Message from the Chancellor

Welcome to UC Merced, where our supportive campus community nurtures you while your world-class education equips you to live life on a global scale.

Here, you have an ever-expanding array of academic programs from which to choose.

Your professors are approachable and invested in your success. They are eager to involve you in their intriguing work to whet your appetite for developing your own passions. For instance, Professor Maurizio Forte of the School of Social Sciences, Humanities and Arts is a virtual archeologist. He "preserves" ancient landscapes designated as World Heritage sites in a virtual format that users can interact with and navigate. He is working with students on a virtual villa, whose ruins he had documented while in Italy. Working from journal writings and other historical evidence, they have recreated in minute detail the villa's appearance in its prime.

Our faculty members receive prestigious recognition for their work. A prime example is Professor Shawn Newsam, founding faculty in the Electrical Engineering and Computer Science program in the School of Engineering. He won the federal government's highest honor, the Presidential Early Career Award for Scientists and Engineers (PECASE), for his groundbreaking research in computer simulation. He says his lifelong interest in photography and aptitude in math and science led to his selection of engineering as a career.

UC Merced's unique transdisciplinary approach to research encourages knowledge seekers to go beyond the limits of their own academic fields to invent new concepts. One such team, composed of our biologists, electrical engineers, mechanical engineers, and chemical engineers, created an artificial lung called Lungs-on-a-Chip to monitor air quality and conduct health studies. This is the quality of learning you can expect at UC Merced.

Another feature that distinguishes our campus is our full commitment to being the model for environmental stewardship for the University of California system and the Central Valley. We are proud to be the first major research university to achieve certification for sustainable design in our buildings from the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) rating system.

You chose well when you chose UC Merced to shape your future. We, in turn, entrust you with the significant role of shaping ours. As a pioneering Bobcat, your ideas, talents and leadership, along with the achievements you have yet to attain, will define our growing campus as potently as they define your personal growth. At no other campus in the UC system can this be more true than here and now.

Congratulations on becoming part of our Bobcat community.

Steve Kang
Chancellor

"EDUCATION IS THE BEST PROVISION FOR THE JOURNEY TO OLD AGE."

—Aristotle, Greek critic, philosopher, physicist, & zoologist (384 BC - 322 BC)

About the 2008-2009 Catalog

CATALOG YEAR

Official degree and major requirements are listed in this catalog. Undergraduate and graduate students are subject to requirements based on a particular catalog, referred to as the student's "catalog year." The catalog year is determined for new students as the catalog in effect at the time of their initial enrollment in courses at UC Merced, provided there is no break of more than 3 consecutive terms (e.g., 2 semesters and 1 summer) in enrollment. It is campus policy to introduce changes in graduation requirements such that students who began their careers with UC Merced before the change will not be hindered substantially in the orderly pursuit of their degrees. Changes in requirements that increase the number or distribution of courses required normally will not be applied to students with earlier catalog years, provided there is no break in enrollment exceeding 3 terms. The student's catalog year determines both the major and general education requirements for degree completion. Students may elect to adhere to a different catalog year if they wish to follow the general education and major requirements listed in a catalog published subsequently to that which was in place at the time of their initial enrollment; the student must note this in a petition to his or her School.

Students transferring from other institutions may elect either (1) those major requirements in effect at the time of transfer to UC Merced; or (2) those in effect up to two years prior to matriculation, provided that their transcripts from earlier schools indicate commitment to the major within that period and that they have adequate preparation for upper-division coursework.

INSTITUTIONAL RESPONSIBILITY

Undergraduate and graduate students who have made significant progress toward a degree in a specific major can assume that a degree will be granted if they meet all catalog degree requirements and maintain continuous enrollment and progress. Should UC Merced find it necessary to discontinue a specific major, every effort will be made to allow currently enrolled majors to complete their degrees within a reasonable period of time. This may include (1) movement to a similar or related degree track; (2) substitution of requirements; (3) development of an individual major proposal; or (4) completion of courses at another University of California campus through the Intercampus Visitor Program. Students with questions concerning this policy should contact their major and school advising offices. In all cases, any financial obligations are the responsibility of the individual student involved.

