E
Hebrew 106
History 5A, 11A, 11B, 14, 30, 40A, 40B, 41, 43, 45, 75, 80H, 80W, 80Y, 101A, 101B, 106A, 106B, 109A, 111, 121A, 121B, 126, 127, 128, 130, 132, 133, 134A, 134B, 137A, 137B, 137C, 140C, 140D, 141B, 145, 147A, 147B, 148, 150C, 154A, 155, 185A, 185B, 185D, 185E, 185F, 190A, 190B, 190C, 190D, 190E, 190L, 190N, 190O, 190R, 194G, 194H, 194N, 194U, 194Y, 196N
History of Art and Visual Culture 22, 24, 27, 60, 70, 80, 110, 111, 115, 116, 117, 122B, 123A, 123B, 127C, 127D, 135E, 140C, 140D, 141C, 143C, 163, 170, 172, 180, 190A, 190B, 190J, 190M, 190W, 190X, 191A, 191B, 191C
History of Consciousness 118
Latin American and Latino Studies 1, 80B, 80D, 80E, 80F, 80G, 80H, 80I, 80J, 80K, 80P, 80Q, 80R, 80S, 80T, 80X, 100, 100A, 100B, 100W, 101, 111, 122, 126A, 126B, 128, 129, 140, 143, 144, 145, 152, 160, 161P, 163, 164, 166, 167, 168, 169, 170, 175, 176, 178, 180, 194F, 194G, 194H, 194M, 194P, 194R
Legal Studies 121, 128, 135, 136
Literature 61J, 80L, 80N
English-Language Literatures 150A, 150C, 155D,
Modern Literary Studies 144A, 144B, 144D
Spanish Literature 60, 102B, 130E, 131B, 131H, 134G
World Literature and Cultural Studies 109, 118, 124, 127, 136, 190A
Merrill College 80A, 80B, 80X
Music 11B, 11D, 80A, 80F, 80I, 80P, 80Q, 80X, 180A, 180B
Oakes College 80A, 80B, 80H, 175
Philosophy 80E
Politics 121, 140C, 140D, 140E, 141, 146
Psychology 110, 119B, 140B, 142, 143, 157, 158
Sociology 15, 133, 156, 169, 170, 174, 188
Spanish 156A
Stevenson College 80H, 80T, 81A, 81B
Theater Arts 22, 80A, 80M, 100A, 100B, 100I, 100L, 100W, 161D, 161P, 161R

Fall 2011 Course Descriptions Update

The following course descriptions are for fall quarter 2011. Descriptions for individual studies courses are not included in these listings. Please contact the course sponsoring agencies for additional information.

College Eight

80A. Introduction to University Discourse: Environment and Society.
Explores rhetorical principles and conventions of university discourse, providing intensive practice in analytical writing, critical reading, and speaking. Introduces students to environmental history, ethics, and policy options, and teaches them to analyze and interpret key literary texts. Students cannot receive credit for this course and course 80B. Concurrent enrollment in course 81A is required. Enrollment restricted to first-year college members who have not satisfied the C1 requirement. (General Education Code(s): TA, T3-Social Sciences, C1.)

80B. Rhetoric and Inquiry: Environment and Society.
Explores the intersections of investigation, interpretation, and persuasion and hones strategies for writing and research. Introduces students to environmental history, ethics, and policy options, and teaches them to analyze and interpret key literary texts. Students cannot receive credit for this course and course 80A. Prerequisite(s): satisfaction of the C1 requirement; concurrent enrollment in course 81A is required. Enrollment restricted to first-year college members. (General Education Code(s): TA, T3-Social Sciences, C2.)

81A. The Environment and Us (3 credits).
Takes students through a wide range of approaches to environmental citizenship and provides conceptual and practical tools to explore alternatives. Students also participate in a hands-on sustainability project designed to connect academic learning with practical applications. Concurrent enrollment in course 80A or 80B is required. Enrollment restricted to first-year college members.

90. College Eight Garden Internship (1 credit).
One-credit internship in the College Eight Garden. Offers students of College Eight an opportunity to become involved in an experimental learning project focusing on application of concepts of sustainable agriculture. Enrollment restricted to members of College Eight. Enrollment limited to 10. May be repeated for credit.

College Nine

80A. Introduction to University Discourse: International and Global Issues.
Explores rhetorical principles and conventions of university discourse and provides intensive practice in analytical writing, critical reading, and speaking. Topics address contemporary global issues including economic globalization, human rights, international and inter-ethnic conflicts, poverty, and immigration. Students cannot receive credit for this course and course 80B. Enrollment restricted to first-year college members who have not satisfied the C1 requirement. Enrollment limited to 22. (General Education Code(s): T3-Social Sciences, C1.)

80B. Rhetoric and Inquiry: International and Global Issues.
Explores the intersection of investigation, interpretation, and persuasion and refines strategies for writing, research, and speaking. Topics address contemporary global issues including economic globalization, human rights, international and inter-ethnic conflicts, poverty, and immigration. Students cannot receive credit for this course and course 80A. Prerequisite(s): satisfaction of the Entry Level Writing and C1 requirements. Enrollment restricted to first-year college members. Enrollment limited to 22. (General Education Code(s): T3-Social Sciences, C2.)

80C. Introduction to University Discourse: International and Global Issues Writing Intensive 1.
Explores rhetorical principles and conventions of university discourse and provides intensive practice in analytical writing, critical reading, and speaking. Topics address contemporary global issues. More writing intensive than course 80A; prerequisite to 80D. Enrollment restricted to first-year college members who have not satisfied the C1 requirement. Enrollment limited to 22.

91. Global Issues Colloquium (1 credit).
Weekly colloquium on global issues with different topical focus each quarter. Presentations by UCSC faculty and invited speakers. Students must attend class, read an assigned article, and write a one-page synopsis. Co-sponsored by College Nine and The Center for Global, International, and Regional Studies. Enrollment restricted to College Nine members Enrollment limited to 50. May be repeated for credit.

College Ten

80A. Introduction to University Discourse: Social Justice and Community.
Explores rhetorical principles and conventions of university discourse and provides intensive practice in analytical writing, critical reading, and speaking. Examines social justice issues; topics include racism, sexism, and other forms of prejudice and discrimination; poverty and welfare; civil liberties; and community involvement and citizenship. Students cannot receive credit for this course and course 80B. Enrollment restricted to first-year college members who have not satisfied the C1 requirement. Enrollment limited to 22. (General Education Code(s): T3-Social Sciences, C1.)

80B. Rhetoric and Inquiry: Social Justice and Community.
Explores the intersection of investigation, interpretation, and persuasion and refines strategies for writing, research, and speaking. Examines social justice issues; topics include racism, sexism, and other forms of prejudice and discrimination; poverty and welfare; civil liberties; and community involvement and citizenship. Students cannot receive credit for this course and course 80A. Prerequisite(s): satisfaction of the Entry Level Writing and C1 requirements. Enrollment restricted to first-year college members. Enrollment limited to 22. (General Education Code(s): T3-Social Sciences, C2.)

80C. Introduction to University Discourse: Social Justice and Community Writing Intensive 1.
Explores rhetorical principles and conventions of university discourse and provides intensive practice in analytical writing, critical reading, and speaking. Examines social-justice issues. Topics include: racism, sexism, and other forms of prejudice and discrimination; poverty and welfare; civil liberties; and community involvement and citizenship. More writing-intensive than 80A; prerequisite to 80D. Enrollment restricted to first-year college members who have not satisfied the Entry Level Writing and C1 requirement and who scored a 5 or lower on the AWPE (Analytical Writing and Placement Exam). Enrollment limited to 22.

91. Introduction to Nuclear Policy (2 credits).
Introduces the key aspects of nuclear policy. Examines issues associated with nuclear weapons and civil nuclear power and the interplay between the two with regards to proliferation. Presentations will be given by guest speakers. Enrollment limited to 50. May be repeated for credit.

110. Service-Learning Field Study (Esprit de Corps).
Provides college members opportunity to apply their academic learning in a practical setting in the community. Students earn academic credit by volunteering in a non-profit agency or school for 10 hours per week. Students supervised by a professional on site. Students attend a weekly class, complete readings, listen to local leaders from the community, reflect upon their experiences with fellow students, and submit a final project related to their service-learning placement. Taught concurrently with course 110B. (Formerly course 193, Field Study.) Enrollment restricted to sophomore, junior, and senior College Nine and College Ten members. Enrollment limited to 22. May be repeated for credit.

110B. Service-Learning Field Study (Esprit de Corps) (2 credits).
Provides college members opportunity to apply their academic learning in a practical setting in the community. Students earn academic credit by volunteering in a non-profit agency or school for four hours per week. Students supervised by a professional on site. Students attend a weekly class, complete readings, listen to local leaders from the community, reflect upon their experiences with fellow students, and submit a final project related to their service-learning placement. Taught concurrently with course 110. (Formerly course 193F, Field Study.) Enrollment restricted to sophomore, junior, and senior College Nine and College Ten members. Enrollment limited to 22. May be repeated for credit.

Cowell College

80A. Introduction to University Discourse: Imagining Justice Past and Present.
Explores rhetorical principles and conventions of university discourse, providing intensive practice in analytical writing, critical reading, and speaking. Focuses on conceptions of justice, historic and contemporary, and considers how literary and artistic media may transmit, question, or revise notions of the just. Students cannot receive credit for this course and course 80B. Enrollment restricted to first-year college members who have not satisfied the C1 requirement. Enrollment limited to 22. (General Education Code(s): T4-Humanities and Arts, C1.)

80B. Rhetoric and Inquiry: Imagining Justice Past and Present.
Explores the intersections of investigation, interpretation, and persuasion and hones strategies for writing and research. Focuses on conceptions of justice, historic and contemporary, and considers how literary and artistic media may transmit, question, or revise notions of the just. Incorporates independent research. Students cannot receive credit for this course and course 80A. Prerequisite(s): satisfaction of the Entry Level Writing and C1 requirements. Enrollment restricted to first-year college members. Enrollment limited to 22. (General Education Code(s): T4-Humanities and Arts, C2.)

138A. The Place of Higher Education in a Democratic Society.
Centers around interviews of alumni and involves a reflective term paper on a specific topic having to do with the role of higher education in a democratic society. Teaches students how to conduct interviews. Prerequisite(s): course 80A or 80B. Enrollment limited to junior and senior Cowell College members. Enrollment limited to 20. (General Education Code(s): PE-H.)

184A. Leadership and Institution Building (2 credits).
Through lectures by senior administrators and student consensus-and-recommendation teams, students learn how leaders work with constituent groups, build cooperation, and develop implementation plans in an institution such as the University of California, specifically, UC Santa Cruz. Enrollment restricted to undergraduates accepted in the Chancellor's Undergraduate Internship Program. Enrollment limited to 40.

Crown College

70. Introduction to Broadcast Media: Radio.
Comprehensive history of noncommercial radio as a mass-communication medium. Course also serves as an introduction to UCSC's radio station KZSC-FM and broadcasting. Through lectures, hands-on instruction, and written assignments, students learn the fundamentals of program presentation and audio production. Enrollment by permission of instructor. Enrollment limited to 14. (General Education Code(s): PR-S.)

80A. University Discourse: Ethical Issues in Emerging Technologies.
Explores rhetorical principles and conventions of university discourse, providing intensive practice in analytical writing, critical reading, and speaking. Examines ethical challenges brought about by rapidly changing science and technology. Students cannot receive credit for this course and course 80B. Enrollment restricted to first-year college members who have not satisfied the C1 requirement. (General Education Code(s): T6-Natural Sciences or Humanities and Arts, C1.)

80B. Rhetoric/Inquiry: Ethical Issues in Emerging Technologies.
Explores intersection, interpretation, and persuasion and hones strategies for writing and research. Examines ethical challenges brought about by rapidly changing science and technology. Students cannot receive credit for this course and course 80A. Prerequisite(s): satisfaction of the Entry Level Writing and C1 requirements. Enrollment restricted to first-year Crown College members. (General Education Code(s): T6-Natural Sciences or Humanities and Arts, C2.)

185. Career and Internship Preparation (1 credit).
For juniors and seniors preparing for an internship experience or career position. Subjects include: self-assessment of career objectives and/or internship goals; exploration of resources and techniques for finding and evaluating potential positions; resume writing; interview techniques; techniques to maximize learning in an internship and advancement in a job; communication; conflict resolution and problem solving in the organizational setting. Enrollment limited to 40.

Kresge College

12A. Service Learning (3 credits).
Students find a volunteer position with the instructor's assistance and perform community service in non-profit organizations, schools, unions, or local government agencies. Students meet weekly, keep a journal, and write a "social action witnessing" report of their experience. Enrollment restricted to college members. Enrollment limited to 15. May be repeated for credit.

65A. Power and Representations: Food and Community (2 credits).
Explores core themes of power and representation through the mediums of food, nature awareness, community, personal empowerment and sustainable living. Students will develop meaningful final projects in collaboration with Kresge Food Co-op, Kresge Garden Co-op, Kresge World Cafe, and projects of their own design. (Formerly *Power and Representations: Food Systems.*)

65B. Power and Representation: Photography (2 credits).
Focuses on creating a final project individually, or in collaboration with others, that engages issues of power and represnetation through the medium of photography. Concurrent enrollment in course 80A or 80B is required. Enrollment limited to 20.

65D. Power and Representation: Art and Visual Performance (2 credits).
Students investigate the themes presented in the core course to arrive at a final creative project in pairs, groups, or individually. Concurrent enrollment in course 80A or 80B is required. Enrollment limited to 20.

80A. Introduction to University Discourse: Power and Representation.
Explores rhetorical principles and conventions of university discourse, providing intensive practice in analytical writing, critical reading,and speaking. Explores relationships between individuals and their communities—communities as small as families and friends, colleges and cities; communities as large as nations and the world. Examines ways we constitute ourselves as individuals in relation to communities, focusing on representations of class, ethnicity, sexual orientation, gender, and race in several genres—critical theory, film, art, fiction, non-fiction, and theater. Students cannot receive credit for this course and course 80B. Enrollment restricted to first-year college members who have not satisfied the C1 requirement. (General Education Code(s): T5-Humanities and Arts or Social Sciences, C1.)

80B. Rhetoric and Inquiry: Power and Representation.
Explores the intersections of investigations, interpretation, and persuasion, and hones strategies for writing and research. Explores relationships between individuals and their communities—communities as small as families and friends, colleges and cities; communities as large as nations and the world. Examines ways we constitute ourselves as individuals in relation to communities, focusing on representations of class, ethnicity, sexual orientation, gender, and race in several genres—critical theory, film, art, fiction, non-fiction, and theater. Students cannot receive credit for this course and course 80A. Prerequisite(s): satisfaction of the Entry Level Writing and C1 requirements. Enrollment restricted to first-year college members. (General Education Code(s): T5-Humanities and Arts or Social Sciences, C2.)

Merrill College

80A. Introduction to University Discourse: Cultural Identities and Global Consciousness.
Explores rhetorical principles and conventions of university discourse, providing intensive practice in analytical writing, critical reading, and speaking. Examines world poverty, imperialism, and nationalism; peoples' need to assert their cultural identities; and the benefits of individuals' absorption in worthy causes. Students cannot receive credit for this course and course 80B. Enrollment restricted to first-year college members who have not satisfied the C1 requirement. (General Education Code(s): T3-Social Sciences, C1, E.)

80B. Rhetoric and Inquiry: Cultural Identities and Global Consciousness.
Explores the intersections of investigation, interpretation, and persuasion and hones strategies for writing and research. Examines world poverty, imperialism, and nationalism; peoples' need to assert their cultural identities; and the benefits of individuals' absorption in worthy causes. Incorporates outside research. Students cannot receive credit for this course and course 80A. Prerequisite(s): satisfaction of the Entry Level Writing and C1 requirements. Enrollment restricted to first-year college members. (General Education Code(s): T3-Social Sciences, C2, E.)

85B. Merrill Classroom Connection Field Study (3 credits).
Supervised hands-on experience assisting in local elementary classrooms. Students attend UCSC class meetings, complete relevant readings in educational theory, and present a final assignment. Priority enrollment restricted to Merrill College members. May be repeated for credit. (General Education Code(s): PR-S.)

85C. Merrill Classroom Connection Field Study (2 credits).
Supervised hands-on experience assisting in local elementary school classrooms. Students also attend UCSC course meetings, complete relevant readings in educational theory, and present a final assignment. Priority enrollment restricted to Merrill College members. May be repeated for credit. (General Education Code(s): PR-S.)

Oakes College

80A. Introduction to University Discourse: Communicating Diversity for a Just Society.
Explores rhetorical principles and conventions of university discourse providing intensive practice in analytical writing, critical reading, and speaking. Examines historical and contemporary aspects of multiculturalism in the U.S. Explores how social inequality based on ethnicity, race, class, and gender occurs among all levels of society. Students cannot receive credit for this course and course 80B. (Formerly Introduction to University Discourse: Values and Change in a Diverse Society.) Enrollment restricted to first-year college members who have not satisfied the C1 requirement. Enrollment limited to 22. (General Education Code(s): T5-Humanities and Arts or Social Sciences, C1, E.)

80B. Rhetoric and Inquiry: Communicating Diversity for a Just Society.
Explores intersections of investigation, interpretation, and persuasion and hones strategies for writing and research. Examines historical and contemporary aspects of multiculturalism in the U.S. Explores how social inequality based on ethnicity, race, class, and gender occurs among all levels of society. Students cannot receive credit for this course and course 80A. (Formerly Rhetoric and Inquiry: Values and Change in a Diverse Society.) Prerequisite(s): satisfaction of the Entry Level Writing and C1 requirements. Enrollment restricted to first-year college members. Enrollment limited to 22. (General Education Code(s): T5-Humanities and Arts or Social Sciences, C2, E.)

80C. Introduction to University Discourse: Communicating Diversity for a Just Society Writing Intensive 1.
Explores rhetorical principles and conventions of university discourse and provides intensive practice in analytical writing, critical reading, and speaking. Examines historical and contemporary aspects of multiculturalism in the U.S. Explores how social inequality based on ethnicity, race, class, and gender occurs among all levels of society. More writing-intensive than course 80A; prerequisite to course 80D. Enrollment restricted to first-year college members who have not satisfied the C1 requirement. Enrollment limited to 22.

Porter College

22A. Day of the Dead (2 credits).
Day of the Dead: Creating an Exhibition—an exploration of art created to celebrate death in Mexican, Chicano, and American culture. Culminates in the creation of a Day of the Dead ceremony and community altar including students' individual art pieces. Enrollment restricted to college members. Enrollment limited to 25. (General Education Code(s): A.)

80A. Introduction to University Discourse: Writing Across the Arts.
Explores rhetorical principles and conventions of university discourse, providing intensive practice in analytical writing, critical reading, and speaking. Study, discuss, and write about social, political, and aesthetic issues raised by selected works of literature and art in a variety of media. Students cannot receive credit for this course and course 80B. Enrollment restricted to first-year college members who have not satisfied the C1 requirement. (General Education Code(s): T4-Humanities and Arts, C1.)

80B. Rhetoric and Inquiry: Writing Across the Arts.
Explores the intersections between rhetoric (persuasion) and inquiry (investigation) and hones strategies for effective reading, writing, speaking, and research. Read, discuss, research, and write about social, political, and aesthetic issues raised by selected works of literature and art in a variety of media. Students cannot receive credit for this course and course 80A. Prerequisite(s): satisfaction of the Entry Level Writing and C1 requirements. Enrollment restricted to first-year college members. (General Education Code(s): T4-Humanities and Arts, C2.)

83. Pacific Rim Film Festival: Viewing Across Cultures (2 credits).
Involves viewing Asian and Pacific films at the annual Pacific Rim Film Festival, participating in post-screening discussions with area experts, and writing on the issues of cross-cultural viewing/reading of film. Enrollment restricted to college members. Enrollment limited to 20. May be repeated for credit. (General Education Code(s): A.)

121C. Opera Workshop/Music Practicum (2 credits).
Rehearsal of the principal vocal parts of an opera in preparation for a full production. Consideration of the dramatic aspects of each role and the interrelationships of the characters. Enrollment limited to 25. May be repeated for credit. (General Education Code(s): A.)

180. Writing Across the Arts: Pedagogical Practicum.
Advanced undergraduates selected for this course lead small group sections that explore social, political, and aesthetic issues raised by selected works of art in a variety of media. Participants also tutor first-year students in writing about these arts texts. Apply and interview for this course in the spring. Enrollment limited to 25. (General Education Code(s): IM.)

Stevenson College

24. Cultural Intelligence: Diversity Facilitator Team (2 credits).
Students who apply for this course have the opportunity to become members of the diversity facilitator team (DFT) and be requested to deliver workshops. Instruction focuses primarily on develop cultural intelligence (CQ) and sharpening facilitation skills. Enrollment by permission of instructor. Enrollment restricted to sophomores, juniors, seniors, and graduate students. Enrollment limited to 18.

80A. Introduction to University Discourse: Self and Society.
Explores rhetorical principles and conventions of university discourse providing intensive practice in analytical writing, critical reading, and speaking. Stevenson's core course considers the roots of modern society using foundational religious texts and major classical and modern philosophical works. Students cannot receive credit for this course and course 80B. Enrollment restricted to first-year college members who have not satisfied the C1 requirement. Enrollment limited to 25. (General Education Code(s): T5-Humanities and Arts or Social Sciences, C1.)

80B. Rhetoric and Inquiry: Self and Society.
Explores the intersections of investigation, interpretation, and persuasion and hones strategies for writing and research. Stevenson's core course investigates the roots of modern society, using foundational religious texts and classical and modern philosophical works. Students cannot receive credit for this course and course 80A. Prerequisite(s): satisfaction of the Entry Level Writing and C1 requirements. Enrollment restricted to first-year college members. Enrollment limited to 25. (General Education Code(s): T5-Humanities and Arts or Social Sciences, C2.)

Applied Mathematics and Statistics

2. Pre-Statistics.
Reviews and introduces mathematical methods useful in the elementary study of statistics, including logic, real numbers, inequalities, linear and quadratic equations, functions, graphs, exponential and logarithmic functions, and summation notation. Prerequisite(s): Mathematics 2 or placement exam score of 20 or higher. (General Education Code(s): MF, Q.)

5. Statistics.
Introduction to statistical methods/reasoning, including descriptive methods, data-gathering (experimental design and sample surveys), probability, interval estimation, significance tests, one- and two-sample problems, categorical data analysis, correlation and regression. Emphasis on applications to the natural and social sciences. Students cannot receive credit for this course if they have already received credit for course 7. (General Education Code(s): SR, IN, Q.)

7. Statistical Methods for the Biological, Environmental, and Health Sciences.
Case-study-based introduction to statistical methods as practiced in the biological, environmental, and health sciences. Descriptive methods, experimental design, probability, interval estimation, hypothesis testing, one- and two-sample problems, power and sample size calculations, simple correlation and simple linear regression, one-way analysis of variance, categorical data analysis. (Formerly Statistical Methods for the Biological and Environmental Sciences.) Prerequisite(s): score of 31 or higher on mathematics placement exam, or course 2 or 3 or 11A or 15A or Mathematics 3 or 11A or 19A. Concurrent enrollment in course 7L is required. (General Education Code(s): SR, IN, Q.) H. Lee, A. Rodriguez, D. Draper, R. Prado

7L. Statistical Methods for the Biological, Environmental, and Health Sciences Laboratory (2 credits).
Computer-based laboratory course in which students gain hands-on experience in analysis of data sets arising from statistical problem-solving in the biological, environmental, and health sciences. Descriptive methods, interval estimation, hypothesis testing, one-and two-sample problems, correlation and regression, one-way analysis of variance, categorical data analysis. (Formerly Statistical Methods for the Biological and Environmental Sciences Laboratory.) Prerequisite(s): score of 31 or higher on mathematics placement exam, course 2 or 3 or 11A or 15A or Mathematics 3 or 11A or 19A. Concurrent enrollment in course 7 is required.

10. Mathematical Methods for Engineers I.
Applications-oriented course on complex numbers and linear algebra integrating Matlab as a computational support tool. Introduction to complex algebra. Vectors, bases and transformations, matrix algebra, solutions of linear systems, inverses and determinants, eigenvalues and eigenvectors, and geometric transformations. Students cannot receive credit for this course and for courses 10A or Mathematics 21. Prerequisite(s): Score of 40 or higher on mathematics placement exam, or course 3, or Mathematics 3. (General Education Code(s): MF, Q.) The Staff, H. Wang, Q. Gong, J. Katznelson, N. Brummell, B. Mendes

10A. Basic Mathematical Methods for Engineers I (3 credits).
Applications-oriented course on complex numbers and linear algebra integrating Matlab as a computational support tool. Introduction to complex algebra. Vectors, bases and transformations, matrix algebra, solutions of linear systems, inverses and determinants. Students cannot receive credit for this course and courses 10 or Mathematics 21. Prerequisite(s): Score of 40 or higher on mathematics placement exam, or course 3, or Mathematics 3.

11A. Mathematical Methods for Economists I.
Introduction to mathematical tools and reasoning, with applications to economics. Topics are drawn from differential calculus in one variable and include limits, continuity, differentiation, elasticity, Taylor polynomials, and optimization. (Also offered as Economics 11A. Students cannot receive credit for both courses.) Students who have already taken Mathematics 11A and 19A should not take this course. Prerequisite(s): score of 31 or higher on Math Placement Exam. Students who do not place into precalculus should enroll in Mathematics 2. (General Education Code(s): IN, Q.)

11B. Mathematical Methods for Economists II.
Mathematical tools and reasoning, with applications to economics. Topics are drawn from multivariable differential calculus and single variable integral calculus, and include partial derivatives, linear and quadratic approximation, optimization with and without constraints, Lagrange multipliers, definite and indefinite integrals, and elementary differential equations. (Also offered as Economics 11B. Students cannot receive credit for both courses.) Prerequisite(s): course 11A , Economics 11A, Mathematics 11A, or Mathematics 19A. (General Education Code(s): MF, IN, Q.)

80A. Gambling and Gaming.
Games of chance and strategy motivated early developments in probability, statistics, and decision theory. Course uses popular games to introduce students to these concepts, which underpin recent scientific developments in economics, genetics, ecology, and physics. (General Education Code(s): SR, T7-Natural Sciences or Social Sciences, Q.)

118. Estimation and Introduction to Control of Stochastic Processes.
Provides practical knowledge of Kalman filtering and introduces control theory for stochastic processes. Selected topics include: state-space modeling; discrete- and continuous-time Kalman filter; smoothing; and applications in feedback control. Students learn through hands-on experience. Students cannot receive credit for this course and course 218. Enrollment by permission of instructor. (General Education Code(s): SR.)

131. Introduction to Probability Theory.
Introduction to probability theory and its applications. Combinatorial analysis, axioms of probability and independence, random variables (discrete and continuous), joint probability distributions, properties of expectation, Central Limit Theorem, Law of Large Numbers, Markov chains. Students cannot receive credit for this course and course 203 and Computer Engineering 107. Prerequisite(s): course 11B or Economics 11B or Mathematics 11B or 19B. (General Education Code(s): SR, Q.)

200. Research and Teaching in AMS (3 credits).
Basic teaching techniques for teaching assistants, including responsibilities and rights; resource materials; computer skills; leading discussions or lab sessions; presentation techniques; maintaining class records; and grading. Examines research and professional training, including use of library; technical writing; giving talks in seminars and conferences; and ethical issues in science and engineering. Enrollment restricted to graduate students.

203. Introduction to Probability Theory.
Introduces probability theory and its applications. Requires a multivariate calculus background, but has no measure theoretic content. Topics include: combinatorial analysis; axioms of probability; random variables (discrete and continuous); joint probability distributions; expectation and higher moments; central limit theorem; law of large numbers; and Markov chains. Students cannot receive credit for this course and course 131 or Computer Engineering 107. Enrollment restricted to graduate students, or by permission of the instructor.

211. Foundations of Applied Mathematics.
Accelerated class reviewing fundamental applied mathematical methods for all sciences. Topics include: multivariate calculus, linear algebra, Fourier series and integral transform methods, complex analysis, and ordinary differential equations. Enrollment restricted to graduate students.

218. Estimation and Introduction to Control of Stochastic Processes.
Provides practical knowledge of Kalman filtering and introduces control theory for stochastic processes. Selected topics include: state-space modeling; discrete- and continuous-time Kalman filter; smoothing; and applications in feedback control. Students learn through hands-on experience. Students cannot receive credit for this course and course 118. Enrollment restricted to graduate students.

263. Stochastic Processes.
Includes probabilistic and statistical analysis of random processes, continuous-time Markov chains, hidden Markov models, point processes, Markov random fields, spatial and spatio-temporal processes, and statistical modeling and inference in stochastic processes. Applications to a variety of fields. Prerequisite(s): course 205A, 205B, or 261, or by permission of instructor.

280A. Seminar in Mathematical and Computational Biology (2 credits).
Weekly seminar on mathematical and computational biology. Participants present research findings in organized and critical fashion, framed in context of current literature. Students present own research on a regular basis. Enrollment restricted to graduate students. Enrollment limited to 20. May be repeated for credit.

280B. Seminars in Statistical and Applied Mathematical Modeling (2 credits).
Weekly seminar series covering topics of current research in applied mathematics and statistics. Permission of instructor required. Enrollment restricted to graduate students. (Formerly Seminar in Applied Mathematics and Statistics.) May be repeated for credit.

280C. Seminar in Geophysical and Astrophysical Fluid Dynamics (2 credits).
Weekly seminar/discussion group on geophysical and astrophysical fluid dynamics covering both analytical and computational approaches. Participants present research progress and findings in semiformal discussions. Students must present their own research on a regular basis. Enrollment restricted to graduate students. May be repeated for credit.

American Studies

100. Key Concepts in American Studies.
Provides majors with an in-depth introduction to American studies and the major at UCSC. Introduces key American studies concepts and highlights the emphases of this major. Careful attention paid to critical reading skills and analytical writing. Required of all American studies majors. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to American studies majors. Enrollment limited to 20. (General Education Code(s): W.)

102. Reading Culture.
Introduction to theoretical and methodological debates at the center of cultural studies as practiced in American studies. Balances theoretical readings with case studies to explore wide-ranging cultural productions and formations from different disciplinary perspectives and interpretive frameworks. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to American studies majors. Enrollment limited to 25.

112. Immigration and Assimilation.
Examines immigration to U.S. from colonial era to present with special emphasis on issues of citizenship, social identities, and social membership. (General Education Code(s): ER.)

113A. Imagining America.
Examination of varied and often conflicting ways the ambiguous entity conventionally labeled "America" has been imagined, both positively and negatively, in political speeches, painting, fiction, film, television, music, drama, advertising, parades, and other modes of expression.

123M. Celluloid Natives: American Indian History on Film.
Examines how American Indian history and culture has been portrayed in Hollywood films, with an emphasis on films that represent Native Americans over the broad spectrum of Native American/white relations. (General Education Code(s): IM, E.)

150. Mediating Desire.
From a foundation in semiotics, considers the ways race and gender are constructed, understood, performed, embraced, commodified, and exploited through representations. Uses representations of, by, and for the margins to engage theories of communication, identity, and representation. Creative final projects encouraged. (Formerly Community Studies 152) (Also offered as Feminist Studies 150. Students cannot receive credit for both courses.) Enrollment restricted to sophomore,

junior, and senior American studies majors or by permission of instructor. Enrollment limited to 100. (General Education Code(s): ER, E.)

180. Special Topics in American Studies.
Highlights important, relevant, and topical themes in American studies and society. By closely examining one topic or theme, students connect larger issues and think across areas of study. Topics include: the prison industrial complex; radical traditions in America; race and cultural exchange; and citizenship in America. May be repeated for credit.

190. Senior Research Seminars.
As a capstone, this seminar begins by reflecting on the field of American studies or on a topic that defines it. Students then develop a research project relevant to their emphasis in the major. Focus and topics vary by instructor. Satisfies American studies senior comprehensive requirement. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to American studies majors. Enrollment limited to 25.

Anthropology

1. Introduction to Human Evolution.
Study of evolution illustrated by Pleistocene hominid fossils and variation in living human groups. Behavior and evolution of primates examined as they contribute to the understanding of human evolution. Required for all anthropology majors. (General Education Code(s): SI, IN.)

80I. Culture and Power in Latin America.
Introduces key issues in the anthropology of Latin America, with emphasis on identity formation, cultural practices, and power. Major themes include race, class, and gender as intersecting forms of oppression, violence, and terror and indigenous social movements. (General Education Code(s): T3-Social Sciences, E.)

81A. Mexican Folklórico Dance (2 credits).
Provides instruction in the aesthetic, cultural, and historical dimensions of Mexican folklórico dance. Students taught choreographed dances from various regions of Mexico and also learn dance techniques (técnica) and stage make-up application. Additional workshops and lectures offered to supplement class. Open to all students; no previous experience required. (Also offered as Latin American and Latino Studies 81A. Students cannot receive credit for both courses.) May be repeated for credit. (General Education Code(s): PR-C, A.)

101. Human Evolution.
Study of human evolution covering the last five million years. Examines the fossil evidence and emphasizes the reconstruction of behavior from the paleontological and anatomical evidence. Prerequisite(s): course 1. Offered in alternate academic years.

102A. Human Skeletal Biology.
Presents basic human osteology allowing students to identify skeletal material by element. Emphasizes the dynamic nature of bone by integrating anatomy with a discussion of bone physiology within the context of the human life cycle. Prerequisite(s): course 1. Enrollment limited to 16.

124. Anthropology of Religion.
Study of the phenomenon of religion as manifested in ethnographic literature, with special attention to traditional and recent modes of analysis of religious behavior. Special topics include myth, religious healing, witchcraft and sorcery, ritual, and millenarian movements.

130G. Asian Americans in Ethnography and Film.
Critically examines category of Asian Americans. Addresses historic representations of Asians and Asian Americans in ethnographic research and film. Explores contemporary issues of race, culture, and politics through ethnographic practice and cultural production. Will be offered in the 2009–2010 academic year. (General Education Code(s): E.)

130J. Politics and Statemaking in Latin America.
Introduction to ethnohistory and political anthropology of one or more Latin American countries: Typically Mexico and one other country. Students explore how contested concepts such as indigeneity, nation or state come to gain credibility and are deployed in contemporary politics. (General Education Code(s): CC.)

130N. Native Peoples of North America.
A survey of Native American cultures and experience during the past century, with emphasis on Pueblo cultures of the American Southwest. (General Education Code(s): ER, E.)

130T. Religion and Politics in the Muslim World.
Analyzes post-colonial forms of Islam, with particular attention to Muslim societies and cultures in the Middle East, North Africa, and Europe. Emphasizes the relationship between power, knowledge, and representation in anthropological approaches to Islam and Muslims. (Formerly Anthropological Approaches to Islam.) (General Education Code(s): CC, E.)

131. Women in Cross-Cultural Perspective.
Examines the diversity of women's as well as men's roles, experiences, and self-conceptions in a number of societies to explore how women and men shape, and are shaped by, particular forms of social life. Prerequisite(s): course 2. Offered in alternate academic years.

134. Medical Anthropology: An Introduction.
Cross-cultural study of health, disease, and illness behavior from ecological and ethnomedical perspectives. Implications for biomedical health care policy. Prerequisite(s): course 2.

142. Anthropology of Law.
An ethnographically informed consideration of law, dispute management, and social control in a range of societies including the contemporary U.S. Topics include conflict management processes, theories of justice, legal discourse, and relations among local, national, and transnational legal systems. (Also offered as Legal Studies 142. Students cannot receive credit for both courses.) Enrollment restricted to anthropology and legal studies majors.

150. Communicating Anthropology.
Encourages anthropology majors to explore different means of communicating anthropology with much attention to individual writing and presentation skills. Intensive work on library research; recognizing, comparing, and making arguments; and analyzing ethnographies, articles, reviews, and films. Prerequisite(s): two of the following courses: 1, 2, or 3; satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to sophomore and junior anthropology majors. (General Education Code(s): W.)

154. Multimedia Ethnography.
Students learn the fundamentals of photography or video production and audio recording in order to create mini-ethnographies. Prerequisite(s): courses 1, 2, and 3. Concurrent enrollment in course 154L is required. Enrollment restricted to anthropology majors. Enrollment limited to 40. (General Education Code(s): PR-C.) S. Errington

154L. Multimedia Laboratory (2 credits).
Designed to instruct in aesthetics and technical production of a short digital slideshow. Using iMovie3 editing program, produce a digital slideshow incorporating sound (narration, music, and sound effects) and still images. Concurrent enrollment in course 154 required. Enrollment limited to 12.

163. Kinship.
Provides a critical survey of debates, old and new, in the study of kinship. Readings range from classical treatments to recent reformulations that use kinship as a lens for exploring intimacy, memory, futurity, embodiment, commodification, and power. Students cannot receive credit for this course and course 263.

170. History of Archaeological Theory.
Historical review of prehistoric archaeology from antiquarianism to the present. Emphasis on development of archaeological theory and its relation to evolutionary and anthropological theory. Students cannot receive credit for this course and course 270. Prerequisite(s): course 3; satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to anthropology and Earth sciences/anthropology combined majors. Recommended for juniors. (General Education Code(s): W.)

176B. Meso-American Archaeology.
Review of the archaeological and ethnohistorical evidence for the origins and development of pre-Columbian civilizations in Meso-America including the Olmec, Maya, Zapotec, Mixtec Teotihuacan, Toltec, Tarascan, and Aztec. Prerequisite(s): course 3.

178. Historical Archaeology: A Global Perspective.
Introduces archaeology of European colonialism and the early-modern world. Topics include historical archaeological methods; the nature of European colonial expansion in New and Old Worlds; culture contact and change; and power and resistance in colonial societies. Students cannot receive credit for this course and Anthropology 278. Prerequisite(s): course 3 or consent of instructor.

194R. Religion, Gender, Sexuality.
Examines religion in relation to gender and sexuality. Examines how gender, sexuality, and religion intersect in notions of civilization, progress, and modernity in the contemporary and colonial periods. Particular attention paid to Islam, Christianity, and Hinduism. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, and courses 1 and 2 and 3. Enrollment restricted to senior anthropology majors. Enrollment limited to 20. (General Education Code(s): W.)

194S. Hearing Culture: The Anthropology of Sound.
Explores relationships between culture and acoustic worlds—environmental, verbal, and musical—within which we live. How sound is shaped by human belief and practice and the role sound plays in cultural and social life, both past and present. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements; courses 1, 2, and 3. Enrollment restricted to senior anthropology majors. Enrollment limited to 15. (General Education Code(s): W.)

194V. Picturing Cultures.
A historical, analytical, and practical exploration of the uses of still and moving pictures in ethnographic representations, research, and production. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements; courses 1, 2, and 3; and course 80J, 120, 132, or 154. Enrollment restricted to senior anthropology majors. Enrollment limited to 20. (General Education Code(s): W.)

200A. Core Graduate Course (10 credits).
Introduces history, ethnography, and theory of cultural anthropology with emphasis on awareness of construction of anthropological canon and areas of conflict within it, leading up to contemporary debates on a variety of issues. Two-term course: students must enroll in both quarters. Enrollment restricted to anthropology graduate students. Enrollment limited to 12.

201. Human Evolution.
Provides an overview of the first five million years of human evolution and a framework for studying evolution and reconstructing the human past. Emphasizes that all lines of evidence must be included: hominid fossils, archaeology, paleoecology, and molecular data. Enrollment restricted to graduate students. Enrollment limited to 15.

228. Grant Writing.
Devoted entirely to writing grant proposals. Students either work on their graduate education fellowships or their doctoral dissertation grants or both. Reading materials consist of granting agency documents plus examples of successful applications. Enrollment restricted to anthropology graduate students. Enrollment limited to 15. May be repeated for credit.

263. Kinship.
Provides a critical survey of debates, old and new, in the study of kinship. Readings range from classical treatments to recent reformulations that use kinship as a lens for exploring intimacy, memory, futurity, embodiment, commodification, and power. Students cannot receive credit for this course and course 163. Enrollment restricted to graduate students. Enrollment limited to 15.

268B. Rethinking Capitalism.
Course 268A addressed changes in the theory and practice of capitalism as derivatives markets have become increasingly central to it. This course, which can be regarded as either background or sequel, concerns questions that surround recent debates about derivatives from the standpoint of broader developments in law, culture, politics, ethics, ontology, and theology. What would it mean to see questions of contingency and value as a challenge to late-modern understandings of these modes of thought? (Also offered as History of Consciousness 268B. Students cannot receive credit for both courses.) Enrollment restricted to graduate students. Enrollment limited to 15.

270. History of Archaeology.
Historical review of prehistoric archaeology from antiquarianism to the present. Emphasis on the development of archaeological theory, its relation to evolutionary and anthropological theory, and themes ongoing over time. Students cannot receive credit for this course and course 170. Enrollment restricted to graduate students. Enrollment limited to 15.

276B. Mesoamerican Archaeology.
Examines the pre-Columbian cultures of Mesoamerica and reviews the archaeological and ethnohistorical evidence related to the origins and development of cultures including the Olmec, Maya, Zapotec, Mixtec, and Aztec. Students cannot receive credit for this course and course 176B. Enrollment restricted to graduate students. Enrollment limited to 15.

278. Tutorial on Historical Archaeology.
Tutorial on archaeology of European colonialism and the early-modern world. Focuses on the nature of European colonial expanison in New and Old Worlds; culture contact and change; and power and resistance in colonial societies. Students cannot receive credit for this course and course 178. Enrollment restricted to graduate students. Enrollment limited to 15.

292. Graduate Colloquium (2 credits).
Designed to offer an institutionalized mechanism for the presentation of research papers and teaching efforts by faculty and advanced graduate students. Enrollment restricted to graduate students. May be repeated for credit.

Art

10H. 3D Foundation.
Introduction to three-dimensional sculpture, intermedia, performance art, and technologically based contemporary art. Weekly lectures and section discussions introduce historical, theoretical, and critical methods of viewing and understanding contemporary art. Studio assignments introduce students to a range of contemporary techniques and materials used to make sculptural, performative, and technologically based work. Students are billed a materials fee. Enrollment restricted to pre-art and art majors during priority enrollment. (General Education Code(s): IM, A.)

22. Introduction to Electronics for Intermedia.
Provides basic introduction to electronic devices for use in making intermedia art. Provides hands-on experience working with sensors, motors, switches, gears, lights, simple circuits, and hardware store devices to create kinetic and interactive works of art. Produce sculptural or installation-based projects. Demonstrations, lectures, and critical discussion of work given to develop concepts and technical skills. Students are billed a materials fee. Enrollment restricted to pre-art majors. (General Education Code(s): PR-C, A.)