PLEASE NOTE: This catalog contains information about UC Merced. Because the UC Merced Catalog must be prepared well in advance of the year it covers, changes in some programs and courses inevitably will occur. The selection of courses to be offered each semester is subject to change without notice, and some courses are not offered each year. The Schedule of Classes, available on the Web shortly before registration begins, provides more current information on courses, instructors, enrollment procedures and restrictions, class hours, room assignments, and final examination schedules. Students should consult the appropriate school or campus unit for even more up-to-date information. Their contact information can be found in the contact information section of this catalog. It is the responsibility of the student to become familiar with the announcements and regulations of the university that are printed in this catalog and other campus publications. The catalog is the document of record for degree requirements and is updated annually.

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Bobcat Bookstore
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Contents

Message from the Chancellor 1
About the 2008-2009 Catalog 2
Academic Calendars 4
Undergraduate Degrees 5
Graduate Degrees 5
UC Merced Contact Directory 6
Welcome To UC Merced 7

GENERAL INFORMATION

UC Merced On Campus And In The Valley 8
The University Of California 9
Environmental Stewardship 10
UC Merced Mission Statement 12
Overview Of Undergraduate And Graduate Study 13
The UC Merced Library 14
Information Technology 15
Recreational Activities 15
Student Life 16
Student Housing 18
Student Services. 19
Education Abroad Program 22
Transportation And Parking Services . 24

FEES AND EXPENSES

Fees And Expenses 25

UNDERGRADUATE INFORMATION

Undergraduate Admissions 29
Application Process 30
Freshman Admission 32
Transfer Admission 34

FINANCIAL AID AND SCHOLARSHIPS

Financial Aid And Scholarships 39

ACADEMIC POLICIES AND PROCEDURES

Academic Policies And Procedures. . . 44
Enrollment 44
Examinations 48
Grades, Progress To Degree And Dismissal 50
Graduation 54

GENERAL EDUCATION AND COLLEGE ONE

General Education And College One . 55

SCHOOLS AND MAJORS

School of Engineering 59
Bioengineering Major 62
Computer Science And Engineering Major 64
Environmental Engineering Major . 66
Materials Science And Engineering Major 69
Mechanical Engineering Major . . . 71
School Of Natural Sciences 73
Applied Mathematical Sciences Major 75
Biological Sciences Major 81
Chemical Sciences Major. 88
Earth Systems Science Major 92
Physics Major 94
Natural Sciences Minors 98
School Of Social Sciences, Humanities And Arts 100
Anthropology Major 102
Cognitive Science Major 104
Economics Major. 107
History Major 108
Literatures And Cultures Major. . 111
Management Major 114
Political Science Major 116
Psychology Major 118
SSHA Programs 119
SSHA Minors. 121

GRADUATE EDUCATION AND RESEARCH

Graduate Studies 125
Research At UC Merced 136
The Sierra Nevada Research Institute (SNRI) 136
World Cultures Institute (WCI) . . 137
Biomedical and Systems Biology Research Institute (BSBR) . . . 137
Center For Nonimaging Optics . 137

COURSES

Anthropology 138
Arts 140
Biological Engineering And Small-Scale Technologies . . . 141
Biological Sciences 142
Bioengineering. 145
Chemistry 147
Chinese 148
Cognitive Sciences 149
Core 151
Computer Science And Engineering. 151
Economics 153
Education 155
Engineering 155
Environmental Engineering. . . . 156
Environmental Systems. 158
Earth Systems Science 159
French 161
Global Arts Studies Program . . . 162
Geography. 163
Human Biology 163
History 163
Integrated Calculus And Physics . 165
Japanese. 165
Literature 166
Mathematics. 169
Mechanical Engineering 171
Mechanical Engineering And Applied Mechanics 171
Management 172
Materials Science And Engineering 173
Natural Sciences Education. . . . 174
Philosophy 175
Physics 176
Political Science 178
Psychology. 179
Public Policy 183
Quantitative And Systems Biology 183
Social And Cognitive Sciences . . 185
Sociology 185
Spanish 186
Undergraduate Studies. 187
World Cultures And History . . . 187
World Heritage 189
Writing 189

UNIVERSITY OFFICERS AND FACULTY

University Administrative Officers . . 191
University Faculty 193
University Endowed Chairs. . . . 199