23. Intermedia I.
Introduction to combining media, materials, and forms to explore contemporary art practices such as installation, time based work, performance, collaboration, and interactivity. Assignments encourage an exploration of conscious subject matter, process, and technique. Discussions, reading handouts, and critiques help develop perceptual and conceptual skills. Skill workshops introduce new techniques. Students are billed a materials fee. Enrollment restricted to pre-art majors. (General Education Code(s): PR-C, A.)

24A. Introduction to Painting: Oil.
Introduction to medium of oil painting and to painting process. Assignments develop understanding of potential of this medium as a tool for perceptual and conceptual exploration. Slide lectures introduce assignments and are basis for class discussion of contemporary and historical art activity in the field. Students are billed a materials fee. (Formerly course 24.) Prerequisite(s): course 20 or 80A. Enrollment restricted to pre-art majors. (General Education Code(s): PR-C, A.)

24B. Introduction to Painting: Acrylic.
Introduction to acrylic painting and to painting process. Assignments develop understanding of this medium's potential as a tool for perceptual and conceptual exploration. Slide lectures introduce assignments and are basis for class discussion of contemporary and historical art activity in this field. Students are billed a materials fee. Prerequisite(s): course 20 or 80A. Enrollment restricted to pre-art majors. (General Education Code(s): PR-C, A.)

36. Relief/Mixed-Media Printmaking.
Introduces relief, monoprinting, and mixed-media printmaking. Explores the traditional and contemporary issues and processes of relief printmaking in conjunction with mono/mixed-media printing which is a blend of drawing, printing, and printmaking in order to expand the creative possibilities of all three. Enrollment restricted to pre-art majors. (General Education Code(s): PR-C.)

38. Digital Printmaking.
Introduces the computer as a creative tool for art-making in the context of print media, primarily as a means for creating and printing digital images. Investigation of conceptual and technical identities in digital image-making as contemporary art practice and visual culture. Students are billed a materials fee. Enrollment restricted to pre-art majors. (General Education Code(s): PR-C.)

40. Sculpture I.
Introduction to a range of concepts and forms used to make contemporary sculpture. Assignments facilitate becoming familiar with sculptural techniques and materials to enable students to visually manifest their sculptural ideas. Combines lectures and demonstrations with work time in class. Students are billed a materials fee. Enrollment restricted to pre-art majors. (General Education Code(s): PR-C, A.)

80A. Introduction to Drawing.
Introductory course for beginners and students not majoring in art. Covers the history of what are considered master drawings from prehistory to the present. Various media are examined and assigned in specific exercises. Course is a balance of historical study and practice through assigned homework exercises. A disciplined performance is expected. Students are billed a materials fee. (General Education Code(s): PR-C, T4-Humanities and Arts, A.)

80D. Introduction to Photography.
Introductory course for beginners and nonmajors. Various techniques examined and assigned in specific exercises. Work on projects using color film; this is a non-darkroom course. Examples given of photography from 1826 to the present. Balances historical study and practice through assigned homework exercises. This is a non-darkroom course and does not satisfy prerequisites

for upper-division photography classes. Students are billed a materials fee. (General Education Code(s): IM, T4-Humanities and Arts, A.)

80F. Introduction to Issues in Digital Media.
Digital media is revolutionizing ways in which artists create and exchange information. Introduces digital media through lectures, demonstrations, and exercises. Topics include networks, imaging, MIDI, interactivity, audio/video, and the World Wide Web. (General Education Code(s): IM, T6-Natural Sciences or Humanities and Arts, A.)

103. Intermediate/Advanced Painting.
Continuation of the development of a basic foundation in painting with emphasis on the development of individual, experimental procedures. Students are billed a materials fee. Prerequisite(s): course 24A or 24B. Enrollment restricted to art majors. May be repeated for credit.

104. Special Topics in Painting.
Special studies in painting as announced. Students are billed a materials fee. Prerequisite(s): course 24A or 24B, and 103. Enrollment restricted to art majors. May be repeated for credit.

105. Special Topics in Drawing.
Special topics in drawing as announced. Students are billed a materials fee. Prerequisite(s): course 20 or 80A. Enrollment restricted to art majors. May be repeated for credit.

114. Lithography I.
Introduction to drawing, processing, and printing of lithographs from stone. Emphasis on discovery of tonal, textural, and expressive potential from the surface of the stone, while establishing individual directions in imagery. Condensed history of the medium, technical theory, and critique in lecture and demonstrations. Students are billed a materials fee. Prerequisite(s): course 20, 25, 26, 27, 33, 36, 38, or 80A. Enrollment restricted to art majors. May be repeated for credit. (General Education Code(s): PR-C, A.)

119. Digital Video.
An exploration of the video medium including production using the digital video format. Digital video cameras will be used to produce digital source material to be manipulated in a non-linear digital editing system. Image manipulation, effects, and editing will be explored. A variety of video structures, theories, concepts, and forms will be examined through production, discussions, and viewing students' and artists' work. Prerequisite(s): course 21 or 22 or 23 or 80F or 118, or by permission of instructor. Enrollment restricted to art majors. May be repeated for credit. (General Education Code(s): PR-C, A.)

130. Intermediate Photography.
Continuation of courses 30 and 32. Students explore visual ideas, directing their work toward individualized goals. Required work includes making photographic prints, reading historical and theoretical works, and examination of photographs. Students are billed a materials fee. Prerequisite(s): course 30, 32 or 80D. Enrollment restricted to art majors. May be repeated for credit.

134. Special Topics in Photography.
Special studies in photography, concentrating on specific subject matter or media. Topics may include documentary photography, landscape, alternative processes, or mixed media. Students are billed a materials fee. Prerequisite(s): course 30, 32, or 80D. Enrollment restricted to art majors. May be repeated for credit.

140. Metal Fabrication.
Focus on teaching intermediate to advanced students the processes and techniques of direct metal fabrication for contemporary sculpture and design. Explores a range of welding, cutting, and forming techniques and processes through demonstrations, slide lectures, field trips, and studio time. Demonstrations, slide lectures, and critical discussion of work help develop technical and conceptual skills. Students are billed a materials fee. (Formerly Metal Sculpture.) Prerequisite(s): one of the following courses: 22, 23, 28, 29, 37, 39, 40, or 41. Enrollment restricted to art majors. May be repeated for credit.

148. Special Topics in Sculpture.
Special topics in sculpture as announced, concentrating on specific aspects of subject matter and media. Students are billed a materials fee. Prerequisite(s): course 23 or 28 or 29 or 37 or 39 or 40 or 143 or 145. Enrollment restricted to art majors. Offered in alternate academic years. May be repeated for credit.

Astronomy and Astrophysics

1. Introduction to the Cosmos.
Overview of the main ideas in our current view of the universe and how these ideas originated. Galaxies, quasars, stars, black holes, and planets. Students cannot receive credit for this course and course 2. (General Education Code(s): SI, IN.)

2. Overview of the Universe.
An overview of the main ideas in our current view of the universe, and how they originated. Galaxies, quasars, stars, pulsars, and planets. Intended primarily for nonscience majors interested in a one-quarter survey of classical and modern astronomy. (General Education Code(s): MF, IN, Q.)

16. Astrobiology: Life in the Universe.
Topics include the detection of extrasolar planets, planet formation, stellar evolution and properties of Mars, the exploration of our solar system and the search for life within it, and the evolution of life on Earth. Intended for science majors and qualified non-science majors. Knowledge of high school physics and an understanding of mathematics at the Math 2 level required. Enrollment limited to 50. (General Education Code(s): MF, IN, Q.)

70. Honors Undergraduate Seminar in Astrophysical Research (2 credits).
Explores current problems in astrophysical research and how they are being solved by practicing scientists. Each presentation-discussion focuses on a different problem or question, explaining how the problem relates to broader astronomical issues, describing the methods used to solve the problem and reviewing the hoped for, or anticipated outcome. Intended for students considering a career in the physical sciences.

112. Physics of Stars.
The leading observational facts about stars as interpreted by current theories of stellar structure and evolution. Spectroscopy, abundances of the elements, nucleosynthesis, stellar atmospheres, stellar populations. Final stages of evolution, including white dwarfs, neutron stars, supernovae. Prerequisite(s): Mathematics 22 or 23A, Physics 5B or 6B, and 101A.

135A. Astrophysics Advanced Laboratory (3 credits).
Introduction to techniques of modern observational astrophysics at optical and radio wavelengths through hands-on experiments. Intended primarily for juniors and seniors majoring or minoring in astrophysics. Offered in some academic years as single-term course 135 in fall, depending on astronomical conditions. (Also offered as Physics 135A. Students cannot receive credit for both courses.) Prerequisite(s): Physics 133 and at least one astronomy course.

171. General Relativity, Black Holes, and Cosmology.
Special relativity is reviewed. Curved space-time, including the metric and geodesics, are illustrated with simple examples. The Einstein equations are solved for cases of high symmetry. Black-hole physics and cosmology are discussed, including recent developments. (Also offered as Physics 171. Students cannot receive credit for both courses.) Prerequisite(s): courses 105, 110A, 110B, and 116A-B-C.

204. Astrophysical Flows.
Explores how physical conditions in astrophysical objects can be diagnosed from their spectra. Discussion topics include how energy flows determine the thermal state of radiating objects and how the physics of radiative transfer can explain the emergent spectral characteristics of stars, accretion disks, Lyman-alpha clouds, and microwave background. (Formerly 204A Physics of Astrophysics I and 204B Physics of Astrophysics II.) Enrollment restricted to graduate students. Offered in alternate academic years.

205. Introduction to Astronomical Research.
Lectures by UCSC faculty on current areas of astronomical and astrophysical research being carried out locally. Enrollment restricted to graduate students.

240A. Galactic and Extragalactic Stellar Systems.
Structure and evolutionary histories of nearby galaxies. Stellar populations, galactic dynamics, dark matter, galactic structure and mass distributions. Peculiar galaxies and starbursting galaxies. Structure and content of the Milky Way. Evolution of density perturbations in the early universe. Hierarchical clustering model for galaxy formation and evolution. Offered in alternate academic years.

289. Adaptive Optics and Its Application.
Introduction to adaptive optics and its astronomical applications. Topics include effects of atmospheric turbulence on astronomical images, basic principles of feedback control, wavefront sensors and correctors, laser guide stars, how to analyze and optimize performance of adaptive optics systems, and techniques for utilizing current and future systems for astronomical observations. (Formerly course 289C.) Enrollment restricted to graduate students. Offered in alternate academic years.

292. Seminar (no credit).
Seminar attended by faculty, graduate students, and upper-division undergraduate students.

Biochemistry and Molecular Bio

100A. Biochemistry.
Fundamentals of molecular biology, structure and function of nucleic acids, and protein structure. Designed for students preparing for research careers in biochemistry and molecular biology. Lecture: 3-1/2 hours; discussion: 1-1/4 hours. Prerequisite(s): Chemistry 108B or 112C; Biology 20A; Concurrent enrollment in BIOL 100K is required.

Biology: Ecology and Evolutionary

20B. Development and Physiology.
Topics in morphology, physiology, development, genetics, and endocrinology selected to exemplify current issues and perspectives in organismic biology. Prerequisite(s): BIOL 20A.

20C. Ecology and Evolution.
Introduction to ecology and evolution covering principles of evolution at the molecular, organismal, and population levels. Evolutionary topics include genetic and phenotypic variation, natural selection, adaptation, speciation, and macroevolution. Also covers behavioral, population, and community ecology including applied ecological issues. .

75. Scientific Diving Certification (2 credits).
Prerequisite for course 161/L, Kelp Forest Ecology, and all research diving performed under the auspices of UCSC or other academic institutions. Course work includes lectures and scuba diving. Topics include subtidal sampling techniques, navigation, low visibility diving, search and recovery, rescues, small boat use, oxygen administration for divers, technical blue water deep diving, physics, and physiology. Apply online at *http://www2.ucsc.edu/sci-diving*. Students are billed a course materials fee that covers costs for equipment use, materials, and transportation. Prerequisite(s): skill level equal to Advanced Scuba Diver Certification, pass scuba physical, provide own scuba gear, be certified in CPR and First Aid; and interview: pass swim test and scuba skills test. Enrollment limited to 16.

109. Evolution.
An examination of the history and mechanisms of evolutionary change. Topics include molecular evolution, natural and sexual selection, adaptation, speciation, biogeography, and macroevolution. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements; BIOL 20A, BIOE 20B, BIOE 20C, and BIOL 105.

112. Ornithology.
Introduction to the evolution, ecology, behavior, and natural history of birds, using exemplary case histories to illustrate key concepts in evolution, ecology, and behavior. Prerequisite(s): BIOE 107, BIOE 109, or BIOE 140. Concurrent enrollment in BIOE 112L is required.

112L. Ornithology Field Studies (2 credits).
Field trips introduce students to field identification skills and field investigation of census, foraging behavior, migration, social behavior, and communication. Examination of specimens in the laboratory will be used to highlight the diversity and taxonomy of birds. Students are billed a materials fee. Some field trips may require students to provide their own transportation. Prerequisite(s): BIOE 107, BIOE 109, or BIOE 140. Concurrent enrollment in BIOE 112 is required. Offered in alternate academic years.

127. Ichthyology.
An introduction to the biology of jawless, cartilaginous, and bony fishes—their classification, evolution, form, physiology, and ecology. Prerequisite(s): BIOL 20A, BIOE 20B, and BIOE 20C. BIOE 127L must be taken concurrently. Offered in alternate academic years.

127L. Ichthyology Laboratory (2 credits).
One laboratory session a week and several field trips to study the biology of fish. Students are billed a materials fee. Prerequisite(s): BIOL 20A, BIOE 20B, and BIOE 20C. BIOE 127 must be taken concurrently. Offered in alternate academic years.

140. Behavioral Ecology.
An introduction to social and reproductive behavior. Emphasis on studies of vertebrates in their natural habitat. Ideas concerning the evolution of social behavior, mating systems, and individual reproductive strategies. Case histories of well-studied animals that illustrate key principles in courtship and mating, parental behavior, and food-getting behavior. Prerequisite(s): BIOL 20A, BIOE 20B, and BIOE 20C.

145. Plant Ecology.
An exploration of the ecology of plant form, function, distribution, abundance, and diversity. Topics include plant adaptations to environmental conditions, life history variation, competition, reproductive ecology, herbivory, and patterns of diversity. Lecture with discussions of original papers and independent field project. Students cannot receive credit for this course and course 245. Prerequisite(s): BIOL 20A, BIOE 20B, and BIOE 20C. BIOE 107 is recommended.

145L. Field Methods in Plant Ecology.
Hands-on exploration of the concepts and techniques of plant ecology. A combination of lab, greenhouse, and field-based exercises (irrespective of weather conditions). Statistical analysis and scientific writing. One required weekend field trip. Students cannot receive credit for this course and course 245L. Students are billed a materials fee. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements; BIOL 20A, BIOE 20B, and BIOE 20C. Concurrent enrollment in BIOE 145 is required. BIOE 107 is recommended. (General Education Code(s): W.)

155. Freshwater Ecology.
Provides an overview of the physical, chemical, and biological processes that characterize inland waters such as lakes, streams, rivers, and wetlands. Also addresses relationships between humans and freshwater, and discusses these challenges in conservation. Prerequisite(s): BIOL 20A, BIOE 20B, and BIOE 20C.

161. Kelp Forest Ecology.
Study of organization of kelp forests as models for examining biological communities. The physical and biotic factors responsible for community organization of kelp forests are explored using original literature and data collected in BIOE 161L. Class meets one full morning each week. Prerequisite(s): by interview only; BIOL 20A, BIOE 20B, and BIOE 20C are required. Students must pass the University Research Diving Certification (contact the diving safety officer, Institute of Marine Sciences, for further information). Enrollment restricted to seniors. BIOE 161L must be taken concurrently; BIOE 107, 120/L, 122/L are recommended. Enrollment limited to 24. Offered in alternate academic years.

161L. Kelp Forest Ecology Laboratory.
Fieldwork using SCUBA to quantitatively and qualitatively examine the abundance and distribution of organisms in kelp forests, with additional laboratory work. Culminates with a directed individual research project. Class meets one full morning each week. Students are billed a materials fee. Admission by interview. Prerequisite(s): BIOL 20A, BIOE 20B, and BIOE 20C; satisfaction of the Entry Level Writing and Composition requirements; BIOE 161 must be taken concurrently; BIOE 107, 120/L, 122/L are recommended. Students must pass the University Research Diving Certification (contact the Diving Safety Officer, Institute of Marine Sciences, for further information). Enrollment limited to 24. Offered in alternate academic years. (General Education Code(s): W.)

165. Marine Conservation Biology.
Initially undertakes an in-depth comparison of the biology and conservation of marine versus terrestrial ecosystems. With this foundation, course examines marine biodiversity loss resulting from overexploitation, habitat loss, species introduction, and pollution, with particular emphasis on the resulting trophic cascades, biodiversity losses, and climate change. Students cannot receive credit for this course and Environmental Studies 120. Prerequisite(s): BIOL 20A, BIOE 20B, and BIOE 20C; OCEA 101 recommended.

183F. Undergraduate Research in Ecology and Evolutionary Biology (2 credits).
Supervised undergraduate research on a project with an ecology and evolutionary biology faculty member for students considering a career based on biological research. Class reviews the philosophy of science, basic statistics, and library searches, and emphasizes how to input data, create graphs, and prepare results for publication, posters, and talks. Enrollment restricted to junior and senior EEB majors conducting research project with EEB faculty member.

183L. Undergraduate Research in Ecology and Evolutionary Biology.
Supervised undergraduate research on a project with an ecology and evolutionary biology faculty member for students considering a career based on biological research. Class reviews the philosophy of science, basic statistics, and library searches, and emphasizes how to input data, create graphs, and prepare results for publication, posters, and talks. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements; enrollment restricted to junior and senior EEB majors conducting research project with EEB faculty member. (General Education Code(s): W.)

200A. Scientific Skills.
Exposes graduate students to teaching skills, understanding the scientific method, searching and organizing literature, grant proposal and scientific writing, data management and presentation, and scientific speaking. Students are evaluated on their participation and the quality of a written research proposal. Enrollment restricted to graduate students.

200B. Advanced Organismal Biology.
Consists of lectures focusing on pivotal topics in ecology and evolution. Relevant background material is developed followed by a critical analysis of readings from the primary literature. Designed to give graduate (and advanced undergraduate) students direct contact

with the major areas of research that are currently at the forefront of organismal biology. Enrollment restricted to graduate students.

245. Plant Ecology.
An exploration of the ecology of plant form, function, distribution, abundance, and diversity. Topics include plant adaptations to environmental conditions, life history variation, competition, reproductive ecology, herbivory, and patterns of diversity. Lecture with discussions of original papers and independent field project. Students cannot receive credit for this course and course 145. Prerequisite(s): BIOE 107 or ENVS 24 or permission of instructor. Concurrent enrollment in BIOE 245L is required except by permission of instructor. Enrollment restricted to graduate students.

245L. Field Methods in Plant Ecology Laboratory.
Hands-on exploration of the concepts and techniques of plant ecology. A combination of lab, greenhouse, and field-based exercises (irrespective of weather conditions), statistical analysis, and scientific writing. One required weekend field trip. Students cannot receive credit for this course and course 145L. Concurrent enrollment in BIOE 245 is required. Enrollment restricted to graduate students. Enrollment limited to 2.

281A. Topics in Basic and Applied Marine Ecology.
Seminar focusing on concepts in basic and applied ecology. Structure rotates quarterly between graduate student research and readings of journal articles and textbooks. Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. Enrollment limited to 10.

281B. Topics in Molecular Evolution (2 credits).
A discussion of current research and literature review on the subject of molecular evolution. Primary focus on recent results on molecular phylogenetics and molecular population genetics. Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. May be repeated for credit.

281C. Topics in Physiological Ecology.
An intensive seminar focusing on the interaction between physiological constraint and life history options and solutions employed by animals. Topics vary from comparative physiology to ecological theory. Participants are required to present results of their own research or review papers of interest. Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. May be repeated for credit. D. Costa

281F. Ecological Research Topics.
Intensive research and discussions on plant-animal interactions. All students undertake a research project and meet weekly with the faculty sponsor to monitor progress. The group meets weekly to discuss experimental design and analysis, specific problems related to the students' research, relevant research papers, or manuscripts that the group members are writing. Each student gives a formal presentation of research plans or progress each quarter. Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. Enrollment limited to 10. May be repeated for credit. L. Fox

281H. Topics in Comparative Marine Physiology.
Intensive seminar on selected topics in marine physiology. Students present results from their own research and discuss recent advances from the literature. Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. May be repeated for credit.

281I. Topics in Disease Ecology, Population Biology, and Conservation.
Selected topics in population biology and disease ecology. Students present results from their own research and discuss recent advances from the literature. (Formerly "Topics in Plant Population and Disease Ecology") Enrollment restricted to graduate students; qualified undergraduates may enroll by permission of instructor. Enrollment limited to 18. May be repeated for credit.

281K. Topics in Plant Evolution.
Intensive seminar on selected topics in plant evolution. Students present results from their own research and discuss recent advances from the literature. Enrollment restricted to graduate students; qualified undergraduates may enroll by permission of instructor. Enrollment limited to 18. May be repeated for credit.

281L. Topics in Behavioral and Evolutionary Ecology.
An intensive seminar on selected topics in behavioral and evolutionary ecology. Students are expected to discuss the current literature and present literature reviews, research proposals, and preliminary results from their ongoing research. Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. Enrollment limited to 10.

281N. Topics in Marine Vertebrate Ecology.
Seminar on the ecology of marine vertebrates. Topics vary from the factors that explain the distribution of marine predators to island biogeography and the ecosystem effects of introduced vertebrates on islands. Enrollment restricted to graduate students. Enrollment limited to 12. May be repeated for credit.

281O. Topics in Plant-Water Relations.
Intensive seminar focusing on fundamental and evolutionary concepts in plant-water relations. Students present results from their own research and discuss recent advances from the literature. Enrollment restricted to graduate students; qualified undergraduates may enroll by permission of instructor. Enrollment limited to 18. May be repeated for credit.

281P. Topics in Plant Population Ecology.
An intensive seminar on selected topics in plant ecology and population biology. Students present results from their own research and discuss recent advances from the literature. Enrollment restricted to graduate students; qualified undergraduates may enroll with permission from instructor. Enrollment limited to 12. May be repeated for credit.

281Q. Topics in Molecular Evolutionary Genetics.
An intensive seminar on selected topics in molecular evolutionary genetics. Students are required to present results from their own research projects, present a critical review paper at least once during the quarter, and submit a written research proposal. Enrollment restricted to graduate students; qualified undergraduate students may enroll with permission of instructor. Enrollment limited to 10. May be repeated for credit.

281R. Topics in Marine Ecology and Evolutionary Biology.
An intensive seminar series focusing on fundamental concepts in marine ecology. Emphasis changes quarter to quarter. At least one quarter per year is devoted to discussion of graduate student research. Other quarters involve reading and evaluating current and classic literature on marine ecology and evolutionary biology. Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. Enrollment limited to 10. May be repeated for credit.

281T. Species Interactions and Coevolution.
The genetics and ecological structure of species interactions, and the role of coevolution between species in shaping biodiversity. Enrollment restricted to graduate students. Enrollment limited to 15. May be repeated for credit.

281U. Topics in Invertebrate Biology.
An intensive study about concepts, theory, and techniques for graduate students conducting research on the ecology, genetics, evolution, systematics, or biodiversity of marine invertebrates. Enrollment restricted to graduate students; advanced undergraduates may enroll with permission of instructor. Enrollment limited to 15. May be repeated for credit.

281V. Topics in Behavioral Ecology.
A discussion of current topics and methods in behavioral ecology and life history evolution. Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. May be repeated for credit.

281W. Topics in Exercise and Environmental Physiology.
A weekly seminar discussion on current research and techniques in mammalian exercise and environmental physiology. Areas covered include locomotor physiology, exercise testing and cardiovascular monitoring, and biomechanics. Oral presentation of ongoing research or current literature required from each student. Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. May be repeated for credit.

294. Ecology, Evolutionary Biology Seminar (no credit).
Selected topics of current interest to ecologists and evolutionary biologists presented by weekly guest speakers. Enrollment restricted to graduate students.

295. Advanced Ecology and Evolutionary Biology Seminar (no credit).
Course consists of extended weekly meetings organized around an advanced theme in theoretical or applied evolutionary biology, ecology, physiology, behavior, or other aspect of oranismal biology. Course is targeted at students who already have reached a professional level of expertise in their field and advanced master students. Enrollment restricted to graduate students. Enrollment limited to 24.

Biology: Molecular Cell and Developmental

15. Undergraduate Research Reports (1 credit).
Undergraduate students who work in faculty research laboratories present the results of their projects. Organized by the Minority Undergraduate Research Program

and the Minority Access to Research Careers Program. Designed for students with membership in the abovementioned programs. Prerequisite(s): qualifications as determined by instructor at first class meeting. May be repeated for credit.

20A. Cell and Molecular Biology.
Introduction to molecular biology, cell physiology, and genetics. Prerequisite(s): Chemistry 1A and 1B. (General Education Code(s): IN.),

20L. Experimental Biology Laboratory (2 credits).
Provides biology majors with the theory and practice of experimental biology. A wide range of concepts and techniques used in the modern laboratory are included in the exercises. Designed to satisfy the introductory biology lab requirement of many medical and professional schools. Students are billed a materials fee. Prerequisite(s): BIOL 20A and previous or concurrent enrollment in BIOE 20B. Enrollment restricted to human biology and health sciences majors; other majors by permission. Enrollment limited to 20.

100. Biochemistry.
An introduction to biochemistry including biochemical molecules, protein structure and function, membranes, bioenergetics, and regulation of biosynthesis. Provides students with basic essentials of modern biochemistry and the background needed for upper-division biology courses. Students who plan to do advanced work in biochemistry and molecular biology should take the Biochemistry and Molecular Biology 100 series directly. Students cannot receive credit for this course after they have completed any two courses from the BIOC 100A, 100B, and 100C sequence with grades of Pass, C, or better. Prerequisite(s): BIOL 20A and BIOE 20B; and CHEM 108A or 112A. Concurrent enrollment in course 100K is required.

100K. Biochemistry Laboratory (2 credits).
Laboratory course providing hands-on experience with, and covering conceptual background in, fundamental techniques in molecular biology and biochemistry, including DNA cloning, PCR, restriction digest, gel electrophoresis, protein isolation, protein quantification, protein immunoblot (Western) analysis, and use of online bioinformatics tools. Students are billed a materials fee. Concurrent enrollment in course 100 or BIOC 100A is required.

105. Genetics.
Mendelian and molecular genetics; mechanisms of heredity, mutation, recombination, and gene action. Prerequisite(s): BIOL 20A.

105L. Eukaryotic Genetics Laboratory.
Classical and newly developed molecular-genetic techniques used to explore genetic variation in wild populations of the fruit fly Drosophila melanogaster. Topics include Mendelian fundamentals, mapping, design of genetic screens, bio-informatic and database analysis, genetic enhancers, and population genetics. Students are billed a materials fee. Prerequisite(s): BIOL 105; BIOL 100 or BIOC 100A recommended; satisfaction of Entry Level Writing and Composition Requirements. Enrollment restricted to biological sciences and affiliated majors; biology minors; non-majors by instructor permission. (General Education Code(s): W.)

110. Cell Biology.
Covers the structure, organization, and function of eukaryotic cells. Topics include biological membranes, organelles, protein and vesicular trafficking, cellular interactions, the cytoskeleton, and signal transduction. Requires a good understanding of basic biochemistry and molecular biology. Prerequisite(s): BIOL 100 or BIOC 100A.

115L. Eukaryotic Molecular Biology Laboratory.
A laboratory designed to provide students with direct training in basic molecular techniques. Each laboratory is a separate module which together builds to allow cloning, isolation, and identification of a nucleic acid sequence from scratch. Students cannot receive credit for this course and course 187L or 287L. Students are billed a materials fee. Prerequisite(s): BIOL 100 or BIOC 100A; previous/concurrent enrollment in course 115; satisfaction of the Entry Level Writing and Composition requirements. Restricted to biological sciences/affiliated majors; biology minors; other majors by permission. Enrollment limited to 20. (General Education Code(s): W.)

119. Microbiology.
Cell and molecular biology of bacteria and their viruses, including applications in medicine, public health, agriculture, and biotechnology. (Also offered as Microbiol & Environ Toxicology 119. Students cannot receive credit for both courses.) Prerequisite(s): BIOL 100 or BIOC 100A.

119L. Microbiology Laboratory.
An introduction to the principles and practices of laboratory microbiology, with a substantial presentation of optical microscopy. Students are billed a materials fee. (Also offered as Microbiology and Environmental Toxicology 119L. Students cannot receive credit for both courses.) Prerequisite(s): previous or concurrent enrollment in BIOL 119 is required; satisfaction of Entry Level Writing and Composition requirements. Enrollment restricted to biological sciences and affiliated majors; biology minors; other majors by permission. (General Education Code(s): W.)

121L. Environmental Phage Biology Laboratory.
Introduction to hypothesis-driven laboratory research. Students isolate a unique bacteriophage and characterize its structure and genome. An understanding of molecular biology and basic genetics required. Students are billed a materials fee. Enrollment by online application and permission of instructor. Enrollment restricted to biological sciences and affiliated majors with sophomore standing or higher. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. Enrollment limited to 20.

125. Introduction to Neuroscience.
The structure and function of the nervous system. Topics include elementary electrical principles, biophysics and physiology of single nerve and muscle cells, signal transduction at synapses, development of the nervous system, and neural basis of behavior. Requires a good understanding of basic biochemistry, cell biology, and molecular biology. Prerequisite(s): BIOL 100. Concurrent enrollment in BIOL 105 or 110 is encouraged.

130. Human Physiology.
Function, organization, and regulation of the major organ systems of humans, with emphasis on integration among systems. Students cannot receive credit for this course and course 131. Prerequisite(s): BIOL 20A, BIOE 20B, BIOL 100, and BIOL 110.

130L. Human Physiology Laboratory (2 credits).
Examines fundamental principles of systemic physiology focusing on the human. Students cannot receive credit for this course and BIOE 131L. Students are billed a materials fee. (General Education Code(s): W satisfied by taking this course and course 189.) Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements; BIOL 20A, BIOE 20B, BIOL100, and BIOL 110. Previous or concurrent enrollment in BIOL130 is required; restricted to biological sciences and affiliated majors; biology minors; other majors by permission.

181. Computational Biology Tools.
Hands-on laboratory geared to teach basic tools used in computational biology (motif searching, primer selection, sequence comparison, multiple sequence alignment, genefinders, phylogenetics analysis, X-ray crystallography software). Web- and Unix-based tools/databases are used. Open to all science students; no prior Unix experience required. (Also offered as Biomolecular Engineering 110. Students cannot receive credit for both courses.) Prerequisite(s): course 100, 105, or Biochemistry 100A or declared bioinformatics majors. Enrollment limited to 25.

186F. Undergraduate Research in MCD Biology (2 credits).
Supervised undergraduate research in laboratory of an MCD biology faculty member accompanied by weekly lectures on ethical and practical scientific issues. Topics include laboratory safety; the scientific method; the collection, treatment, and presentation of data; critical evaluation of scientific literature; scientific misconduct; and peer review. Career issues, including how to apply for admission to graduate and professional schools, also discussed. Prerequisite(s): BIOL 20A and BIOE 20B; at least one of BIOL 100, BIOL 105, or BIOC 100A; and permission of instructor. May be repeated for credit.

186L. Undergraduate Research in MCD Biology.
Supervised undergraduate research in laboratory of an MCD biology faculty member accompanied by weekly lectures on ethical and practical scientific issues. Topics include laboratory safety; the scientific method; the collection, treatment, and presentation of data; critical evaluation of scientific literature; scientific misconduct; and peer review. Career issues, including how to apply for admission to graduate and professional schools, also discussed. Prerequisite(s): satisfaction of the Entry-Level Writing and Composition requirements; courses BIOL 20A and BIOE 20B; at least one of BIOL 100, BIOL 105, or BIOC 100A; and permission of instructor. (General Education Code(s): W.)

187L. Molecular Biotechnology Laboratory.
An intensive molecular biology laboratory that presents procedures used in molecular and biotechnology research. Topics and procedures include DNA/RNA isolation, cloning and library construction, southern and northern hybridization, DNA fingerprinting, PCR, manual and automated sequencing, and computer methods for analyzing molecular data. New procedures currently being developed in biotechnology industries

are presented by industry representatives. Students cannot receive credit for this course and BIOL 116L or BIOL 287L. Students are billed a materials fee. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements and BIOL 20A, BIOE 20B, BIOE 20C, BIOL 100, and BIOL 110. Enrollment limited to 20.

186R. Undergraduate Research in MCD Biology.
Supervised undergraduate research in the laboratory of an MCD biology faculty member accompanied by weekly lectures on practical scientific issues. Topics include: laboratory safety; the scientific method; the collection, treatment, and presentation of data; critical evaluation of scientific literature; ethics and scientific misconduct; and peer review. Career issues, including how to apply for admission to graduate and professional schools, are discussed. Students cannot receive credit for this course and course 186L. Prerequisite(s): BIOL 100K and previous completion of the Disciplinary Communication requirement, and permission of instructor. May be repeated for credit.

189. Health Sciences Internship.
Structured off-campus learning experience providing hands-on experience and pre-professional mentoring in a variety of health-related settings. Interns are trained and supervised by a professional at their placement and receive academic guidance from their faculty sponsor. Students spend 10-12 hours per week at their placement, participate in weekly discussion meetings on campus, keep a reflective journal, and submit a final paper. Enrollment by application. Students interview with health sciences internship coordinator; applications are due one quarter in advance to the Health Sciences Internship Office. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to human biology majors. (General Education Code(s): W satisfied by taking this course and BIOL 130L.)

189F. Health Sciences Internship (2 credits).
Structured off-campus learning experience providing hands-on experience and pre-professional mentoring in a variety of health-related settings. Interns are trained and supervised by a professional at their placement, and receive academic guidance from their faculty sponsor. Students spend six hours per week at their placement, keep a reflective journal, and submit a final paper. Enrollment by application. Students interview with health sciences internship coordinator. Applications due one quarter in advance to the Health Sciences Internship Office. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. May be repeated for credit.

200A. Critical Analysis of Scientific Literature.
Development of critical thinking skills via discussion of research articles on a broad range of topics. Prepares students to critically evaluate research publications, and improves their ability to organize effective oral presentations and to evaluate the oral presentations of other scientists. Enrollment restricted to graduate students in MCD biology, or by permission of instructor. (Formerly Critical Analysis of Genetics and Molecular Biology.) Enrollment limited to 20.

200B. Advanced Molecular Biology.
An in-depth coverage of the structure, function, and synthesis of DNA, RNA, and proteins. Discussion of the roles of macromolecules in the regulation of information in the cell. Prerequisite(s): Enrollment restricted to graduate students.

206. Introduction to Stem Cell Biology.
Fundamental concepts, experimental approaches, and current advances in stem cell biology, with consideration of key ethical issues. Topics include: self-renewal and differentiation; the microenvironment; epigenetics; cell-cycle regulation; and how basic research translates to medical therapeutics. Ethical, moral, and political issues surrounding stem cell research are discussed with lectures from philosophy and other relevant disciplines. Enrollment restricted to graduate students. Enrollment limited to 15.

280A. Topics in Research on Molecular Genetics of Yeast (2 credits).
Intensive research seminar on the structure and function of the gene expression machinery in the simple eukaryote Saccharomyces cervisiae and its relationship to the human gene expression machinery. Enrollment restricted to graduate students; qualified undergraduates may enroll with approval of instructor. May be repeated for credit.

280B. Chromatin Structure and Transcriptional Regulation (2 credits).
Weekly seminar on structure and gene regulatory function of chromatin. Discusses research of participants and relevant scientific literature. Enrollment restrIcted to graduate students; qualified undergraduates may enroll with permission of instructor. Enrollment limited to 10. May be repeated for credit.

280C. Mammalian Brain Development (2 credits).
Seminar covers research into the development of the mammalian brain. Enrollment restricted to graduate students; undergraduates may enroll with permission of instructor. Enrollment limited to 10. May be repeated for credit.

280D. RNA Processing (2 credits).
A discussion of current research and literature concerning the regulation of precursor messenger RNA processing. Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. Enrollment limited to 10. May be repeated for credit.

280E. Meiotic Chromosome Dynamics (2 credits).
Intensive course on the molecular mechanisms underlying homolog pairing, synapses, and recombination; and how they are regulated, coordinated, and monitored to ensure accurate meiotic chromosome segregation. Enrollment restricted to graduate students; undergraduates may enroll with permission of instructor. May be repeated for credit.

280F. Development of Vertebrate Neural Connections (2 credits).
Intensive research seminar on molecular mechanisms by which neural connections are established during mouse development. Special focus on topographic maps and role of Eph receptors and ephrins in this process. Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. May be repeated for credit.

280H. Topics on Research into Chromatin and Transcription (2 credits).
Seminar covering research into the effects of chromatin on transcription in yeast. Enrollment restricted to graduate students; undergraduates may enroll with permission of instructor. Enrollment limited to 10. May be repeated for credit.

280I. Epigenetic Gene Silencing and Insulators (2 credits).
Intensive course on molecular mechanisms by which insulator elements regulate epigenetic gene silencing. Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. May be repeated for credit.

280J. Structures of Macromolecular Complexes (2 credits).
Focuses on structure and function of the spliceosome using electron microscopy and x-ray crystallography. Participants present results from their own research and relevant journal articles. Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. Enrollment limited to 20. May be repeated for credit.

280K. Topics in Cell Cycle Research (2 credits).
An intensive seminar focusing on current research on the molecular mechanisms that control cell division. Participants are required to present results of their own research or to review journal articles of interest. Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor.

280L. Topics on Neural Development (2 credits).
Seminar covering research into breast development and cancer. Enrollment restricted to graduate students. Enrollment limited to 12. May be repeated for credit.

280M. Post-Transcriptional Control of Mammalian Gene Expression (2 credits).
Intensive course on the molecular mechanisms by which RNA binding proteins regulate gene expression. Enrollment restricted to graduate students; qualified undergraduates may enroll with the permission of the instructor. Enrollment limited to 8. May be repeated for credit.

280N. Structure and Function of Ribosomes (2 credits).
An intensive and advanced course focusing on the structure and function of ribosomes. Participants present research findings in an organized, critical fashion, in the context of current research literature in the ribosome field. Enrollment restricted to graduate students; qualified undergraduate students may enroll with permission of the instructor. Enrollment limited to 20. May be repeated for credit.

280O. Topics in Bacterial Pathogenesis (2 credits).
Intensive seminar focusing on mechanisms of bacterial pathogenesis of the ulcer-causing bacterium Helicobacter pylori. Participants are required to present results from their own research and relevant journal articles. (Also offered as Microbiol & Environ Toxicology 281O. Students cannot receive credit for both courses.) Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. Enrollment limited to 20. May be repeated for credit.

280Q. Cell Biology of Oocytes, Embryos, and Neurons (2 credits).

Weekly seminar and round-table discussion about research problems and recent advances in molecular motor proteins, cytoskeletons, and the control of force-producing processes. Each participant reports recent advances in their field from current literature, their own primary research questions, current approaches to answering those questions, and their research progress. Enrollment restricted to graduate students; undergraduates may enroll with permission of instructor. Enrollment limited to 10. May be repeated for credit.

280R. Structure and Function of the Nuclear Pore Complex (2 credits).
Intensive and advanced course focusing on structure and function of the nuclear pore complex. Participants present research findings in an organized critical fashion in the context of current research literature in the nucleocytoplasmic transport field. Enrollment restrIcted to graduate students; qualified undergraduates may enroll with permission of instructor. Enrollment limited to 10. May be repeated for credit.

280S. Chromatin and RNA Regulation in C. elegans (2 credits).
Intensive research seminar about regulators of chromatin organization; the composition and function of germ granules; and the roles of both levels of regulation in germline development in C. elegans. Participants present their research results and report on related journal articles. Enrollment restricted to graduate students; undergraduates may enroll with permission of instructor. Enrollment limited to 10. May be repeated for credit.

280T. Molecular Biology of Drosophila Development (2 credits).
An intensive seminar concerning the molecular genetics of Drosophila. Recent research is discussed weekly, with an emphasis on gene regulation and development. Students present their own research or critical reviews of recent articles at least once during the quarter. Enrollment restricted to graduate students. Qualified undergraduates may enroll with permission of instructor. Enrollment limited to 10. May be repeated for credit.

280U. Discussions on the Development of the Drosophila Embryo (2 credits).
Involves a two-hour weekly meeting in which the students discuss topics concerning the cell cycle, early embryonic development, and the cytoskeleton. These discussions critically evaluate ongoing research in this area. Material is drawn from student research and recently published journal articles. Students are also expected to meet individually with the instructor two hours weekly. In addition to a three–five page research proposal, each student gives two one-hour oral presentations. Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. May be repeated for credit.

280W. Membrane Proteins (2 credits).
Seminar on recent research on membrane proteins, with an emphasis on ion-pumping ATPase. Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. Enrollment limited to 20. May be repeated for credit.

280X. Mammalian Developmental and Stem Cell Biology (2 credits).
Explores topics in developmental and stem cell biology, with emphasis on mammalian systems. Students present results of independent research projects in the context of relevant publications and other background information. Course meets once each week. Enrollment restricted to graduate students. May be repeated for credit.

280Y. Activity-Dependent Synaptic Plasticity (2 credits).
Research seminar covering the regulation of synaptic plasticity in the mammalian nervous system, focusing on how the activity regulates the structural and functional dynamics of synapses. Enrollment restricted to graduate students; undergraduates may enroll with permission of instructor. Enrollment limited to 10. May be repeated for credit.

291. Molecular, Cellular, and Developmental Biology Seminar (2 credits).
Topics of current interest in molecular, cellular, and developmental biology are presented weekly by graduate students, faculty, and guest speakers. Enrollment restricted to graduate students. Enrollment limited to 60. May be repeated for credit.

292. MCD Seminar (no credit).
Various topics by weekly guest speakers. Enrollment restricted to graduate students.

Biomolecular Engineering

5. Introduction to Biotechnology.
Introduces the tools and applications of biotechnology in the fields of medicine, agriculture, the environment, and industry. (General Education Code(s): PE-T, IN.)

80G. Bioethics in the 21st Century: Science, Business, and Society.
Serves science and non-science majors interested in bioethics. Guest speakers and instructors lead discussions of major ethical questions having arisen from research in genetics, medicine, and industries supported by this knowledge. (Also offered as Philosophy 80G. Students cannot receive credit for both courses.) (General Education Code(s): PE-T, T6-Natural Sciences or Humanities and Arts.)

80H. The Human Genome.
Course will focus on understanding human genes. Accessible to non-science majors. Will cover principles of human inheritance and techniques used in gene analysis. The evolutionary, social, ethical, and legal issues associated with knowledge of the human genome will be discussed. (General Education Code(s): PE-T, T2-Natural Sciences.)

110. Computational Biology Tools.
Hands-on laboratory geared to teach basic tools used in computational biology (motif searching, primer selection, sequence comparison, multiple sequence alignment, genefinders, phylogenetics analysis, X-ray crystallography software). Web- and Unix-based tools/databases are used. Open to all science students; no prior Unix experience required. (Also offered as Biology: Molecular Cell & Dev 181. Students cannot receive credit for both courses.) Prerequisite(s): Biology 100, 105, or Biochemistry 100A or declared Bioinformatics majors. Enrollment limited to 25.

123A. Bioengineering Project 1 (7 credits).
First of a two-course sequence that is the culmination of the engineering program. Students apply knowledge and skills gained in elective track to complete a major design project. Students complete research, specification, planning, and procurement for a substantial project. Includes technical discussions, design reviews, and formal presentations; engineering design cycle, engineering teams, and professional practices. Formal technical specification of the approved project is presented to faculty. Students are billed a materials fee. Prerequisite(s): course 140 or 150 and Computer Engineering 185.

130. Genomes.
Advanced elective for biology majors, examining biology on the genome scale. Topics include genome sequencing; large scale computational and functional analysis; features specific to prokaryotic, eukaryotic, or mammalian genomes; proteomics; SNP analysis; medical genomics; and genome evolution. Prerequisite(s): Biology 100 or Biochemistry 100A and Biology 105, or approval of instructor. Enrollment limited to 30.

140. Bioinstrumentation.
Introduction to theory, design, and application of bioinstrumentation in clinical, pharmaceutical , and biotechnology laboratories. Highly recommended for students planning careers in the biomolecular industries. Typical topics and demonstrations include thermocycler, polymerase chain reaction (PCR), pyrosequencing, fabless nanofabrication, ion-sensitive measurements, microarray fabrication, and fluorescent-activated cell sorter (FACS). Students are billed a materials fee. Prerequisite(s): course 5, or Biology 100, or Biochemistry and Molecular Biology 100A.

200. Research and Teaching in Bioinformatics (3 credits).
Basic teaching techniques for teaching assistants, including responsibilities and rights of teaching assistants, resource materials, computer security, leading discussion or lab sessions, presentation techniques, maintaining class records, electronic handling of homework, and grading. Examines research and professional training, including use of library and online databases, technical typesetting, writing journal and conference papers, publishing in bioinformatics, giving talks in seminars and conferences, and ethical issues in science and engineering. Required for all teaching assistants. Enrollment restricted to graduate students.

205. Bioinformatics Models and Algorithms.
Covers bioinformatics models and algorithms: the use of computational techniques to convert the masses of information from biochemical experiments (DNA sequencing, DNA chips, and other high-throughput experimental methods) into useful information. Emphasis is on DNA and protein sequence alignment and analysis. Enrollment restricted to graduate students. Undergraduates may enroll with prerequisite(s): Computer Science 12B; and Computer Engineering 107 or Applied Math and Statistics 131; and Biology 20A; and concurrent enrollment in Biochemistry 100A.

207. Biomolecular Recognition.
Course is the core biomolecular-engineering emphasis graduate course. Focuses on the molecular mechanism enabling the flow of information within and between cells in living systems, and its application to engineering new tools for high-throughput molecular-biology research, improving biomedical diagnostics, and aiding treatment of human disease. Prerequisite(s): Equivalent of one full year of undergraduate biochemistry. Enrollment restricted to graduate students.

237. Applied RNA Bioinformatics.

Teaches methods for RNA gene discovery; probabilistic modeling, secondary structure/trans-interaction prediction; mRNA splicing; and functional analysis. Emphasis on leveraging comparative genomics and employing high-throughput RNA sequencing data. Includes lectures, scientific literature discussion, problem sets, and final gene-discovery project. Enrollment restricted to seniors and graduate students.

268B. Science and Justice Research Seminar.
Provides in-depth instruction in conducting collaborative interdisciplinary research. Students produce a final research project that explores how this training might generate research that is more responsive to the links between questions of knowledge and questions of justice. Prerequisite(s): course 268A. Enrollment by permission of instructor. Enrollment restricted to graduate students. (Also offered as Feminist Studies 268B. Students cannot receive credit for both courses.) Enrollment limited to 15.

280B. Seminar on Bioinformatics (2 credits).
Weekly seminar series covering topics of current research in computational biology or bioinformatics. Current research work and literature in these areas are discussed in weekly meetings. May be repeated for credit.

281A. Seminar on Processive Enzymes and Nanopores (2 credits).
Weekly seminar series covering experimental research in nanopore technology and single-molecule analysis of polymerase function. Current research work and literature is discussed. Students lead some discussions and participate in all meetings. Enrollment restricted to graduate students. Qualified undergraduates may enroll with permission of instructor. May be repeated for credit. M. Akeson

281B. HIV Vaccine Research (2 credits).
Weekly seminar series covering topics of HIV vaccine research. Current research work and literature in this area discussed. Students lead some discussions and participate in all meetings. Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. Enrollment limited to 10. May be repeated for credit.

281C. Seminar in Cancer Genomics (2 credits).
Presents current computational biology research to identify genomics-based signatures of cancer onset, progression, and treatment response. Examples of such investigations include: genetic pathway interpretation of multivariate high-throughput datasets; discovery of mutations in whole-genome sequence; identifications and quantification of gene isoforms, alleles, and copy number variants; and machine-learning tools to predict clinical outcomes. Students present their own research, host journal clubs, and attend lectures and teleconferences to learn about research conducted by national and international projects. Enrollment restricted to graduate students. May be repeated for credit.

281E. Seminar in Genomics (2 credits).
Current topics in genomia including high-throughput sequencing, genome assembly, and comparative genomics. Students design and implement independent research projects. Weekly laboratory meetings are held to discuss these projects and related research in the field. Enrollment restricted to graduate students May be repeated for credit.

281F. Blood Cell Development (2 credits).
Weekly seminar covering topics in current research on blood cell development and stem cell biology. Current research and literature in these areas discussed. Students lead some discussions and participate in all meetings. Enrollment restricted to graduate students. Undergraduates may enroll with permission of instructor. Enrollment limited to 10. May be repeated for credit.

281G. Seminar on Protein Structure and Function (2 credits).
Weekly seminar series covering topics of current computational and experimental research in protein structure prediction and design, structure-function relationships and protein evolution. Current research work and literature in these areas discussed. Students lead some discussions and participate in all meetings. (Formerly course 281R.) Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. May be repeated for credit.

281H. Seminar in Comparative Genomics (2 credits).
Weekly seminar series covering topics of current computational and experimental research in comparative genomics. Current research work and literature in this area discussed. Students lead some discussions and participate in all meetings. Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. May be repeated for credit.

281L. Seminar in Computational Genetics (2 credits).
Weekly seminar series covering topics and experimental research in computational genetics. Current research work and literature in this area discussed. Students lead some discussions and participate in all meetings. Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. May be repeated for credit.

281P. Seminar on Nanotechnology and Biosensors (2 credits).
Weekly seminar covering topics of research in the development of new tools and technologies to detect and study genes and proteins. Latest research work and literature in these areas are discussed. Students lead some discussions and participate in all meetings. Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. May be repeated for credit.

281S. Seminar in Computational Functional Genomics (2 credits).
Weekly seminar series covering topics of current computational and experimental research in computational functional genomics. Current research work and literature in this area discussed. Students lead some discussions and participate in all meetings. Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. May be repeated for credit.

Chemistry and Biochemistry

1A. General Chemistry.
First quarter of an integrated study of general chemistry. Covers a range of topics including the atomic structure of matter; molecules; chemical reactions; acids and bases; gases; and equilibria in the gas and liquid phase. Lecture: 3-1/2 hours; discussion: 1-1/4 hours. Students expected to use algebra to solve problems. Prerequisite(s): Course 1P or strong high school level chemistry equivalent to 1P is strongly recommended; taking the online chemistry self-assessment exam is strongly recommended. . (General Education Code(s): SI, IN, Q.)

1B. General Chemistry.
Second quarter of an integrated study of general chemistry. Coverage includes quantum mechanics; the hydrogen atom; many-electron atoms and chemical periodicity; elementary covalent bonding; transition metals; and chemical kinetics. Lecture: 3-1/2 hours, discussion: 1-1/4 hours. Prerequisite(s): Course 1P or strong high school level chemistry equivalent to 1P is strongly recommended; taking the online chemistry self-assessment exam is strongly recommended. Concurrent enrollment in course 1M is recommended. . (General Education Code(s): IN, Q.)

1C. General Chemistry.
Third quarter of an integrated study of general chemistry. Coverage includes thermodynamics; oxidation-reduction and electrochemistry; liquids and solids; intermolecular forces and solutions, including colligative properties; and nuclear chemistry. Lecture: 3-1/2 hours; discussion: 1-1/4 hours. Prerequisite(s): course 1A. Concurrent enrollment in course 1N is required. (General Education Code(s): IN, Q.)

1M. General Chemistry Laboratory (2 credits).
Laboratory sequence illustrating topics covered in courses 1B and 1C and important experimental techniques. Laboratory: 3 hours; lecture: 1-1/4 hours. Students are billed a materials fee. Prerequisite(s): Previous or concurrent enrollment in course 1B is required.

1N. General Chemistry Laboratory (2 credits).
Laboratory sequence illustrating topics covered in courses 1B-1C, respectively, and important experimental techniques. Laboratory: 3 hours; lecture: 1-1/4 hours. Students are billed a materials fee. Prerequisite(s): Concurrent enrollment in course 1C is required.

1P. Chemistry Essentials (3 credits).
Introduction to basic concepts required for the Chemistry 1 series. This course is for students who have little background in high school chemistry or equivalent. Covers elementary topics including units, conversions, the mole, chemical reactions, and balancing.

108A. Organic Chemistry.
An integrated study of fundamental organic chemistry, with emphasis on materials especially relevant to the biological sciences. Students with credit for course 112A cannot receive credit for course 108A. Lecture: 3-1/2 hours, discussion: 1-1/4 hours. Prerequisite(s): courses 1B, 1C, and 1N.

108L. Organic Chemistry Laboratory (2 credits).
Laboratory experience in organic chemistry associated with course 108A. Designed to introduce the student to the many techniques associated with organic chemistry while affording an opportunity to explore the concepts discussed in the lecture material. Laboratory: 4 hours, lecture: 1-1/4 hours. Students are billed a materials fee. Prerequisite(s): courses 1C/N and previous or concurrent enrollment in 108A is required.

112A. Organic Chemistry.
An integrated study of fundamental organic chemistry, including principles, descriptive chemistry, synthetic

methods, reaction mechanisms, and compounds of biological interest. These courses are coordinated with 112L-M-N respectively and are to be taken concurrently with them. Students with credit in course 108A cannot receive credit for 112A. Lecture: 3-1/2 hours; optional discussion section: 1-1/4 hours. Prerequisite(s): courses 1B, 1C, and 1N. Concurrent enrollment in course 112L is required. Enrollment limited to 80.

112L. Organic Chemistry Laboratory (2 credits).
Laboratory experience in organic chemistry and associated principles. Experiments involve the preparation, purification, characterization, and identification of organic compounds and make use of modern as well as classical techniques. Lecture: 1-1/2 hours. Laboratory: 4 hours. Students are billed a materials fee. Prerequisite(s): courses 1C/N. Concurrent enrollment in course 112A required. Enrollment limited to 80.

122. Principles of Instrumental Analysis.
A laboratory course designed to develop familiarity with techniques and instrumentation used in analytical chemistry, emphasizing determination of trace inorganic species. Primary emphasis on applications utilizing the absorption or emission of electromagnetic radiation and on voltammetry. Topics include molecular UV-visible absorption and fluorescence spectrometry; atomic absorption, emission and fluorescence spectrometry; and various forms of voltammetry. Lecture: 2 hours; laboratory: 8 hours. Students are billed a materials fee. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, course 108B or 112C. (General Education Code(s): W.)

143. Organic Chemical Structure and Reactions.
Advanced topics such as the chemistry of terpenes, steroids, synthetic polymers, alkaloids, reactive intermediates, and reaction mechanisms are treated. Lecture: 4 hours. Prerequisite(s): course 108B or 112C.

146A. Advanced Laboratory in Organic Chemistry (3 credits).
Exposes students to advanced laboratory techniques in organic chemistry. Designed for students without previous research background in organic chemistry. Experiments carry a research-like format and cover the areas of natural products and reaction chemistry. Modern methods of organic analysis are emphasized including chromatographic methods and organic structure determination by spectroscopy. Laboratory: 8 hours. Students billed a materials fee. (General Education Code(s): W satisfied by taking this course and courses 151L and 164B.) Prerequisite(s): courses 108B/M or 112C/N; satisfaction of Entry Level Writing and Composition requirements.; enrollment restricted to chemistry majors. Enrollment limited to 16.

156C. Advanced Topics in Inorganic Chemistry.
Advanced topics in inorganic chemistry and an introduction to solid state chemistry. Synthesis and structure of materials discussed as well as their influence on properties for modern devices and applications. Recent developments in area of material science also explored. Taught in conjunction with course 256C. Prerequisite(s): course 151A. Enrollment restricted to seniors.

163A. Quantum Mechanics and Basic Spectroscopy.
A detailed introduction to quantum theory and the application of wave mechanics to problems of atomic structure, bonding in molecules, and fundamentals of spectroscopy. Prerequisite(s): course 1C or 4B, Physics 5A-B-C or 6A-B-C and Mathematics 11C or 22 or 23B. Physics 6C can be taken concurrently.

182. ACE Program Service Learning (2 credits).
Students participate in training and development to co-facilitate collaborative learning in ACE chemistry discussion sections and midterm/exam review sessions. Students are role models for students pursuing science- and math-intensive majors. Prerequisite(s): Prior participation in ACE; good academic standing; no non-passing grades in prior quarter. Enrollment restricted to sophomores, juniors, and seniors. Enrollment limited to 10. (General Education Code(s): PR-S.)

200A. Advanced Biochemistry: Biophysical Methods.
An introduction to the theory, principles, and practical application of biophysical methods to the study of biomolecules, especially proteins and nucleic acids. Emphasis on spectroscopic techniques. Topics include magnetic resonance, optical spectroscopy, fast reaction techniques, crystallography, and mass spectrometry.

240C. Organic Structure Analysis from Spectra (3 credits).
Determination of 2-D and 3-D structure and functionality of organic molecules from spectroscopic properties, including nuclear magnetic resonance, infrared, ultraviolet-visible and mass spectroscopy.

240E. Modern Synthetic Methods (3 credits).
An advanced study designed to provide the background and insight to enable the student to compare and contrast new reagents and reactions with existing methods. Prerequisite(s): course 143.

256C. Advanced Topics in Inorganic Chemistry.
Advanced topics in inorganic chemistry are presented. Topics covered vary from year to year, and are announced in advance. Possible topics include A) organometallic chemistry; B) structural methods in inorganic chemistry; C) solid-state chemistry. Prerequisite(s): courses 151A/L and 146B or graduate standing.

274. Proseminar in Synthetic and Polymer Chemistry.
Weekly meetings devoted to study of synthetic organic chemistry and controlled polymer design for applications in nanotechnology. Topics drawn from current literature and research interests of participants. May be repeated for credit.

275. Proseminar in Biological Inorganic Chemistry.
Weekly meetings devoted to biological inorganic chemistry and biochemistry. Topics are drawn from current literature. Papers and reviews are discussed, and participants give short seminars on their research interests. May be repeated for credit.

282. Proseminar: Synthetic Methods.
Weekly meetings devoted to the study of asymmetric and/or enantio-selective synthesis of optically active organic compounds of biological and medicinal significance. Topics drawn from the current literature and the research interests of the participants. May be repeated for credit.

284. Proseminar in Synthetic Organic Chemistry.
Weekly meetings devoted to the study of synthetic organic chemistry. Topics drawn from the current literature and the research interests of the participants. May be repeated for credit.

285. Proseminar: Photobiochemistry and Photobiology.
A detailed study of molecular mechanisms of light energy conversion and light-signal transduction processes in biological systems. Student participation in critical discussion of current literature examples are emphasized. Two-hour lecture and two-hour seminar weekly. Enrollment limited to 8. May be repeated for credit.

286. Proseminar in Natural Products Chemistry.
Weekly meetings devoted to the study of natural products. Topics drawn from the current literature and research interests of the participants. May be repeated for credit.

288. Proseminar in Bioinorganic Chemistry.
Weekly meetings devoted to inorganic and bioinorganic research. Topics are drawn from current literature. Papers and reviews are discussed. Participants also give short seminars on topics of their research interests. May be repeated for credit.

291A. Organic Chemistry Research Seminar.
Open to chemistry graduate students interested in organic chemistry. Weekly meetings are held to hear both local and external speakers discuss their work. Enrollment restricted to graduate students. May be repeated for credit.

291B. Biochemistry and Molecular Biology Research Seminar.
A weekly seminar series covering topics on the frontiers of biochemistry and molecular biology. The speakers include experts in these fields from other institutions. Enrollment restricted to graduate students. May be repeated for credit.

291C. Inorganic Chemistry Research Seminar.
For those interested in following the recent developments in the various areas of inorganic chemistry. External speakers; weekly discussion based on personal research or recent literature, led by the inorganic chemistry faculty, postdoctoral fellows, and students. Enrollment restricted to graduate students. May be repeated for credit.

291D. Physical Chemistry Research Seminar.
A weekly seminar series covering topics of current research in physical chemistry. Weekly meetings are held to hear both local and external speakers discuss their work. Enrollment restricted to graduate students. May be repeated for credit.

292. Seminar (2 credits).
Enrollment restrictions: graduate standing or approval of the graduate adviser.

296. Teaching Chemistry (2 credits).
University-level pedagogy in chemistry; examines the role of preparation, assessment, and feedback in teaching chemistry discussion and laboratory sections. Effective classroom techniques and organizational strategies discussed; oral presentations analyzed critically. Required of entering chemistry graduate students.

Chinese

1. Instruction in the Chinese (Mandarin) Language.
Instruction in elementary spoken and written Chinese (Mandarin), beginning with the sounds of Chinese and their representation in the pinyin romanization system. Conversation, structural analysis, and an introduction to character texts. Elementary sequence (1-2-3) begins only in fall quarter. Students interested in learning Chinese who are uncertain about where they should enter the sequence should meet with the instructor, prior to the first class meeting.

4. Intermediate Chinese (Mandarin).
Instruction in intermediate spoken and written Chinese (Mandarin). Conversation, composition, and the reading of modern texts. Intermediate sequence (4-5-6) begins only in fall quarter. Students interested in improving their Chinese who are uncertain about where they should enter the sequence should meet with the instructor, prior to the first class meeting. Prerequisite(s): course 3, or equivalent. (General Education Code(s): IH.)

103. Advanced Chinese: Readings in Economics and Trade.
Designed to familiarize students with the issues and specialized vocabulary relating to China's trade, development, and economic policies through extensive reading and translating of essays, articles, and documents. Students interested in this course who have not taken the prerequisite should meet with the instructor prior to the first class meeting. May be repeated for credit.

Community Studies

100E. Economic Justice.
Examines how markets operate within the political economy of contemporary capitalism to generate myriad and often chronic forms of economic and social inequality in the United States. Explores different approaches to addressing inequality within the multifaceted economic justice movement. Interview only: admission determined at first class meeting. Enrollment limited to sophomores and juniors. (Formerly Theory and Practice of Economic Justice.) Enrollment limited to 25. (General Education Code(s): E.)

100M. Health Care Inequalities.
Examines system and non-system that is American health care with special attention to inequalities in access, financing, and quality of care. Covers concepts such as equality, fairness, and need as well as community organizing and community building for health. Interview only: admission determined at first class meeting. Enrollment limited to sophomores and juniors. Enrollment limited to 25.

122. Whiteness, Racism, and Anti-Racism.
Examines the social, cultural, institutional, and personal ways that white privilege and racial domination are constructed, maintained, and reproduced in U.S. society. Goal is to reveal the "hidden" quality of whiteness and illuminate effective strategies for anti-racist activism. (Formerly course 114.) Enrollment limited to 25. (General Education Code(s): E.)

142. Introduction to Marxism. *
A close study of original texts by Marx and Engels and contemporary Marxists, focusing on the basic tenets of Marxism and their applicability to current community problems. An interdisciplinary course for students with little previous experience in Marxist method.

Computer Engineering

3. Personal Computer Concepts: Software and Hardware.
Provides an introduction to computers. Personal computing is emphasized, and students are introduced to word processing, spreadsheets, database management, graphics, and programming. Covers fundamentals of computing and current and future uses of computer technology, PC hardware, Windows operating system, applications software, networking and the Internet, and developments in the computer industry. Designed for students with little or no experience using computers. Students cannot receive credit for this course and Computer Science 2. (General Education Code(s): IN.)

8. Robot Automation: Intelligence through Feedback Control.
Introduction to dynamical systems, feedback control, and robotics. Fundamental concepts in dynamical systems, modeling, stability analysis, robustness to uncertainty, feedback as it occurs naturally, and the design of feedback-control laws to engineer desirable static and dynamic response. Course includes an introduction to MATLAB and programming in MATLAB. Priority enrollment restricted to first-year students and sophomores. (General Education Code(s): MF, IN, Q.)

12. Computer Systems and Assembly Language.
Introduction to computer systems and assembly language and how computers compute in hardware and software. Topics include digital logic, number systems, data structures, compiling/assembly process, basics of system software, and computer architecture. May include C language. Prerequisite(s): course 3 or 8, or Computer Science 10 or 12A or 5C or 5J or 5P, or Biomolecular Engineering 60, or suitable programming experience; previous or concurrent enrollment in course 12L required. (General Education Code(s): IN, Q.)

12L. Computer Systems and Assembly Language Laboratory (2 credits).
Laboratory sequence in assembly language programming. The basics of logic design, both RISC and microcontroller programming. May include C language programming. Two two-hour laboratories per week . Prerequisite(s): course 3 or 8, or Computer Science 10 or 12A or 5C or 5J or 5P, or Biomolecular Engineering 60, or suitable programming experience; previous or concurrent enrollment in course 12 required.

16. Applied Discrete Mathematics.
Introduction to applications of discrete mathematical systems. Topics include sets, functions, relations, graphs, trees, switching algebra, first order predicate calculus, mathematical induction, permutations, combinations, summation, and recurrences. Examples drawn from computer science and computer engineering. Prerequisite(s): eligibility to enroll in Mathematics 19A (completion of Mathematics 2B or 3 or Mathematics Placement Exam score of 40 or higher) or completion of Mathematics 19A or 11A, or Applied Mathematics and Statistics 11A, or Economics 11A. (General Education Code(s): MF, Q.)

80A. Universal Access: Disability, Technology, and Society.
Overview of human-centered technology and of its potential for increasing the quality of life and independence of disabled individuals. A substantial portion of the course is devoted to studying physical, psychological, and psychosocial aspects of disability. Topics include: diversity and integration, legislation, accessibility, and universal design. (Formerly Assistive Technology and Universal Access.) (General Education Code(s): PE-T, T7-Natural Sciences or Social Sciences.)

80N. Introduction to Networking and the Internet.
Introduction to the evolution, technological basis, and services of the Internet, with descriptions of its underlying communications structure, routing algorithms, peer-to-peer hierarchy, reliability, and packet switching. Network security, mail, multimedia and data compression issues, HTML, and digital images. Students who have completed course 150 cannot receive credit for this course. (General Education Code(s): PE-T, T2-Natural Sciences.)

107. Probability and Statistics for Engineers.
Introduction to fundamental tools of stochastic analysis. Probability, conditional probability; Bayes Theorem; random variables and transforms; independence; Bernoulli trials. Statistics, inference from limited data; outcomes of repeated experiments; applications to design; assessment of relative frequency and probability; law of large numbers; precision of measurements. Elements of stochastic processes, Poisson processes; Markov chains. Students cannot receive credit for this course and Applied Mathematics and Statistics 131. (Formerly Mathematical Methods of Systems Analysis: Stochastic.) Prerequisite(s): course 16 or 16H and Mathematics 22 or 23A. (General Education Code(s): SR.)

121. Microprocessor System Design.
The design and use of microprocessor-based systems. Covers microprocessor and microcontroller architecture, programming techniques, bus and memory organization, DMA, timing issues, interrupts, peripheral devices, serial and parallel communication, and interfacing to analog and digital systems. Prerequisite(s): courses 12/L and 100/L and Electrical Engineering 101/L; previous or concurrent enrollment in course 121L required. Enrollment limited to 40.

121L. Microprocessor System Design Laboratory (2 credits).
Laboratory sequence illustrating topics covered in course 121. One two-hour laboratory session per week. Students design, build, program, debug, document, and demonstrate a microprocessor-based system. Students are billed a materials fee. Prerequisite(s): courses 12/L and 100/L and Electrical Engineering 101/L. Previous or concurrent enrollment in course 121 also required. Enrollment limited to 40.

125. Logic Design with Verilog.
Verilog digital logic design with emphasis on ASIC and FPGA design. Students design and verify large-scale systems. Assignments and project use the Verilog Hardware Description Language with emphasis on verification and high-frequency ASIC/FPGA targets. Prerequisite(s): courses 100 and 100L. Concurrent enrollment in course 125L required. Enrollment limited to 40.

125L. Logic Design with Verilog Laboratory (2 credits).
Laboratory sequence illustrating topics covered in course 125. One two-hour laboratory session per week. Students are billed a materials fee. Prerequisite(s): courses 100 and 100L. Concurrent enrollment in course 125 is required. Enrollment limited to 40.

150. Introduction to Computer Networks.
Addresses issues arising in organizing communications among autonomous computers. Network models and conceptual layers; Internet-working; characteristics of transmission media; switching techniques (packet switching, circuit switching, cell switching); medium access control (MAC) protocols and local area networks; error-control strategies and link-level protocols; routing algorithms for bridges and routers; congestion control mechanisms; transport protocols; application of concepts to practical wireless and wireline networks and standard protocol architectures. Students who have completed course 80N can take this course for credit. Students are billed for a materials fee. Prerequisite(s): course 16 and either courses 12 and 12L, or Computer Science 12B and 12M. Concurrent enrollment in course 150L is required.

150L. Introduction to Computer Networks Laboratory (2 credits).
Illustrates the concepts covered in course 150 and provides students with hands-on experience in computer networks. Prerequisite(s): course 16 and either courses 12 and 12L, or Computer Science 12B and 12M. Concurrent enrollment in course 150 is required.

156. Network Programming.
Methods and tools used for network programming. Topics include inter-process communication (IPC), facilities such as pipes, shared memory, semaphores, sockets, and remote procedure call (RPC); design of client and server sides of network applications; CGI programming; and programming projects. Prerequisites: course 150 and Computer Science 111. Concurrent enrollment in course 156L required.

156L. Network Programming Laboratory (2 credits).
Laboratory sequence illustrating concepts taught in course 156. Learn use of network programming tools and methods via programming exercises. Students are billed a materials fee. Prerequisites: course 150 and Computer Science 111. Concurrent enrollment in course 156 required.

174. Introduction to EDA Tools for PCB Design (3 credits).
Focus on EDA tools for design of printed-circuit boards. Elements of design flow covered: schematic capture and simulation to final PCB layout. Final project is required. Students are billed a materials fee. Prerequisite(s): Electrical Engineering 101/L or consent of instructor.

185. Technical Writing for Computer Engineers.
Writing by engineers and computer scientists, not to general audiences, but to engineers, engineering managers, and technical writers. Exercises include job application and resume, in-code documentation, algorithm description, naive-user documentation, library puzzle, survey article, proposal, progress report, formal technical report, and oral presentation. Offered in alternate quarters. Prerequisite(s): satisfaction of Entry Level Writing and Composition requirements; Computer Science 12B or Computer Engineering 12 or junior standing in a School of Engineering major. Enrollment limited to 60. (General Education Code(s): W.)

200. Research and Teaching in Computer Science and Engineering (3 credits).
Basic teaching techniques for teaching assistants including responsibilities and rights of teaching assistants, resource materials, computer security, leading discussion or lab sessions, presentation techniques, maintaining class records, electronic handling of homework, and grading. Examines research and professional training, including use of the library and online databases, technical typesetting, writing journal and conference papers, publishing in computer science and computer engineering, giving talks in seminars and conferences, and ethical issues in science and engineering. Required for all T.A.s. Enrollment restricted to graduate students.

222. VLSI Digital System Design.
Introduction to Very Large Scale Integrated (VLSI) design, focusing on custom integrated circuits. Topics include logic families, FETs, interconnect models, simulation, and RC timing. Course covers the design flow from logic design to layout, with a focus on high performance and low power. Students should be familiar with RC circuit analysis. Enrollment restricted to seniors and graduate students. Undergraduates may enroll with permission of instructor.

230. Computer Performance Evaluation.
Introduction to methods of analysis of computer system performance. Predictive performance models with emphasis on queuing models; exact and appropriate solution methods, discrete-event simulation, and numeric iterative approaches; analytical solutions and their computation; separable queuing networks, decomposition approaches; examples of practical application; and performance measurement, model validation, robustness of models, and operational analysis. Enrollment restricted to graduate students. Enrollment limited to 20. Offered in alternate academic years.

235. User Evaluation of Technology.
Presents a variety of evaluation methodologies to assess usability, acceptance, and effectiveness of technology with the intended users. Combines lectures and exercises for students to gain firsthand experiences of these methodologies with real users. Enrollment restricted to graduate students. Seniors may enroll with completion of course 131.

241. Introduction to Feedback Control Systems.
Graduate-level introduction to control of continuous linear systems using classical feedback techniques. Design of feedback controllers for command-following error, disturbance rejection, stability, and dynamic response specifications. Root locus and frequency response design techniques. Extensive use of Matlab for computer-aided controller design. Course has concurrent lectures with Electrical Engineering 154. (Also offered as Electrical Engineering 241. Students cannot receive credit for both courses.) Enrollment restricted to graduate students.

251. Error-Control Coding.
Overview of coding to protect messages against error during transmission or storage. Topics include channel models, linear algebra over finite fields, linear block codes and bounds, cyclic codes (BCH and RS), decoding algorithms, spectral analysis, codes on graphs, and low-complexity algorithms. Enrollment restricted to graduate students or consent of instructor.

252A. Computer Networks.
Issues resulting from organizing communication among autonomous computers. Includes network models and switching techniques; medium access control protocols and local area networks; error control and retransmission strategies; routing algorithms and protocols; congestion control mechanisms and end-to-end protocols; application-level protocols; and application of concepts to wireless and wireline networks, with emphasis on the Internet. Enrollment restricted to graduate students.

259. Sensor Networks.
Focus is on the networking aspects of sensor networks: protocols at the various layers and how they answer the specific requirements posed by these networks (e.g., data driven, energy efficient, etc.) and their applications (monitoring, tracking, etc.). Explore how physical layer and hardware issues may influence protocol design. Courses 252A and 257 recommended.

280C. Seminar on Control (2 credits).
Weekly seminar series covering topics of current research in theory and application of control to engineering systems. Current research work and literature in these areas discussed. Enrollment restricted to graduate students; undergraduates may enroll with permission of instructor. May be repeated for credit.

280G. VLSI/CAD Seminar (2 credits).
Weekly seminar on advanced topics in VLSI and computer-aided design (CAD). Students present and discuss modern issues in semiconductor design, fabrication, and CAD. Frequent guest speakers present pertinent results from industry and academia. Enrollment limited to 20. May be repeated for credit.

280H. Seminar in Human Computation Systems (2 credits).
Covers advanced topics and current research in the general area of human computation. Material is drawn from several disciplines that involve or deal with human computation, including computer vision, human-computer interaction, databases, and machine learning. The course comprises presentations from faculty, enrolled students, and external visitors. Enrollment restricted to graduate students. May be repeated for credit.

280N. Seminar on Networks (2 credits).
Weekly seminar series covering topics of current research in networks and networked systems. Current research work and literature in these areas are discussed. Prerequisite(s): permission of instructor. Enrollment restricted to graduate students. May be repeated for credit.

280P. Seminar on Parallel Processing (2 credits).
Weekly seminar series covering topics of current research in parallel systems, architectures, and algorithms. Current research work and literature in these areas are discussed. Enrollment restricted to graduate students. Enrollment limited to 20. May be repeated for credit.

280V. Seminar on Computer Vision (2 credits).
Weekly graduate-level seminar series discussing advanced topics in computer vision and image analysis. Current research and literature presented during each meeting. Enrollment limited to 20. May be repeated for credit.

Computer Science

5J. Introduction to Programming in Java.
Introductory programming for School of Engineering majors who have no prior programming experience. Students learn programming and documentation skills, as well as algorithmic problem-solving and programming methodologies. Introduces computers, compilers,

and editors. Students write medium-sized programs. The two-quarter sequence courses 5J and 11 cover in two quarters the same material as the accelerated introductory course and lab 12A/L cover in one quarter. (Formerly course 60G.) (General Education Code(s): MF, IN.)

10. Introduction to Computer Science.
An overview of the theory, foundations, and practice of computer science with emphasis on what computers can and cannot do, now and in the future. Topics include algorithms and data, correctness and efficiency of algorithms, hardware, programming languages, limitations of computation, applications, and social issues. No programming skills are required as a prerequisite. Major concepts and open problems in computer science are presented without reliance on sophisticated mathematical tools. (General Education Code(s): MF, IN.)

12A. Introduction to Programming (Accelerated).
Accelerated introduction to programming. Students write medium-sized programs. Topics include: functions; conditionals and loops; classes; event-driven programming and graphic user interfaces (GUIs); recursion; and arrays. Students who have no or very limited programming experience should consider courses 5J and 11 which cover the same material in two quarters. Students may not receive credit for both this course and course 11. Some prior programming experience in a language such as C, C++, Java, or C# strongly recommended. Prerequisite(s): eligibility to enroll in Mathematics 19A (Mathematics 2B or 3 or 40 or higher on mathematics placement exam) or completion of Mathematics 11A or 19A or Economics 11A or AMS 11A. Concurrent enrollment in 12L required. (General Education Code(s): IN.)

12B. Introduction to Data Structures.
Teaches students to implement common data structures and the algorithms associated with each data structure, through progressively difficult exercises. Topics include big "O" notation; pointers, recursion (induction), and dynamic allocation; linked lists and list processing; stacks, queues, binary trees and binary search trees; simple sorting techniques and simple search techniques. Students will gain a working knowledge of the elements of the Java and C programming languages. Prior experience with Unix is assumed. Prerequisite(s): course 11 or 12A or Computer Engineering 13. Concurrent enrollment in course 12M required. (General Education Code(s): MF, IN.)

12L. Computer Programming Laboratory (2 credits).
Laboratory sequence complementing topics taught in course 12A by providing training and exposure to several software development tools and practices not covered in course 12A. In addition, the lab provides an initial exposure to a second programming language to reinforce concepts from course 12A. Prerequisite(s): eligibility to enroll in Mathematics 19A (Mathematics 2B or 3 or 40 or higher on mathematics placement exam) or completion of Mathematics 11A or 19A or Economics 11A or AMS 3 or 11A. Previous or concurrent enrollment in 12A required.

12M. Data Structures Laboratory (2 credits).
Complements course 12B, gaining additional competence with a number of important software development tools, languages, and techniques. Included are advanced Unix features and utilities such as grep, find, diff, the shell, and pipes; C programs utilizing I/O, arrays, pointers, and structures; a scripting language to perform simple text and file manipulation; and the make utility. Prerequisite(s): course 11 or 12A or Computer Engineering 13. Concurrent enrollment in course 12B required.

25. Introduction to Computer Graphics: 3D Modeling.
Introduces theory and techniques of 3D computer graphics. Topics include: capabilities of modern graphics hardware; 3D coordinate spaces; modeling with polygons; NURBS and subdivision surfaces; applying textures and materials; lighting; and simple effects. Students develop proficiency in 3D modeling via lectures and assignments focused on the use of a 3D modeling tool. (General Education Code(s): PR-C.)

101. Algorithms and Abstract Data Types.
Studies basic algorithms and their relationships to common abstract data types. Covers the notions of abstract data types and the distinction between an abstract data type and an implementation of that data type. The complexity analysis of common algorithms using asymptotic (big "O") notation is emphasized. Topics include sorting and searching techniques, basic graph algorithms, and algorithm design techniques. Abstract data types covered include priority queues, dictionaries, disjoint sets, heaps, balanced trees, and hashing. Familiarity with C, Java, and Unix is assumed. Prerequisite(s): course 12B or 13H; CMPE 16 or 16H; MATH 19B; and one course from the following: MATH 21, 22, 23A, or AMS 10.

104A. Fundamentals of Compiler Design I.
An introduction to the basic techniques used in compiler design. Topics include compiler structure, symbol tables, regular expressions and languages, finite automata, lexical analysis, context-free languages, LL(1), recursive descent, LALR(1), and LR(1) parsing; and attribute grammars as a model of syntax-directed translation. Students use compiler building tools to construct a working compiler. Prerequisite(s): course 101 and Computer Engineering 12 and 12L.

115. Software Methodology.
Emphasizes the characteristics of well-engineered software systems. Topics include requirements analysis and specification, design, programming, verification and validation, maintenance, and project management. Practical and research methods are studied. Imparts an understanding of the steps used to effectively develop computer software. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements and course 101. Enrollment restricted to computer science, computer engineering, and information systems management majors.

130. Computational Models.
Various representations for regular languages, context-free grammars, normal forms, parsing, pushdown automata, pumping lemmas, Turing machines, the Church-Turing thesis. Prerequisite(s): course 101.

142. Machine Learning and Data Mining.
Introduction to machine learning algorithms and their applications. Topics include classification learning, density estimation and Bayesian learning regression, and online learning. Provides introduction to standard learning methods such as neural networks, decision trees, boosting, and nearest neighbor techniques. Students may not receive credit for both this course and course 242. Prerequisite(s): course 101 and one of Applied Mathematics and Statistics 5, 7, 113, 131, or Computer Engineering 107.

160. Introduction to Computer Graphics.
Introduces techniques of modeling, transformation, and rendering for computer-generated imagery. Topics: 2D/3D primitives, projections, matrix composition, and shading algorithms. Programming assignments and a major project are required. Students cannot receive credit for both this course and course 260. Prerequisite(s): course 101 and Mathematics 21 or Applied Mathematics and Statistics 10. Concurrent enrollment in course 160L required.

160L. Introduction to Computer Graphics Laboratory (2 credits).
Complements course 160, gaining additional competence with a number of important software development tools, graphics libraries, and graphical user interfaces. Included are OpenGL program, utilizing rubberbanding, picking, trackballing, display lists, double buffering, lighting, shading, materials and textures; and FLTK program, utilizing sliders, buttons, and dialog boxes. Prerequisite(s): course 101 and Mathematics 21 or Applied Math 10. Concurrent enrollment in course 160 required. Enrollment restricted to all engineering majors.

166A. Game Theory and Applications I.
Introduces modern game theory, including applications in social science, biology, and engineering. Topics include extensive form, strategic form, mixed strategies, incomplete information, repeated games, evolutionary games, and simulation techniques. (Also offered as Economics 166A. Students cannot receive credit for both courses.) Prerequisite(s): Applied Math and Statistics 5 or 7 or Economics 113; and Economics 11B, Applied Math and Statistics 11B, or Mathematics 11B or 19B. Enrollment restricted to juniors and seniors. Enrollment limited to 100.

170. Game Design Studio I.
First of a three-course capstone sequence for the computer game design program. Students work in teams to develop a comprehensive game design for a substantial computer game, including detailed storyline, level design, artistic approach, implementation technologies, and art-asset pipeline. Emphasis placed on creating novel, artistic game design concepts. Includes design reviews and formal presentations. Companion lectures cover advanced topics in game design, game programming, and software project management. Students are billed a materials fee. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. Courses 20 and 109, and any two of: courses 102, 105, 111, 128, 130, 140, 146, 148, 160/L, 161/L, 164/L, 180, 181, 183; Computer Engineering 110, 112, 113, 117/L, 118/L, 150.

182. Introduction to Database Management Systems.
Concepts, approaches, tools, and methodology of database design. Topics include the entity-relationship model; the relational data model; normal forms; commercial languages such as SQL (SQL constraints, SQL triggers, and update languages); query-by-example (QBE); XML data model, and XML query language (XQuery); as well as relational database-management support for XML and object-relational features in database-management systems. Involves a database -application development project. Prerequisite(s): course

12B. Course intended for non-majors; computer science majors should enroll in course 180.

200. Research and Teaching in Computer Science and Engineering (3 credits).
Basic teaching techniques for teaching assistants, including responsibilities and rights of teaching assistants, resource materials, computer security, leading discussion or lab sessions, presentation techniques, maintaining class records, electronic handling of homework, and grading. The course examines research and professional training, including use of the library and online databases, technical typesetting, writing journal and conference papers, publishing in computer science and computer engineering, giving talks in seminars and conferences, and ethical issues in science and engineering. Required for all teaching assistants. Enrollment restricted to graduate students.

201. Analysis of Algorithms.
Rigorous analysis of the time and space requirements of important algorithms, including worst case, average case, and amortized analysis. Techniques include order-notation, recurrence relations, information-theoretic lower bounds, adversary arguments. Analysis of the key data structures: trees, hash tables, balanced tree schemes, priority queues, Fibonacci and binomial heaps. Algorithmic paradigms such as divide and conquer, dynamic programming, union-find with path compression, augmenting paths. Selected advanced algorithms. Introduction to NP-completeness. Enrollment restricted to graduate students; undergraduate students may enroll in this course if they have completed either course 102 or Computer Engineering 177 and have the consent of the instructor. A. Van Gelder, D. Achlioptas, D. Helmbold

221. Advanced Operating Systems.
A detailed study of the issues involved in operating systems design and implementation. Readings cover current research topics and systems of historical significance. Topics include (but are not restricted to) process and memory management, protection, security, synchronization, performance evaluation, file systems, distributed systems. Enrollment restricted to graduate students; undergraduates by interview only.