APPENDIX

Appendix 200
Clery Act (Crime Statistics) 200
FERPA 200
Index 204
UC Merced Campus Map 206

Academic Calendars

FALL SEMESTER 2008

Housing Move-In	Friday	August 22, 2008
Instruction Begin	Tuesday	August 26, 2008
Labor Day Holiday	Monday	September 1, 2008
Veterans Day Holiday	Tuesday	November 11, 2008
Thanksgiving Holiday	Thursday - Friday	November 27 - 28, 2008
Instruction Ends	Wednesday	December 10, 2008
Final Exam Preparation	Thursday	December 11, 2008
Final Exams	Friday - Thursday	December 12 - 18, 2008
Semester Ends	Thursday	December 18, 2008
Winter Holiday	Thursday - Friday	December 25 - 26, 2008
New Years Holiday	Wednesday - Thursday	December 31, 2008 - January 1, 2009

SPRING SEMESTER 2009

Martin Luther King Jr. Holiday	Monday	January 19, 2009
Housing Move-In	Monday	January 19, 2009
Instruction Begins	Tuesday	January 20, 2009
President's Day	Monday	February 16, 2009
Spring Recess	Monday - Thursday	March 23 - 26, 2009
Cesar Chavez Holiday	Friday	March 27, 2009
Instruction Ends	Friday	May 8, 2009
Final Exam Preparation	Saturday - Sunday	May 9 - 10, 2009
Final Exams	Monday - Friday	May 11 - 15, 2009
Semester Ends	Friday	May 15, 2009
Commencement	Saturday	May 16, 2009

FALL SEMESTER 2009

Housing Move-In	Friday	August 21, 2009
Instruction Begins	Tuesday	August 25, 2009
Labor Day Holiday	Monday	September 7, 2009
Veterans Day Holiday	Wednesday	November 11, 2009
Thanksgiving Holiday	Thursday - Friday	November 26 - 27, 2009
Instruction Ends	Wednesday	December 9, 2009
Final Exam Preparation	Thursday	December 10, 2009
Final Exams	Friday - Thursday	December 11 - 17, 2009
Semester Ends	Thursday	December 17, 2009
Winter Holiday	Thursday - Friday	December 24 - 25, 2009
New Years Holiday	Thursday - Friday	December 31, 2009 - January 1, 2010

SPRING SEMESTER 2010

Martin Luther King Jr. Holiday	Monday	January 18, 2010
Housing Move-In	Monday	January 18, 2010
Instruction Begins	Tuesday	January 19, 2010
President's Day	Monday	February 15, 2010
Spring Recess	Monday - Thursday	March 22 - 25, 2010
Cesar Chavez Holiday	Friday	March 26, 2010
Instruction Ends	Friday	May 7, 2010
Final Exam Preparation	Saturday - Sunday	May 8 - 9, 2010
Final Exams	Monday - Friday	May 10 - 14, 2010
Semester Ends	Friday	May 14, 2010
Commencement	Saturday	May 15, 2010

Information regarding the summer session calendar can be found at summersessions.ucmerced.edu

Undergraduate Degrees

Anthropology, B.A.

Applied Mathematical Sciences, B.S.
Emphases: Computational Biology
Computer Science and Engineering
Economics
Engineering Mechanics
Physics

Bioengineering, B.S.
Emphases: Nanobioengineering
Tissue Engineering

Biological Sciences, B.S.
Emphases: Molecular and Cell Biology
Human Biology
Ecology and Evolutionary Biology
Developmental Biology
Microbiology and Immunology

Chemical Sciences, B.S.
Emphases: Biological Chemistry
Chemistry
Environmental Chemistry
Materials Chemistry

Cognitive Science, B.A. and B.S.

Computer Science and Engineering, B.S.

Economics, B.A.

Earth Systems Science, B.S.
Emphases: Atmospheric Sciences
Ecosystem Science
Geochemistry and Biogeochemistry
Hydrologic and Climate Sciences

Environmental Engineering, B.S.
Emphases: Air Pollution
Hydrology
Sustainable Energy
Water Quality

History, B.A.
Concentrations: World History
United States History

Literatures and Cultures, B.A.
Concentrations: Literatures of the English Speaking World
Literatures of the Spanish Speaking World

Management, B.S.

Materials Science and Engineering, B.S.