242. Machine Learning.
Introduction to machine learning algorithms. Covers learning models from fields of statistical decision theory and pattern recognition, artificial intelligence, and theoretical computer science. Topics include classification learning and the Probably Approximately Correct (PAC) learning framework, density estimation and Bayesian learning, EM, regression, and online learning. Provides an introduction to standard learning methods such as neural networks, decision trees, boosting, nearest neighbor, and support vector machines. Requirements include one major experimental learning project or theoretical paper. Students may not receive credit for both this course and course 142. Enrollment restricted to graduate students. Enrollment limited to 30.

277. Principles of Database Systems.
Advanced course on principles of database systems. Main topics include overview of the relational data model and relational query languages; recursive queries, datalog, and fixed-points; query processing and optimization; database design, dependencies, normal forms, and the chase procedure. Additional topics may include information integration, complex objects, semistructured data, and XML. (Formerly Database Systems I.) Prerequisite(s): course 180 (or equivalent) or consent of instructor. Enrollment restricted to graduate students. Enrollment limited to 20. Offered in alternate academic years.

280D. Seminar in Database Systems (2 credits).
Covers advanced research topics from the recent literature in database systems and related fields. Involves presentations from UCSC students and faculty, and guest talks from researchers in industry and other academic institutions. Enrollment by permission of instructor. Enrollment limited to 30. May be repeated for credit.

280S. Seminar on Computer Systems (2 credits).
Weekly seminar series covering topics of current research in computer systems. Enrollment by permission of instructor. Enrollment limited to 30. May be repeated for credit.

280X. Expressive AI (2 credits).
Weekly seminar covering topics of current research in artificial intelligence applied to interactive art and entertainment, including computer games. Enrollment restricted to graduate students. Enrollment limited to 30. May be repeated for credit.

290P. Topics in Computational Cinematography.
Focuses on discussion of recent advances in visual storytelling in graphical environments. Major topics covered are: intelligent camera control, shot-compositions, lighting design, interactive storytelling, and computational techniques associated with these applications. Class consists of in-class discussions and student presentations of research papers and a final student project. Enrollment restricted to graduate students.

290S. Advanced Topics in Computer Systems.
Focuses on current research topics in computer systems. Topics vary from year to year depending on the current research of the instructor(s) and the interests of the students. Students read technical papers from current journals and conference proceedings, and present class lectures. A research project is required. Prerequisite(s): course 221 recommended. Enrollment restricted to graduate students; qualified undergraduates may enroll with instructor's consent. May be repeated for credit.

Digital Arts and New Media

201. Recent Methods and Approaches to Digital Arts and Culture.
Students examine methods and approaches to research and writing in digital art and new media, while exploring key theories concerning technology, art, and culture. Focus is on the interaction between digital technologies and socio/cultural formations. Enrollment restricted to graduate students.

204. Ways of Seeing and Hearing.
Graduate-level advanced seminar explores ways that seeing, hearing, and knowing are influenced by culture, power, race, and other factors. Readings emphasize how documentary subjects are constituted and known, addressing questions of epistemology, social constructivism, objectivity, and method. (Also offered as Social Documentation 204. Students cannot receive credit for both courses.) Enrollment restricted to social documentation and digital arts new media graduate students.

205. Approaches to Social Documentation.
Comprehensive review and analysis of documentary strategies aimed at societal critique and social change, evaluating changes in argument, evidence, and process over development of the discipline. (Also offered as Social Documentation 200. Students cannot receive credit for both courses.) A concurrent media lab is required. Enrollment restricted to digital arts and new media graduate students. Enrollment limited to 15.

206. Practice of Social Documentary.
Introduction to social documentary genres including video, photography, new media and other mediums, which addresses social-scientific research and methodology in the context of these processes. (Also offered as Social Documentation 202. Students cannot receive credit for both courses.) A concurrent media lab is required. Enrollment restricted to digital arts and new media graduate students. Enrollment limited to 15.

208. Special Topics in Social Documentation.
Designed to provide supplemental instruction on specific topical and/or technical matters related to social documentation. Topics include technical standards and innovations within the field of social documentation, documentary subjects, location production, and/or the work of individual professional documentarians. (Also offered as Social Documentation 290. Students cannot receive credit for both courses.) Enrollment restricted to digital arts and new media graduate students. Enrollment limited to 15. May be repeated for credit.

210. Project Design Studio.
Students work on the design of individual projects by developing project proposals, budgets, "proof of concept" design documents and/or prototypes and exploring tools, technologies, programming languages, hardware, software, and electronics techniques relevant to their projects. Enrollment restricted to graduate students.

219. Introduction to Electronics for Artmaking.
Intensive introduction to electronic devices used in artmaking, providing hands-on experience with sensors, motors, switches, gears, lights, simple circuits, microprocessors, and hardware storage devices to create kinetic and interactive works of art. Students are billed a materials fee. Enrollment restricted to graduate students.

250A. Collaborative Research Project Group: Mechatronics.
Three-quarter collaborative research project group involves faculty-initiated research in the use of a variety of media including video, performance, and sculpture, for the creation of complex, kinetic, audio-visual systems exploring temporality, materiality, experience, and perception. Enrollment restricted to graduate students. Enrollment limited to 8. May be repeated for credit.

250B. Collaborative Research Project Group: Participatory Culture.
Three-quarter collaborative research project group encompasses a range of faculty-initiated projects in social computing and community-media activism, which involve the design of new technologies to address social problems and facilitate broader participation in culture and politics. Enrollment restricted to graduate students. Enrollment limited to 8. May be repeated for credit.

250C. Collaborative Research Project Group: Performative Technologies.
Three-quarter collaborative research project group generates faculty-initiated new public and performative spaces where digital media, communication networks, and interactive systems may be fused with lighting, movement, stage, and sound design to create shared

multimedia experiences for audiences and performers. Enrollment restricted to graduate students. Enrollment limited to 8. May be repeated for credit.

Earth Sciences

2. Earth Catastrophes.
The role of catastrophic processes in shaping Earth and the environment in which we live. The physical processes causing earthquakes, volcanic eruptions, tsunamis, floods, windstorms, landslides, and meteorite impacts will be described, along with the role played by these rapid processes in the geological and biological evolution of the planet. Interdisciplinary approaches to understanding these phenomena will be discussed. The entire time scale from formation of the universe to the present Earth system will be considered. (Formerly course 80A.) (General Education Code(s): SI, T-2 Natural Sciences.)

5. California Geology.
An introduction to physical geology emphasizing the minerals, rocks, volcanoes, mountains, faults, and earthquakes of California. In-class field trips to study the caves, rocks, and landforms of the campus and the Monterey Bay area. Discussion-1 hour. Concurrent enrollment in 5L required for majors and minors. (General Education Code(s): SI, IN.)

5L. California Geology Laboratory (1 credit).
Laboratory sequence illustrating topics covered in course 5 with particular emphasis on rock and mineral identification and map interpretation. Field trip. Laboratory three hours. Students are billed a materials fee.

9. Earth History and Global Change.
Over the past 4.5 billion years, planet Earth has evolved in exciting ways. Environments, climates, and life forms have come and gone in fascinating combinations. Course examines changing physical, biological, and climatological conditions through geologic time, beginning with the evolution of the Earth through changes leading to the current state of the planet, and considers prospects for Earth's future. (Formerly course 80F). (General Education Code(s): PE-E, T2-Natural Sciences.) L. Sloan

101. The Fossil Record.
An introduction to paleobiology; the use of fossil evidence to pose and solve evolutionary and geologic questions. Students are billed a materials fee. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements and course 5 or 10 or 20 or Biology 20C or Anthropology 1. Concurrent enrollment in course 101L is required.

101L. The Fossil Record Laboratory (1 credit).
Systematics, ecology, and evolutionary history of the major groups of fossil-forming animals. Laboratory 3 hours and one 1-day field trip. Concurrent enrollment in course 101 is required.

102. Marine Geology.
Geology of the marine environment. Topics include controls on the types, origin, and distribution of marine sediments; geology of oceanic crust; evolution of continental margins and plate boundaries; introduction to paleoceanography. Discussion: 1 hour. Students cannot receive credit for this course and Ocean Sciences 280. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements,and course 5 or 10 or 20 or Biology 20C.

104. Geologic Hazards.
The recognition, evaluation, and mitigation of geologic hazards: earthquakes and faulting, tsunamis, volcanism, landslides and mass movements, and flooding. Students are billed a materials fee. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, and course 10/L or 5/L or 20/L.

109. Elements of Field Geology.
Basic tools and techniques used in geologic fieldwork. Preparation, analysis, and interpretation of geologic maps. Nine to 10 days of weekend field trips required, including a six-day geologic mapping exercise. Laboratory: 3 hours. Recommended for courses 120, 130, 150, and required for 188A-B. May not be taken concurrently with course 120, 150, or 188. Students are billed a materials fee. (General Education Code(s): W satisfied by taking this course and courses 188A and 188B.) Prerequisite(s): Satisfaction of the Entry Level Writing Requirement, course 5 or 10 or 20, and 5L or 10L or 20L. Concurrent enrollment in 109L is required. Enrollment limited to 25.

109L. Field Geology Laboratory (2 credits).
Laboratory exercises essential to the successful completion of fieldwork required in course 109. Topics include topographic maps, Brunton compass, rock identification and description, geologic map analysis, structure section "construction," and landslide recognition. Concurrent enrollment in course 109 required. Enrollment limited to 25. (General Education Code(s): PR-E.)

110A. Evolution of the Earth.
Investigation of the processes and mechanisms that have produced the present Earth system, with an emphasis on the temporal evolution of the earth from the Archean to the present. Specific topics covered include cyclicity in Earth processes and the evolution of, and interplay between the planet's crust, atmosphere, hydrosphere, and biosphere. Prerequisite(s): courses 5 or 10 or 20, and 5L or 10L or 20L, and Mathematics 11A or Mathematics 19A or Applied Mathematics and Statistics 15A. (General Education Code(s): PE-E.)

110L. Evolution of the Earth Laboratory (2 credits).
Laboratory sequence illustrating topics covered in course 110A. Emphasis is on quantifying and evaluating different phenomena related to thermal, tectonic, climatic, and evolutionary processes. Prerequisite(s): concurrent enrollment in course 110A. (General Education Code(s): PR-E.)

111. Mathematics in the Earth Sciences.
Series and sequences, vectors, 3D analytic geometry, partial differentiation, matrix algebra, and differential equations with applications in the Earth sciences. Topics include matrix manipulation, systems of linear equations, least-squares, Taylor series, gradients, optimization, analytic and numerical solutions to differential equations. Prerequisite(s): courses 5 or 10 or 20, and Mathematics 11B or Mathematics 19B or Applied Mathematics and Statistics 15B. (General Education Code(s): Q.)

150. Structural Geology.
Principles and methods of analysis of brittly and ductily deformed rocks. Includes descriptions of structures, field analysis of structures, and mechanics of deformation. Three day-long field trips on weekends. Students are billed a materials fee. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, and course 110A or 110B; course 109 recommended; concurrent enrollment in course 150L is required.

150L. Structural Geology Laboratory (2 credits).
Structural analysis of faults, folds, and maps. Use of stereographic projections. Cross section construction and balancing from field data. Concurrent enrollment in course 150 is required.

160. Planetary Science.
Broad introduction to planetary science. Topics include the fundamental characteristics of solar system bodies; space exploration of these bodies; formation and evolution of surfaces, atmospheres and interiors of planets, satellites and small bodies. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, and Mathematics 11B or Mathematics 19B or Applied Mathematics and Statistics 15B; and Physics 5A or 6A.

190. Earth Sciences Mentorship (1 credit).
Faculty research activity, analytic facilities, and career counseling in three separate Earth sciences laboratories are offered with varied formats including field trips, discussions, and equipment demonstrations. Three different faculty participate in each offering. Enrollment restricted to Earth sciences, Earth sciences/anthropology, and environmental studies/Earth sciences majors. Enrollment limited to 24. May be repeated for credit.

203. Introductory Teaching Seminar (1 credit).
Intended for new Earth sciences graduate students. Focus on preparation, assessment, and feedback. Classroom techniques, organizational and time management strategies, practice teaching sessions specific to laboratory and/or science instruction. Required follow-up meetings to discuss practical teaching experience. Enrollment restricted to graduate students.

204. Earth and Planetary Sciences Foundations (4 credits).
Provides a comprehensive overview of key concepts, dominant paradigms, and research frontiers in Earth and planetary sciences in plenary talks by multiple faculty. Provides a required foundation course for all incoming students pursuing graduate degrees in Earth and planetary sciences. Enrollment restricted to Earth sciences graduate students. Enrollment limited to 20.

205. Introductory Graduate Seminar (2 credits).
Lecture and- seminar-style class intended to welcome new graduate students to the department and to introduce students to the research and interests of departmental faculty and researchers. Includes exercises to develop skills in reading scientific abstracts and papers and in writing abstracts and proposals. Two weekend field trips. Students are billed a materials fee. Enrollment restricted to Earth sciences graduate students.

208. Methods in Paleoclimatology.
Addresses methods used to reconstruct aspects of paleoclimates and paleoenvironments from the geologic record, focusing primarily on terrestrial records. Topics to be covered include dendrochronology and dendroclimatology, paleopalynology, paleobotany, ice cores, and paleosol studies. Lectures, discussions, and laboratory work. Enrollment restricted to graduate students. Offered in alternate academic years.

229. Isotopic Methods in Environmental Science.
Explores how natural variations in stable isotope ratios answer questions in ecology, paleobiology, and other

environmental sciences. Format includes lectures by the instructor and student presentations on applications following literature-based research on each topic. Enrollment restricted to graduate students. Enrollment limited to 25.

290B. Topics in Glaciology.
Advanced review of the physics and chemistry of ice and snow. Mass and heat balance of ice masses. Motion of glaciers and ice sheets. Subglacial and englacial hydrology. Thermodynamics of ice masses and the linkage to climate. Enrollment restricted to graduate students. May be repeated for credit.

290C. Topics in Geophysics.
Different problems and approaches will be stressed from year to year such as geotectonics, paleomagnetism, or properties and processes in the mantle and core. Course designed for graduate students but available to qualified Earth sciences majors.

290F. Topics in Coastal Processes (2 credits).
Instructor and students lead discussions and make presentations on current research, problems, and publications in coastal processes. These topics include littoral drift, sediment transport and storage on the inner shelf, shoreline erosion/change and its documentation, and related issues. Enrollment restricted to graduate students. May be repeated for credit.

292. Seminar (no credit).
Weekly seminar attended by faculty, graduate students, and upper-division undergraduate students.

Economics

1. Introductory Microeconomics: Resource Allocation and Market Structure.
For all interested students as well as prospective economics majors. Examines how markets allocate resources in different kinds of economies. Topics include competitive markets, monopoly, financial markets, income distribution, market failures, the environment, and the role of government. (General Education Code(s): PE-H, IS.)

2. Introductory Macroeconomics: Aggregate Economic Activity.
For all interested students and prospective economics majors. Examines how the overall level of national economic activity is determined, including output, employment, and inflation. Explores the roles of monetary and fiscal policies in stabilizing the economy and promoting growth, with a focus on contemporary policy debates. (General Education Code(s): PE-H, IS.)

10A. Economics of Accounting.
Introduction to accounting principles and practice; preparation and analysis of financial statements; study of internal control procedures. Courses 10A and 10B satisfy the Accounting 1A-B requirement at UC Berkeley.

11A. Mathematical Methods for Economists I.
Introduction to mathematical tools and reasoning, with applications to economics. Topics are drawn from differential calculus in one variable and include limits, continuity, differentiation, elasticity, Taylor polynomials, and optimization. (Also offered as Applied Math and Statistics 11A. Students cannot receive credit for both courses.) Students who have already taken Mathematics 11A and 19A should not take this course. Prerequisite(s): score of 31 or higher on Mathematics Placement Exam. Students who do not place into precalculus should enroll in Mathematics 2. (General Education Code(s): IN, Q.)

11B. Mathematical Methods for Economists II.
Mathematical tools and reasoning, with applications to economics. Topics are drawn from multivariable differential calculus and single variable integral calculus, and include partial derivatives, linear and quadratic approximation, optimization with and without constraints, Lagrange multipliers, definite and indefinite integrals, and elementary differential equations. (Also offered as Applied Math and Statistics 11B. Students cannot receive credit for both courses.) Prerequisite(s): course 11A, or Applied Mathematics and Statistics 11A, or Mathematics 11A, or Mathematics 19A. (General Education Code(s): MF, IN, Q.)

100A. Intermediate Microeconomics.
Covers major theoretical issues arising in the study of resource allocation, the function of markets, consumer behavior, and the determination of price, output, and profits in competitive, monopolistic, and oligopolistic market structures. Also considers issues of welfare and public policy. Students cannot receive credit for this course and course 100M. Prerequisite(s): courses 1; 2; and 11B or Applied Mathematics and Statistics 11B or Mathematics 22 or 23A.

100B. Intermediate Macroeconomics.
Covers major theoretical issues arising in the study of income, employment, interest rates, and the price level. Examines the role of monetary and fiscal policy in economic stabilization. Also considers these issues as they relate to the global economy. Students cannot receive credit for this course and course 100N. Prerequisite(s): courses 1; 2; and 11B or Applied Mathematics and Statistics 11B or Mathematics 22 or 23A.

101. Managerial Economics.
Analysis of the theory and practice of decision making in business firms, applying the concepts and techniques of microeconomics. Topics may include pricing schemes, non-price competition, internal organization of firms, incentive contracts, asymmetric information, and game theory. Case studies are used to illustrate some topics. Prerequisite(s): courses 100A or 100M, and 113.

111A. Intermediate Accounting I.
Principles, control, and theory of accounting for assets; accounting as an information system; measurement and determination of income. Projects involving spreadsheet software required. Students cannot receive credit for this course and course 209A. Prerequisite(s): course 10B.

113. Introduction to Econometrics.
Practical methods for organizing and analyzing economic data, testing economic hypotheses, and measuring economic relationships. Regression analysis is the main empirical method, and basic statistical and probability theory is included. Students gain hands-on computer experience with an econometric software package. Students cannot receive credit for this course and Applied Mathematics and Statistics 113. Prerequisite(s): courses 1, 2, Applied Mathematics and Statistics 5, and either course 11B, Applied Mathematics and Statistics 11B, Mathematics 22, or Mathematics 23A. Courses 100A or 100B strongly recommended as preparation. (General Education Code(s): SR, Q.)

115. Introduction to Management Sciences.
The scientific study of management decision making. Topics include linear, integer, and non-linear programming. Special emphasis on a wide variety of practical applications, including production scheduling, optimal transportation assignments, and optimal inventory policy. Prerequisite(s): course 100A or 100M.

117A. Income Tax Factors for Individuals.
Introduces federal taxation for individuals. Topics for study include taxable income, gross income exclusions and inclusions, capital gains, depreciation, business and itemized deductions, personal and dependency exemptions, passive activity losses, tax credits, and methods of accounting. Prerequisite(s): course 10B.

120. Economic Development.
A comparative approach to the study of the economic development of low-income countries. Various obstacles to growth are identified, and different types of solutions are analyzed. Prerequisite(s): courses 1, 2, and 113. (General Education Code(s): E.)

126. Why Economies Succeed or Fail: Lessons from Western and Japanese History.
Examines the emergence of capitalism and the world's first industrial revolution in Britain, continental Europe industrialization, Soviet economic growth and collapse, and the Japanese economic miracle. Asks about the historical sources of long-run economic development, stagnation, and decline. Draws lessons for current debates over free market versus more interventionist policies, economic reform in the former Communist nations, and economic rivalry between the U.S. and Japan. Prerequisite(s): courses 1 and 2. Related course work in history also helpful.

128. Poverty and Public Policy.
Studies the causes, consequences, and governmental response to urban poverty in the U.S. Topics include how public policy, the macroeconomy, race, gender, discrimination, marriage, fertility, child support, and crime affect and are affected by urban poverty. Emphasizes class discussion and research. (Also offered as Legal Studies 128. Students cannot receive credit for both courses.) Prerequisite(s): satisfaction of Entry Level Writing & Composition requirement; courses 100A or 100M; and course 113. Enrollment restricted to economics, business management economics, global economics, legal studies, or economics combined majors. Enrollment limited to 35. (General Education Code(s): W, E.)

133. Security Markets and Financial Institutions.
An examination of all major financial markets: equities, bonds, options, forwards, and futures. Uses modern financial theory, including asset pricing models such as CAPM and APT. Prerequisite(s): courses 100A or 100M, and 113.

138. The Economics and Management of Technology and Innovation.
Examines the analytics of issues in technology and innovation, including cooperation in research and development (R&D), standardization and compatibility, patents and intellectual property rights, and strategic management, using economic models and firm case studies. Prerequisite(s): course 100A or 100M, or permission of instructor.

140. International Trade.
The theory of international production and trade. The effects of tariffs and quantitative trade restrictions; the nature of economic integration; multinational firms; effects of trade and protection on economic stability and welfare. Prerequisite(s): course 100A or 100M.

143. Policy Issues in the International Economy.
Covers selected issues concerning the international economy. Topics include: U.S. competitiveness; U.S. trade policy; immigration; trade and the environment; developing countries; foreign investment; foreign exchange markets; and international economic institutions. Prerequisite(s): courses 1, 2, and 100A or 100M.

149. The Economies of East and Southeast Asia.
Examines the pattern of international trade, investment, and industrial structure in Asia. Examines competing explanations of rapid growth of Japan, Korea, and Taiwan; presents an overview of economic developments in China, Hong Kong, and Taiwan. Concludes with an analysis of high technology trade and multinationals in Asia in 2000 and beyond. Prerequisite(s): courses 1 and 2.

150. Public Finance.
Economics of taxation, including incidence, equity issues, efficiency, and supply side effects. Close attention to taxes in the U.S. system and tax-reform issues. Students cannot receive credit for this course and course 250. Prerequisite(s): course 100A or 100M, and course 100B or 100N.

161A. Marketing.
The evolution of markets and marketing; market structure; marketing cost and efficiency; public and private regulation; the development of marketing programs including decisions involving products, price, promotional distribution. (Formerly course 161.) Prerequisite(s): course 100A or 100M.

164. Economics and the Telecommunications Industry.
Covers the economics of the telecommunications industry including telephone, cellular telephone, and data communications. Particular emphasis on the Internet, satellite, paging, cable television, radio and television broadcasting. Examines the industry structure and implications of moving from a regulated environment to competition. Topics examined from a competitive strategic standpoint as well as public policy perspective. Prerequisite(s): courses 100A or 100M, and 113.

166A. Game Theory and Applications I.
Introduces modern game theory, including applications in social science, biology, and engineering. Topics include extensive form, strategic form, mixed strategies, incomplete information, repeated games, evolutionary games, and simulation techniques. (Also offered as Computer Science 166A. Students cannot receive credit for both courses.) Prerequisite(s): Applied Math and Statistics 5 or 7 or Economics 113; and Economics 11B, Applied Math and Statistics 11B, or Mathematics 11B or 19B. Enrollment restricted to juniors and seniors. Enrollment limited to 100.

170. Environmental Economics.
Economic analysis of environmental issues. Environmental pollution and deterioration as social costs. Economic policy and institutions for environmental control. Influences of technology, economic growth, and population growth on environmental quality. Prerequisite(s): courses 100A or 100M, and 113.

197. Using Economic Theory and Empirical Evidence in Arguing Policy.
Economics students are expected to learn to effectively communicate economic theory and evidence relating to economic policy to audiences that do not have economics degrees. The skills to be learned are both written and oral communication. Students learn to present convincing policy arguments in position papers, executive summaries, and in oral presentation that may include charts and other means of communication. Prerequisite(s): Entry Level Writing and Composition requirements; courses 100A, 100B, and course 113; and a concurrent, upper-division, economic-policy course. Restricted to junior/senior economics, business-management economics, global economics majors.

204A. Advanced Microeconomic Theory.
Economic theory of individual and market behavior, including constrained optimization, duality, theory of the consumer, theory of the producer, dynamic optimization, behavior under uncertainty, intertemporal choice, asymmetric information, game theory, partial and general equilibrium, pure and applied welfare economics, public goods and externalities. Illustrative examples emphasize international applications. Courses must be taken in sequence.

205A. Advanced Macroeconomic Theory.
Modern macroeconomic theory: determination of national income; employment, inflation, and exchange rates; theories of growth and business cycle fluctuations; international transmission of inflation and other disturbances; recent developments in the analysis of macroeconomic policy; modern theoretical and empirical analysis of aggregate relationships. Courses must be taken in sequence.

209A. Accounting 1.
Principles, control, and theory of accounting for assets; accounting as an information system; measurement and determination of income. M.S. level projects required. Students cannot receive credit for this course and course 111A. Enrollment restricted to graduate students.

210B. Mathematical Methods for Economic Analysis.
A course in introductory mathematical economics which covers standard optimization problems, difference and differential equations, optimal control theory, decisions under uncertainty, game theory, and stochastic calculus. Course 210A or equivalent is strongly recommended as preparation.

211A. Advanced Econometrics.
Advanced econometric methods are introduced. Topics include the standard regression analysis, simultaneous equation estimation, nonlinear models, qualitative response models, panel data analysis, and univariate and multivariate time series analysis.

220A. Development Economics: Theory and Cases.
Surveys traditional development economics and the neoclassical resurgence in development theory. Topics include sources of growth, income distribution, population and human capital development, savings, fiscal and monetary mobilization and allocation, foreign investment and aid, and macroeconomic policies. Case study focus in the second quarter. Courses 204A and 205A are strongly recommended as preparation.

236. Financial Engineering.
This course surveys the financial risks faced by corporation, banks, and other financial institutions that arise from changes in interest rates, foreign exchange rates, commodity prices, and stock prices. It examines the characteristics, payoffs, and pricing of financial derivatives and other instruments for managing risk, including options, forwards, futures, swaps, structured notes, and asset-backed securities. Several cases will be used to illustrate how actual firms solve financial risk management problems. Prerequisite(s): course 233.

240A. Advanced International Trade Theory I.
The theory of international trade and commercial policy. Both traditional analyses and recent developments are covered. Topics include both normative and positive theoretical analyses, as well as empirical testing of theory. Enrollment restricted to graduate students. Courses 204A-B-C are strongly recommended as preparation.

241A. Advanced International Finance I.
Financial aspects of aggregate capital and trade flows and income determination in open economies. Specific topics include financial risk in the international setting, international borrowing and lending, money and exchange rate regimes, income determination and macroeconomic policy, current issues in international monetary reform.

250. Advanced Public Finance.
Theory of the role of public sector expenditures and taxes in market economies. Analyzes efficiency and equity arguments for government intervention. Topics include the role of public debt and deficits in economies, international effects of tax and spending policies, and economic theories of public sector decision making. Courses 204A and 205A are strongly recommended as preparation. Students cannot receive credit for this course and course 150.

274. Workshop in Macroeconomics and Monetary Economics (3 credits).
For Ph.D. students in economics who are at the early stages of their research careers as well as for those who are engaged in dissertation work in macroeconomics and monetary economics. Topics vary from quarter to quarter depending on the interests of participants. Prerequisite(s): courses 205A, 205B, and 205C, or by consent of instructor. Enrollment restricted to graduate students. May be repeated for credit.

275. Workshop in Applied Microeconomics (3 credits).
For Ph.D. students in economics who are at the early stages of their research careers as well as for those who are engaged in dissertation work in applied microeconomics or other empirical work. Topics vary from quarter to quarter depending on the interests of participants. Enrollment restricted to graduate students. May be repeated for credit.

296A. Third Year Ph.D. Seminar.
Student presentations of literature and/or original research in areas of student research interest. Student discussion of presentations under faculty supervision. Prerequisite(s): courses 204C, 205C, 211B, 240A, 240B, 241A, and 241B are required preparation.

Education

50B. CAL Teach 1: Mathematics (2 credits).
Introductory seminar exploring secondary students, teaching, and schools in the context of mathematics instruction. Concurrent participation in a secondary school internship required. Course material supports and enhances students' placement experiences. Prerequisite(s): Acceptance into CAL Teach and concurrent participation in a secondary school internship

in a math classroom. Enrollment limited to 25. (General Education Code(s): PR-S.)

50C. CAL Teach 1: Science (2 credits).
Introductory seminar exploring secondary students, teaching, and schools in the context of science instruction. Concurrent participation in a secondary school internship required. Course material supports and enhances students' placement experiences. Prerequisite(s): Acceptance into CAL Teach and concurrent participation in a secondary school internship in a science classroom. Enrollment limited to 25. (General Education Code(s): PR-S.)

60. Introduction to Education: Learning, Schooling, and Society.
Explores the foundations of learning and teaching, the social and political forces within schools and school systems in the U.S., and the educational policies and practices in culturally and linguistically diverse communities. (General Education Code(s): IS, E.)

100A. Cal Teach 2: Science and Mathematics (2 credits).
Examines students, schools, and science and/or mathematics instruction with emphasis on developing an instructional project aligned with state-mandated content standards. Concurrent participation in a secondary school internship required. Course content supports and enhances students' internship experience. (Formerly course 75A.) (General Education Code(s): W satisfied by taking this course and course 185L.) Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements; course 50A, 50B, or 50C; and acceptance into the Cal Teach program. Enrollment restricted to sophomores, juniors, and seniors. Enrollment limited to 25.

170. East Asian Schooling and Immigration.
Focuses on an historical and contemporary study of education in Japan, China, Korea, Hong Kong, and Taiwan, and the adaptation to schooling in the U.S. of immigrant families from those cultures. Topics include the effects on schooling of language acquisition, religion and cultural practices, family patterns, socioeconomic status, career aspirations, and parental expectations. (Formerly Schools and Asian Cultures.) Prerequisite(s): Enrollment restricted to juniors, seniors, or education minors. Enrollment limited to 50. (General Education Code(s): CC.)

173. Seminar in Critical Pedagogy.
Philosophical and pedagogical exploration of relationships among oppression, power, society, education, and change. Examines how history, power, economics, and discrimination shape societal perspectives and schooling practices, and considers ways to transform education. Enrollment restricted to juniors, seniors, or education minors. Enrollment limited to 50. May be repeated for credit.

180. Introduction to Teaching.
Designed to encourage students to think about teaching in new ways. Assumptions about teaching and schooling are examined as well as considering what it takes to teach so that children learn and understand. Not a course in how to teach, but an opportunity to reconsider what teaching should try to accomplish and what kinds of learning teachers should foster. Practicum in the schools of 30 hours per quarter required. Enrollment restricted to juniors, seniors, or education minors. Enrollment limited to 120.

200. Beginning Student Teaching.
A required course that introduces students to the diverse cultural and linguistic settings of today's classrooms. Classroom practices, instructional strategies, and analysis are emphasized. First course in the student teaching placement series. Placements are used to examine and apply teaching methods while developing classroom management skills. Class meetings include discussion and demonstration of teaching methods. (Formerly Applied Classroom Analysis and Methods: Beginning Student Teaching.) Enrollment restricted to MA/credential students.

204. Methods of English Language Development: Single Subject.
Course helps future educators develop a practical theory for teaching English in the elementary and secondary schools to students who speak other languages. Topics include current trends in the field, language assessment ,and the design of instructional units. Enrollment restricted to MA/credential students.

211. Topics in Elementary Education: Teaching Special Populations (2 credits).
Addresses the preparation of teachers for meeting needs of special populations within the general education setting. Covers basic knowledge, skills, and strategies. Enrollment restricted to MA/credential students.

212A. Bilingualism and Biliteracy: History, Politics, Theory, and Practice (2 credits).
Taught in Spanish. Prepares future bilingual teachers to be knowledgeable about history, politics, theory, and practices related to bilingual instructional programs. Topics: second-language acquisition, bilingual-program models, equity pedagogy. Enrollment restricted to MA/credential students.

220. Reading and Language Arts for Elementary Classrooms.
This course provides both a theoretical and practical foundation for literacy instruction, emphasizing reading and language arts instruction in grades K–8. Interactive instruction and field experience will be used to examine curricula, methods, materials, and literacy evaluation. Enrollment restricted to MA/credential students.

222. Mathematics Learning and Teaching in Elementary Classrooms.
This course is required for the multiple subject credential. Examines constructivist and sociocultural approaches to the learning and teaching of mathematics in elementary classrooms, including the nature of mathematics and theories of how children learn mathematics. Provides an introduction to mathematics teaching standards and a critical overview of curricula, instructional theories, and multiple approaches to teaching the "big ideas" in elementary mathematics. Enrollment restricted to MA/credential students.

226. English Teaching: Theory and Curriculum.
Required for the single subject English credential student. Examines sociocultural approaches to the learning and teaching of English in secondary classrooms, including theories of how children learn English language, literature, and composition. Enrollment restricted to MA/credential students.

228. Math Education: Research and Practice.
Examines research on the learning and teaching of mathematics. Topics include the nature of mathematics cognition and learning, how children learn mathematics, mathematical discourse, and perspectives on addressing diversity in mathematics classrooms. Course is required for M.A./credential students in secondary (single subject) mathematics and of Ph.D. students in mathematics education. Enrollment restricted to MA/credential students.

230. Science Education: Research and Practice.
Examines theoretical approaches to the learning and teaching of science including the nature of scientific knowledge, theories of how children learn science, approaches to scientific discourse, and perspectives on addressing diversity in science classrooms. Course is required for single subjects science credential. Enrollment restricted to MA/credential students.

232. Social Science: Theory and Curriculum.
Required for the single subject social science credential student. Tracks both the implicit and explicit connections between theory and practice, illustrating that theory suggests best practice while practice informs theory-formation and testing. Enrollment restricted to MA/credential students.

235. Introduction to Educational Inquiry.
Addresses foundational knowledge needed to understand and conduct educational inquiry and research. Topics include epistemology in the human sciences, philosophical foundations of modern research strategies, and general classes of research investigations in education. Enrollment restricted to graduate students. Enrollment limited to 15.

261. Thinking, Learning, and Teaching.
Examines multiple theoretical perspectives on thinking, learning, and teaching; the development of the whole person in a variety of cultural contexts; the roles thinking, learning, and teaching play in that development; and how researchers' and educators' conceptions shape instruction. Enrollment restricted to graduate students. Enrollment limited to 15.

269A. First-Year Doctoral Proseminar (2 credits).
This three-quarter seminar supports professional development for first-year doctoral students. Students develop essential skills for success as scholars, discuss issues in educational research and practice, and are introduced to research by Education Department faculty. Enrollment restricted to education graduate students. Enrollment limited to 15.

270A. Second-Year Professional Development Seminar (2 credits).
Three-quarter seminar supports professional development for second-year doctoral students. Activities include preparation of research and conference proposals, presentation of second-year project findings, and attendance at department colloquia. Enrollment restricted to second-year Ph.D. students. Enrollment limited to 12.

277A. Second-year Doctoral Proseminar (2 credits).
This three-quarter seminar supports professional development for second-year doctoral students as they prepare their qualifying materials and begin dissertation work. Prerequisite(s): courses 269 A-B-C. Enrollment restricted to graduate students. Enrollment limited to 20.

280. Academic Language.
Considers and critiques conceptualizations of the language used for academic pursuits, from the early years of schooling to higher education. Focuses on implica-

tions for research and practice related to the education of students in linguistically diverse schools and societies. Enrollment restricted to graduate students. Enrollment limited to 15.

285. Culture and Learning.
Examines multiple approaches to the study of the relation between culture and learning. Readings include historical and contemporary perspectives from cognitive science, cognitive anthropology, cross-cultural psychology, cultural psychology, and socio-cultural theories as frameworks for the study of culture and learning. Enrollment restricted to graduate students. Enrollment limited to 15.

288. Ethnographies of Education.
Offers opportunity to critique a range of book-length ethnographic studies of education focusing on relationship between culture, learning, and schooling in the U.S. with comparative studies from other countries. Enrollment restricted to graduate students. Enrollment limited to 12.

Electrical Engineering

80S. Sustainability Engineering and Practice.
Topical introduction to principles and practices of sustainability engineering and ecological design with emphasis on implementation in society. Provides an understanding of basic scientific, engineering, and social principles in the design, deployment, and operation of resource-based human systems, and how they can be maintained for this and future generations. No specialized background in engineering, science, or social sciences is assumed. (General Education Code(s): PE-E, T7-Natural Sciences or Social Sciences.)

101. Introduction to Electronic Circuits.
Introduction to the physical basis and mathematical models of electrical components and circuits. Topics include circuit theorems (Thevenin and Norton Equivalents, Superposition), constant and sinusiodal inputs, natural and forced response of linear circuits. Introduction to circuit/network design, maximum power transfer, analog filters, and circuit analysis using Matlab. Topics in elementary electronics including ampliphiers and feedback. (Formerly course 70.) Prerequisite(s): Physics 5C/N or 6C/N, and Mathematics 24 or previous or concurrent enrollment in Applied Mathematics and Statistics 20 or 20A. Concurrent enrollment in course 101L is required.

101L. Introduction to Electronic Circuits Laboratory (2 credits).
Illustrates topics covered in course 101. One two-hour laboratory session per week. Students are billed for a materials fee. (Formerly course 70L.) Prerequisite(s): Physics 5C/N or 6C/N; and Mathematics 24 or previous or concurrent enrollment in Applied Mathematics and Statistics 20 or 20A. Concurrent enrollment in course 101 is required.

103. Signals and Systems.
The course covers the following topics: characterization and analysis of continuous-time signals and linear systems, time domain analysis using convolution, frequency domain analysis using the Fourier series and the Fourier transform, the Laplace transform, transfer functions and block diagrams, continuous-time filters, sampling of continuous time signals, examples of applications to communications and control systems. Prerequisite(s): courses 101/L and Applied Mathematics and Statistics 20 or 20A.

103L. Signals and Systems Laboratory (2 credits).
Use and operation of spectrum analyzers; advanced signal analysis using oscilloscopes; measuring impulse response, step response, frequency response, and computer analysis of real signals. MATLAB programming is taught and used as a tool for signal analysis. Students are billed a materials fee. Prerequisite(s): course 101and 101L, and Applied Mathematics and Statistics 20 or 20A. Concurrent enrollment in course 103 required

130. Introduction to Optoelectronics and Photonics.
Introduction to optics, photonics and optoelectronics, fiber optic devices and communication systems: Topics include: ray optics, electromagnetic optics, resonator optics, interaction between photons and atoms, dielectric waveguides and fibers, semiconductor light sources and detectors, modulators, amplifiers, switches, and optical fiber communication systems. Taught in conjunction with course 230. Students cannot receive credit for this course and course 230. Prerequisite(s): Physics 5B and 5C, or 6B and 6C; concurrent enrollment in course 130L.

130L. Introduction to Optoelectronics Laboratory (1 credit).
Includes a series of projects to provide hands-on experience needed for basic concepts and laboratory techniques of optical fiber technology. Students are billed a materials fee. Prerequisite(s): Physics 5L-M-N, or 6L-M-N; concurrent enrollment in course 130. Enrollment limited to 30.

145. Properties of Materials.
The fundamental electrical, optical, and magnetic properties of materials, with emphasis on metals and semiconductors: chemical bonds, crystal structures, elementary quantum mechanics, energy bands. Electrical and thermal conduction. Optical and magnetic properties. Prerequisite(s): Physics 5A/L, 5B/M, and 5C/N or 6A/L, 6B/M, and 6C/N. Students must also concurrently enroll in course 145L.

145L. Properties of Materials Laboratory (2 credits).
Laboratory sequence illustrating topics covered in course 145. One two-hour laboratory per week. Students are billed a materials fee. Prerequisite(s): Physics 5A/L, 5B/M, and 5C/N or 6A/L, 6B/M, and 6C/N. Students must also concurrently enroll in course 145.

154. Feedback Control Systems.
Analysis and design of continuous linear feedback control systems. Essential principles and advantages of feedback. Design by root locus, frequency response, and state space methods and comparisons of these techniques. Applications. Prerequisite(s): course 103. Enrollment restricted to School of Engineering and Division of Physical and Biological Sciences majors or permission of instructor. Enrollment limited to 30.

176. Energy Conservation and Control.
AC/DC electric-machine drives for speed/position control. Integrated discussion of electric machines, power electronics, and control systems. Computer simulations. Applications in electric transportation, hybrid-car technology, robotics, process control, and energy conservation. Prerequisite(s): courses 103 and 171. Concurrent enrollment in course 176L is required.

176L. Energy Conversion and Control Laboratory (2 credits).
Simulink-based simulations of electric machines/drives in applications such as energy conservation and motion control in robotics and electric vehicles. Students are billed a materials fee. Prerequisite(s): courses 103 and 171. Concurrent enrollment in course 176 is required.

212. Introduction to BioMEMS.
Oriented to general engineering and science students. Topics included are: 1) microfabrication of silicon, glass, and polymer materials; 2) microfluidics and electrokinetics; 3) sensors, actuators, and drug-delivery systems; 4) micro total-analysis systems and lab-on-a-chip devices; 5) detection and measuring systems; 6) genomics, proteomics, DNA, and protein microarrays; 7) emerging applications in medicine, research, and homeland security; 8) packaging, power systems, data communication, and RF safety; and 9) biocompatibility and standards. Recommended for advanced undergraduates and graduate students in bioengineering, electrical engineering, chemistry, and health-related fields including biochemistry, molecular and cellular biology, physiology, and genetics. Enrollment restricted to graduate students, or by permission of the instructor.

230. Optical Fiber Communication.
Components and system design of optical fiber communication. Topics include step-index fibers, graded-index fibers, fiber modes, single-mode fibers, multimode fibers, dispersion, loss mechanics, fiber fabrication, light-emission processes in semiconductors, light-emitting diodes, laser diodes, modulation response, source-fiber coupling, photodetectors, receivers, receiver noise and sensitivity, system design, power budget and rise-time budget, fiber-optic networks (FDDI, SONET, etc), wavelength division multiplexing (WDM). Students cannot receive credit for this course and course 130. Enrollment restricted to graduate students. May be repeated for credit.

241. Introduction to Feedback Control Systems.
Graduate-level introduction to control of continuous linear systems using classical feedback techniques. Design of feedback controllers for command-following error, disturbance rejection, stability, and dynamic response specifications. Root locus and frequency response design techniques. Extensive use of Matlab for computer-aided controller design. Course has concurrent lectures with Electrical Engineering 154. (Also offered as Computer Engineering 241. Students cannot receive credit for both courses.) Enrollment restricted to graduate students.

261. Error Control Coding.
Covers the following topics: introduction to algebra; linear block code; cyclic codes; BCH code; RS codes; spectral domain study of codes; CRC; and product codes. Enrollment restricted to graduate students.

264. Image Processing and Reconstruction.
Fundamental concepts in digital image processing and reconstruction. Continuous and discrete images; image acquisition, sampling. Linear transformations of images, convolution and superposition. Image enhancement and restoration, spatial and spectral filtering. Temporal image processing: change detection, image registration, motion estimation. Image reconstruction from incomplete data. Applications. Students that have completed Computer Engineering 261 may not take this course for credit. Prerequisite(s): course 153 or permission of instructor.