Mechanical Engineering, B.S.

Physics, B.S.
Emphases: Atomic/Molecular/Optical Physics
Biophysics
Mathematical Physics

Political Science, B.A.

Psychology, B.A.

MINORS
Minor in American Studies
Minor in Anthropology
Minor in Applied Mathematics
Minor in Arts
Minor in Cognitive Science
Minor in Economics
Minor in History
Minor in Literatures and Cultures
Minor in Management
Minor in Natural Science Education
Minor in Philosophy
Minor in Physics
Minor in Political Science
Minor in Psychology
Minor in Services Science
Minor in Sociology
Minor in Spanish
Minor in Writing

PLANNED ENGINEERING MAJORS
Chemical Engineering, B.S.
Civil Engineering, B.S.
Electrical Engineering, B.S.
Engineering Economics and Management, B.S.

PLANNED SOCIAL SCIENCES, HUMANITIES AND ARTS MAJORS
Art, B.A.
International Communications, B.A.
Law and Society, B.A.
Museum Studies, B.A.
Philosophy, B.A.
Public Policy, B.A.
Sociology, B.A.
Spanish Language and Cultures, B.A.

PLANNED NATURAL SCIENCES MAJORS
Biochemistry, B.S.
Integrative Biology, B. S.

Graduate Degrees

Individual Graduate Programs and Groups M.A., M.S., Ph.D.
Graduate Group Emphases include:

Applied Mathematics
Biological Engineering and Small-Scale Technologies
Electrical Engineering and Computer Science
Environmental Systems
Mechanical Engineering and Applied Mechanics
Physics and Chemistry
Quantitative and Systems Biology
Social and Cognitive Sciences
World Cultures

UC Merced Contact Directory

UNIVERSITY OF CALIFORNIA, MERCED
5200 N. Lake Road
Merced, CA 95343
General information: (209) 228-4400
www.ucmerced.edu

ADMISSIONS-UNDERGRADUATE
Admissions/Relations with Schools and Colleges
Kolligian Library Room 108
(209) 228-4682 (CAT-GoUC)
Toll free in California (866) 270-7301
E-mail: admissions@ucmerced.edu
admissions.ucmerced.edu

ADMISSIONS-GRADUATE DIVISION
Kolligian Library Room 227
(209) 228-4723 (CAT-GRAD)
E-mail: graddiv@ucmerced.edu
graduatedivision.ucmerced.edu

BOBCAT BOOKSTORE
Kolligian Library Room 160
(209) 228-2665 (CAT-BOOK)
bookstore.ucmerced.edu

CAMPUS TOURS
Kolligian Library Room 108
(209) 228-4682 (CAT-GoUC)
Toll free in California (866) 270-7301
E-mail: tours@ucmerced.edu

CAREER SERVICES
Kolligian Library Room 127
(209) 228-7272 (CATS-CSC)
E-mail: careerservices@ucmerced.edu
careerservices.ucmerced.edu

COLLEGE ONE
Kolligian Library Room 167
(209) 228-7458
E-mail: collegeone@ucmerced.edu

COUNSELING SERVICES
Kolligian Library Room 107
(209) 228-7337 (CAT-PEER)
E-mail: counseling@ucmerced.edu
counseling.ucmerced.edu

DINING SERVICES
Dining Commons
(209) 228-3463 (CAT-DINE)
dining.ucmerced.edu

DISABILITY SERVICES
Kolligian Library 109
(209) 228-7884
E-mail: disabilityservices@ucmerced.edu
disability.ucmerced.edu

EDUCATION ABROAD PROGRAM
Kolligian Library 122
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studentsfirst.ucmerced.edu

FINANCIAL AID AND SCHOLARSHIPS
Kolligian Library Room 122
(209) 228-4243 (CAT-4AID)
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financialaid.ucmerced.edu

HEALTH SERVICES
Joseph Edward Gallo Recreation and Wellness Center
(209) 228-2273 (CAT-CARE)
E-mail: health@ucmerced.edu
health.ucmerced.edu

HOUSING AND RESIDENCE LIFE
(209) 228-4663 (CAT-HOME)
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housing.ucmerced.edu

LIBRARY
Kolligian Library 2nd Floor
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library.ucmerced.edu