280B. Seminar on Integrated Bioelectronics (2

credits).
Weekly seminar covering current research in integrated bioelectronics. May be repeated for credit.

280M. Seminar on Micro-Electro-Mechanical Systems (MEMS) (2 credits).
Weekly seminar series covering topics of current research interest in Micro-Electro-Mechanical Systems (MEMS) design, fabrication and applications. Current research work and literature in these areas are discussed. Enrollment restricted to graduate students. Undergraduates may enroll with permission of instructor. May be repeated for credit.

280O. Seminar on Applied Optics (2 credits).
Weekly seminar series covering topics of current research in applied optics, including integrated, quantum, nonlinear, and nano-optics. Current research work and literature in these areas are discussed. Enrollment restricted to graduate students. Undergraduates may enroll with permission of instructor. May be repeated for credit.

280Q. Seminar on Quantum Electronics and Nanoelectronics (2 credits).
Weekly series covers current research in quantum electronics including electron and photon transport in nanostructures; nanoscale heat transport; optoelectronic integrated circuits; nanoscale devices for energy conversion; micro-refrigeration; thermal and acoustic imaging of nanostructures. Current research work and recent literature are discussed. Enrollment restricted to graduate students; undergraduates may enroll by permission of instructor. May be repeated for credit.

293. Advanced Topics in Electrical Engineering.
Graduate seminar course on a research topic in electrical engineering that varies with the particular instructor. Typical topics include, but are not limited to, electromagnetics, antennas, electronics biotechnology, nanotechnology, signal processing, communications, VLSI, and MEMS. Prerequisite(s): Consent of instructor. Enrollment restricted to graduate students. Enrollment limited to 25. May be repeated for credit.

Environmental Studies

24. General Ecology.
Covers principles of ecology including limits to species abundances, evolutionary ecology, population dynamics, community interactions and patterns, and ecosystem patterns and dynamics. Prerequisite(s): Applied Mathematics and Statistics 2 or 3, or Mathematics 3 or higher level Mathematics course or placement exam score of 31 or higher; or AP Calculus AB exam score of 3 or higher; course 23 recommended as prerequisite to this course. (General Education Code(s): SI, IN.)

80B. The Ecological Forecast for Global Warming.
A broad overview of the impacts of human activities on the global climate system. Topics include how climate affects the distribution of ecosystems, the influence of global climate change on biodiversity, ecosystem function, and consequences for the human enterprise. (General Education Code(s): PE-E, T7-Natural Sciences or Social Sciences.)

91F. Community and Agroecology (2 credits).
Interdisciplinary two-credit seminar designed to introduce students to concepts of community and agroecology in the context of sustainability. Course can serve as a gateway to or as a continuing basis for participation in PICA (Program in Community and Agroecology). Specific topics and readings change each quarter. May be repeated for credit.

100. Ecology and Society.
Introduction to environmental issues in an interdisciplinary matrix. Focuses on three issues at the intersection of ecological questions and social institutions: agroecology and sustainable agriculture; population growth, economic growth, and environmental degradation; and biodiversity conservation and land management. Reviews the important roles of disciplinary abstraction and of the application of that knowledge to context-dependent explanations of environmental problems. Enrollment restricted to environmental studies, environmental studies/biology, environmental studies/economics, and environmental studies/Earth sciences majors. Prerequisite(s): course 23 or CHEM 1A; course 24 or BIOE 20C; course 25; and AMS 7/L or ECON 113; and one from: ANTH 2, SOCY 1,10,15, PHIL 21,22,24,28, or 80G. Concurrent enrollment in 100L is required.

100L. Ecology and Society Writing Laboratory (2 credits).
Required writing lab accompanying course 100. Students are introduced to writing in different styles and for different audiences typical of the ecosystem-society interface. Course 100 writing assignments are developed, written, and revised in conjunction with the lab. W credit is granted only upon successful completion of course 100. Prerequisite(s): Satisfaction of the Entry Level Writing and Composition requirements. Concurrent enrollment in 100 is required. (General Education Code(s): PR-E.)

115A. Geographic Information Systems and Environmental Applications.
Introduction to geographic information systems (GIS) as the technology of processing spatial data, including input, storage and retrieval; manipulation and analysis; reporting and interpretation. Emphasizes GIS as a decision support system for environmental and social problem solving, using basic model building, experimental design, and database management. Students cannot receive credit for this course and course 215A. Enrollment restricted to environmental studies majors and combined majors. Prerequisite(s): Previous or concurrent enrollment in course 115L, 100/L, or permission of instructor. Course in computer science, Earth science, math, or geography recommended. Enrollment restricted to environmental studies majors and combined majors.

115L. Exercises in Geographic Information Systems (2 credits).
Exercises in Geographic Information Systems and Remote Sensing that demonstrate the development of digital geographic data. Students gain hands-on experience with developing datasets, using imagery to create GIS layers, performing spatial analysis, and utilizing GPS technology. Emphasis placed on environmental applications. Students cannot receive credit for this course and course 215L. Students are billed a materials fee. Concurrent enrollment in course 115A is required.

130A. Agroecology and Sustainable Agriculture.
Ecological concepts and principles are applied to the design and management of sustainable agroecosystems. Alternatives for agriculture are discussed in terms of ecosystem structure and function. A weekly three-hour lab is required. Prerequisite(s): Concurrent enrollment in course 130L and previous or concurrent enrollment in courses 100 and 100L required, or by permission of instructor. Enrollment restricted to environmental studies majors and combined majors.

130L. Agroecology and Sustainable Agriculture Laboratory (2 credits).
Laboratory and field exercises to train in the analysis of ecological processes in agricultural systems, with a focus on the quantification of ecological sustainability. Experimental design, analysis, and data interpretation are emphasized. Concurrent enrollment in course 130A is required.

131. Insect Ecology.
Advanced course in ecology featuring insect-plant interactions such as herbivory, pollination, and the effects of plants on insect population dynamics. Lectures emphasize current controversies in ecological theory and relate theory to application. Prerequisite(s): previous or concurrent enrollment in courses 100 and 100L required, or by permission of instructor. Enrollment restricted to environmental studies majors and combined majors. Offered in alternate academic years.

141. Ecological Economics.
Application of economic analysis to natural resource policy and management. Topics include welfare economics, property rights and externalities, natural resource valuation, exhaustible and renewable resources, and sustainable development. Prerequisite(s): Economics 1 is strongly recommended as preparation. Previous or concurrent enrollment in courses 100 and 100L is required, or by permission of instructor. Enrollment restricted to environmental studies majors and combined majors.

165. Freshwater Issues and Policy.
Concepts, vocabulary, and skills necessary to the analysis of freshwater issues are introduced from hydrology, ecology, law, economics, engineering, and other disciplines. The skills are then applied to case studies involving local, state, and international freshwater conflicts and crises. Prerequisite(s): Previous or concurrent enrollment in courses 100 and 100L is required, or by permission of instructor. Enrollment restricted to environmental studies majors and combined majors.

166. Agroecosystem Analysis and Watershed Management.
Explores a range of approaches to examine agroecosystem function, watershed management, and concepts of sustainability. Uses a combination of lecture, demonstration, field work, and field trips to illustrate approaches to analysis of managed ecosystems behavior and the integration of biophysical and socio-political knowledge to aid in watershed management. Prerequisite(s): Previous or concurrent enrollment in courses 100 and 100L required, or by permission of instructor; and course 130A or 130B or 129 or 133 or 160 or 167. Enrollment restricted to environmental studies majors and combined majors.

177. Teaching Environmental Education.
Designed for environmental studies majors interested in teaching environmental education in the K-12 school system. Students investigate incorporation of environmental education in the classroom; design an environmental education school project; and are placed in a school where they observe environmental education

in practice. Prerequisite(s): course 91F or 191F, and previous or concurrent enrollment in courses 100 and 100L required, or by permission of instructor. Enrollment restricted to environmental studies majors and combined majors.

189. Environmental Studies Research Seminar (1 credit).
Research seminars presented weekly throughout the year by environmental studies faculty, visiting scholars, and graduate students. Students discuss content and methodology of research presented following each seminar. Students write critiques of some seminars. May be repeated for credit.

191F. Community and Agroecology Seminar (2 credits).
Interdisciplinary two-credit seminar designed for upper-division students who want to become involved in PICA (Program in Community and Agroecology) and to explore concepts of community and agroecology as they relate to sustainability. Also emphasizes development of leadership skills. Specific topics and readings change each quarter. Prerequisite(s): course 91F, 130A, 130B, 133, or equivalent experience. Enrollment limited to 25. May be repeated for credit.

196. Senior Seminar.
Readings and discussions of primary literature on a current environmental studies topic. Field or literature-based research projects (individual or group) writing multiple drafts resulting in a final paper. Topics vary yearly; consult current course listings. Enrollment by application with selection based on appropriate background and academic performance. Satisfies senior comprehensive requirement. Enrollment restricted to senior environmental studies majors; senior environmental studies/biology combined majors; senior environmental studies / Earth sciences combined majors; and senior environmental studies /economics combined majors. Prerequisite(s): Entry Level Writing and Composition requirements.

201A. Keywords and Concepts.
Two-quarter course introduces keywords and concepts that underlie interdisciplinary work in environmental studies through lectures, directed readings, and discussion. Modules include resonant concepts in ecology and society; ecology and evolution; environment and development; the global environment and society; agroecology and conservation biology; and public policy, economics, and law. Final grade for both courses assigned at the end of the second quarter. Enrollment restricted to graduate students.

201M. Developing Research Proposals (2 credits).
Offers graduate students the opportunity to become familiar with the research expertise of the faculty in the Environmental Studies department. Enrollment restricted to graduate students.

215A. Geographic Information Systems and Environmental Applications.
Introduction to geographic information systems (GIS) as the technology of processing spatial data, including input, storage and retrieval; manipulation and analysis; reporting and interpretation. Emphasizes GIS as a decision support system for environmental and social problem solving, using basic model building, experimental design, and database management. Students cannot receive credit for this course and course 115A. Concurrent enrollment in course 215L is required. Enrollment restricted to environmental studies graduates students.

215L. Exercises in Geographic Information Systems (2 credits).
Exercises in Geographic Information Systems and Remote Sensing that demonstrate the development of digital geographic data. Students gain hands-on experience with developing datasets, using imagery to create GIS layers, performing spatial analysis, and utilizing GPS technology. Emphasis placed on environmental applications. Students cannot receive credit for this course and course course 115L. Students are billed a materials fee. Concurrent enrollment in course 215A is required. Enrollment restricted to environmental studies graduate students.

290. Interdisciplinary Research Seminar (2 credits).
Research seminars presented weekly throughout the year by environmental studies and affiliated faculty, by visiting scholars, and by graduate students. Students discuss the content and methodology of research presented following each seminar. Enrollment restricted to graduate students. May be repeated for credit.

290L. Graduate Research Seminar (2 credits).
Graduate student presentations of doctoral research proposals, dissertation work-in-progress, grant applications, and conference papers. This weekly laboratory meeting seeks to develop professional skills, teach constructive criticism, and foster effective discussion among peers. Enrollment restricted to graduate students.

291. Advanced Readings in Environmental Studies (3 credits).
Focusing on a recently published volume or on a topic of current interest, this seminar requires a rigorous analysis of the principles and methods employed in the four core areas of the program: sustainable agriculture and agroecology; conservation biology; environmental policy analysis; and political economy. Enrollment restricted to graduate students. May be repeated for credit.

292. Topics in Research in Environmental Studies (2 credits).
Seminar in which students give critically evaluated presentations regarding current research in environmental studies and issues in research design. Students should consult with faculty prior to enrolling. Enrollment restricted to graduate students. May be repeated for credit.

Feminist Studies

80A. Feminism and Social Justice.
Examines, and critically analyzes, select post-World War II movements for social justice in the United States from feminist perspectives. Considers how those movements and their participants responded to issues of race, class, gender, and sexuality. A feminist, transnational, analytic framework is also developed to consider how those movements may have embraced, enhanced, or debilitated feminist formations in other parts of the world. (General Education Code(s): ER, T5-Humanities and Arts or Social Sciences.)

124. Technology, Science, and Race Across the Americas.
Examines new ways of understanding the body and race through the intersection of technology and science. Addresses how broader structures of power and the rise of new technological and scientific discoveries mediate power relations and alter how race, national boundaries, the body, and citizenship are normalized and contested from colonialism to the present. Course content may vary; themes may include: U.S. eugenics, I.Q. tests, patenting debates, sterilization, assisted reproduction, biometrics, and genetics across the Americas. (Formerly Technologies and Latinidad: Cyberspace and Beyond.) Enrollment restricted to sophomore, junior, and senior feminist studies majors during priority enrollment only. Enrollment limited to 25. (General Education Code(s): E.)

145. Racial and Gender Formations in the U.S.
Introduces the defining issues surrounding racial and gender formations in the U.S. through an understanding of the term "women of color" as an emergent, dynamic, and socio-political phenomenon. Interrogates organizing practices around women of color across multiple sites: film and media, globalization, representation, sexuality, historiography, and war, to name a select few. (General Education Code(s): ER, E.)

150. Mediating Desire.
From a foundation in semiotics, considers the ways race and gender are constructed, understood, performed, embraced, commodified, and exploited through representations. Uses representations of, by, and for the margins to engage theories of communication, identity, and representation. Creative final projects encouraged. (Formerly Community Studies 152) (Also offered as American Studies 150. Students cannot receive credit for both courses.) Enrollment restricted to sophomore, junior, and senior feminist studies majors or by permission of instructor. Enrollment limited to 100. (General Education Code(s): ER, E.)

194O. The Politics of Gender and Human Rights.
Examines human rights projects and discourses with a focus on the politics of gender, sexuality, race, and rights in the international sphere. Reading important human rights documents and theoretical writings, and addressing particular case studies, emphasizes the tensions between the ideals of the universal and the particular inherent in human rights law, activism, and humanitarianism. Prerequisite(s): satisfaction of Entry Level Writing and Composition requirements; courses 1 and 100. Enrollment restricted to senior feminist studies majors.

260. Black Feminist Reconstruction.
Re-visions and extends Reconstruction from 1865-1920 from a black feminist standpoint. Topics include: redefining democracy labor; literacy and education; suffrage; re-visioning sexuality; childbirth; parenting, etc. Analyzes traditional historiography and the methodological implications of the boundaries between history and fiction, and archival and oral traditions. Enrollment restricted to graduate students Enrollment limited to 15.

268B. Science and Justice Research Seminar.
Provides in-depth instruction in conducting collaborative interdisciplinary research. Students produce a final research project that explores how this training might generate research that is more responsive to the links between questions of knowledge and questions of justice. Prerequisite(s): course 268A. Enrollment by permission of instructor. Enrollment restricted to graduate students. (Also offered as Biomolecular Engineering 268B. Students cannot receive credit for both courses.)

Enrollment limited to 15.

Film and Digital Media

20A. Introduction to Film Studies.
An introduction to the basic elements, range, and diversity of cinematic representation and expression. Aesthetic, theoretical, and critical issues are explored in the context of class screenings and critical readings. Students are billed a course fee. (Formerly The Film Experience.) Enrollment restricted to first-year students, sophomores, and juniors.

20P. Introduction to Production Technique.
Introduction to production process with emphasis on low-budget, independent film and video making. Explores conceptualization, planning, shooting, editing of documentary, personal essay, and feature narrative works. Emphasis on visualization and shooting style, and scriptwriting, but not hands-on editing. Open to students of varied backgrounds and goals. Students are billed a course fee. Enrollment restricted to film pre-majors, majors, and minors.

134B. American Film, 1960–Present.
A survey of American narrative cinema from 1960 to the present. Examines developments in film style, film technology, and the film industry in relation to American cultural history. Students are billed a course fee. Prerequisite(s): course 20A or 20B. Offered in alternate academic years. (General Education Code(s): IM.)

136D. Documentary Film and Video.
Explores the category of nonfiction through a historical and theoretical study of documentary in film and video. Addresses ethnographic film, Soviet and Griersonian documentary, cinema verite and/or other selected documentary texts and the issues of representation they raise. Students are billed a course fee. (Formerly course 161A.) Prerequisite(s): course 20A or 20B. Offered in alternate academic years.

160. Film Genres.
Concentrated study of films from one cinematic grouping with similar themes and narrative structures such as westerns, musicals, or science fiction, or a comparative study of different genres. History, theory, and criticism of the genre are covered. Students are billed a course fee. Prerequisite(s): course 132A, 132B, 132C, 134A or 134B. May be repeated for credit. (General Education Code(s): A.)

165D. Asian Americans and Media.
Examines media representations about, as well as by, Asian Americans. Using critical essays on film theory, racial studies, feminist criticism, and independent cinema, students develop the skills necessary to conduct critical analysis of Asian Americans in film and television. Students are billed a course fee. Enrollment restricted to juniors and seniors. Enrollment limited to 60. (General Education Code(s): ER, E.)

170A. Fundamentals of Digital Media Production.
Introduction to the conceptual and technical fundamentals of making digital media. Covers principles of digital image manipulation, basic web authoring, and interface design through projects that introduce production techniques and methods. Prerequisite(s): courses 20A and 20C. Students are billed for a materials fee. Enrollment limited to 20. (General Education Code(s): PR-C, A.)

170B. Fundamentals of Film and Video Production.
An introduction to the art and craft of making films and videos. Covers principles of cinematography, videography, editing, production planning, and lighting involving both production techniques and methods. Students are billed a materials fee. Prerequisite(s): course 20A or 20B and one other film/video and digital media critical studies or history course required. Completion of additional upper-division film and digital media critical studies or history courses improves students' ability to be admitted to this course. Admission by application and entrance essay. The online application process begins several weeks prior to the start of the quarter. See enrollment conditions section in quarterly Schedule of Classes for application dates and other application instructions that may apply. Enrollment limited to 24. (General Education Code(s): PR-C, A.)

171F. Special Topics Workshop: Autobiographical Film.
Students explore autobiography as a filmmaking genre and practice, using experimental, fictionalized, documentary, and hybrid forms. Readings and screenings provide a theoretical context for production work. Topics include: strategies of (self) representation, reenactment, performance, portraiture, memoir, confession, and diaristic film. Prerequisite(s): course 170B. Enrollment by interview only; priority given to application process/production concentrators. Students are billed a materials fee. Enrollment limited to 20.

171G. Documentary Animation Workshop.
A project-based production seminar in documentary animation: students learn diverse animation styles and techniques, and apply them to a documentary-animation class project. Courses 161B and 170A are strongly recommended as preparation (or equivalent background). Enrollment by interview only: an online application process is available in the preceding quarter. Enrollment limited to 20.

172. Film and Video Studio.
Intermediate workshop in film and video production concentrating on narrative production, development of critical standards, and technical methods. Topics include cinematography, sound, and non-linear digital editing techniques. Each student is responsible for the completion of short narratives from assignments. Students must bear the cost of materials and are billed a materials fee. Prerequisite(s): priority given to students who have been accepted into the production concentration. Admission is by an online application process which begins several weeks prior to the start of the quarter. See enrollment conditions section in quarterly Schedule of Classes for application dates and other application instructions that may apply. Students who are not in the production concentration and who have completed course 170A or 170B may apply by submitting an application and sample of production work at first class meeting; these applications will be considered on a space-available basis. Enrollment limited to 20.

176. Experimental Video Workshop.
Introductory workshop in video production (non-narrative, experimental). Topics include a survey of non-narrative experimental video from a historical/theoretical perspective and an introduction to videography, fundamentals of video editing, and sound. Students complete several short projects and are billed a materials fee. Students must bear the cost of all materials. Prerequisite(s): course 170B; priority given to students who have been accepted into the production concentration. Admission is by an online application process which begins several weeks prior to the start of the quarter. See the enrollment conditions section in the quarterly Schedule of Classes for application dates and other application instructions that may apply. Students who are not in the production concentration and who have completed course 170B may apply by submitting an application and sample of production work at first class meeting; these applications will be considered on a space-available basis. Enrollment limited to 20. (General Education Code(s): A.)

194A. Film Theory Seminar.
Advanced senior seminar examining classical and contemporary film theory and those theoretical paradigms and methods that have illuminated the medium: formalism, realism, structuralism, semiology, psychoanalysis, Marxism, feminism, and phenomenology. Primary texts are read. Students are billed a course fee. Prerequisite(s): course 120. Enrollment restricted to senior film and digital media majors. Enrollment limited to 20.

194S. Special Topics Seminar.
Intensive research and writing on a changing topic chosen to demonstrate critical mastery in a specific area of film and digitial media studies, for example, film adaptations and their literary sources, documentary/reality shows, or networked new media texts. Students are billed a materials fee. Prerequisite(s): course 120. Enrollment restricted to senior film and digital media majors. Enrollment limited to 20. May be repeated for credit.

200A. Introduction to Graduate Study.
Introduces graduate study in the critical practice of film and digital media. Conducted as a pro-seminar, with faculty presentations and discussion. Enrollment restricted to graduate students. Enrollment limited to 15.

283. New Media Art and Digital Culture.
A study of new media art in the context of digital culture. Electronic, digital and online technology art are set in critical relation to discourse on history, aesthetics, hypermedia, the interface, hacks, embodiment, robotics, artificial life and other topics. Students are billed a course fee. Enrollment restricted to graduate students. Enrollment limited to 15.

French

1. Instruction in the French Language.
Introduction to French language and culture with practice in all four language skills: listening, speaking, reading, and writing. Intended for students with no previous study of French.

2. Instruction in the French Language.
Further development of cultural competence and basic French language skills, both written and spoken. Students learn past tenses in this course. Prerequisite(s): course 1 or placement by interview.

3. Instruction in the French Language.
Final quarter of first-year sequence. Students complete study of French language basics, including the future tense and the conditional and the subjunctive moods, while continuing to learn about French and Francophone cultures. Prerequisite(s): course 2 or placement by interview.

4. Intermediate French.
First course in intermediate sequence. Students review

and expand upon their previous study of the language through short literary readings, vocabulary building, grammar study, composition, and discussions. Prerequisite(s): course 3 or placement by interview. (General Education Code(s): CC, IH.)

6. Intermediate French.
Final course of intermediate sequence includes grammar study, vocabulary building, extensive writing, and discussion. Reading of a French or Francophone novel is an integral part of course. Prerequisite(s): course 5 or placement by interview. (General Education Code(s): CC, IH.)

125B. French Civilization: 20th Century.
A survey of the important historical events, social changes, and artistic movements contributing to the development of French culture during the 20th century. Prerequisite(s): course 6.

German

1. Instruction in the German Language.
Teaches beginning-level competence in speaking, reading, writing, and listening comprehension. Elementary sequence (1-2-3) starts in fall quarter only. (An accelerated sequence, course 1A-1B, begins winter quarter.) Not all levels are available each quarter. Check the quarterly Schedule of Classes for exact quarter(s) of offering.

4. Intermediate Studies in German Language.
Intermediate composition and conversation based on the reading of selected prose and related cultural material. Speaking, reading, writing, and listening comprehension skills are developed by extensive use of media materials. Conducted entirely in German. Not all levels are available each quarter. Check the quarterly Schedule of Classes for the exact quarter(s) of offering. Prerequisite(s): course 1B or 3; or placement by examination. Students interested in this course who have not taken the prerequisite should meet with the instructor prior to the first class meeting. (General Education Code(s): CC, IH.)

Greek

1. Elementary Ancient Greek.
Instruction in the grammar of Attic Greek, together with readings from ancient authors, designed to prepare for the study of classical literature. The sequence begins in the fall quarter only.

Hebrew

1. Instruction in the Hebrew Language.
Speaking, listening comprehension, reading, and writing fundamentals. The use of Modern Hebrew is encouraged through classroom practice supplemented by language laboratory work. Elementary sequence (1-2-3) begins in fall quarter only.

4. Intermediate Hebrew.
Development of the students' familiarity with the spoken and written language through grammar review, discussions, and vocabulary building. Varied readings on literary and cultural topics related to modern Israel. Prerequisite(s): course 3. Students interested in this course who have not taken the prerequisite should meet with the instructor prior to the first class meeting. (General Education Code(s): IH.)

History

11A. Latin America: Colonial Period.
Introduces the social, cultural, economic, and political history of the New World through a close examination of the process of European "conquest" in the 16th century and its consequences for both native and settler peoples. Medieval and Renaissance European and African backgrounds; Inca, Maya, Aztec, plains, woodland, and tropical rainforest native American societies; processes of military and cultural conquest; epidemics and ecological changes; native resistance and the establishment of the fundamental institutions of colonial society. (General Education Code(s): CC, IH, E.)

40A. Early Modern East Asia.
Surveys the history of East Asia from 1500 to 1894. Covers political, social, economic, and cultural histories of China, Japan, and Korea with the goal of perceiving a regional history that encompassed each society. (General Education Code(s): CC, IH, E.)

62A. Classical World: Greece.
An overview of Greek history from the beginnings through the Hellenistic period, with emphasis on the Archaic and Classical periods (ca. 800 B.C. through 323 B.C.). (General Education Code(s): CC, IH.)

70A. Modern European History, 1500-1789.
A survey of economic, social, and political history of Europe since the late 15th century: 1500–1789. A is not prerequisite to B, nor B to C. (Formerly Modern European History.) (General Education Code(s): CC, IH.)

80X. Civil Rights Movement: Grassroots Change and American Society.
The civil rights movement of the 1950s-60s was one of the most important grassroots social movements in American history. Course examines this movement and its effects on American society, focusing especially on the experiences of rank-and-file participants. (Formerly Community Studies 80B) (General Education Code(s): ER, T3-Social Sciences, E.)

110D. The Civil War Era.
Social, political, and economic history of the American Civil War and Reconstruction, focusing on the war's changing nature and significance, emancipation, and the postwar struggle over the future of the South and the nation.

110E. What Is a Nation? The U.S. from 1877 to 1914.
History of the U.S. during what was perhaps its most socially turbulent era, the period following Reconstruction through the First World War. What did it mean to be a nation in the post-Reconstruction era? How did a country that had only recently unified itself under one system of labor now resolve the question of national identity? Was America truly a nation by 1914?

121A. African American History to 1877.
A survey of pre-contact Africa, indigenous social structures, class relations, the encounter with Europe, forced migration, seasoning, resistance, Africa's gift to America, slavery and its opponents, industrialization, emigration vs. assimilation, stratification, Convention Movement, Black feminism, Civil War, and Reconstruction. (General Education Code(s): ER, E.)

128. Chicana/Chicano History.
A survey course on the social history of the Mexican (Chicana/o) community and people in the U.S. through the 20th century. Themes include resistance, migration, labor, urbanization, culture and politics. Satisfies American History and Institutions Requirement. (General Education Code(s): ER, E.)

134A. Colonial Mexico.
Covers the social, cultural, economic, and political history of colonial Mexico (New Spain). Special attention paid to colonial identity formation, religion, and labor systems. Begins by examining indigenous societies prior to the arrival of Europeans and concludes with Mexico's independence movement in the early 19th century. (Formerly History of Mexico, 1500–1850.) (General Education Code(s): ER, E.)

140B. History of Qing China, 1644-1911
Introduces students to how Qing China arose, expanded, and struggled to enter the modern world. Focuses on what the Qing empire had in common with other agrarian empires across Eurasia, commercialization and communication networks, elite mobility and peasant revolts, political legitimacy of the alien rule, maintaining social order (such as merchants' control and gender segregation), massive population growth and internal migration, as well as its conflicts with the industrial West. (General Education Code(s): CC.)

147B. Political and Social History of Modern South Asia.
Social, political, and religious movements in the colonial and postcolonial contexts of the 19th and 20th centuries in modern and contemporary South Asia. (General Education Code(s): CC, E.)

150A. Ancient Japan.
Surveys the history of the peoples of the Japanese islands from prehistorical migrations through the 15th century. Emphases include examination of social structures, political formations, cultural production, and religion. (General Education Code(s): CC.)

170B. French History: The 19th Century.
Social, political, and cultural history of France from the Revolution to WWI. Focus on the Revolutionary tradition, the Napoleonic myth, the transformation of Paris, and the integration of the peasantry into the national community. Readings may include novels by Stendhal and Balzac.

172B. German Film, 1919–1945.
Introduction to German films from 1919 to 1945. Through combination of movies and documentaries, gain insight into political, economic, social, and cultural conditions of Weimar and Nazi Germany.

175A. Medieval Russia.
Medieval Russia.

178A. European Intellectual History: The Enlightenment.
Study of European thought and literature from Hobbes and Swift to Rousseau and Goethe. Focuses on relation of ideas to their social and cultural context. Special attention to traditions of religious conflict and criticism rising from the Protestant Reformation; to the discovery of the world beyond Europe; and to the intellectual and cultural roots of the French Revolution. (Formerly European Intellectual History.) N. Deutsch

183A. Nineteenth-Century Italy.
Italian politics, culture, and society from the Napoleonic era through early leftist movements. Central emphasis on the Risorgimento and Unification. Other topics

include: north-south conflict; banditry; urban change; growth of tourism; popular religion; family structures and gender; visual arts and opera.

185I. Latin American Jewish History in the Modern Period.
Explores Jewish immigration settlement and identity negotiation in Latin America from the mid-19th Century to the present.

190D. Tale of Two Cities.
A comparative study of the social, economic, cultural, political, and geographical development of Los Angeles and Mexico City in the 20th century. Emphasis on the diverse peoples, changing physical environment and various images/interpretations of these two world cities. (Also offered as Latin American&Latino Studies 194P. Students cannot receive credit for both courses.) Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, two upper-division history courses, or permission of instructor. Enrollment restricted to junior and senior history and Latin American and Latino studies majors. Enrollment limited to 20. (General Education Code(s): W, E.)

190H. History of Time.
Writing-intensive seminar on the experience, manipulation, and representation of time in history. Students pursue advanced research using primary and secondary sources. Prerequisite(s): two upper-division history courses and satisfaction of the Entry Level Writing and Composition requirements. Enrollment limited to junior and senior history majors. Enrollment limited to 20.

190U. Power and Culture in the U.S.
Students read historical monographs that explore, from a variety of race, class, and gender perspectives, how U.S. culture and thought have changed over time. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, two upper-division history courses, or permission of instructor. Enrollment restricted to junior and senior history majors. Enrollment limited to 20. (General Education Code(s): W.)

194N. Comparative Studies in Modern Asian History.
Seminar on cultural and social changes in Asia, mainly in the 19th and 20th centuries. Topics include colonial encounters, cities, narratives of ordinary persons, nationalism and identity, visual cultures, and Orientalism. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, two upper-division history courses, or permission of instructor. Enrollment restricted to junior and senior history majors. Enrollment limited to 20. (General Education Code(s): W, E.)

196E. Modern Irish History.
Aims to illuminate major themes and turning points of modern Irish history: the causes and consequences of the famine; the development of Irish nationalism; revolution, civil war, and partition; and the recent economic boom. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, two upper-division history courses, or permission of instructor. Enrollment restricted to junior and senior history majors. Enrollment limited to 20. (General Education Code(s): W.)

196N. Eastern European Jewish Social History.
Study of 19th- and 20th-century Eastern European and Russian Jewish social history. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, two upper-division history courses, or permission of instructor. Enrollment restricted to junior and senior history, German studies, and Jewish studies majors. Enrollment limited to 20. (General Education Code(s): W, E.)

200. Methods and Theories of History.
An overview of theories, methods, and philosophies concerning the nature and production of history. Topics vary with instructor. Enrollment restricted to graduate history students and others by permission of instructor. Enrollment limited to 20.

210A. Readings in U.S. History.
Introduction to major themes and controversies in the interpretation of U.S. history. Readings cover both chronological eras and topical subjects, often in a comparative context: colonial and early national periods. Enrollment restricted to graduate history majors. Enrollment limited to 15.

230C. Readings in 20th-Century China.
A survey of major Western-language works and historiographical controversies in Chinese history from 1900 to the present. Weekly readings emphasize particular social and political movements as well as long-term changes in urban and rural society. Enrollment restricted to graduate students. Enrollment limited to 20.

280A. History Graduate Proseminar: Teaching Pedagogy (2 credits).
Devoted to professionalism and socialization of history graduate students. Includes formal and informal meetings with faculty and other graduate students. Topics include TAships, designing course syllabi, pedagogy, teaching technologies, and teaching in different venues. This course is required for first-year students; however, it is open to all other history graduate students as needed. Enrollment restricted to graduate history majors. May be repeated for credit.

History of Art and Visual Culture

43. History of Modern Architecture.
Examines the origins and development of modern architecture, from the Enlightenment and the Industrial Revolution to the 20th Century and beyond. Buildings, urban plans, and works of art and design are discussed in relation to political, social, and cultural currents. (Formerly course 46.) (General Education Code(s): IM, IH, A.)

45. Photography Now.
Explores recent methods and approaches in photography. Surveys significant aesthetic, conceptual, and theoretical shifts occurring in the photographic medium and related discourses. Special attention given to the "current" landscape of contemporary photography (1980-present). (General Education Code(s): IM.).

51. Greek Eyes: Visual Culture and Power in the Ancient Greek World.
The central role of visual communication in ancient Greek civilization: examines the construction of cultural, social, political, religious, and gender identities through material objects and rituals. Includes discussions of images of the public and private sphere, athletic and theatrical performances, mythology, pilgrimage, and magic. (Formerly course 80X, Greek Eyes: Visual Culture and Power in the Ancient Greek.) (General Education Code(s): IM, A.)

110. Visual Cultures of West Africa.
Explores visual cultures of West Africa through time (Nok to present). Attention paid to relationships between peoples and impact of European/Arab presence on visual cultures. Prerequisite(s): course 10 or 80 recommended. (Formerly course 107B, West Africa.) (General Education Code(s): CC, A, E.)

123B. Religions and Visual Culture of South Asia.
South Asia is the home of many religions (Hinduism, Buddhism, Jainism, Islam, and Sikhism). Introduces the role images (painting, sculpture, architecture, photography, film) play in shaping these diverse religious traditions. (Formerly course 106A.) Enrollment restricted to sophomores, juniors, and seniors. Enrollment limited to 80. (General Education Code(s): CC, A, E.)

135B. German Art, 1905–1945.
Expressionism, agitprop, the Bauhaus, New Objectivity, attacks on modernism, National Socialist realism. Painting, sculpture, graphic art, and some architecture and film, studied in the context of political events from the eve of World War I to the end of World War II. (Formerly course 136.) (General Education Code(s): IM, A.)

143A. Contemporary Architecture and Critical Debates.
Examination of practitioners, projects, issues, and theories in contemporary architecture circa 1968 to the present. Topics include the architecture of aftermath, the ethics of memory and memorialization, the corporatization of museums, the role of criticism and exhibitions, and the cult of the brand-name architect. (Formerly course 124.) (General Education Code(s): IM, A.)

143C. Latin American Modern Architecture.
Presents Latin America's modern architecture with relation to colonization; the influence of immigrants from Europe, Africa, and Asia; the presence of indigenous cultures; and the search for autonomy. Case studies include Argentina, Brazil, Chile, Mexico, Venezuela, and Uruguay. (General Education Code(s): CC, A, E.)

160A. Mexico.
Art and architecture of selected pre-Hispanic cultures from the gulf coast, central, western, and southern Mexico including the Olmec, Zapotec, Toltec, Mixtec, Mexica (Aztec), and others. (Formerly course 110A.) Offered in alternate academic years. (General Education Code(s): IM, A.)

190P. Death and Patriotism: The Case of the French Revolution.
What are the relations between the mortal body and politics in times of crisis? What purposes can death, or the threat of death, serve? Examines representations of executions, assassinations, and funerals during the French Revolution, with an emphasis on the Terror. This course can be taken for senior exit credit only by permission of the instructor. Prerequisite(s): course 100A. Enrollment restricted to junior and senior history of art and visual culture majors and minors. Enrollment limited to 18. (General Education Code(s): A.)

190T. Topics in Pre- and Post-Columbian Visual Culture.
Seminar on changing topics related to the current scholarship on pre-Hispanic and colonial Spanish American visual culture. This course can be taken for senior exit credit only by permission of the instructor. Prerequisite(s): course 100A. Enrollment restricted to junior and senior history of art and visual culture majors.

Juniors and seniors from other majors may enroll with permission of the instructor. Enrollment limited to 18.

191G. Art, Cinema, and the Postmodern.
Explores how theory can illuminate various forms of cultural production from art and cinema to popular and material cultures. Considers how scholars and visual producers utilize theory creatively and in the study of aesthetic objects and experiences. Prerequisite(s): course 100A. Enrollment restricted to junior and senior history of art and visual culture majors and minors. Enrollment limited to 18.

201. Introduction to Visual Studies.
Introduces the visual studies discipline and the History of Art and Visual Culture Department, providing students with an overview of the field's development, its issues of central concern, and its dominant research methods. Features intensive readings, student-led discussions, and exposure to some of the primary texts instrumental in the development of the field. Required seminar for all first-year visual studies graduate students. Enrollment restricted to graduate students. Enrollment limited to 15.

240. Seeing Race.
Investigates how discursive systems racialized the sight of various racial and ethnic groups in 19th- and 20th-century U.S. society. Focuses on the construction and maintenance of racial values systems and on the historically specific ways in which an eclectic assortment of visual artifacts have been read by groups over time. Considers the visual and material implications of race-based sight. Enrollment restricted to graduate students. Enrollment limited to 15.

History of Consciousness

105. Feminist Science Studies: Narratives and Refigurations.
All knowledge, including scientific knowledge, is story-laden. Narratives, along with literary devices, tropes, figures, images, and the aesthetics of language, inhabit and inform even our most reliable knowledge-making practices. Rather than understanding stories as either narrative window dressing or as a threat to scientific objectivity, course examines storytelling as a consequential material practice that sustains and informs how scientists (and others) investigate the world. In this idiom, engaging well with science requires honing reading skills and looking for stories in unexpected places. Enrollment limited to 25. (General Education Code(s): TA.)

107. Freak Shows: Performing Difference and Dis/Order.
Examines the complex politics of displaying so-called anomalous and hybrid subjects in relation to producing "normal" ones. How are formations of race, gender, and dis/ability articulated in relation to normalcy, hybridity, and/or anomaly? What forms of "freakery" exist in the contemporary world? Enrollment limited to 25.

203A. Approaches to History of Consciousness.
An introduction to history of consciousness required of all incoming students. The seminar concentrates on theory, methods, and research techniques. Major interpretive approaches drawn from cultural and political analysis are discussed in their application to specific problems in the history of consciousness. Prerequisite(s): first-year standing in the program. See the department office for more information. (Formerly course 203.)

216. Critical Race/Ethnic Studies.
Explores foundational and emergent theoretical and methodological approaches to the study of race. Issues examined include the production of race within and across various spheres of human activity and how race has shaped notions of difference and commonality in the past and present. Enrollment restricted to graduate students. Enrollment limited to 15.

242A. Violence and Phenomenology: Fanon/Hegel/Sartre.
Study of the work and influence of Frantz Fanon from a range of viewpoints: existential, phenomenological, psychoanalytic, and political; a variety of genres: film, literature, case history, and critique; and a set of institutional histories: clinical, cultural, and intellectual. Enrollment restricted to graduate students. Enrollment limited to 15.

259A. Kant, Lacan, and the Ethics of Psychoanalysis.
Offers an introduction to Jacques Lacan's "Return to Kant" and the response it provokes as a reading of sadism, politics, and ethics. Specific point of entry adopted for course is Lacan's seminar on "The Ethics of Psychoanalysis." Enrollment restricted to graduate students. Enrollment limited to 15.

268B. Rethinking Capitalism.
Course 268A addressed changes in the theory and practice of capitalism as derivatives markets have become increasingly central to it. This course, which can be regarded as either background or sequel, concerns questions that surround recent debates about derivatives from the standpoint of broader developments in law, culture, politics, ethics, ontology, and theology. What would it mean to see questions of contingency and value as a challenge to late-modern understandings of these modes of thought? (Also offered as Anthropology 268B. Students cannot receive credit for both courses.) Enrollment restricted to graduate students. Enrollment limited to 15.

Humanities

70S. Introduction to the Sikhs (2 credits).
Introduces the Sikh community, including origins, history, belief system, and contemporary issues. Topics: Sikh music, art and literature, and contemporary Sikh society (class, gender, political and religious institutions). Attention paid to the Sikh diaspora community in California and the United States, including comparative perspectives with other minority communities.

For Information Systems Managemen courses, please see Technology and Information Management, page 74.

Italian

1. Instruction in the Italian Language.
Aural comprehension, speaking, reading, writing, and laboratory. Check the quarterly Schedule of Classes for exact quarter(s) of offering. Elementary sequence (1-2-3) begins in fall quarter.

4. Intermediate Italian.
Short stories, articles, films, and newsclips are used as the basis for studying intermediate-level conversation and composition. Laboratory assignments involve use of the World Wide Web, conversations with native speakers, films and video clips. Students interested in this course who have not taken the prerequisite at UCSC should meet with the instructor, preferably prior to the first class meeting, and take the placement examination. Prerequisite(s): course 1B or 3, or placement by examination. Enrollment limited to 25. (General Education Code(s): CC, IH.)

Japanese

1. Instruction in the Japanese Language.
Students carry out beginning-level tasks that involve listening, speaking, reading, and/or writing, and learn how to read and write Japanese scripts (hiragana, katakana, and about 40 kanji).

4. Intermediate Japanese.
Students carry out intermediate-level tasks that involve listening, speaking, reading, and/or writing, and learn how to read and write 70 additional kanji. Prerequisite(s): course 3; or by consent of instructor. (General Education Code(s): IH.)

103. Advanced Japanese.
Students carry out advanced-level tasks that involve listening, speaking, reading, and/or writing, and learn how to read and write 100 additional kanji. Emphasis placed on developing the student's cultural knowledge about Japan as well as knowledge relevant to intercultural communication. Prerequisite(s): course 6; or by consent of instructor. Students interested in this course who have not taken the prerequisite should meet with the instructor prior to the first class meeting.

Languages

109. Japanese Language, Culture, and Society.
Examines the social and cultural aspects of the Japanese language. Topics include language planning; writing-system reform; standard Japanese; regional variation; honorifics; gender norms and practices; age variation; communication styles; loanwords and English; and minority languages and their speakers. (Formerly Japanese 110.) Prerequisite(s): Japanese 6, or consent of instructor. Enrollment limited to 25.

210. Oral Communication in the U.S. Classroom: Strategies for International T.A.s (2 credits).
Seminar for international graduate students who speak English as a second or foreign language. Focuses on oral competency and serves to qualify students as graduate teaching assistants in UCSC classrooms or laboratories. Enrollment restricted to international graduate students; language assessment administered by the Graduate Division.

Latin American and Latino Studies

1. Introduction to Latin American and Latino Studies.
Interdisciplinary introduction presenting the elements for studying Latin American culture, society, economics, and politics, as well as the dynamics of Latino communities in the U.S. Special attention paid to issues of race, gender, and class, to emerging political and economic shifts in the Americas, and to new local and transnational efforts for social change on the part of Latin America's peoples and Latinos in the U.S. (General Education Code(s): ER, IS, E.)

80J. Race, Nation, and War.
Evaluates the relationship between processes of racial formation, war, and nationalism in Latin America. Case studies range from the wars of independence to more recent forms of transnational violence. Students engage historical and anthropological perspectives and critiques of modernity. Enrollment limited to 80. (General Education Code(s): ER, T3-Social Sciences, E.)

80Q. Musica Latina: Music of Latin America and the Caribbean.
Surveys various musical forms and styles that have developed in Latin America and Latino communities in the U.S. Discusses concept of hybridity and grapples with this as a central issue in the evolution of Latin American/Latino music. Addresses migration of music, which not only contributes to its distribution but also to the evolvement of musical practices of forms, styles and genres across borders. (Formerly Musica Latina.) (General Education Code(s): CC, T3-Social Sciences, E.)

81A. Mexican Folklórico Dance (2 credits).
Provides instruction in the aesthetic, cultural, and historical dimensions of Mexican folklórico dance. Students taught choreographed dances from various regions of Mexico and also learn dance techniques (técnica) and stage make-up application. Additional workshops and lectures offered to supplement class. Open to all students; no previous experience required. (Also offered as Anthropology 81A. Students cannot receive credit for both courses.) May be repeated for credit. (General Education Code(s): PR-C, A.)

100. Concepts and Theories Latin American and Latina/o Studies.
Interdisciplinary exploration of transnational migrations; social inequalities; collective action and social movements; and cultural productions, products, or imaginaries. Examines how transnational migration and hemispheric integration are transforming Latin American studies and Chicana/o-Latina/o studies. Explores the influence of neoliberalism and globalization, especially the intersection of critical analysis and social-justice praxis. Completion of course 1 highly recommended. (Formerly course 10, Bridging Latin American and Latina/o Studies) Enrollment restricted to sophomores, juniors, and seniors. (General Education Code(s): ER, E.)

102. Advanced Expository Writing Workshop.
For Latin American and Latino studies students who wish to gain greater awareness of rhetorical modes and the academic essay. Students write several academic essays, each with a different purpose, and master the conventions of revising and editing. Prerequisite(s): and satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to. Latin American and Latino studies majors, minors, and combined with economics, global economics,literature, politics, and sociology. Enrollment limited to 25.

121. Antropologia de las juventudes.
Taught in Spanish. Overview of the social construction of youth identities represented by intertwined liminal processes linked to the history of migration and ethnicity. Explores theoretical approaches on border youth and methodological strategies. Enrollment restricted to junior and senior Latin American and Latino studies majors. Enrollment limited to 25. (General Education Code(s): CC.)

149. Theories and Actors: U.S.-Latin American Policy Formation.
Examines how domestic political considerations and transnational forces influence the formation of U.S. foreign policy, specifically in the context of relations with Latin America. Explores the impact of institutional, electoral, and psychological pressures, public opinion, interest groups, non-state actors, and the media on decision-making regarding U.S. foreign policy toward Latin America. Enrollment limited to 40. (General Education Code(s): PE-H.)

150. Afro-Latinos/as: Social, Cultural, and Political Dimensions.
Explores multiple aspects of African-descendant lives in the Americas and the Caribbean. Students obtain an in-depth introduction to the socio-political struggles of Afro-Latinos/as and develop the analytical skills to better understand the plight of Afro-Latinos/as today. Enrollment limited to 40. (General Education Code(s): ER.)

165. Contemporary Peru.
Explores contemporary issues facing Peru, with a basic overview including its complex history with political and state violence. Students learn about Peru's multicultural/racial population and about ongoing indigenous land struggles in the Northern Amazon region. Enrollment limited to 40. (General Education Code(s): CC.)

172. Visualizing Human Rights.
Explores how visual artists take up the subject of human rights in response to urgent challenges facing Latina/o and Latin American communities across the Americas. Examines the imprint of film and media arts reshaping human-rights discourse. Considers persistent themes in Latina/o representation, including colonialism and state terrorism; self-representation and the rights of collectives (racial, ethnic, and sexual groups); social and economic rights.

172L. Human Rights Media Laboratory (2 credits).
Media laboratory (4 hours per week) for students enrolled in course 172. Students are trained in the use of electronic and photographic equipment in order to collaborate to create a media project that includes an oral presentation and research paper. Prerequisite(s): concurrent enrollment in course 172. Enrollment limited to 40.

175. Migration, Gender, and Health.
Through an interdisciplinary, cross-border approach, examines complex nature of Latino health in relation to migration and how women and men experience health problems differently. Examines how health problems are created by economic and social conditions, how migrants experience access to care, and how agencies can design culturally sensitive programs. (General Education Code(s): ER, E.)

194P. Tale of Two Cities.
A comparative study of the social, economic, cultural, political, and geographical development of Los Angeles and Mexico City in the 20th century. Emphasis on the diverse peoples, changing physical environment and various images/interpretations of these two world cities. (Also offered as History 190D. Students cannot receive credit for both courses.) Prerequisite(s): two upper-division history courses and satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to junior and senior Latin American and Latino studies and history majors. Enrollment limited to 20. (General Education Code(s): W, E.)

194R. Violencia Cotidiana en las Americas.
Senior seminar taught in Spanish. Engages a critical study of violence, social relations, and everyday life in contemporary Latin America. Focuses on the relationship between narratives and acts of violence, and the constitution and social effects of these representations. Requires proficiency in Spanish (written and spoken), and advanced reading knowledge of Spanish. Enrollment restricted to junior and senior Latin American and Latino studies majors, minors, double majors, and combined majors. Enrollment limited to 25. (General Education Code(s): E.)

215. Latina Cultural Studies: Culture, Power, and Coloniality.
Examines the theories and practices informing the field of Latina cultural studies in the Americas. For students pursuing the Designated Emphasis in Latin American and Latino studies and students with interest in theories of coloniality of power, decolonialism, intercultural and transnational feminist methodologies. (Formerly Latina Cultural Studies: Transborder Feminist Imaginaries.) Enrollment restricted to graduate students.

Latin

1. Elementary Latin.
Instruction in Latin grammar, using a modern Latin method, designed to prepare for the study of classical literature. The sequence begins in the fall quarter only.

Legal Studies

10. Introduction to Legal Process.
Introduction to U.S. and comparative legal institutions and practices. Examines diverse areas of law from torts to civil rights to international human rights. Why is America portrayed as having an activist legal culture; why is law used to decide so many questions from presidential elections to auto accidents; can law resolve disputes that, historically, have led to war and violence; is the legal system fair and/or effective, and, if so, for whom and under what conditions? (General Education Code(s): IS.)

105C. Modern Political Thought.
Studies in 19th- and early 20th-century theory, centering on the themes of capitalism, labor, alienation, culture, freedom, and morality. Authors studied include J. S. Mill, Marx, Nietzsche, Foucault, Hegel, Fanon, and Weber. (Also offered as Politics 105C. Students cannot receive credit for both courses.) Enrollment restricted to legal studies majors during priority period.

120A. Congress, President, and the Court in American Politics.
Study of political development, behavior, performance, and significance of central governmental institutions of the U.S. Emphasizes the historical development of each branch and their relationship to each other, including changes in relative power and constitutional responsibilities. (Also offered as Politics 120A. Students cannot receive credit for both courses.) Enrollment restricted to legal studies majors during priority period. Satisfies American History and Institutions Requirement.

121. Black Politics and Federal Social Policy.
Examination of changes in the political and economic status of African Americans in the 20th century; particular focus on the role of national policies since 1933 and the significance of racism in 20th-century U.S. political development. (Also offered as Politics 121. Students cannot receive credit for both courses.) Enrollment restricted to legal studies majors during priority enrollment. (General Education Code(s): E.)

128. Poverty and Public Policy.
Studies the causes, consequences, and governmental response to urban poverty in the U.S. Topics include how public policy, the macroeconomy, race, gender, discrimination, marriage, fertility, child support, and crime affect and are affected by urban poverty. Emphasizes class discussion and research. (Also offered as Economics 128. Students cannot receive credit for both courses.) Prerequisite(s): satisfaction of Entry Level Writing and Composition requirements; ECON 100A & 113 or consent of instructor. Enrollment restricted to economics, business management economics, global economics, legal studies, or economics combined major Enrollment limited to 35. (General Education Code(s): W, E.)

128I. Race and Justice.
An introduction to comparative and historical analyses of the relations between race and criminal justice in the U.S. Emphasis on examinations of structural mechanisms that help maintain and perpetuate racial inequality in law, criminal justice, and jury trials. (Formerly Race and Criminal Justice) (Also offered as Sociology 128I. Students cannot receive credit for both courses.) Enrollment restricted to sophomores, juniors, and seniors. Enrollment limited to 120.

142. Anthropology of Law.
An ethnographically informed consideration of law, dispute management, and social control in a range of societies including the contemporary U.S. Topics include conflict management processes, theories of justice, legal discourse, and relations among local, national, and transnational legal systems. (Also offered as Anthropology 142. Students cannot receive credit for both courses.) Enrollment restricted to anthropology and legal studies majors.

151. Politics of Law.
Uncovers the important debates in politics and law around the functions of courts, litigation, and rights--and the political nature of law itself. Course is interdisciplinary, and draws from literature in political science, law, and sociology. (Also offered as Politics 151. Students cannot receive credit for both courses.) Enrollment restricted to politics, legal studies, and Latin American and Latino studies/politics combined majors during priority period.

Linguistics

53. Semantics I.
Introduction to the logical foundations of natural language semantics. Logical and semantic relations, simple set theory, logical representations (propositional and predicate calculi, modal and tense logics) and their interpretations. A basic literacy course in the language of logical representation. (General Education Code(s): IH.)

102. Phonology II.
Advanced phonological theory. Topics include markedness; underspecification theories; advanced topics in feature geometry, syllable theory, and stress theory; and optimality theory. Readings include published articles. Emphasis on theory construction and argumentation based on data. Prerequisite(s): course 101.

112. Syntax I.
An introduction to syntactic investigation, developed through the study of central aspects of English syntax. A major purpose is to introduce students to the study of language as an empirical science. (Formerly course 52.) Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. (General Education Code(s): IH.)

120. Structure of English.
Survey of grammatical structure of English and terminology of grammatical description. Covers phonological, morphological, and syntactic structure of English and contrasts it with other languages. Prerequisite(s): course 111 or 112, and 101.

151. Phonetic Analysis.
Introduction to instrumental phonetic analysis—analysis using experimental methods. Emphasis is on the acoustics and perception of speech. Prerequisite(s): course 101.

154. Language and Social Identity.
Introduction to sociolinguistics exploring the relationship between language and such social parameters as social status, ethnicity, race, gender, etc., including the role of language differences in the creation of social stereotypes. Emphasis on gathering, examining, and reporting data. Prerequisite(s): course 101, and either course 111 or 112. Enrollment restricted to senior language studies majors. Enrollment limited to 25.

211. Phonology A.
First part of a three quarter introduction to phonology. Topics of the sequence include fundamentals of acoustic phonetics; introduction to optimality theory; theories of syllabification, stress, and prosodic organization; prosodic morphology; advanced issues in faithfulness and correspondence; segmental and suprasegmental processes. Enrollment restricted to graduate standing or consent of instructor.

221. Syntax A.
Introduction to syntactic theory. Phrase structure; subcategorization; lexical entries; passive; infinitival constructions. Enrollment restricted to graduate standing or consent of instructor.

226. Proseminar in Syntax.
In-depth investigation of some topic in syntactic theory. Topics vary from year to year, covering literature and current research in grammatical structure from varying theoretical perspectives. Prerequisite(s): course 222.

231. Semantics A.
Introduction to linguistic semantics: nature of lexical entries, thematic relations, representation of logical form; relation between semantic interpretation and syntactic representation, quantification and scope relations, reference and presupposition. Enrollment restricted to graduate standing or consent of instructor.

240. The Pedagogy of Linguistics (1 credit).
Provides training for graduate students in university-level pedagogy in general and in the pedagogy of linguistics specifically. Under the supervision of a faculty member, coordinated by a graduate student with substantial experience as a teaching assistant. May be repeated for credit.

257. Psycholinguistics and Linguistic Theory.
Theory and methods in psycholinguistics, covering perception, production, and acquisition of language and linguistic structure. A hands-on, laboratory-style introduction to the topic, focusing on the relation between experimental findings and linguistic theory. Graduate students have separate evaluation criteria. Students cannot receive credit for this course and course 157. Enrollment restricted to graduate students.

Literature

1. Literary Interpretation.
Close reading and analysis of literary texts, including representative examples of several different genres and periods. An introduction to practical criticism required of all literature majors; should be completed prior to upper-division work in literature. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to first-year students and sophomores, or literature and proposed literature majors and literature minors. (General Education Code(s): TA, IH, W.)

42W. Student-Directed Seminar: Harry Potter: Myth, Magic, and Morality.
Close study of the Harry Potter novels. Topics include: ways in which the series interacts with the tradition of the fairy tale; how race, class, and social hierarchies are depicted; and the cultural impact of the series. Enrollment limited to 20.

42Y. Student Directed Seminar: Children's Literature.
Exploration and analysis of children's literature from its roots in fables and fairy tales to the modern-day, young-adult genre. Key ideas include: the role of the child, hegemony, social morality, historical development, marketing, socialization, and the agency of the child. Enrollment limited to 20.

61M. Approaches to Classical Myth.
Introduction to Greek myths, including selected ancient texts and visual artifacts, historical and cultural context of their creation and reception, modern theoretical approaches such as structuralism and psychoanalysis, and interpretations in various media. (General Education Code(s): TA, IH.)

80I. Topics in American Popular Culture.
History of one or more popular cultural genres in written, visual, and/or musical forms and their relation to ongoing public debates. (General Education Code(s): T4-Humanities and Arts.)

200. Proseminar.
The proseminar provides a common experience for entering students, facilitates exchange of ideas and approaches to literary and extra-literary texts, critical issues, and theoretical problems. It focuses on broad aspects of the history of theory and criticism, on the students' critical writing, and on aspects of professional development. Enrollment restricted to graduate students.

201. The Pedagogy of Literature (1 credit). F
Provides training for graduate students in university-level pedagogy in general and in the pedagogy of literature specifically. Coordinated by a graduate student who has had substantial experience as a teaching assistant, under the supervision of a faculty member. Enrollment restricted to graduate students. May be repeated for credit.

Creative Writing

10. Introduction to Creative Writing.
Introduction to the crafts and techniques of poetry, fiction, and creative non-fiction, identifying and exploring traditional and non-traditional literary forms and genres while working on individual creative writing projects. An author reading and two workshop sections per week. Prerequisite: satisfaction of the Entry Level Writing

requirement. Enrollment restricted to first-year students, sophomores, and juniors. May be repeated for credit. (General Education Code(s): PR-C, A.)

52. Intermediate Fiction Writing.
An intermediate-level course in fiction designed for prospective creative writing majors. Prerequisite(s): submission of writing at first class meeting. May be repeated for credit. (General Education Code(s): PR-C, A.)

53. Intermediate Poetry Writing.
An intermediate-level course in poetry designed for prospective creative writing majors. Prerequisite(s): submission of writing at first class meeting. May be repeated for credit. (General Education Code(s): PR-C, A.)

170. Methods and Materials.
Focuses on a particular process or subject used in the production of a literary text. Course is intended to work as a bridge between invention and scholarship. Course topic changes; please see the Schedule of Classes for current topic. Enrollment restricted to creative writing literature majors. May be repeated for credit. (General Education Code(s): A.)

180. Advanced Writing: Fiction.
Intensive work in writing fiction. Satisfies the Creative Writing Literature concentration. Enrollment restricted to creative writing literature majors or by permission of instructor. May be repeated for credit. (General Education Code(s): A.)

183. Advanced Writing: Poetry.
Intensive work in writing poetry. Satisfies the Creative Writing Literature concentration. Enrollment restricted to creative writing literature majors or by permission of instructor. May be repeated for credit. (General Education Code(s): A.)

English-Language Literatures

103E. Studies in Romanticism.
A survey of major romantic themes and authors between 1780 and 1820. Explores relationships to preromantic and postromantic authors. The main goal is to achieve familiarity with a wide range of individual poems in the general context of romanticism. Satisfies the English and Modern Literature concentrations; also satisfies the Poetry distribution requirement. (General Education Code(s): TA.)

103J. Contemporary American Literature.
A selective examination of major writings since WWII, with attention to both literary issues and historical context. Satisfies the English and Modern Literature concentrations. May be repeated for credit.

155B. Regions in American Literature.
Examines development of regional writing in the U.S. Course topic changes; see the Schedule of Classes for current topic. Satisfies the English and Modern Literature concentrations. May be repeated for credit.

170C. William Shakespeare.
Satisfies the English and Pre- and Early Modern Studies Literature concentrations; also satisfies the Pre- and Early Modern distribution requirement. May be repeated for credit. (General Education Code(s): TA.)

170H. Dickinson and American Women Poets.
Focuses on Emily Dickinson's letters and poems with emphasis on genre, audience, art and the erotic, and on current textual editing issues, including development of the Dickinson Electronic Archives. Also connections to other poets: Anne Bradstreet, Gwendolyn Brooks, Sandra Cisneros, Sylvia Plath, and Adrienne Rich. (Formerly American Literature 120P.) (General Education Code(s): TA.)

190L. Studies in English Language Literature.
Studies of selected authors or issues in English language literature. Course topic changes; see the Schedule of Classes for current topic. Satisfies the English and Modern Literature concentrations; also satisfies the senior seminar distribution requirement. Prerequisite(s): Literature 101. Enrollment restricted to senior Literature majors.

French Literature

141. Studies in Narrative.
Speaking, reading, and writing proficiency in French required. Course topic changes; see the Schedule of Classes for current topic. Satisfies the French and Modern Literary Studies concentrations. May be repeated for credit.

252. Texts and Contexts.
The implications of social and political change examined in terms of literary theory and practice. Equal emphasis placed on literary and other kinds of cultural texts: historical, political, cinematic. Enrollment restricted to graduate students. May be repeated for credit.

German Literature

154. The German Novelle.
Speaking, reading, and writing proficiency in German required. A study of Novellen of the major 19th-century German authors. Satisfies the German and Modern Literary Studies concentrations. Offered in alternate academic years.

Greek Literature

104. Prose Authors.
Reading proficiency in Ancient Greek required. Course topic changes; see the Schedule of Classes for current topic. Satisfies the Greek and Pre- and Early Modern Literature concentrations; also satisfies the Pre- and Early Modern distribution requirement. May be repeated for credit.

Latin Literature

102. Roman Poetry.
Reading proficiency in Latin required. Course topic changes; see the Schedule of Classes for current topic. Satisfies the Latin and Pre- and Early Modern Studies Literature concentrations; also satisfies the Poetry and Pre- and Early Modern distribution requirements. May be repeated for credit.

Italian Literature

165. Studies in Italian Literature and Culture.
Speaking, reading, and writing proficiency in Italian required. In-depth examination of a topic in Italian literary and cultural studies. Course topic changes; see the Schedule of Classes for current topic. Satisfies the Italian and Modern Literary Studies concentrations. May be repeated for credit.

Modern Literary Studies

144A. Jewish Diaspora, Ethnicity, and Urban Life.
Focuses on modern Jewish diaspora, ethnicity, and urban life. Satisfies the Modern Literature concentration. (General Education Code(s): ER, E.)

145B. Modern Literature. Winter
Study of 19th- and/or 20th-century literature, with attention to its literary and historical context. Course topic changes; please see the Schedule of Classes for current topic. Satisfies the Modern Literary Studies concentration. May be repeated for credit. (General Education Code(s): TA.)

145C. Modern Fiction and Poetry.
Survey of modern fiction and poetry. Course topic changes; please see the Schedule of Classes for the current topic. Satisfies the Modern Literary Studies concentration; also satisfies the Poetry distribution requirement. May be repeated for credit.

231. Studies in Literary and Cultural History.
Course topic changes; see the Schedule of Classes for current topic. Enrollment restricted to graduate students. May be repeated for credit.

Pre and Early Modern Literature

134. The Idea of Poetry.
Focus is on the theories of rhetoric and poetry written between 1580 and 1620. Texts include English, Italian, French, and Spanish works. Satisfies the Pre- and Early Modern Studies concentration; also satisfies the Poetry and Pre- and Early Modern Studies distribution requirements. (General Education Code(s): TA.)

230. Early Modern Colonial Encounters.
This course will examine primary texts and interpretations, both fictional and archival, of the "encounter" between western Europe and non-European populations affected by European expansion from the 15th through the 18th centuries. Enrollment restricted to graduate students.

Spanish/Latin American/Latino Literature

60. Introduction to Literary Genres.
Speaking, reading, and writing proficiency in Spanish required. The study of poetry, drama, and prose in Spain and Latin America. (General Education Code(s): TA, IH, E.)

102A. From the Conquest to Sor Juana.
Speaking, reading, and writing proficiency in Spanish required. A study of Hispanic American literature from the chronicles of the conquest through the 17th century. Readings deal with transformations in both the idea of empire and the rights of the conquered. Includes the works of Colon, Cortes, El Inca Garcilaso de la Vega, Sor Juana Inés de la Cruz, and others. Satisfies the Global, Pre- and Early Modern Studies and Spanish Literature concentrations; also satisfies the Global and Pre- and Early Modern distribution requirements. (General Education Code(s): CC.)

135F. Cine y Literatura.
Speaking, reading, and writing proficiency in Spanish required. Analysis and interpretation of Spanish-language films derived from literary works by Latin American and Spanish authors. Topic changes; see the "Schedule of Classes" for the current topic. Satisfies the Spanish/Latin American/Latino, and World Literature concentrations; also satisfies the Global distribution requirement. May be repeated for credit. (General Education Code(s): IM.)

222. Reconstructing Spain.
Construction of new discourses of "Spanishness" after

1975, their negotiation in the context of European integration/globalization and against historical memories. Enrollment restricted to graduate students. May be repeated for credit.

World Literature and Cultural Studies

109. Topics in Cultural Studies.
Studies in the theory of cultural studies.Course topic changes; see the Schedule of Classes for current topic. Satisfies the Modern and World Literature concentrations; also satisfies the Global distribution requirement. May be repeated for credit. (General Education Code(s): E.)

124. Cultural Theory in Historical Perspective.
Examination of representations of medieval and early modern Mediterranean history. Course topic changes: see the Schedule of Classes for current topic. Satisfies the Pre- and Early Modern and World Literature concentrations; also satisfies the Global and Pre- and Early Modern distribution requirements. May be repeated for credit. (General Education Code(s): E.)

133. Culture and Nation.
Course explores the role of literature and culture in the production of national communities. Course topic changes; please see the Schedule of Classes for the current topic. Satisfies the Modern Literary Studies and world Literature concentrations; also satisfies the Global distribution requirement. May be repeated for credit.

150A. Worldings.
How to think about the world as a whole: representations, networks, systems, taxonomies, versions of globalization. Course topic changes; see the Schedule of Classes for current topic. Satisfies the Modern and World Literature concentrations; also satisfies the Global requirement. May be repeated for credit.

190A. Topics in World Literature and Cultural Studies.
Course topic changes; see the Schedule of Classes for current topic. Satisfies the Modern and World Literature concentrations; also satisfies the Global and Senior Seminar distribution requirements. Prerequisite(s): Literature 101. Enrollment restricted to senior literature majors. May be repeated for credit. (General Education Code(s): E.)

201. Theory and Methods.
Global theories of history and cultural production. Course topic changes; see the Schedule of Classes for current topic. Enrollment restricted to graduate students. May be repeated for credit.

Mathematics

2. College Algebra for Calculus.
Operations on real numbers, complex numbers, polynomials, and rational expressions; exponents and radicals; solving linear and quadratic equations and inequalities; functions, algebra of functions, graphs; conic sections; mathematical models; sequences and series. Prerequisite(s): placement exam score of 12 or higher.

3. Precalculus.
Inverse functions and graphs; exponential and logarithmic functions, their graphs, and use in mathematical models of the real world; rates of change; trigonometry, trigonometric functions, and their graphs; and geometric series. Students cannot receive credit for both course 3 and Applied Mathematics and Statistics 3. Applied Mathematics and Statistics 3 can substitute for course 3. Prerequisite(s): course 2 or placement exam score of 20 or higher. (General Education Code(s): MF, Q.)

11A. Calculus with Applications.
A modern course stressing conceptual understanding, relevance, and problem solving. The derivative of polynomial, exponential, and trigonometric functions of a single variable is developed and applied to a wide range of problems involving graphing, approximation, and optimization. Students cannot receive credit for both this course and course 19A or Applied Mathematics and Statistics 11A and 15A, or Economics 11A. Prerequisite(s): course 3 or Applied Mathematics and Statistics 3; or placement exam score of 31 or higher; or AP Calculus AB exam score of 3 or higher. (General Education Code(s): MF, IN, Q.)

11B. Calculus with Applications.
Starting with the fundamental theorem of calculus and related techniques, the integral of functions of a single variable is developed and applied to problems in geometry, probability, physics, and differential equations. Polynomial approximations, Taylor series, and their applications conclude the course. Students cannot receive credit for this course and course 19B, or Applied Mathematics and Statistics 11B and 15B, or Economics 11B. Prerequisite(s): course 11A or Applied Mathematics and Statistics 15A or AP Calculus AB exam score of 4 or 5, or BC exam score of 3 or higher, or IB Mathematics Higher Level exam score of 5 or higher. (General Education Code(s): MF, IN, Q.)

19A. Calculus for Science, Engineering, and Mathematics.
The limit of a function, calculating limits, continuity, tangents, velocities, and other instantaneous rates of change. Derivatives, the chain rule, implicit differentiation, higher derivatives. Exponential functions, inverse functions, and their derivatives. The mean value theorem, monotonic functions, concavity, and points of inflection. Applied maximum and minimum problems. Students cannot receive credit for both this course and course 11A or Applied Mathematics and Statistics 11A and 15A,or Economics 11A. Prerequisite(s): course 3 or Applied Mathematics and Statistics 3 or placement exam score of 40 or higher or AP Calculus AB exam score of 3 or higher. (General Education Code(s): MF, IN, Q.)

19B. Calculus for Science, Engineering, and Mathematics.
The definite integral and the fundamental theorem of calculus. Areas, volumes. Integration by parts, trigonometric substitution, and partial fractions methods. Improper integrals. Sequences, series, absolute convergence and convergence tests. Power series, Taylor and Maclaurin series. Students cannot receive credit for both this course and course 11B, Applied Math and Statistics 11B and 15B, or Economics 11B. Prerequisite(s): course 19A or AP Calculus AB exam score of 4 or 5, or BC exam score of 3 or higher, or IB Mathematics Higher Level exam score of 5 of higher. (General Education Code(s): MF, IN, Q.)

20A. Honors Calculus.
Challenging course designed to approach single-variable calculus from the perspective of modern mathematics. Emphasis is on the evolution and historical development of core concepts underlying calculus and analysis. Prerequisite(s): placement exam score of 46 or higher; or AP Calculus AB exam score of 4 or 5; or BC exam of 3 or higher; or IB Mathematics Higher Level exam score of 5 or higher. Enrollment limited to 60. (General Education Code(s): MF, IN, Q.)

21. Linear Algebra.
Systems of linear equations, matrices, determinants. Introduction to abstract vector spaces, linear transformation, inner products, geometry of Euclidean space, and eigenvalues. One quarter of college mathematics is recommended as preparation. Prerequisite(s): course 2 or above, or placement exam score of 20 or higher. (General Education Code(s): MF, Q.)

23A. Multivariable Calculus.
Vectors in n-dimensional Euclidean space. The inner and cross products. The derivative of functions from n-dimensional to m-dimensional Euclidean space is studied as a linear transformation having matrix representation. Paths in 3-dimensions, arc length, vector differential calculus. Taylor's theorem in several variables, extrema of real-valued functions, constrained extrema and Lagrange multipliers, the implicit function theorem, some applications. Students cannot receive credit for this course and course 22. Prerequisite(s): course 19B or 20B or AP calculus BC exam score of 4 or 5. (General Education Code(s): MF.)

23B. Multivariable Calculus.
Double integral, changing the order of integration. Triple integrals, maps of the plane, change of variables theorem, improper double integrals. Path integrals, line integrals, parametrized surfaces, area of a surface, surface integrals. Green's theorem, Stokes theorem, conservative fields, Gauss' theorem. Applications to physics and differential equations, differential forms. Prerequisite(s): course 23A. (General Education Code(s): MF.)

30. Mathematical Problem Solving.
Students learn techniques of problem solving such as induction, contradiction, exhaustion, dissection, analogy, generalization, specialization, and others in the context of solving problems drawn from number theory, probability, combinatorics, graph theory, geometry, and logic. Prerequisite(s): course 11A or 19A or 20A or Math Placement Exam score of 40 or higher. (General Education Code(s): PR-E.)

100. Introduction to Proof and Problem Solving.
Students learn the basic concepts and ideas necessary for upper-division mathematics and techniques of mathematical proof. Introduction to sets, relations, elementary mathematical logic, proof by contradiction, mathematical induction, and counting arguments. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements; courses 11A and 11B or 19A and 19B or 20A and 20B. Enrollment limited to 50. (General Education Code(s): MF.)

105A. Real Analysis.
The basic concepts of one-variable calculus are treated rigorously. Set theory, the real number system, numerical sequences and series, continuity, differentiation. Prerequisite(s): course 23B and either course 100 or Computer Science 101.

106. Systems of Ordinary Differential Equations.
Linear systems, exponentials of operators, existence

and uniqueness, stability of equilibria, periodic attractors, and applications. (Formerly course 106A.) Prerequisite(s): courses 21 and 24 (preferred) or Applied Mathematics and Statistics 10 and 20; and either course 100 or Computer Science 101.

110. Introduction to Number Theory.
Prime numbers, unique factorization, congruences with applications (e.g., to magic squares). Rational and irrational numbers. Continued fractions. Introduction to Diophantine equations. An introduction to some of the ideas and outstanding problems of modern mathematics. Prerequisite(s): course 100 or Computer Science 101. (General Education Code(s): Q.)

111A. Algebra.
Group theory including the Sylow theorem, the structure of abelian groups, and permutation groups. Prerequisite(s): course 21 or Applied Mathematics and Statistics 10 and either course 100 or Computer Science 101.

124. Introduction to Topology.
Topics include introduction to point set topology (topological spaces, continuous maps, connectedness, compactness), homotopy relation, definition and calculation of fundamental groups and homology groups, Euler characteristic, classification of orientable and nonorientable surfaces, degree of maps, and Lefschetz fixed-point theorem. Prerequisite(s): course 100; course 111A recommended.

128A. Classical Geometry: Euclidean and Non-Euclidean.
Rigorous foundations for Euclidean and non-Euclidean geometries. History of attempts to prove the parallel postulate and of the simultaneous discovery by Gauss, J. Bolyai, and Lobachevsky of hyperbolic geometry. Consistency proved by Euclidean models. Classification of rigid motions in both geometries. Prerequisite(s): either course 100 or Computer Science 101.

129. Algebraic Geometry.
Algebraic geometry of affine and projective curves, including conics and elliptic curves; Bezout's theorem; coordinate rings and Hillbert's Nullstellensatz; affine and projective varieties; and regular and singular varieties. Other topics, such as blow-ups and algebraic surfaces as time permits. Prerequisite(s): courses 21 and 100. Enrollment limited to 40.

189. ACE Program Service Learning (2 credits).
Students participate in training and development to co-facilitate collaborative learning in ACE chemistry discussion sections and midterm/exam review sessions. Students are role models for students pursuing science- and math-intensive majors. Prerequisite(s): Prior participation in ACE; good academic standing; no non-passing grades in prior quarter. Enrollment restricted to sophomores, juniors, and seniors. Enrollment limited to 10. (General Education Code(s): PR-S.)

200. Algebra I.
Group theory: subgroups, cosets, normal subgroups, homomorphisms, isomorphisms, quotient groups, free groups, generators and relations, group actions on a set. Sylow theorems, semidirect products, simple groups, nilpotent groups, and solvable groups. Ring theory: Chinese remainder theorem, prime ideals, localization. Euclidean domains, PIDs, UFDs, polynomial rings. Prerequisite(s): courses 111A and 117 are recommended as preparation. Enrollment restricted to graduate students. May be repeated for credit.

203. Algebra IV.
Topics include tensor product of modules over rings, projective modules and injective modules, Jacobson radical, Wedderburns' theorem, category theory, Noetherian rings, Artinian rings, affine varieties, projective varieties, Hilbert's Nullstellensatz, prime spectrum, Zariski topology, discrete valuation rings, and Dedekind domains. Prerequisite(s): courses 200, 201, and 202. Enrollment restricted to graduate students.

204. Analysis I.
Completeness and compactness for real line; sequences and infinite series of functions; Fourier series; calculus on Euclidean space and the implicit function theorem; metric spaces and the contracting mapping theorem; the Arzela-Ascoli theorem; basics of general topological spaces; the Baire category theorem; Urysohn's lemma; and Tychonoff's theorem. Prerequisite(s): course 105A or equivalent; course 105B is recommended as preparation. Enrollment restricted to graduate students.

207. Complex Analysis.
Holomorphic and harmonic functions, Cauchy's integral theorem, the maximum principle and its consequences, conformal mapping, analytic continuation, the Riemann mapping theorem. Prerequisite(s): Course 103 is recommended as preparation. Enrollment restricted to graduate students.

208. Manifolds I.
Definition of manifolds; the tangent bundle; the inverse function theorem and the implicit function theorem; transversality; Sard's theorem and the Whitney embedding theorem; vector fields, flows, and the Lie bracket; Frobenius's theorem. Course 204 recommended for preparation. Enrollment restricted to graduate students.

211. Algebraic Topology.
Continuation of course 210. Topics include theory of characteristic classes of vector bundles, cobordism theory, and homotopy theory. Prerequisite(s): Courses 200, 201, and 202 recommended as preparation. Enrollment restricted to graduate students.

213A. Partial Differential Equations I.
First of the two PDE courses covering basically Part I in Evans' book; Partial Differential Equations; which includes transport equations; Laplace equations; heat equations; wave equations; characteristics of nonlinear first-order PDE; Hamilton-Jacobi equations; conservation laws; some methods for solving equations in closed form; and the Cauchy-Kovalevskaya theorem. Courses 106 and 107 are recommended as preparation. Enrollment restricted to graduate students.

225A. Lie Algebras.
Basic concepts of Lie algebras. Engel's theorem, Lie's theorem, Weyl's theorem are proved. Root space decomposition for semi-simple algebras, root systems and the classification theorem for semi-simple algebras over the complex numbers. Isomorphism and conjugacy theorems. Prerequisite(s): Courses 201 and 202 recommended as preparation. Enrollment restricted to graduate students.

292. Seminar (no credit).
A weekly seminar attended by faculty, graduate students, and upper-division undergraduate students. All graduate students are expected to attend. Enrollment restricted to graduate students.

Microbiology and Environmental Toxicology

102. Cell and Molecular Toxicology.
Emphases of biochemical, cellular, and organ system basis of intoxication, including dose-response relationships, biotransformation of toxicants, biochemical mechanisms underlying toxicity, factors influencing toxic action, and biomarkers of exposure. Emphasizes effects of various classes of toxins, including heavy metals and persistent synthetic organics, with a focus on susceptible biochemical/cellular processes of the central nervous, immune, hepatic, and renal target organ systems. Designed for advanced undergraduates. Students cannot receive credit for this course and course 202. (Formerly Cellular and Organismal Toxicology.) Prerequisite(s): Biology 20A and 20B or equivalent; Biology 100, Biochemistry, and 110, Cell Biology, are recommended. Enrollment restricted to juniors and seniors.

119. Microbiology.
Cell and molecular biology of bacteria and their viruses, including applications in medicine, public health, agriculture, and biotechnology. (Also offered as Biology: Molecular Cell & Dev 119. Students cannot receive credit for both courses.) Prerequisite(s): BIOL 100 or BIOC 100A.

119L. Microbiology Laboratory.
An introduction to the principles and practices of laboratory microbiology, with a substantial presentation of optical microscopy. Students are billed a materials fee. (Also offered as Biology: Molecular Cell & Dev 119L. Students cannot receive credit for both courses.) Prerequisite(s): previous or concurrent enrollment in course 119 is required;satisfaction of Entry Level Writing and Composition requirements. Enrollment restricted to biological sciences and affiliated majors; biology minors; other majors by permission. (General Education Code(s): W.)

200. Interdisciplinary Approaches in Environmental Toxicology.
Introduction to interdisciplinary, case-based approaches to problem-solving. Course demonstrates how important, current problems in environmental and human health have been addressed and solved. Assigned problems that integrate the different organization levels (environmental, molecular/cellular, organismal/public health) inherent to environmental and human health are presented. Students work in collaborative teams to analyze each problem and create a proposal for a research plan/solution. Enrollment restricted to graduate students.

202. Cell and Molecular Toxicology.
Emphasizes biochemical, cellular, and organ system basis of intoxication, including dose-response relationships, biotransformation of toxicants, biochemical mechanisms underlying toxicity, factors influencing toxic action, and biomarkers of exposure. Emphasizes effects of various classes of toxins, including heavy metals and persistent synthetic organics, with a focus on susceptible biochemical/cellular processes of the central nervous, immune, hepatic, and renal target organ systems. Students cannot receive credit for this course and Microbiology and Environmental Toxicology 102 or BIOL 122.. (Formerly "Cellular and Organismal Toxicology.") Enrollment restricted to graduate students.

206A. Advanced Microbiology.
Focuses on aspects of bacterial molecular biology. Covers four main areas: (1) metabolism-catabolism,

anabolism, building-block precursors; (2) transcription/signal transduction; (3) replication/plasmid biology/division; (4) translation/protein processing/secretion/cell structure. Strong focus on experimental techniques and approaches used in molecular biology, and on model bacteria, such as Esherichia coli and Bacillus subtilis. Enrollment restricted to graduate students .Advanced undergraduates may enroll with permission of instructor.

281C. Topics in Environmental Microbiology (2 credits).
Seminar and discussion focusing on mechanism of microbial transformation of metals. Participants present results from their research projects in a seminar format. Relevant journal articles presented and discussed. Enrollment restricted to graduate students; qualifed undergraduates may enroll with instructor's permission.

281F. Topics in Aquatic Toxicology.
Analyses of the sources and fates of aquatic pollutants. Discussions on processes at the air-water interface, within the water column, and in aquatic sediments. Topics vary from year to year. Enrollment restricted to graduate students; qualified upper-division science majors may enroll with instructor's permission. May be repeated for credit.

281M. Topics in Molecular Toxicology (2 credits).
Seminar and discussion on the mechanisms of toxicity in DNA alkylating agents. Participants present results from their research, and relevant journal articles are discussed. Enrollment restricted to graduate students. Undergraduates may enroll with instructor's permission. Enrollment limited to 5. May be repeated for credit.

281O. Topics in Bacterial Pathogenesis (2 credits).
Intensive seminar focusing on mechanisms of bacterial pathogenesis of the ulcer-causing bacterium Helicobacter pylori. Participants are required to present results from their own research and relevant journal articles. (Also offered as Biology: Molecular Cell & Dev 280O. Students cannot receive credit for both courses.) Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. Enrollment limited to 20. May be repeated for credit.

281S. Cellular and Organismal Responses to Toxicants.
Intensive research seminar on the concepts, theory, and techniques in deriving physiologically based pharmacokinetic models of toxin exposure, metabolism, and efficacy of therapeutic treatment in mammalian models of human metal toxicity. Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. May be repeated for credit.

281V. Topics in Bacterial Pathogenesis and Innate Immunity (2 credits).
Focuses on the interplay between the human gut bacterial pathogen Yersinia pseudotuberculosis and the innate immune system of the host. Participants are required to present the goals, results, and conclusions from their own research. Participation in the general discussion during others' presentations is also required. Enrollment restricted to graduate students. Qualified undergraduates performing research under the supervision of the instructor may enroll with instructor's permission. May be repeated for credit.

281Y. Biofilms: Processes and Regulation (2 credits).
Intensive seminar series focusing on the most current work on genes and the processes that regulate biofilm development dynamics as well as on the recent developments on visualization of biofilms. Presentation and discussion based. Enrollment restricted to graduate students. Qualified undergraduate students may enroll with instructor's permission. May be repeated for credit.

292. Introductory Graduate Seminar (no credit).
Weekly seminars by academic and research faculty on their areas of special interest. Students write weekly abstracts on articles covered by the seminars. Enrollment restricted to graduate students; qualified undergraduates may enroll with instructor's permission.

Music

1C. University Concert Choir (2 credits).
A study of selected works for mixed chorus, with emphasis on masterworks for chorus and orchestra, culminating in one or more public concerts. Familiarity with basic music notation recommended. Admission by audition with conductor prior to first class meeting. See enrollment conditions section of the quarterly Schedule of Classes. Students are billed a materials fee. May be repeated for credit. (General Education Code(s): PR-E, A.)

2. University Orchestra (2 credits).
A study of selected works for orchestra, culminating in one or more public concerts. Admission by audition with conductor prior to first class meeting. See enrollment conditions section of the quarterly Schedule of Classes. Students are billed a materials fee. May be repeated for credit. (General Education Code(s): PR-E, A.)

3. Large Jazz Ensemble (2 credits).
Instruction in performance in large jazz ensembles with written arrangements. Prepares a specific repertory for public performance. Admission by audition with instructor prior to first class meeting. See the enrollment conditions section of the quarterly Schedule of Classes. Students are billed a materials fee. Enrollment limited to 25. May be repeated for credit. (General Education Code(s): A.)

5A. West Javanese Gamelan Ensemble: Beginning (2 credits).
Instruction in practice and performance of gamelan music from Java or Sunda. Preparation of several works for public presentation. Attend first class meeting. See the enrollment conditions section of the quarterly Schedule of Classes. May be repeated for credit. (General Education Code(s): A.)

5B. West Javanese Gamelan Ensemble: Intermediate (2 credits).
Instruction in practice and performance of gamelan music from Java or Sunda. Preparation of several works for public presentation. Attend first class meeting. See the enrollment conditions section of the quarterly Schedule of Classes. May be repeated for credit. (General Education Code(s): A.)