RECREATION AND ATHLETICS
Joseph Edward Gallo Recreation and Wellness Center
(209) 228-7732 (CATS-REC)
E-mail: recreation@ucmerced.edu
recreation.ucmerced.edu

OFFICE OF THE REGISTRAR
Kolligian Library Room 122
(209) 228-2734 (CAT-2REG)
E-mail: registrar@ucmerced.edu
registrar.ucmerced.edu

OFFICE OF RESEARCH
(209) 228-4429
research.ucmerced.edu

POLICE DEPARTMENT
(209) 228-2677 (CAT-COPS)
E-mail: police@ucmerced.edu
police.ucmerced.edu

SCHOOL OF ENGINEERING
Science and Engineering Bldg. Room 270
(209) 228-4411
E-mail: engineering@ucmerced.edu
engineering.ucmerced.edu

SCHOOL OF NATURAL SCIENCES
Science and Engineering Bldg. Room 370
(209) 228-4309
E-mail: naturalsciences@ucmerced.edu
naturalsciences.ucmerced.edu

SCHOOL OF SOCIAL SCIENCES, HUMANITIES AND ARTS
Classroom and Office Bldg. Room 241
(209) 228-7742 (CAT-SSHA)
E-mail: ssha@ucmerced.edu
ssha.ucmerced.edu

SIERRA NEVADA RESEARCH INSTITUTE
(209) 228-4429

STUDENT ADVISING AND LEARNING CENTER
Kolligian Library Room 172
(209) 228-7252 (CAT-SALC)
E-mail: learning@ucmerced.edu
learning.ucmerced.edu

STUDENT BUSINESS SERVICES
Kolligian Library Room 122
(209) 228-4114
E-mail: sbs@ucmerced.edu
sbs.ucmerced.edu

STUDENT LIFE
Kolligian Library Room 184
(209) 228-5433 (CAT-LIFE)
E-mail: studentlife@ucmerced.edu
students.ucmerced.edu

STUDENTS FIRST CENTER
Kolligian Library Room 122
(209) 228-7178 (CATS-1ST)
E-mail: studentsfirst@ucmerced.edu
studentsfirst.ucmerced.edu

STUDENT GOVERNMENT
Kolligian Library Room 184
(209) 228-4688 (CAT-GOVT)

SUMMER SESSIONS
(209) 228-2736
E-mail: summersession@ucmerced.edu
summersession.ucmerced.edu

VICE CHANCELLOR FOR STUDENT AFFAIRS
(209) 228-4482

GREAT VALLEY CENTER
(209) 522-5103
E-mail: info@greatvalley.org
www.greatvalley.org

UC MERCED CENTERS

Bakersfield
2000 K Street, Suite 300
Bakersfield, CA 93301
(661) 861-7955

Fresno
550 East Shaw Avenue
Fresno, CA 93710
(559) 241-7400

Merced Tri-College Center
3600 M Street
Merced, CA 95348
(209) 381-6545

Welcome To UC Merced

The University of California, Merced offers students the benefits of a major research university—the first to be built in the 21st century—with the personalized attention of an intimate campus setting. UC Merced is the tenth and newest campus of the University of California and is committed to excellence in teaching, research and public service.

"Innovative" and "hands-on" are central themes in the approach to learning at UC Merced, where students are invited to explore emerging areas of knowledge. Undergraduate and graduate students have unparalleled access to UC Merced's distinguished faculty and state-of-the-art facilities. Working alongside these leading scholars, students can participate in ground-breaking research that crosses and links a wide array of disciplines. Research institutes created at UC Merced to conduct region- and state-wide research with national and international import include the Sierra Nevada Research Institute, the Center for Nonimaging Optics and the Systems Biology Institute. Campus partnerships with such organizations as the National Park Service and Lawrence Livermore National Laboratory offer additional intellectual and facilities resources, and expand opportunities for research on the cutting edge.

UC Merced gives you a feeling of belonging. There are just enough places to go, restaurants to eat at and new people to meet. Plus, there are so many big towns near by and everywhere in California is about the same distance away. I get to enjoy a serene way of life while still enjoying the perks of a big acclaimed University.