5C. West Javanese Gamelan Ensemble: Advanced (2 credits).
Instruction in practice and performance of gamelan music from Java or Sunda. Preparation of several works for public presentation. Attend first class meeting. See the enrollment conditions section of the quarterly Schedule of Classes. May be repeated for credit. (General Education Code(s): A.)

6. Classical Guitar Ensemble (2 credits).
Study of selected repertoire and instruction in performance for classical guitar ensemble. Ensembles for guitar and other instruments will prepare works for public performances both on and off campus. All students enrolled in individual guitar lessons are expected to enroll. Students of other instruments or voice may also audition. Some additional rehearsal time, individually and with the group, is required. Admission by audition with instructor prior to first class meeting. May be repeated for credit. (General Education Code(s): A.)

8. Balinese Gamelan Ensemble (2 credits).
Instruction in practice and performance of gamelan music from Bali and Indonesia, including ritual and new music. Preparation of several works for public presentation. Attend first class meeting. See the enrollment conditions section of the quarterly Schedule of Classes. Prerequisite(s): course 5A or 5B or 5C or 8 or 13 or 14, or by permission of instructor at first class meeting. May be repeated for credit. (General Education Code(s): A.)

9. Wind Ensemble (2 credits).
A study of selected advanced-level works for wind ensemble, culminating in one or more public concerts. Admission by audition with conductor prior to first class meeting. Students are billed a materials fee. May be repeated for credit. (General Education Code(s): PR-C, A.)

11A. Classical Music from the Middle Ages to the Present.
A study of selected masterworks in relation to the periods which they represent. Emphasis upon the listening experience and awareness of musical style and structure. Illustrated lectures and directed listening. (Formerly Introduction to Western Art Music.) (General Education Code(s): IM, IH, A.)

11B. Introduction to Jazz.
Designed to provide students with thorough and comprehensive background in history and roots of jazz as a musical style from its African roots to the present. Essential jazz styles and traditions are discussed through lectures, required listening, readings, lecture demonstrations, and film presentations. (General Education Code(s): IH, A, E.)

30A. Theory, Literature, and Musicianship I.
Integrated musicianship, theory, and analysis. Species counterpoint and fundamentals of tonal harmony. Analysis of literature from the Middle Ages and Renaissance. Ear-training, taught in smaller sections, emphasizes recognition of triad and dominant-seventh inversions, dictation of diatonic melodies, and aural analysis of simple diatonic interval and chord progressions. Most of the ear-training materials consist of homophonic and polyphonic examples from music literature performed live in class. Concurrent enrollment in course 30L required. Prerequisite: admission by core curriculum placement examination or by passing course 14 with a final examination score of approximately 85 percent or higher. Enrollment limited to 60.

51. Vocal Repertoire Class (2 credits).
The study and performance of vocal repertoire from 1400 to the present, including solo song, oratorio, opera,

ensemble music. Emphasis is given to the development of effective performance skills, culminating in public performance. Attend first class meeting; concurrent enrollment in individual voice lessons with instructor of this course is required. See the enrollment conditions section of the quarterly Schedule of Classes. Enrollment limited to 20. May be repeated for credit. (General Education Code(s): A.)

80C. History, Literature, and Technology of Electronic Music.
This survey of electronic music from previous centuries to the present studies the works and aesthetics of important composers, acoustics, musical perception, the effects of technological innovation on cultural evolution, and the development of synthesizers and computer music. (General Education Code(s): T6-Natural Sciences or Humanities and Arts, A.)

80P. History of Jewish Music.
Survey of the diverse and rich musical traditions of Jewish music in the diaspora from biblical times to the present. Examines the historical, social, and anthropological aspects of the different communities from sacred music through art and popular songs. Enrollment limited to 40. (General Education Code(s): CC, T4-Humanities and Arts, A, E.)

80W. Music Business.
Explores the many facets of the music industry: history, technology, economics, sociology, and legislation. Provides both a broad understanding of the industry and a pragmatic survey of available career paths. Students cannot receive credit for both this course and course 180W in the same quarter. Offered in alternate academic years. (General Education Code(s): T4-Humanities and Arts, A.)

101C. History of Western Art Music.
Third quarter of a four-quarter detailed chronological study of Western art music from antiquity to the present. Coordinated lectures, readings, listening assignments, and analysis of representative works: Classical and Romantic. Prerequisite(s): course 30C and satisfaction of the Entry Level Writing and Composition requirements.

102. University Orchestra (2 credits).
A study of selected works for orchestra, culminating in one or more public concerts. Admission by audition with conductor prior to first class meeting; see the enrollment conditions section of the quarterly Schedule of Classes. Students are billed a materials fee. Enrollment restricted to juniors and seniors. May be repeated for credit. (General Education Code(s): A.)

103. University Concert Choir (2 credits).
A study of selected works for orchestra, culminating in one or more public concerts. Prerequisite(s): admission by audition with conductor prior to first class meeting. See the enrollment conditions section of the quarterly Schedule of Classes. Students are billed a materials fee. May be repeated for credit. (General Education Code(s): A.)

111B. Seminar in Jazz Analysis.
Analytic exploration of the evolution of "jazz" in America. The process involves independent listening, analysis, transcription, weekly seminar discussions, and oral presentation to students in course 11B. Prerequisite(s): course 30B and course 11B. Enrollment limited to 20.

121. Orchestration.
A study of the nature of each instrument of the orchestra. Scoring for various small instrumental combinations, culminating in a transcription for full orchestra. (Formerly course 130.) Prerequisite(s): course 30C. Enrollment limited to 20.

125. Advanced Electronic Sound Synthesis.
Continuing study in the electronic music studio, with concentration on compositional development. Includes advanced applications of skills developed in courses 123 and 124, expansion of background knowledge and relevant electroacoustical studies. Prerequisite(s): course 124. Enrollment limited to 25.

130. Orchestration.
A study of the nature of each instrument of the orchestra. Scoring for various small instrumental combinations, culminating in a transcription for full orchestra. Prerequisite(s): course 30C. Enrollment limited to 20.

159A. Opera Workshop (2 credits).
A workshop for singers, accompanists, and directors, the course develops a wide variety of skills related to opera through scenework. Attention will be given to movement, acting, coaching, and operatic stage-directing technique. Instruction culminates in studio productions of scenes from operas and musicals. Admission by permission of vocal instructor, or by audition with instructor prior to first class meeting. Students are billed a materials fee. Enrollment limited to 30. May be repeated for credit. (General Education Code(s): A.)

164. Jazz Ensembles (2 credits).
Instruction in combo performance and techniques of the jazz idiom. The class forms several ensembles that prepare a specific repertory for public performance. Admission by audition with instructor prior to first class meeting. See the enrollment conditions section of the quarterly Schedule of Classes. May be repeated for credit.

166. Chamber Singers (2 credits).
The study of selected works for small vocal ensemble from the 15th through 20th centuries, with performances on and off campus throughout the academic year. Students must have demonstrated vocal and music reading skills. Admission by audition with instructor prior to first class meeting. See the enrollment conditions section of the quarterly Schedule of Classes. Students are billed a materials fee. May be repeated for credit. (General Education Code(s): PR-C, A.)

167. Workshop in Electronic Music (2 credits).
Continuing studio work in electronic music. Students carry out individual projects, meeting in weekly seminar to share problems and discoveries. Relevant advanced topics are covered, including new developments in the art. Prerequisite(s): course 124. Enrollment limited to 20. May be repeated for credit.

180W. Seminar in Music Business.
An exploration of the many facets of the music industry: history, technology, economics, sociology, and legislation. Intended to provide both a broad understanding of the industry and a pragmatic survey of available career paths. While designed for general students, this seminar is specifically directed to those students desiring to pursue a music business career, whether in performance, management, the record business, writing about music (journalism, criticism), or entertainment law. Students cannot receive credit for both this course and course 80W in the same quarter. Admission by permission of instructor at or before first class meeting. Enrollment limited to 25.

200. Introduction to Research Methods.
Practical introduction to graduate study in music focusing on research methods, music sources and bibliography, techniques of scholarly writing, and critical readings in the discipline. Culminates in a public oral presentation on the model of a professional conference paper.

203H. Area Studies in Performance Practice.
Intensive examination of the vocal and instrumental performance practices of living musical traditions of Indonesia, Latin America, or other regions. Topics may incorporate soloistic and ensemble traditions, secular and sacred traditions. Research rubrics include tuning, tone quality, performance posture and rhetoric, and improvisational and fixed patterns, as dictated by regional norms. May be repeated for credit in a different area. Offered on a rotational basis with other courses in the 203 series. May be repeated for credit.

206B. Computer-Assisted Composition.
Study of techniques of algorithmic and computer-assisted composition in a variety of contemporary idioms. Topics may include stochastic methods, generative grammars, search strategies, and the construction of abstract compositional designs and spaces. Final project for course involves students formulating and algorithmically implementing their own theoretical assumptions and compositional strategies.

219. Techniques in Composition.
Short compositional exercises incorporating diverse contemporary techniques with emphasis on problem-solving and development of compositional skills. Exercises focus on particular strategies for organizing and coordinating aspects of pitch, rhythm, timbre, and other musical dimensions, depending on interests of instructor and students. (Formerly course 219A.) Enrollment restricted to graduate students. May be repeated for credit.

252. Current Issues Colloquium (2 credits).
An interactive colloquium featuring presentations by faculty, graduate students, and visiting scholars on research projects in composition, musicology / ethnomusicology, and performance practice, followed by focused discussion. Enrollment restricted to graduate students. Undergraduate students may enroll with permission of instructor. May be repeated for credit.

253C. Music and Discourse.
Addresses both song and musical performance as modes of discourse. For song: musical and textual phrase and verse structures and their interrelationships. For musical performances: musical performance as rhetoric and emblem. Enrollment restricted to graduate students. Enrollment limited to 5.

Ocean Sciences

1. The Oceans.
An interdisciplinary introduction to oceanography focusing on biological, chemical, geological, and physical processes. Covers topics such as origins and structure of planet Earth and its oceans, co-evolution of Earth and life, plate tectonics, liquid water and the hydrologic and hydrothermal cycles, salinity and elemental cycles, ocean circulation, primary production and nutrient cycles, plankton and nekton, life on the

sea floor, near shore and estuarine communities, future environmental problems our oceans face. Students may also enroll in and receive credit for Earth Sciences 1. (Note: General Education credit will not be granted for this course and Biology 80D.) (General Education Code(s): SI, IN, Q.)

80B. Our Changing Planet.
Interdisciplinary scientific perspective on Earth system, focusing on human impacts on global environment. Introduces concepts of Earth system science and explores topics such as global warming, ozone depletion, pollution, deforestation, and future climate change. Prerequisite(s): high school chemistry course recommended. (General Education Code(s): PE-E, T2-Natural Sciences.)

200. Physical Oceanography.
Introduction to the physics of the ocean-atmosphere system. Structure of the ocean and atmosphere. Energy balance and radiative transfer. Atmospheric circulation; weather and climate. Physical properties of seawater, air-sea interaction, mixing, water masses, ocean circulation, waves; CO2 and global change. Designed for beginning graduate students in ocean sciences and upper-division science majors. Calculus and physics recommended as preparation.

280. Marine Geology.
Geology of the marine environment. Topics include controls on the types, origin, and distribution of marine sediments; geology of oceanic crust; evolution of continental margins and plate boundaries; introduction to paleoceanography. Students cannot receive credit for this course and Earth Sciences 102. Enrollment restricted to graduate students.

290D. Topics in Marine Microbiology.
A weekly seminar series covering topics in environmental microbiology. Topics vary from year to year, and will include research in ecology, methodology, biochemistry and physiology of bacteria. Emphasis on the role of bacteria in biogeochemical cycling from microzone to global scales, with particular focus in marine systems. May be repeated for credit.

292. Seminar (no credit).
Weekly seminar on various topics attended by faculty, graduate, and upper-division undergraduate students.

296. Teaching in Ocean Sciences (2 credits).
For new and/or relatively inexperienced graduate students in pedagogy of ocean sciences. Role and responsibilities of teaching in ocean sciences described and developed. Includes discussions about effective teaching methods; hands-on issues for work in the laboratory; university expectations; and regulations regarding teaching, organizational strategies, time management, and working with instructors and staff. Prerequisite(s): graduate standing or permission of instructor. Enrollment restricted to graduate students.

Philosophy

9. Introduction to Logic.
A study of correct reasoning, concentrating on developing the skills necessary to distinguish logically correct from logically incorrect arguments. The emphasis is on modern symbolic logic, although the traditional theory of the syllogism is also covered. (General Education Code(s): MF, IH, Q.)

11. Introduction to Philosophy.
An introduction to the main areas of philosophy through critical reflection on and analysis of both classical and contemporary texts. Focuses on central and enduring problems in philosophy such as skepticism about the external world, the mind-body problem, and the nature of morality. (General Education Code(s): TA, IH.)

80G. Bioethics in the 21st Century: Science, Business, and Society.
Serves science and non-science majors interested in bioethics. Guest speakers and instructors lead discussions of major ethical questions having arisen from research in genetics, medicine, and industries supported by this knowledge. (Also offered as Biomolecular Engineering 80G. Students cannot receive credit for both courses.) (General Education Code(s): PE-T, T6-Natural Sciences or Humanities and Arts.)

80S. The Nature of Science.
A survey of what philosophers have said about the nature of science and scientific change. Emphasis is placed on whether science is best characterized as the gradual accumulation of truth or whether truth is irrelevant to scientific change. (General Education Code(s): T6-Natural Sciences or Humanities and Arts.)

100A. Ancient Greek Philosophy.
Survey of ancient Greek philosophy of the Classical and Hellenistic periods. Begins with Socrates and the pre-Socratics, then undertakes an intensive study of Plato and Aristotle. Course then surveys the main developments that follow: Epicureanism, Stoicism, and Scepticism. (Formerly course 91.) (General Education Code(s): W satisfied by taking this course and either course 100B or 100C.) Prerequisite(s): course 9; courses 11 or 22 or 24 or 28 or any 80 course; and satisfaction of the Entry Level Writing and Composition requirements.

121. Knowledge and Rationality.
An investigation of modern theories of knowledge, justification, and rationality. One course in philosophy is strongly recommended prior to taking this course. Prerequisite(s): course 100A or 100B or 100C.

139. Freud.
The development of Freud's concept of mind. Extensive reading tracing the origins and development of Freud's theories and concepts (e.g., abreaction, psychic energy, defense, wish-fulfillment, unconscious fantasy, dreams, symptoms, transference, cure, sexuality) and emphasizing the underlying model of the mind and mental functioning. (Also offered as Psychology 163. Students cannot receive credit for both courses.) Prerequisite(s): course 100A or 100B or 100C. Offered in alternate academic years.

141. Epistemology and Cognition.
Epistemology is preoccupied with skepticism, the view that knowledge is unobtainable. Recently, there has been skepticism voiced about the status of epistemology itself; philosophers conversant in cognitive science suggest that epistemology is beset with dubious presuppositions. We survey epistemology, cognitive science, and their interface. Students cannot receive credit for this course and course 241. Prerequisite(s): at least one of course 100A or 100B or 100C. Enrollment restricted to junior and senior philosophy majors.

180R. Readings in Philosophy (2 credits).
Discussion-based course centered on readings in contemporary philosophy. Readings change each term and are a mixture of books, chapters from books, and articles. Readings are primarily in analytic philosophy, and student input is strongly encouraged. Prerequisite(s): One philosophy course. Enrollment by permission of instructor. Enrollment limited to 20. May be repeated for credit.

190E. Major Figures in 19th-Century Philosophy.
Focuses on philosophical writings and the significance of a single figure in 19th-century philosophy. May include, but not be limited to, Emerson, Hegel, Kierkegaard, Marx, Schopenhauer, Nietzsche, and Thoreau. Enrollment restricted to junior and senior philosophy majors. Enrollment limited to 22. May be repeated for credit.

239. Philosophy of Religion.
Investigation of various topics in philosophy of religion. Enrollment restricted to philosophy graduate students or by permission of instructor. Enrollment limited to 20. May be repeated for credit.

Physical Education

5A. Aquatics: Swimming Level I (no credit).
Coeducational. Water exploration and primary skills development. Course is designed to teach only "non-swimmers" how to swim. The following is taught: Red Cross swimming instruction in overcoming fears, water adjustment, floating, breath holding, and rhythmic breathing. Skills to be learned are: water entries, sculling, treading, elementary backstroke, freestyle, methods of water safety, and survival techniques. Students pay a course fee. Prerequisite(s): instructor determines skill level at first class meeting. Enrollment limited to 15.

5B. Aquatics: Swimming Level II (no credit).
Coeducational. Stroke readiness and development. Course is for those who have completed Swimming Level I or who can swim freestyle and demonstrate elementary backstroke. Skills to be learned are underwater swimming, turns, improvement of freestyle and elementary backstroke, beginning side stroke, backstroke, breaststroke, diving, personal safety skills, and basic rescue techniques. Prerequisite(s): instructor determines skill level at first class meeting: pass Swimming Level I course or demonstrate equivalent skills. Students pay a course fee. Enrollment limited to 20.

5C. Aquatics: Swimming Level III (no credit).
Coeducational. Stroke refinement and skill proficiency. Course teaches refinement of basic strokes and introduces butterfly, plus backstroke, surface diving, turns, endurance swimming, and survival techniques. Students pay a course fee. Prerequisite(s): instructor determines skill level at first class meeting: pass in Swimming Level II course or possess equivalent skills in freestyle, sidestroke, elementary backstroke, and breaststroke. Enrollment limited to 30.

5G. Aquatics: Swimming/Conditioning (no credit).
Open to all students who wish to explore swimming as a conditioning and fitness exercise. Students should know three competitive strokes, and should be able to swim fifteen minutes without stopping. Short health and fitness lectures precede some classes. Students pay a course fee. Prerequisite(s): instructor determination at first class meeting. Enrollment limited to 40.

5R. Aquatics: Basic Scuba Diving (no credit).
Coeducational. Sections geared toward the successful completion of NAUI Scuba Diver Certification. The

course is divided into three parts: lecture, pool lab, and open water experience. Four open water training dives are offered. Emphasis is on training for open water scuba diving, using the beach as a base of operation. Students pay a course fee. Prerequisite(s): pass swimming skills tests and medical clearance. It is strongly recommended that students enroll in course 5S. Enrollment limited to 24.

5S. Aquatics: Advanced Scuba Diving (no credit).
Coeducational. Sections are offered to facilitate the development of the basic scuba diver's open water techniques. A minimum of six open water experiences is offered. Course is geared toward successful completion of NAUI Advanced Scuba Diver Certification. Students pay a course fee. Prerequisite(s): course 5R or pass swimming skills test and medical clearance. (Formerly course 5T.) Enrollment limited to 25.

5T. Scuba Rescue Diving (no credit).
Coeducational. Course geared toward the successful completion of NAUI Rescue Diver Certification. Course consists of lecture, pool laboratory, and open-water experience. Emphasis is on training divers to manage risks and effectively handle limited in-water problems. Prerequisite(s): Scuba certification and medical clearance. Enrollment limited to 10.

9B. Boating: Beginning Dinghy Sailing (no credit).
Coeducational. Introductory course in practical boating safety using 15-foot sailboats. Includes introduction to rigging, nomenclature, seamanship, proper boat-handling techniques, and general boating and aquatic safety. Satisfactory completion meets prerequisites for intermediate-level dinghy course. Students pay a course fee. Prerequisite(s): swimming ability. (Formerly Boating: Basic Sailing) Enrollment limited to 18.

9C. Boating: Intermediate Dinghy Sailing (no credit).
Coeducational. Course includes a review of basic sailing with an emphasis on the further development and refinement of small-boat sailing techniques. Fifteen-foot sailboats are used with two students per boat. Students pay a course fee. (Formerly Boating: Intermediate Sailing) Prerequisite(s): course 9B or equivalent skills. Enrollment limited to 16.

9H. Boating: Basic Rowing (no credit).
Coeducational. Course designed to cover types of rowing boats, nomenclature, fundamental skills, and specific safety and rescue aspects related to the activity. Students will row singly as well as in groups using 15-foot to 22-foot rowing dories. (Formerly course 9J.) Students pay a course fee. Prerequisite(s): swimming ability. Enrollment limited to 12.

9J. Boating: Intermediate Rowing (no credit).
Coeducational intermediate course designed to cover more advanced rowing techniques and the skills needed for safe open water rowing. Students pay a course fee. Students pay a course fee. Prerequisite(s): basic rowing or permission of instructor. (Formerly course 9H.) Enrollment limited to 11.

9K. Boating: Ocean Kayaking (no credit).
Co-educational course that teaches novice kayakers the skills to safely use UCSC kayaks in the Monterey Bay. Topics include: basic paddling strokes and maneuvers; self and assisted deep-water rescues; beach launching; landing through surf; and marine hazards and navigation. Students pay a course fee. Enrollment limited to 12.

9S. Boating: Intermediate Keelboat Sailing (no credit).
Coeducational. Combines hands-on rigging and docking practice in the harbor and sailing practice on Monterey Bay with instruction in sail-trimming, de-powering, powering-up, person-overboard recovery techniques, boating safety, weather, ocean conditions, sailing theory, rigging, navigation, and the maritime rules of the road. Twenty-seven foot, ultralight, displacement keelboats are used. Students pay a course fee. Enrollment limited to 16.

15B. Court Sports: Basketball (no credit).
Coeducational. Instruction in fundamentals, offensive and defensive strategies, rules, and conditioning designed primarily for beginning and intermediate level players. Students pay a course fee. Enrollment limited to 20.

15H. Court Sports: Racquetball (no credit).
Coeducational. The beginning section provides an introduction to the basic knowledge and skills involved in this indoor racquet sport. The advanced beginning section continues the development of the basic skills emphasizing increased shot variety and advanced strategy. The intermediate section offers the opportunity for further skill development and introduces more advanced offensive skills. Students pay a course fee. Enrollment limited to 18.

15N. Court Sports: Tennis (no credit).
Coeducational. The beginning section introduces the basics of forehand, backhand, and serve. Advanced beginning section reviews these basics and introduces the volley, overhead, and lob. The intermediate section reviews all stroke mechanics and covers basic singles and doubles strategy. The advanced section includes use of spins, practice principles, detailed stroke analysis, and advanced play situations. Competitive Tennis is a year-long program for members of the intercollegiate tennis teams. Students pay a course fee. Enrollment limited to 24.

15T. Court Sports: Volleyball (no credit).
Coeducational. Beginning/intermediate, intermediate, and advanced sections are offered for students who desire to learn and improve the basic skills, as well as to understand the rules. Competitive section is open to students interested in participation in the UCSC NCAA Women's Volleyball team. It covers information and practice in all aspects of the competitive volleyball season. Students pay a course fee. Enrollment limited to 25.

20A. Dance: Ballet (no credit).
Coeducational. Sections offered at various technical levels graded from I to III. Emphasis on principles of movement, style, and execution of ballet technique. Section in ballet repertory where advanced students have the opportunity to perform is offered in the spring quarter. Students pay a course fee.

20B. International Folk Dance (no credit).
Coeducational. International folk dance with an emphasis on Balkan and Israeli dances. Sections are also offered periodically in Mexican dance. Students pay a course fee.

20C. Dance: Jazz (no credit).
Coeducational. Sections offered at various technical levels graded from I to III. Exploration of jazz dance emphasizing basic technique, styling, rhythm, and isolations. Jazz and contemporary music is used as accompaniment. Some background in ballet strongly recommended before continuing to Jazz II or III. Section in jazz dance repertory where advanced students have the opportunity to perform is offered in spring quarter. Students pay a course fee. Enrollment limited to 40.

20D. Dance: Modern (no credit).
Coeducational. Sections offered at various technical levels graded from I to III. Emphasis on basic techniques and building phrases of movement. Section in choreography and improvisation offered in spring quarter. Section in dance repertory offered periodically. Students pay a course fee.

20F. Dance: Individual Studies in Dance (no credit).
Coeducational. Designed to give students the opportunity of pursuing their particular interests in the field of dance with the support and direction of a faculty member. Prerequisite(s): instructor determination at first class meeting.

25A. Fencing: Épée (no credit).
Coeducational. Basic instruction in the techniques, strategy, and general methodology of modern épée fencing. Emphasis on épée fencing as a development from the traditional French and Italian dueling sword styles as they have evolved to form the modern electrical épée game. Students pay a course fee.

25B. Fencing: Foil (no credit).
Coeducational. Instruction in modern competitive French-Italian foil techniques for beginning, intermediate, and advanced levels. Emphasis on physical and mental conditioning leading to improved skill in recreational and competitive areas of involvement. Students pay a course fee.

25C. Fencing: Sabre (no credit).
Coeducational. Instruction and practice in basic offensive and defensive skills of modern Hungarian sabre technique. Emphasis on physical and mental conditioning as a foundation for more advanced levels of instruction. Preparation for recreational and competitive involvement. Students pay a course fee.

28K. Field Sports: Soccer (no credit).
Coeducational/Women's. Sections are offered in field soccer and indoor soccer. Instruction in the basic techniques, tactics, laws of the game, and injury prevention for beginners and advanced players. Students pay a course fee. Prerequisite(s): determination at first class meeting.

30G. Fitness Activities: Physical Conditioning (no credit).
Coeducational. An exercise course designed to increase the participants' strength, flexibility, coordination, and cardiovascular endurance. Special attention is given to understanding and utilizing sound and safe principles of body alignment and movement. Courses include, but not limited to: Pilates, cardio boxing, stretch and strengthen, and aerobics. Students pay a course fee.

30H. Fitness Activities: T'ai Chi Ch'uan

(no credit).
Through balanced movement and breath control, T'ai Chi Ch'uan attempts to forestall many processes of aging by cultivating greater strength of body, mind, and spirit. Students pay a course fee.

30J. Fitness Activities: Strength Training (no credit).
Coeducational. An introduction to safe and effective methods of weight training and other personal conditioning activities. Topics covered include proper weight-training techniques, care of body and equipment, and elementary exercise physiology. Students pay a course fee. (Formerly Fitness Activities: Weight Training.)

30L. Fitness Activities: Yoga Exercises (no credit).
Coeducational. Sections offered at beginning, continuing beginning, and advanced beginning levels of Hatha Yoga. Students pay a course fee.

43A. Martial Arts: Aikido (no credit).
Coeducational. A nonviolent, noncompetitive Japanese martial art emphasizing mind-body harmony, balance, relaxation, and the understanding of vital energy. Aikido self-defense techniques aim toward the creative resolution of conflict and the growth of the individual. Sections offered at beginning and experienced levels. Students pay a course fee.

43G. Martial Arts: Tae Kwon Do (Karate) (no credit).
Coeducational. Sections offered at the beginning and intermediate/advanced levels. Covering basic skills, knowledge, and philosophy of Tae Kwon Do and providing instruction in the following aspects of martial arts study: fundamental techniques of self-defense, physical conditioning, emotional control, self-discipline, and self-confidence. Students pay a course fee. Enrollment limited to 35.

Physics

5A. Introduction to Physics I.
Elementary mechanics. Vectors, Newton's laws, inverse square force laws, work and energy, conservation of momentum and energy, and oscillations. Corequisite(s): concurrent enrollment in course 5L and Mathematics 19A or 20A is required. (General Education Code(s): MF, IN, Q.)

5D. Heat, Thermodynamics, and Kinetics (2 credits).
Introduction to temperature, heat, and thermal conductivity, ideal gases, the first and second laws of thermodynamics, and an introduction to kinetic theory. Prerequisite(s): courses 5A/L and Mathematics 19B or 20B.

5I. Introduction to Physics Honors I (2 credits).
Weekly 90-minute section covering advanced and modern topics. Topics may include the theory of relativity; complicated dynamics (air resistance, planetary dynamics, etc.); fallacies in perpetual-motion machines; the Euler disk and unusual tops; elasticity of materials applied to structures. Concurrent enrollment in course 5A is required.

5L. Introduction to Physics Laboratory (1 credit).
Laboratory sequence illustrating topics covered in course 5A. One three-hour laboratory session per week. Prerequisite(s): concurrent enrollment in course 5A is required.

6A. Introductory Physics I.
Elementary mechanics. Vectors, Newton's laws, inverse square force laws, work and energy, conservation of momentum and energy, and oscillations. Prerequisite(s): Concurrent enrollment in course 6L required. Corequisite(s): Mathematics 11A or 19A or 20A or Applied Mathematics and Statistics 15A. (General Education Code(s): MF, IN, Q.)

6C. Introductory Physics III.
Introduction to electricity and magnetism. Elementary circuits; Maxwell's equations; electromagnetic radiation; interference and polarization of light. Prerequisite(s): courses 6A/L and Mathematics 11B or 19B or 20B or Applied Mathematics and Statistics 15B. (General Education Code(s): SI, IN.)

6L. Introductory Physics Laboratory (1 credit).
Laboratory sequence illustrating topics covered in course 6A. One three-hour laboratory session per week. Prerequisite(s): Previous or concurrent enrollment in course 6A required.

6N. Introductory Physics Laboratory (1 credit).
Laboratory sequence illustrating topics covered in course 6C. One three-hour laboratory session per week. Prerequisite(s): courses 6A and 6L; previous or concurrent enrollment in course 6C; courses 6B and 6M are recommended.

8. The Quantum Enigma.
Addressed to non-science majors; may interest science majors. After a brief overview of classical physics concepts, some philosophical interpretations of quantum mechanics, which revolutionized our description of nature, are discussed. Concepts are stressed, but some calculation techniques are developed. Enrollment limited to 210. (General Education Code(s): SI.)

101A. Introduction to Modern Physics I.
Special theory of relativity. Early experiments and models in quantum physics. Introduction to concepts and calculations in quantum mechanics. Single-electron atoms. Prerequisite(s): courses 5A/L, 5B/M, and 5C/N or 6A/L, 6B/M, and 6C/N.

105. Mechanics.
Particle dynamics in one, two, and three dimensions. Conservation laws. Small oscillations, Fourier series and Fourier integral solutions. Phase diagrams and nonlinear motions, Lagrange's equations, and Hamiltonian dynamics. Prerequisite(s): courses 5A/L, 5B/M, 5C/N, and 116A-B.

116C. Mathematical Methods in Physics.
Series solutions of ordinary equations, Legendre polynomials, Bessel functions, sets of orthogonal functions, partial differential equations, probability and statistics. Prerequisite(s): courses 5A/L, 5B/M, 5C/N, 116A-B, Mathematics 23A and 23B.

135A. Astrophysics Advanced Laboratory (3 credits).
Introduction to techniques of modern observational astrophysics at optical and radio wavelengths through hands-on experiments. Intended primarily for juniors and seniors majoring or minoring in astrophysics. Offered in some academic years as single-term course 135 in fall, depending on astronomical conditions. (Also offered as Astronomy and Astrophysics 135A. Students cannot receive credit for both courses.) Prerequisite(s): course 133 and at least one astronomy course.

139B. Quantum Mechanics.
The principles and mathematical techniques of nonrelativistic quantum mechanics: the Schrödinger equation, Dirac notation, angular momentum, approximation methods, and scattering theory. Offered in fall. Prerequisite(s): courses 101A, 101B, 116A-B-C and 139A.

171. General Relativity, Black Holes, and Cosmology.
Special relativity is reviewed. Curved space-time, including the metric and geodesics, are illustrated with simple examples. The Einstein equations are solved for cases of high symmetry. Black-hole physics and cosmology are discussed, including recent developments. (Also offered as Astronomy and Astrophysics 171. Students cannot receive credit for both courses.) Prerequisite(s): courses 105, 110A, 110B, and 116A-B-C.

195A. Senior Thesis Research (3 credits).
A seminar course to help students explore their theses topics and plan, organize, and develop their theses. Choosing a thesis topic, preparing a work plan for the research, assembling an annotated bibliography, and writing a draft outline of the thesis. Students must complete 5 credits in the 195 series to satisfy the writing intensive (W) general education requirement. Prerequisite(s): Entry Level Writing and Composition requirements.

210. Classical Mechanics.
Generalized coordinates, calculus of variations, Lagrange's equations with constraints, Hamilton's equations, applications to particle dynamics including charged particles in an electromagnetic field, applications to continuum mechanics including fluids and electromagnetic fields, introduction to nonlinear dynamics. Enrollment restricted to graduate students only, except by permission of instructor.

212. Electromagnetism I.
Electrostatics and magnetostatics, boundary value problems with spherical and cylindrical symmetry, multipole expansion, dielectric media, magnetic materials, electromagnetic properties of materials, time-varying electromagnetic fields, Maxwell's equations, conservation laws, plane electromagnetic waves and propagation, waveguides and resonant cavities. Enrollment restricted to graduate students only, except by permission of instructor.

217. Quantum Field Theory I.
Lorentz invariance in quantum theory, Dirac and Klein-Gordon equations, the relativistic hydrogen atom, Green functions and canonical approach to field theory, quantum electrodynamics, Feynman diagrams for scattering processes, symmetries and Ward identities. Students learn to perform calculations of scattering and decay of particles in field theory. Prerequisite(s): course 216. Enrollment restricted to graduate students only, except by permission of instructor.

220. Theory of Many-Body Physics.
Finite temperature Green functions, Feynman diagrams, Dyson equation, linked cluster theorem, Kubo formula for electrical conductivity, electron gas, random phase approximation, Fermi surfaces, Landau fermi liquid theory, electron phonon coupling, Migdal's theorem, superconductivity. Prerequisite(s): courses 216 and 219. Enrollment restricted to graduate students only, except by permission of instructor. Offered in alternate

academic years.

221A. Introduction to Particle Physics I.
First quarter of a two-quarter graduate level introduction to particle physics, including the following topics: discrete symmetries, quark model, particle classification, masses and magnetic moments, passage of radiation through matter, detector technology, accelerator physics, Feynman calculus, and electron-positron annihilation. Prerequisite(s): course 217 or concurrent enrollment. Enrollment restricted to graduate students only, except by permission of instructor.

231. Introduction to Condensed Matter Physics.
Crystal structures, reciprocal lattice, crystal bonding, phonons (including specific heat), band theory of electrons, free electron model, electron-electron and electron-phonon interactions, transport theory. Prerequisite(s): course 216. Enrollment restricted to graduate students only, except by permission of instructor.

291A. Cosmology (2 credits).
Intensive research seminar on cosmology and related topics in astrophysics: nature of dark matter; origin of cosmological inhomogeneties and other initial conditions of the big bang; origin and evolution of galaxies and large scale structure in the universe. Enrollment restricted to graduate students only, except by permission of instructor.

291C. Developments in Theoretical Particle Physics (2 credits).
Seminar on the current literature of elementary particle physics, ranging from strong and weak interaction phenomenology to Higgs physics, supersymmetry, and superstring theory. Students may present their own research results. Prerequisite(s): course 218; enrollment restricted to graduate students. May be repeated for credit.

291D. Experimental High-Energy Collider Physics (2 credits).
Seminar on current results in experimental high-energy particle physics. Topics follow recently published results, including design of experiments, development of particle detector technology, and experimental results from new particle searches, quantum chromodynamics, and properties of heavy flavor quarks. Enrollment restricted to graduate students. May be repeated for credit.

291E. Applied Physics (2 credits).
Intensive research seminar on applied physics and related topics in materials science, including semiconductor devices, optoelectronics, molecular electronics, magnetic materials, nanotechnology, biosensors, and medical physics. Students may present their own research results. Enrollment restricted to graduate students. May be repeated for credit.

291F. Experimental High-Energy and Particle Astrophysics Seminar (2 credits).
Survey of current research in experimental high-energy and particle astrophysics. Recent observations and development in instrumentation for x-rays, gamma rays, and neutrinos, and evidence for dark matter and other new particles. Students lead discussion of recent papers. Enrollment restricted to seniors and graduate students. Enrollment limited to 15. May be repeated for credit.

291G. Condensed Matter Physics Research Seminar (2 credits).
Weekly seminar series covering topics of current interest in condensed matter physics. Local and external speakers discuss their work. Enrollment restricted to graduate students. May be repeated for credit.

292. Seminar (no credit).
Weekly seminar attended by faculty and graduate students. Directed at all physics graduate students who have not taken and passed the qualifying examination for the Ph.D. program. Enrollment restricted to graduate students only, except by permission of instructor.

Politics

3. Keywords: Concepts in Politics.
Introduces key concepts in political discourse and key debates generated by contested terms such as "powers," "ideology," and "multiculturalism." Students read from canonical texts, feminist scholarship, historical materials, and contemporary cultural and postmodernist writings. (General Education Code(s): IS.)

17. U.S. and the World Economy.
Explores intellectual and empirical trends shaping the U.S. relationship with the global economy. Traces debates about liberalism and interventionism, surveys post-war American foreign economic policy and discusses varieties of capitalism emerging around the world. (General Education Code(s): IS.)

70. Global Politics.
Can common global interest prevail against particular sovereign desires? Surveys selected contemporary issues in global politics such as wars of intervention, ethnic conflict, globalization, global environmental protection, and some of the different ways in which they are understood and explained. (General Education Code(s): PE-H, IS.)

105C. Modern Political Thought.
Studies in 19th- and early 20th-century theory, centering on the themes of capitalism, labor, alienation, culture, freedom, and morality. Authors studied include J. S. Mill, Marx, Nietzsche, Foucault, Hegel, Fanon, and Weber. (Also offered as Legal Studies 105C. Students cannot receive credit for both courses.) Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to politics and Latin American and Latino studies/politics combined majors during priority enrollment only.

109. Orientalism.
Studies "Orientalism" as a concept of political theory and as a historical practice. Considers how "Western" views of the peoples, cultures, and governments of 'the East" influenced political, intellectual, and aesthetic projects of the 18th and 19th centuries, with attention to the themes of colonialism, nationalism, language, and gender. Also considers Orientalism as a subject of post-colonial thought. Prerequisite(s): course 105A, or 105B, or 105C, or 105D; or by permission of instructor. Enrollment restricted to politics majors.

120A. Congress, President, and the Court in American Politics.
Study of political development, behavior, performance, and significance of central governmental institutions of the U.S. Emphasizes the historical development of each branch and their relationship to each other, including changes in relative power and constitutional responsibilities. (Also offered as Legal Studies 120A. Students cannot receive credit for both courses.) Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to politics and Latin American and Latino studies/politics combined majors during priority enrollment only. Satisfies American History and Institutions Requirement.

121. Black Politics and Federal Social Policy.
Examination of changes in the political and economic status of African Americans in the 20th century; particular focus on the role of national policies since 1933 and the significance of racism in 20th-century U.S. political development. (Also offered as Legal Studies 121. Students cannot receive credit for both courses.) Enrollment restricted to politics and Latin American and Latino studies/politics combined majors during priority enrollment only. (General Education Code(s): E.)

140B. Comparative Post-Communist Politics.
Comparative study of revolutionary transformations of East European, Soviet, and former Soviet nations to post-Communist political orders. Focus on reemergence of political society, social and economic problems of transition, and maintenance of many cultural norms and authority patterns associated with previous regime. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements.

144. Andean Politics.
Examines similar political trends in four Andean countries: Bolivia, Colombia, Ecuador, and Peru. Trends include mobilization of indigenous populations, breakdown of traditional party systems, and reconstruction efforts in post-conflict environments. Students who have taken prior courses in Latin American politics, including course 140C, will be best prepared for this course. Enrollment restricted to politics and Latin American and Latino studies/politics combined majors during priority enrollment only.

149. Democratic Transitions.
Explores democratization processes from a variety of historical and geographical perspectives. Examines the role of foreign influences, economic development, civil society, elites, and institutions in the transition and consolidation of democratic systems. Enrollment restricted to politics and Latin American and Latino studies/politics majors during priority enrollment only.

151. Politics of Law.
Uncovers the important debates in politics and law around the functions of courts, litigation, and rights--and the political nature of law itself. Course is interdisciplinary, and draws from literature in political science, law, and sociology. (Also offered as Legal Studies 151. Students cannot receive credit for both courses.) Enrollment restricted to politics, legal studies, and Latin American and Latino studies/politics combined majors during priority period.

160D. International Political Economy.
Introduction to the politics of international economic relations. Examines the history of the international political economy, the theories that seek to explain it, and contemporary issues such as trade policy, globalization, and the financial crisis. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to politics and Latin American and Latino studies/politics combined majors.

161. Foreign Relations of China.
Surveys China's foreign policy from 1949 to today, including the Korean War; Sino-Soviet ties; relations with the United States; tension with Taiwan; and China's

rise to geopolitical prominence. Introduces the major theoretical approaches to international relations. (Formerly course 143) Enrollment restricted to politics and politics/Latin America and Latino studies combined majors during priority enrollment.

190A. State and Revolution.
Investigates the process of rapid and fundamental political change from the standpoint of both the structures of states in which revolutions have occurred and the structures of states issuing from revolutions. A number of cases are examined, but particular emphasis is given to the "classic" revolutions in France (1789) and Russia (1917). Enrollment restricted to senior politics and Latin American and Latino studies/politics combined majors; major restrictions lifted during open enrollment. Enrollment limited to 20.

190L. Poverty Politics.
Examines theoretical, historical, and contemporary sources of poverty, politics, and policies in the U.S. Explores competing theories of the causes of poverty and the consequences of social provision. Focuses on successive historical reform efforts and contemporary dilemmas of race, gender, low-wage labor, and the politics of welfare reform. Enrollment restricted to senior politics and Latin American and Latino studies/politics combined majors during priority enrollment only. Enrollment limited to 20.

190P. Race: History of a Concept.
Examines how we came, by the late 19th century, to classify humanity into racial categories. In an effort to trace emergence of this very modern phenomenon, explores historical shifts that informed Europe's representation of cultural difference from the writings of ancient Greeks to the social Darwinism of 19th-century Britain. Enrollment restricted to senior politics and Latin American and Latino studies/politics combined majors during priority enrollment. Enrollment limited to 20.

200C. States and Political Institutions Core Seminar.
Introduces study of political institutions as instruments of collective decision making and action. Explores alternative theoretical approaches to development of political institutions, state and political economy, and security dilemmas. Enrollment restricted to graduate students. Enrollment limited to 15.

232. United States Political History.
Covers several important themes and sets of readings from the literature on American political development. Topics include the origins and development of American political institutions, the evolution of democratic mechanisms, the rise and fall of social movements, and debates about the sources of policy regimes and political change, including the role of war. Enrollment restricted to graduate students. Enrollment limited to 15.

Portuguese

1A. Intensive Elementary Portuguese.
Intensive instruction in elementary Portuguese, emphasizing oral proficiency as well as reading and writing skills. Taken together, courses 1A and 1B are equivalent to first-year instruction. Enrollment limited to 25.