—Rosanna Rita Venegas Cruz, Undergraduate

THE CAMPUS

UC Merced's three schools—the School of Engineering, School of Natural Sciences and School of Social Sciences, Humanities and Arts—offer both undergraduate and graduate degree programs, and emphasize links between disciplines. State-of-the-art library resources and laboratories further enrich students' educational experience.

Adjacent to Lake Yosemite Park and just outside the city of Merced, UC Merced is continuing to develop in its convenient location at the center of California. Nestled between the Sierra Nevada range to the east and the Coast Ranges to the west, the over 800-acre campus is situated within a two-hour drive from San Francisco, the Pacific Ocean and Sacramento; less than two hours from Yosemite National Park and other Sierra Nevada destinations; and an hour from Fresno. Even closer to campus, the surrounding communities in Merced, Stanislaus and Mariposa Counties offer a unique selection of cultural, entertainment and recreational options for students to experience.

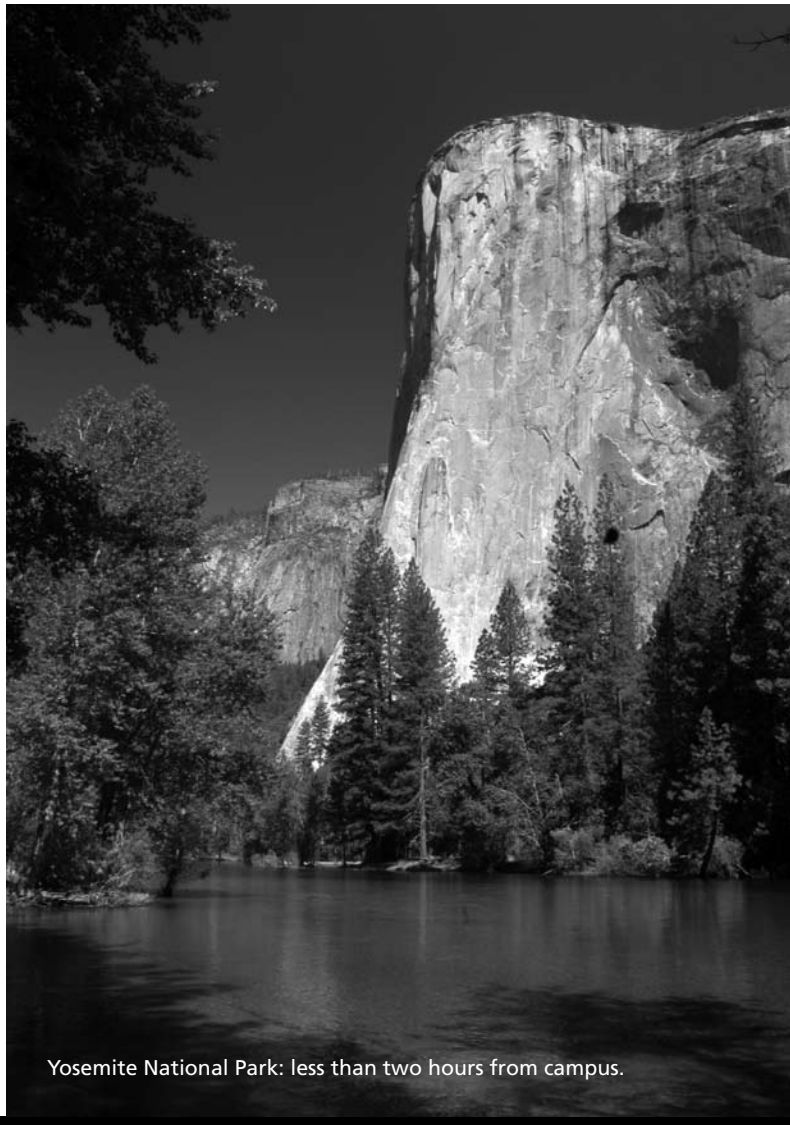
AN INSTITUTION DESIGNED FOR STUDENTS

Full development of the campus is anticipated within about three decades, or around the year 2035, when UC Merced will serve an estimated 25,000 students.

On campus, UC Merced students have a once-in-a-lifetime chance to help create the student life experience for the UC Merced students who will follow. You are invited to add to campus traditions, create student organizations and activities, and offer your ideas on student services, planning priorities and university philosophy.

As a student at UC Merced, you can gain valuable skills through internships and service learning, expand your cultural awareness and understanding, develop your leadership potential and make lifelong friends through involvement in a variety of student programs. Student government, intercultural and residential programs, intramural and club sports, university events and a variety of clubs and organizations are among your choices. Students also have access to a wide array of support services as well as academic, social, recreational and wellness activities.

You belong here!



Yosemite National Park: less than two hours from campus.

McFadden/Willis Reading Room in the Kolligian Library.

I chose to come here because of the quaint, peaceful area in which the campus is set. It is away from the hustle and bustle of a large city and there are fewer distractions.

—Wally Knops, student, Resident Assistant

ACADEMIC BUILDINGS

The first phase of campus development, spanning approximately 100 acres, includes three academic buildings, in addition to housing and dining complexes, and the Joseph E. Gallo Recreation and Wellness Center. At the heart of the campus, featuring a library collection that blends books and bytes, the Leo and Dottie Kolligian Library is home to campus student services and administrative offices. It also is a welcoming meeting place for individual study, small group work and encounters with your friends. The majority of your classrooms and lecture halls are located in the Classroom Building. The facility features the 377-seat Lakireddy Auditorium, and other programmed space including teaching laboratories, and faculty and graduate student offices. The three-story Science and Engineering Building accommodates teaching in both wet and dry research laboratories and computing laboratories. Future buildings include a Social Sciences and Management Building and a second Science and Engineering Building.

UC Merced On Campus And In The Valley

THE COMMUNITY

In the neighboring city of Merced, students will find a small, vibrant community. Currently home to more than 80,000 residents, the city retains the charm of a small town and boasts an average commute time of only 15 minutes.

Many educational, cultural and co-curricular activities connect students with the city of Merced and the surrounding region, and students are encouraged to experience the warmth of UC Merced's host community and discover its treasures. Wandering through the pedestrian-friendly downtown is a good place to start. Brick-paved walking areas, alleys decorated with murals and Italian trellises, an award-winning multicultural arts center, a community playhouse and several historically significant buildings are among the features. Merced also is home to shops, restaurants and major retail stores, with additional choices available in the nearby cities of Modesto and Fresno.

SERVING THE SAN JOAQUIN VALLEY THROUGH THE 10TH UNIVERSITY OF CALIFORNIA CAMPUS

UC Merced's history dates back to 1988, when the University of California Board of Regents first authorized planning for at least one additional campus based on projections of long-range enrollment demand. The Regents targeted the San Joaquin Valley as the region where the tenth University of California campus should be located. As one of the fastest-growing regions in the state, the Valley population was one of the most distant from the nine existing UC campuses. The Regents wanted to encourage more Valley students to attend the University and to extend the University's role in contributing to the region. Locating UC Merced in the San Joaquin Valley has given the campus access to a rich natural laboratory for scientific and cultural research. UC Merced's proximity to the Sierra Nevada has also led to creation of a special relationship for education and research with three crown jewels of the U.S. National Park Service: Kings Canyon, Sequoia and Yosemite National Parks.

The University Of California

FIAT LUX. LET THERE BE LIGHT

Established in 1868, fewer than 20 years after California became a state, the University of California opened with 10 faculty members offering classes to 40 students the following year in Oakland. By 1873, the first academic buildings were completed on the UC Berkeley campus and the University moved to its new home. Today, the University of California serves more than 200,000 students and includes approximately 120,000 faculty and staff members. Encompassing 10 campuses, five medical centers, four law schools and a Statewide Division of Agriculture and Natural Resources, the University also manages three national laboratories for the U.S. Department of Energy. The University has awarded more than 1.5 million degrees and has more than 1.2 million living alumni.

UC FACULTY

A leading center for innovation for more than a century, the University of California has responded to the needs of California through research, education and public service, and has helped to transform the world. University of California faculty members and researchers are pioneers in fields as diverse as agriculture, biological sciences, engineering, the environment, the arts, economics, medicine and technology, and approximately 50 have garnered Nobel Prizes for their pioneering discoveries and advances of knowledge. Among the University's current faculty are more members of the National Academy of Sciences than at any other university in the United States.