60A. Advanced Beginning and Intermediate Portuguese.
This sequence is designed for students with an equivalent of four quarters of college level study of Spanish, French, Italian, or Catalan or for native speakers of these Romance languages (including heritage speakers of Portuguese). Prepares students in all language skills. Prerequisite(s): Spanish 4 or Spanish for Spanish Speakers 61 or French 4 or Italian 4 or Spanish Placement Examination score of 50.

65B. Intermediate Portuguese.
Sequential to course 65A, completes second-year accelerated instruction. A systematic grammar review is combined with literacy and cultural readings, while communicative exercises focus on improving students' ability to understand and hold sustained conversations. Students expand their vocabulary and knowledge of Brazil and other Portuguese-speaking cultures through films, popular music, and other cultural authentic materials. Prerequisite(s): course 65A or by instructor approval. (General Education Code(s): CC, IH.)

Psychology

1. Introduction to Psychology.
Introduces prospective majors to the scientific study of behavior and mental processes and also provides an overview for non-majors. Emphasizes social, cognitive, developmental, and personality psychology and their interrelations. (General Education Code(s): PE-H, IS.)

10. Introduction to Developmental Psychology.
Psychological development from conception to adolescence. A broad introduction to the field of developmental psychology. Prerequisite(s): course 1. Enrollment restricted to psychology and pre-psychology majors.

20. Introduction to Cognitive Psychology.
Introduces basic concepts in cognitive psychology. Topics include thinking, consciousness, perceiving, language, remembering, reasoning, problem solving, and decision-making.

40. Introduction to Social Psychology.
An analysis of contemporary research in social psychology and of what that research can teach us about the world we live in. Problems of conformity, propaganda, prejudice, attraction, and aggression. Focuses on a person's relationship with other people, how he or she influences them and is influenced by them.

60. Introduction to Personality Psychology.
An overview of major personality theories from Freud to the modern day, and an introduction to contemporary personality research and assessment. Prerequisite(s): course 1.

80A. Psychology and Religion.
Topics covered include myth and the unconscious, the varieties of religious experience, dualism, women and religion, the role of authority, transpersonal experience, conversion, disaffiliation, self and community. (General Education Code(s): T3-Social Sciences.)

100. Research Methods in Psychology (7 credits).
An introduction to research methods used to investigate human psychology. Course emphasizes critical thinking, designing and conducting research, analyzing and interpreting data, and writing a professional research report. (Formerly course 3.) Prerequisite(s): Entry Level Writing and Composition requirements; course 2 or Applied Mathematics and Statistics 5 or Applied Mathematics and Statistics 7/7L.

115. Lifespan Developmental Psychopathology.
Examines theory and research on developmental psychopathology. Emphasizes the origin and longitudinal course of disordered behavior. Explores the processes underlying continuity and change in patterns of adaptation and age-related changes in manifestations of disorders. Prerequisite(s): courses courses 3 or 100, 10, and 170.

118B. Children in Extreme Circumstances.
Reviews child survival in life-threatening contexts. Examines the lives of street children, institutionalized children, orphans, children in extreme poverty, enslaved children, war-affected children, abandoned children, and children whose parents have HIV/AIDS and other life-threatening illnesses. Prerequisite(s): courses 3 or 100 and 10. Enrollment limited to 60.

119A. Development as a Sociocultural Process.
Examines theory and research in sociocultural approaches to how people (especially children) learn and develop through participating in activities of their communities with other people. Emphasizes the organization of social interactions and learning opportunities, especially in communities where schooling has not historically been prevalent. Satisfies seminar requirement. Satisfies senior comprehensive requirement. (Formerly course 100L.) Prerequisite(s): satisfaction of Entry Level Writing, Composition requirements; course 1, Anthropology 1 or 2, Education 92A, 92B, or 92C, Latin American and Latino Studies 1, or Sociology 1. Enrollment restricted to seniors or permission of instructor. Enrollment limited to 30. (General Education Code(s): W.)

125. The Psychology of Language.
A study of human communication as a function of psychological, linguistic, and social factors. Topics covered include language comprehension and production, language and reasoning, and language as a social activity. Prerequisite(s): course 3 or 100. (General Education Code(s): W.)

135. Feelings and Emotions.
Focuses on contemporary research in the psychology of human emotions. Special attention given to work in cognitive science, including psychology, linguistics, philosophy, and anthropology, on how emotions are central to understanding human action and mental life. Prerequisite(s): course 3 or 100, or major standing in linguistics, philosophy or anthropology.

139D. Modeling Human Performance.
Hands-on experience using computational modeling to understand human cognitive-task performance by comparing simulated and human data. Satisfies senior seminar requirement. Satisfies senior comprehensive requirement. Enrollment restricted to junior and senior psychology, cognitive science, computer science, and computer engineering majors, or by permission of instructor. Prerequisite(s): at least one of the following: course 121 or 123 or 128 or 129; or Computer Science 5C or 5J or 11 or 12A or 13H or 130 or 140. Enrollment limited to 30.

140B. African American Psychology.
Incorporates historical and conceptual foundations; issues of social psychology; individual and developmental processes; and adjustment and clinical issues. Readings expose students to attributes of African American culture that have an impact on the psychology of African Americans as well as methodological issues relevant to key psychological topics. Prerequisite(s): course 3 or 100 or declaration of major in one of the following programs: feminist studies, sociology, community studies, or politics. Enrollment limited to 60. (General Education Code(s): E.)

140G. Women's Lives in Context.
Examines gender as a psychological and social factor that influences women's experiences in different contexts. Cuts across other areas of psychology by taking a women-centered approach. Emphasis also placed on understanding how intersections between gender, race and ethnicity, sexual orientation, socioeconomic status, etc., impact women's psychological well-being. Prerequisite(s): satisfaction of Entry Level Writing and Composition requirements and course 3 or 100, or sociology 103B, or feminist studies 100, or community studies 100. Enrollment restricted to junior and senior psychology, feminist studies, sociology, and community studies majors. (General Education Code(s): W.)

150. Social Psychology of Flimflam.
Why do we believe strange things? This course investigates such flimflams as beliefs in the Loch Ness Monster, quack health care, and racial superiority to illustrate the underlying social psychological principles that lead us to adopt weird attitudes. (Formerly course 159I.) Prerequisite(s): course 3 or 100. (General Education Code(s): SI.)

159E. Peace Psychology.
Is war inevitable? What is peace? Is it more than the absence of violence? Explore how psychology— the study of human behavior —can help to decrease violence and enhance cooperation at multiple levels including the personal, interpersonal, community, and international arenas. Satisfies seminar requirement. Satisfies senior comprehensive requirement. Enrollment restricted to senior psychology majors. Enrollment limited to 30.

163. Freud.
The development of Freud's concept of mind. Extensive reading tracing the origins and development of Freud's theories and concepts (e.g., abreaction, psychic energy, defense, wish-fulfillment, unconscious fantasy, dreams, symptoms, transference, cure, sexuality) and emphasizing the underlying model of the mind and mental functioning. (Also offered as Philosophy 139. Students cannot receive credit for both courses.) Prerequisite(s): Philosophy 100A or 100B or 100C. Offered in alternate academic years.

169. Community Mental Health.
Examines theory and research on outreach and prevention for application with various populations in community settings (e.g., victims of violence, immigrants, severely mentally ill); presents characteristics of successful agencies and agency development. Surveys interventions currently used in community mental health. Prerequisite(s): course 3 or 100. Courses 60 and 170 recommended.

170. Abnormal Psychology.
Survey of theory and research on the nature of behavioral disorders. Covers psychological, biological, developmental, and socio-cultural approaches. Prerequisite(s): course 3 or 100; course 60 highly recommended as preparation.

171. Childhood Psychopathology.
A critical and intensive exploration of a wide variety of specific disorders within their biological, developmental, and social contexts. Concepts of psychopathology in childhood, major and minor diagnostic systems, and a variety of theories of etiology are explored. General intervention strategies and a wide range of specific psychotherapy systems for treatment are closely examined and demonstrated. Prerequisite(s): courses 3 or 100; and courses 10, and 170.

179D. Psychological Interpretation.
Seminar explores ego, Jungian, and object relations interpretive systems in-depth, applying them to film, music, literature, dreams, art, as well as traditional psychological measures, such as the TAT and interview protocols. Interprets psyche of author, audience, and engendering culture. Prerequisite(s): course 3 or 60 or 100; satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to senior psychology majors. Enrollment limited to 30.

183. History and Systems of Psychology.
An overview of the history of psychology. Examines issues of paradigm and philosophy of science. Reviews central paradigms in the history of the discipline. Assumes a critical-historical approach, linking scientific knowledge produced to prevailing societal beliefs about mind and behavior. Prerequisite(s): course 3 or 100. (Formerly course 180)

191A. Introduction to Teaching Psychology.
Students lead discussion groups and provide one-to-one tutoring for courses 1 or 3 or 100. Admission requires essay describing interest in becoming a course assistant, copies of psychology evaluations, and a letter of recommendation from a psychology faculty member; completion of some upper-division psychology courses prior to enrollment in this course. Prerequisite(s): course 3 or 100. Enrollment restricted to psychology majors. (Formerly "Introduction to Psychology.") Enrollment limited to 20.

204. Quantitative Data Analysis.
Intermediate statistical methods widely used in psychology (e.g., n-way, ANOVA, ANCOVA, multiple-comparisons, repeated-measures, nested-designs, correlational analyses, bivariate regression), corresponding SAS programs, and elements of measurement theory. Enrollment restricted to graduate students. Enrollment limited to 20.

211A. Proseminar: Social Justice and the Individual.
Provides an introduction to social psychology, focusing on various individual-level social justice topics, including the self, social comparison, individual and collective identity, social historical and social structural determinants of behavior and various policy and social change-related issues. Enrollment restricted to psychology graduate students; undergraduates planning graduate work in social psychology may enroll with permission of instructor. Enrollment limited to 20.

224A. Proseminar: Cognitive I.
A proseminar reviewing current topics in cognitive psychology, designed to introduce new graduate students to the field. Enrollment restricted to psychology graduate students. Enrollment limited to 10.

225A. Introduction to Developmental Research I (3 credits).
Surveys the rationale and techniques of research in developmental psychology. Students build skills in evaluating published research, in translating theoretical ideas into researchable hypotheses, and in selecting appropriate research designs, measurement, and statistical approaches for research problems. Multiple-term course; students receive 6 credits in the second quarter of attendance; the grade and evaluation submitted for the final quarter applies to both quarters. Enrollment restricted to psychology graduate students or with instructor's permission. May be repeated for credit.

230. Research in Cognitive Psychology Seminar.
Seminar to study, critique, and develop research in perception and cognition, including topics in psychobiology, psycholinguistics, and memory. Enrollment restricted to psychology graduate students. May be repeated for credit.

231. Research in Social Psychology Seminar.
Seminar to study, critique, and develop research in social psychology. Enrollment restricted to psychology graduate students. May be repeated for credit.

242. Research in Developmental Psychology Seminar.
Seminar to study, critique, and develop research in developmental psychology. Enrollment restricted to psychology graduate students. May be repeated for credit.

244A. Proseminar I: Cognitive and Language Development.
Explores major theories and research in the fields of cognitive development and language development. Begins with classic theories, such as Piaget's theory of cognitive development, and proceeds to theories and research on topics of current interest, such as the relation between culture and cognitive and language development. Enrollment restricted to graduate students.

247. Special Topics in Developmental Psychology.
Focuses on particular issues of theoretical importance in developmental psychology. Topics vary from year to year. Particular issues in language, culture, cognitive, social, and personality development may be covered. Enrollment restricted to graduate students. Enrollment limited to 15. May be repeated for credit.

252. Special Topics in Cognitive Psychology.
Focuses on particular issues in cognitive psychology. Topics vary from year to year. Particular issues in language, memory, perception, attention, judgment and decision making, problem solving, reasoning, emotion, cognitive modeling, cognitive neuroscience, and cognition and aging covered. Enrollment restricted to graduate students. May be repeated for credit.

290B. Advanced Developmental Research and Writing (2 credits).
Tailored to graduate students' interests among topics involving research and scholarship in sociocultural approaches to development, methods for research design, data collection, coding, and analysis, and preparing and reviewing grant proposals and journal manuscripts. Multiple-term course; students receive 6 credits in the third quarter of attendance; the performance evaluation and grade submitted for the final quarter applies to all three quarters. Enrollment restricted to graduate students. May be repeated for credit.

Russian

1. Instruction in the Russian Language.
Aural comprehension, speaking, reading, and writing. Recitation and laboratory. Elementary sequence (1-2-3) begins in the fall quarter only.

4. Intermediate Russian.
Second-year courses designed to improve functional competence in speaking, listening, reading, and writing by activating basic grammar covered in introductory

courses. Grammatical explanations and exercises supplemented with short readings and films. Prerequisite(s): course 3; or permission of instructor. (General Education Code(s): CC, IH.)

Science Communication

201A. Reporting and Writing Science News.
A survey of the conventions of newspaper journalism and the special application of those conventions to scientific and technological subjects. Enrollment restricted to graduate students formally accepted into the writing track of the Science Communication Program.

202. Writing and Editing Workshop.
Theory and practice of writing and editing articles on scientific, medical, environmental, and technological subjects for newspapers, magazines, and special publications directed at non-technical readers. Enrollment restricted to graduate students formally accepted into the writing track of the Science Communication Program. May be repeated for credit.

Social Documentation

200. Approaches to Social Documentation.
Comprehensive review and analysis of documentary strategies aimed at societal critique and social change, evaluating changes in argument, evidence, and process over development of the discipline. (Also offered as Digital Arts and New Media 205. Students cannot receive credit for both courses.) A concurrent media lab is required. Enrollment restricted to social documentation graduate students. Enrollment limited to 15.

202. Practice of Social Documentary.
Introduction to social documentary genres including video, photography, new media and other mediums, which addresses social-scientific research and methodology in the context of these processes. (Also offered as Digital Arts and New Media 206. Students cannot receive credit for both courses.) A concurrent media lab is required. Enrollment restricted to social documentation graduate students. Enrollment limited to 15.

204. Ways of Seeing and Hearing.
Graduate-level advanced seminar explores ways that seeing, hearing, and knowing are influenced by culture, power, race, and other factors. Readings emphasize how documentary subjects are constituted and known, addressing questions of epistemology, social constructivism, objectivity, and method. (Also offered as Digital Arts and New Media 204. Students cannot receive credit for both courses.) Enrollment restricted to social documentation and digital arts new media graduate students.

290. Special Topics in Social Documentation.
Designed to provide supplemental instruction on specific topical and/or technical matters related to social documentation. Topics include technical standards and innovations within the field of social documentation, documentary subjects, location production, and/or the work of individual professional documentarians. (Also offered as Digital Arts and New Media 208. Students cannot receive credit for both courses.) Enrollment restricted to social documentation graduate students. Enrollment limited to 15. May be repeated for credit.

291. Media Laboratory for Social Documentation (2 credits).
Individual training in a social documentation medium under the guidance of a faculty supervisor. Course is intended to be taken concurrently with social documentation courses requiring a laboratory course. Enrollment restricted to social documentation and digital arts and new media graduate students. Enrollment limited to 10. May be repeated for credit.

294A. Production/Analysis/Editing.
Workshop seminar oriented toward actual fieldwork, production, and preparation for editing of the thesis project in the student's chosen genre. Techniques of collection and recording, analysis, preparation, and editing taught. Enrollment restricted to social documentation graduate students. Enrollment limited to 15.

Social Sciences

194A. UCDC Internship Research Seminar.
Weekly seminar that focuses on the production of a major research paper or equivalent scholarly undertaking connected to an internship in Washington, D.C., government, non-profit, or private institution. Seminar stresses institutional analysis, the development of bibliographic expertise in the use of Washington-based resources, and participant-observer skills. Required for participants in the UCDC program. Required for and enrollment restricted to students participating in the UCDC Program. Enrollment limited to 22.

194B. UCDC Internship Seminar (7 credits).
A 30- to 36-hour-per-week internship in a Washington, D.C., government, non-profit, or private institution. Required for and enrollment restricted to UCDC program participants. (Formerly UCDC Internship and Internship Seminar.) Enrollment limited to 22. May be repeated for credit.

Sociology

1. Introduction to Sociology.
A systematic study of social groups ranging in size from small to social institutions to entire societies. Organized around the themes of social interaction, social inequality, and social change. Fulfills lower-division major requirement. (General Education Code(s): IS.)

15. World Society.
Introduction to comparative and historical sociology. Focuses on the global integration of human society. Examines social changes such as industrialization, globalization, colonial rule, and the rise of Islamic fundamentalism. Uses social theory (including ideas from Marx, Weber, and Adam Smith) to explore the making of institutions like the nation-state, the World Trade Organization, the World Bank, and the International Monetary Fund. Fulfills lower-division major requirement. (General Education Code(s): CC, IS, E.)

30A. Introduction to Global Information and Social Enterprise Studies (3 credits).
Teaches how to use social-enterprise methodologies to transfer information-communication technologies (ICT) to community and non-governmental organizations. Concepts include: globalization, info-exclusion, social justice, information revolution, global civil-society networks, social entrepreneurship, "open source" resources, web design, databases, networking. Requires organizational assessment. Enrollment limited to 50.

105A. Classical Sociological Theory.
This intensive survey course examines the intellectual origins of the sociological tradition, focusing on changing conceptions of social order, social change, and the trends observed in the development of Western civilization in the modern era. Readings are all taken from original texts and include many of the classical works in social theory with special emphasis on the ideas of Marx, Weber, and Durkheim which constitute the core of the discipline. Required for sociology majors planning on studying abroad (EAP). Enrollment restricted to juniors and seniors in sociology, proposed sociology, the combined Latin American and Latino studies/sociology, and the proposed combined Latin American and Latino studies/sociology majors and sociology minors.

111. Family and Society.
Focuses on the interaction between family and society by considering the historical and social influences on family life and by examining how the family unit affects the social world. Readings draw on theory, history, and ethnographic materials.

116. Communication, Media, and Culture.
Examines media institutions, communication technologies, and their related cultural expressions. Focuses on specific ways the media—including media studies and criticism—operates as social and cultural factor. Contemporary theory or equivalent in related fields recommended. (Formerly "Communication and Mass Media.") Enrollment restricted to upper-division students.

121. Sociology of Health and Medicine.
Analysis of the current health care "crises" and exploration of the social relationships and formal organizations which constitute the medical institution. Study of the political, economic, and cultural factors which affect the recognition, distribution, and response to illness.

128I. Race and Justice.
An introduction to comparative and historical analyses of the relations between race and criminal justice in the U.S. Emphasis on examinations of structural mechanisms that help maintain and perpetuate racial inequality in law, criminal justice, and jury trials. (Formerly Race and Criminal Justice) (Also offered as Legal Studies 128I. Students cannot receive credit for both courses.) Enrollment restricted to sophomores, juniors, and seniors. Enrollment limited to 120.

141. Group Process.
The study of group development and interpersonal behavior based primarily on observation of the class discussion group. Readings are drawn from psychology and fiction as well as from sociology. Offered in alternate academic years. Enrollment restricted to senior sociology majors. Enrollment limited to 18.

152. Body and Society.
Critically examines the place of the human body in contemporary society. Focuses on the social and cultural construction of bodies, including how they are gendered, racialized, sexualized, politicized, represented, colonized, contained, controlled, and inscribed. Discusses relationship between embodiment, lived experiences, and social action. Focuses on body politics in Western society and culture, especially the United States. An introductory sociology course is recommended prior to taking this course. Enrollment restricted to juniors and seniors. Enrollment limited to 50.

156. U.S. Latina/o Identities: Centers and Margins.
Explores historical and contemporary constructions of Latina/o identities and experiences in U.S. Particular emphasis placed on transcultural social contexts, racial formations, and intersections with other identities in-

cluding sexuality and gender. Enrollment restricted to juniors and seniors. Enrollment limited to 50. (General Education Code(s): ER, E.)

167. Development and Underdevelopment.
Examines contemporary debates about development in the Third World: alternative meanings of development, recent work on the impact of colonial rule, how some economies have industrialized, ideas about agrarian change, and recent research on paths out of poverty. Students work in pairs to examine a development in one country since World War II.

169. Social Inequality.
A survey of theories and systems of social stratification focusing on such phenomena as race, class, power, and prestige. Enrollment restricted to juniors and seniors. (General Education Code(s): E.)

172. Sociology of Social Movements.
Through readings on social movements that span the 20th century, course examines the causes of popular mobilizations, their potential for rapid social change, and the theories developed to understand and explain their role in modern social life. Enrollment restricted to juniors and seniors. Enrollment limited to 40. (General Education Code(s): PE-H.)

177A. Latinos/as and the American Global City.
Examines roles of emerging Latino/a majorities in urban centers across the U.S. Explores the "Latinization" of U.S. cities and various factors affecting the life chances of Latinos/as including, but not limited to, immigration, segregation, social movements, and other forms of political participation. Enrollment restricted to juniors and seniors. Enrollment limited to 40.

188G. Global Islam: Politics, Movements, Discourses.
Historical sociology of Muslim political and cultural movements as a global phenomena. Topics include: survey of Muslim globalization processes, Muslim political theory, Shari'a, Sufi networks, economic institutions, Islamic nationalism contemporary social movements, Muslim response to imperialism, Islamic revival, Muslim civil society, and the role of women in contemporary Muslim politics.

201. The Making of Classical Theory.
Examines the establishment of "theory" in the discipline of sociology. Introduces students to close readings and analysis of a core selection of social theory. Problematizes the construction, maintenance, and reproduction of a theoretical canon in sociology. Enrollment restricted to graduate students in sociology and by permission number. Enrollment limited to 20.

203. Sociological Methods.
Approaches methods as a series of conscious and strategic choices for doing various kinds of research. Introduces students to the epistemological questions of method in social sciences; to key issues in "technique," particularly control, reliability, and validity; and to good examples of social research. Enrollment restricted to graduate students in sociology and by permission number.

204. Methods of Quantitative Analysis.
Students are provided with intuitive explanation of fundamental concepts in statistics and learn how to use statistics to answer sociological questions. Experience and guidance in using computers to efficiently analyze data are provided. Enrollment restricted to graduate students in sociology and by permission number. Enrollment limited to 20.

268B. Science and Justice Research Seminar.
Provides in-depth instruction in conducting collaborative interdisciplinary research. Students produce a final research project that explores how this training might generate research that is more responsive to the links between questions of knowledge and questions of justice. Prerequisite(s): course 268A. Enrollment by permission of instructor. Enrollment restricted to graduate students. (Also offered as Biomolecular Engineering 268B. Students cannot receive credit for both courses.) Enrollment limited to 15.

Spanish

1. Instruction in the Spanish Language.
Speaking, listening comprehension, reading and writing fundamentals. Taught entirely in Spanish; conversational fluency is encouraged through classroom practice and conversation groups, and is supplemented by language laboratory work. Classes are held three days a week; students complete the conversation group work independently of the classroom sessions. Prerequisite(s): Spanish Placement Examination score of 10. Enrollment limited to 24.

2. Instruction in the Spanish Language.
Speaking, listening comprehension, reading and writing fundamentals. Taught entirely in Spanish; conversational fluency is encouraged through classroom practice and conversation groups, and is supplemented by language laboratory work. Classes are held three days a week; students complete the conversation group work independently of the classroom sessions. Prerequisite(s): course 1 or Spanish Placement Examination score of 20. Enrollment limited to 24.

3. Instruction in the Spanish Language.
Speaking, listening comprehension, reading and writing fundamentals. Taught entirely in Spanish; conversational fluency is encouraged through classroom practice and conversation groups, and is supplemented by language laboratory work. Classes are held three days a week; students complete the conversation group work independently of the classroom sessions. Prerequisite(s): course 2, 2X, or Spanish Placement Examination score of 30. Enrollment limited to 24.

4. Intermediate Spanish.
Includes comprehensive grammar review, composition, readings, and discussion. Reading and audiovisual material deal with various sociopolitical and cultural issues in the Spanish speaking world. Classes are conducted in Spanish. Prerequisite(s): course 3, 3T, 3X, or Spanish Placement Examination score of 40. Enrollment limited to 24. (General Education Code(s): CC, IH.)

5. Intermediate Spanish.
Includes comprehensive grammar review, composition, readings, and discussion. Reading and audiovisual material deal with various socio-political and cultural issues in the Spanish speaking world. Classes are conducted in Spanish. Prerequisite(s): course 4, 4X, or Spanish Placement Examination score of 50. Enrollment limited to 24. (General Education Code(s): CC, IH.)

5M. Medical Spanish.
Students learn vocabulary, expressions, and cultural background to be able to interact with Spanish-speaking patients and doctors. Medical Spanish fulfills language requirement for the health science major of the Biology Department. Prerequisite(s): course 4; or Spanish for Spanish Speakers 61, 62, and 63; or Spanish for Spanish Speakers 125; or Spanish Placement Examination score of 50 or higher. Enrollment restricted to health sciences majors. Enrollment limited to 24. (General Education Code(s): IH.)

6. Intermediate Spanish.
Increases oral and written proficiency using authentic reading materials which focus on such topics as social class, ethnicity, education, religion, economic, and political developments in the Spanish-speaking world. Prerequisite(s): course 5, 5M, 5X, or Spanish Placement Examination score of 60. Enrollment limited to 24. (General Education Code(s): CC, IH.)

114. Advanced Conversation and Composition.
Advanced conversation and composition based on extensive readings in the humanities and social sciences. Students interested in this course who have not taken the prerequisite should meet with the instructor prior to the first class meeting. Prerequisite(s): course 6, 56, Spanish for Spanish Speakers 63, or Spanish Placement Examination score of 70. (General Education Code(s): TA.)

Spanish for Spanish Speakers

61. Spanish for Spanish Speakers.
This course deals with orthography (syllabification, accentuation, etc.), basic grammatical features, verbal structures, and development of conversation skills and confidence in spoken Spanish. Focus on development of writing skills: description, dialogue, exposition, and commentary on contemporary issues relevant to Spanish speakers of the Americas. Students need to utilize the Self-Placement Guidelines, available in 133 Humanities Building to assure proper placement in this class. (General Education Code(s): CC, IH.)

Technology and Information Management (Formerly Information Systems Management)

50. Business Information Systems.
Addresses the use of information systems (IS) within a business enterprise. Subjects include computer hardware and software concepts, system design and implementation, telecommunications, data management, transaction-based systems, management information systems, and the use of IS to compete. Intended for information system management and business management economics majors.

101. Management of Technology Seminar (2 credits).
Uses weekly talks by leading industry practitioners and university researchers to provide in-depth exposure to the management of technology. Topics covered include product development, operations, strategy, finance, and marketing for technologies such as software and information systems. May be repeated for credit.

105. Management of Technology I.
An in-depth examination of technological, strategic, marketing, and financial methods and analytical tools for the management of technology to enable cost-effective and rapid development of profitable and high quality technologies. Includes case studies and a comprehensive project. Students who receive credit for course 205 cannot also receive credit for this course. Prerequisite(s): Mathematics 19B or 11B or Applied Mathematics and Statistics 11B or Economics 11B.

205. Management of Technology I.

Addresses technological, strategic, marketing, financial methods, and analytical tools for management of technology in an integrated manner that enables the cost-effective and rapid development of profitable and high quality technologies. Includes case studies and a comprehensive project. Students cannot receive credit for this course and course 105. Enrollment restricted to juniors, seniors, and graduate students.

206. Optimization Theory and Applications.
A first graduate course in optimization with an emphasis on problems arising in management and engineering applications. Objectives are to become experts in problem formulation, comfortable with software for solving these problems, and familiar with analytical methods behind these solver technologies. Prerequisite(s): calculus and linear algebra. Enrollment restricted to graduate students.

209. Data Mining and Business Analytics in Knowledge Services.
Provides students with systematic methodology and analytical tools in data and text mining and business analytics. Also provides an integrated perspective and examines use of these methods in the field of knowledge services, such as online marketing, sponsored search, health care, financial services, recommender systems, etc. Includes training in the basic elements of stochastic optimization and other algorithmic approaches, such as stochastic dynamic programming, statistics, constrained optimization, and machine learning with exposure to software tools. These methods enable firms to achieve rapid, effective, and profitable optimization of knowledge-services management. (Formerly Knowledge Services and Data Analytics.) Enrollment restricted to graduate students. Students are expected to have undergraduate preparation in probability and statistics. Undergraduates may enroll with instructor approval.

215. Organizations and Leadership.
Addresses organizational and managerial aspects of high-tech enterprises, providing an understanding of various corporate functions. Considers issues of human resources: motivation and rewards, group dynamics, communication, ethics, and leadership. Includes perspectives from behavioral theories and corporate practice/culture. Enrollment restricted to graduate students.

260. Information Retrieval.
Course covers major topics of information retrieval, including statistical characteristics of text, several important retrieval models, text clustering, text classification, text filtering, web analysis, information extraction, peer to peer research, distributed search, personalized search, and other related topics. Enrollment restricted to graduate students. Undergraduates may enroll with permission of instructor.

Theater Arts

10. Introduction to Theater Design and Technology.
Addresses imagination and creativity. Using the framework of theater production, students explore the process of translating a script into a performance. Topics include visual literacy, creative problem solving, establishing effective working teams, tear sheets, storyboarding, drawing, sound and color theory. This course is a prerequisite for all upper-division design courses. (General Education Code(s): IM, IH, A.)

12. Stage Management.
Designed to acquaint students with the complexities of staging productions from the audition process to final performance. Directing, lighting, scenic production, sound, cueing, and personnel management are aspects that will be touched upon in class. Students are billed a materials fee. (Formerly Production Management.) (General Education Code(s): A.)

20. Introductory Studies in Acting.
Introduction to basic acting skills and the problems of performance. Concentrates on expanding the students' range of expression and ability to respond to and analyze dramatic text. Students with little or no experience are encouraged to attend. (General Education Code(s): IM, IH, A.)

21B. Acting Studio 1B, Actors' Physicality.
Uses a rigorous physical approach to acting (rather than the text-based approach of course 21A). Provides an "outside-in" starting point for theatrical creation and study, balancing and countering the "inside-out" approach of Stanislavski-based actor training. Emphasis on physical characterization, ensemble theater, mask work, and object performance. May involve practices, theories, and readings of Jerzy Grotowski, Eugenio Barba, Jacques Lecoq, and/or Tadashi Suzuki. Enrollment by interview only. Enrollment limited to 30. (General Education Code(s): A.)

22. Indonesian Dance and Drama.
Students learn the basic movement repertoire of the specific characters of the Indonesian dance-drama/puppetry tradition over the quarter with explication of how these types operate in their own cultural context. The course culminates in an open showing of scenework. May be repeated for credit. (General Education Code(s): CC, A, E.)

30. Introduction to Dance Theory and Technique.
Intensive instruction in developing the dancer's mind/body, with introduction to movement theory and practice. Students are billed a materials fee. (Formerly Introduction to Modern Dance Theory and Technique.) May be repeated for credit. (General Education Code(s): PR-C, IH, A.)

40. Introduction to Directing.
An overview of the analytical and creative processes that inform the director's work. Close examination of texts, concepts, and directorial choices in staged performances, opera, films, and video. (General Education Code(s): IM, IH, A.)

50. Fundamentals of Theater Production (2 credits).
Work is on various aspects of theatrical production, including scenery, lighting, costumes, sound, stage management, and video documentation. Satisfies the department's technical experience requirement. May be repeated for credit. (General Education Code(s): PR-E, A.)

55A. Workshop in Performance: Barnstorm.
Process-oriented investigation of practical theater production by working in and on productions in the Barnstorm season. Requires a total of 150 hours working backstage or onstage. Admission by audition at first class meeting; see department office for more information. May be repeated for credit.

55B. Workshop in Performance: Barnstorm Lab (2 credits).
Process-oriented investigation of practical theater production by working in and on productions in the Barnstorm season. Requires a total of 50 hours working backstage or onstage. Admission by audition at first class meeting; see department office for more information. May be repeated for credit.

61C. The Birth of the Modern: Drama and Performance After the Renaissance.
Examines dramatic and theatrical works that sprang into being in the wake of the European Renaissance. Follows the ways modern artists have dramatized their questions, struggles, beliefs, and despair in the face of world wars, cultural fragmentation, unprecedented prosperity, and new technologies that changed the concrete experience of life itself. Enrollment limited to 60. (General Education Code(s): TA, IH, A.)

80X. The Performance of Story in Theater and Film.
An examination of the theory and practice of theater and film, comparing and contrasting works that have been adapted from one genre to another. Lecture, film and video viewing and discussion of materialist, psychoanalytic, and feminist approaches will be shared. (General Education Code(s): TA, T4-Humanities and Arts, A.)

80Z. Indian Dance.
Classical Indian dance will be studied as a performance practice. Understanding of drum syllables and associated steps, religious and sociological context, and mimesis (abinaya) as well as introduction to epic stories (Ramayana, Mahbharata, Bhagavata Purana) and classical song. (General Education Code(s): CC, T4-Humanities and Arts, A.)

126. Acting Studio III.
Individual work on acting skills and problems, with emphasis on individual interpretation and scene work with other students. Prerequisite(s): course 121; permission of instructor; audition at first class meeting—contact department office for more information. Enrollment limited to 18. May be repeated for credit. (General Education Code(s): A.)

128. Choreographic Workshop.
Intensive upper-division choreographic workshop that begins from the key motifs of historical dance to develop original work. Dancers made available to the student choreographers. Course is a prerequisite for the student-choreographed production Random With a Purpose. Enrollment limited to 15. (General Education Code(s): A.)

151. Studies in Performance (Drama).
Studies in theater, taken in connection with participation in a Theater Arts Department sponsored production. Enrollment is limited to those persons chosen to take part in a particular production. Admission by audition; audition schedule to be announced at first class meeting. May be repeated for credit. (General Education Code(s): A.)

157. Playwriting.

Students are given the opportunity to write their own scripts and refine them as the result of class discussion and scenework with actors. Work is on specific problems involving such elements as the structuring of a plot or the development of character. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. May be repeated for credit. (General Education Code(s): W,A.)

161D. Asian Theater: An Anthropological Approach.
Art serves simultaneously to educate its audience to the group's traditional values and to test new ideas. Indian, Indonesian, and Japanese forms are studied in relation to their cultural context. Through videotapes, lecture demonstrations, performances, and scenework, students explore the forms. Offered in alternate academic years. (General Education Code(s): CC, A, E.)

163A. Shakespeare.
Focuses on selected plays of Shakespeare. Explores the range and variety of interpretations of the plays, both in critical writings and in performance. Also studies other writings and graphic art created on the subjects and themes of the plays. Offered in alternate academic years. (General Education Code(s): A.)

185. Senior Seminar.
A required seminar for majors involving readings and discussions of important texts in dance, design, and drama. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements; course 160.

290. Special Topics and Area Concentration.
Study group meetings on a regular basis which involve either the study of shared texts or presentations by the group members and invited guests. Enrollment restricted to graduate students in theater arts. May be repeated for credit.

Writing

2. Rhetoric and Inquiry.
Explores the intersections of investigation, interpretation, and persuasion and hones strategies for writing and research. Students develop specific, practical ways of improving their writing through sustained critical thinking about diverse issues from multiple points of view. Students cannot receive credit for this course and course 1. Prerequisite(s): satisfaction of the Entry Level Writing and C1 requirements. Enrollment limited to 25. (General Education Code(s): C2.)

22A. Grammar and Editing Workshop (3 credits).
Offers instruction on selected topics in grammar and conventions of written English as needed to strengthen the writing skills of students whose primary language is not standard English. Provides students practice in applying these concepts to editing their own writing. Designed for entering first-year students. Enrollment restricted to first-year students. Enrollment limited to 22.

23. Grammar and Rhetoric: Language for Writing.
Builds on writing skills gained in previous writing courses; focuses on effective language use in academic writing. Students reinforce their written English proficiency by reading, studying, practicing, and writing structures and patterns of written English. Enrollment restricted to students who have not passed the Entry Level Writing Requirement. Open to others by permission of instructor. Enrollment restricted to first-year students and sophomores. Enrollment limited to 22.

169. Theory and Practice of Tutoring Writing (3 credits).
An introduction to theory and research on the composing process and practical strategies for teaching writing, especially in tutorial situations. Recommended for writing assistants. Prerequisite(s): instructor determination at first class meeting; course intended for writing tutors only. Enrollment limited to 30. (General Education Code(s): PR-S.)

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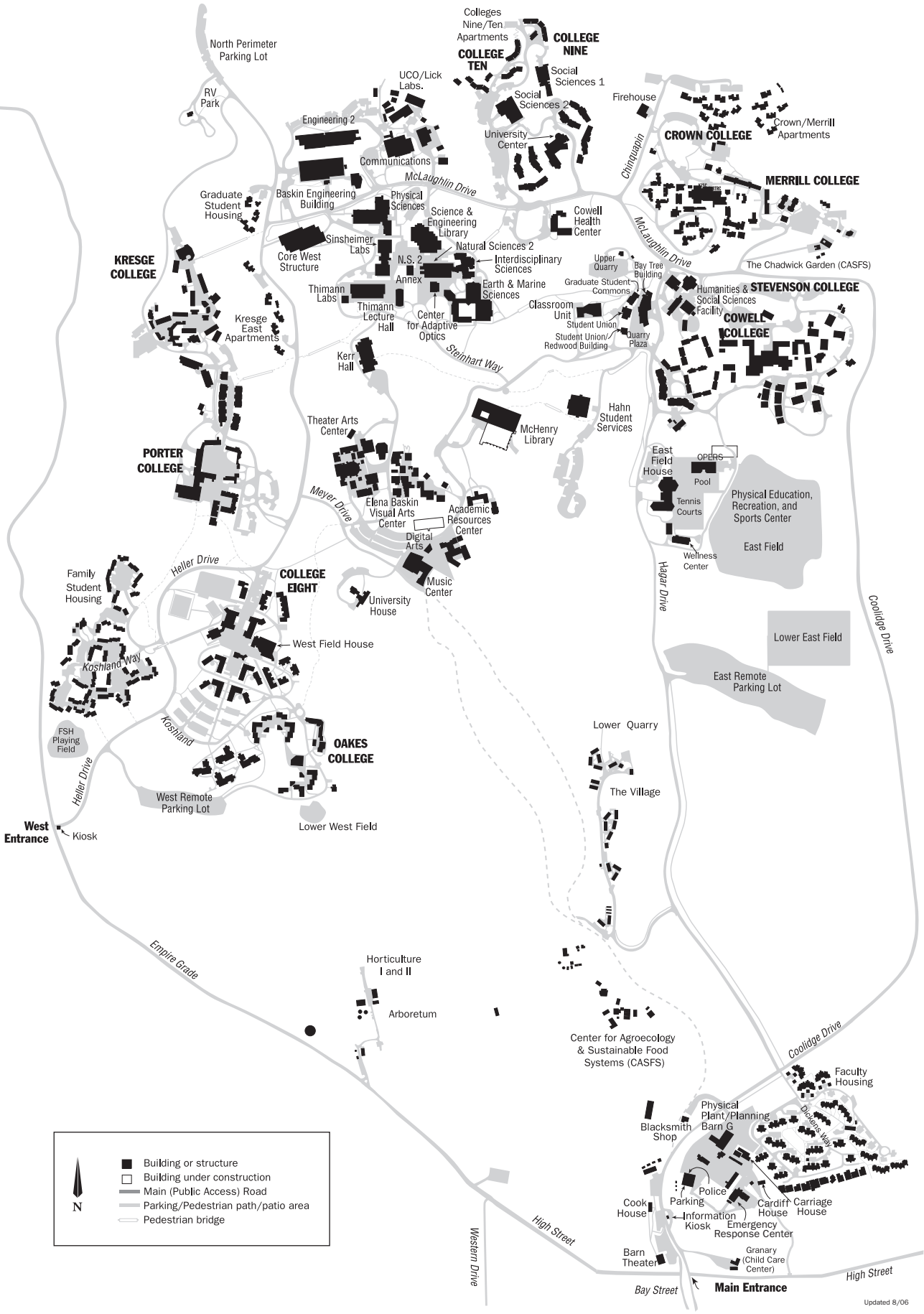
Colleges Nine/Ten Apartments
COLLEGE NINE
COLLEGE TEN
North Perimeter Parking Lot
RV Park
UCO/Lick Labs.
Social Sciences 1
Social Sciences 2
Firehouse
CROWN COLLEGE
Crown/Merrill Apartments
Engineering 2
University Center
Communications
McLaughlin Drive
Chinquapin
MERRILL COLLEGE
Graduate Student Housing
Baskin Engineering Building
Physical Sciences
Science & Engineering Library
Cowell Health Center
Sinsheimer Labs
Core West Structure
Natural Sciences 2
Interdisciplinary Sciences
N.S. 2 Annex
Upper Quarry
Bay Tree Building
Graduate Student Commons
The Chadwick Garden (CASFS)
KRESGE COLLEGE
Thimann Labs
Earth & Marine Sciences
Humanities & Social Sciences Facility
STEVENSON COLLEGE
Thimann Lecture Hall
Center for Adaptive Optics
Classroom Unit
Student Union
Student Union/ Redwood Building
Quarry Plaza
COWELL COLLEGE
Kresge East Apartments
Steinhart Way
Kerr Hall
Theater Arts Center
McHenry Library
Hahn Student Services
PORTER COLLEGE
East Field House
OPERS
Pool
Tennis Courts
Physical Education, Recreation, and Sports Center
Meyer Drive
Elena Baskin Visual Arts Center
Academic Resources Center
Digital Arts
East Field
Wellness Center
Hagar Drive
Heller Drive
Family Student Housing
COLLEGE EIGHT
Music Center
University House
Coolidge Drive
Lower East Field
West Field House
Koshland Way
East Remote Parking Lot
Koshland
FSH Playing Field
OAKES COLLEGE
Lower Quarry
Heller Drive
West Remote Parking Lot
The Village
West Entrance
Kiosk
Lower West Field
Empire Grade
Horticulture I and II
Arboretum
Center for Agroecology & Sustainable Food Systems (CASFS)
Coolidge Drive
Faculty Housing
Physical Plant/Planning Barn G
Blacksmith Shop
Dickens Way
Police
Parking
Cook House
Information Kiosk
Cardiff House
Carriage House
Emergency Response Center
High Street
Western Drive
Barn Theater
Granary (Child Care Center)
Bay Street
Main Entrance
High Street
Updated 8/06
N
Building or structure
Building under construction
Main (Public Access) Road
Parking/Pedestrian path/patio area
Pedestrian bridge