UNIVERSITY OF CALIFORNIA: AN ECONOMIC FORCE IN CALIFORNIA

The University also fuels the state and national economies through the creation of thousands of California jobs and billions of dollars in revenues, countless discoveries that improve our quality of life and research to support innovation in fields critical to the future of our country. Technology developed by the University powers many of the state's top and emerging industries, and University of California faculty and alumni have founded or led such major companies as Chiron, Genentech, Intel Corp., Apple Inc. and Gap, Inc. A driving force in the daily life of Californians, the University is a critical source of civic leaders, social service programs and providers, and teachers at all levels of education.

RESEARCH AND EDUCATION NETWORK

Teaching and research are strengthened within the University through an extensive network of laboratories, museums and galleries, UC Extension centers, and research and field stations, which provide valuable public service to the communities of California and the nation. The University of California further extends its resources to the public through its performing arts centers, athletic facilities and botanical gardens. With collections totaling more than 32 million volumes, the University's libraries are yet another valuable public asset and are surpassed in size on the North American continent only by the Library of Congress collection.

UC ACADEMIC PREPARATION INITIATIVES TO K-12 AND COMMUNITY COLLEGE STUDENTS

Beyond its tripartite mission of teaching, research and public service, the University is committed to expanding the educational horizons of California's students and is engaged in a growing number of initiatives to bolster achievement in the state's schools and better prepare students for college. UC Merced's academic preparation efforts, led by our Center for Educational Partnerships, connect with K-12 students through mentoring, tutoring, college advising and other academic programs, while community college students benefit from services that help them prepare for transfer to the University. The University of California's school partnerships offer curriculum development, direct instruction and community engagement, sophisticated data analysis of required student tests and additional assistance for many of California's lowest-performing schools. For teachers and administrators, the University of California provides professional development opportunities designed to improve skills and effectiveness. Overall, the University of California's K-12 academic preparation initiatives directly affect hundreds of thousands of students and educators each year.

I chose to come to UC Merced because I knew that it would be a great opportunity to be part of a university that is enthusiastic about student learning, development, and personal growth.

—Candice Bluntson, student, Resident Assistant

GOVERNANCE OF THE UNIVERSITY OF CALIFORNIA

The University of California system is governed by the 26-member Board of Regents, including 18 general members appointed by the Governor. Charged with setting general policy and making budgetary decisions for the University, the Regents also appoint the UC President, the 10 campus chancellors and other top administrators for individual campuses and system wide divisions. Authority for University-wide academic matters is delegated to the Academic Senate, which is composed of faculty members and administrative officers from throughout the University of California system. For each campus, a division of the University of California Academic Senate guides academic policy. Students also have the opportunity to participate in policy-making at both the campus-wide and system-wide levels. For complete information about the University of California System, please visit www.universityofcalifornia.edu

Environmental Stewardship

ENVIRONMENTAL STEWARDSHIP: BUILDING

UC Merced is using the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED™) system for all major campus development and construction. The LEED™ system provides a national standard for what constitutes a "green building." Using these stewardship elements in campus development will have the following environmental, economic, health and community benefits:

Sustainable Sites – 100% of the campus storm water flows into on-site retention ponds that treat building and site contaminants.

Recycling and Regional Materials – Construction practices recycle and/or divert more than 90% of the job site waste from landfills, limit the distance that materials are transported to the site and incorporate recycled content materials and sustainable harvested wood products.

Indoor Environment – Buildings are designed to provide increased ventilation and use natural daylight, creating a more pleasant working environment inside.

Water Conservation – Water reduction in the buildings and landscape will lower the use of potable water up to 50% above minimum state standards by using fixtures that conserve wastewater, waterless urinals, drought-tolerant planting for landscaping and deep root tubes for trees, which direct water straight to the roots and eliminate excessive watering.

Indoor Air Quality – Paints, carpets and composite woods with low volatile organic compounds have been selected as a means to reduce indoor contaminants that might irritate or harm the comfort and well-being of building occupants.

Energy – Campus buildings are designed to energy performance targets that are significantly better (30-60%) than required by California law (Title 24) and than found at other University of California campuses. The campus also employs a centralized heating and cooling strategy that significantly improves efficiency and shifts the electricity used for cooling to nighttime hours. This minimizes UC Merced's impact on the state energy infrastructure.

Living Laboratory – UC Merced has installed an advanced building energy management and control system that allows centralized operation and monitoring of all building functions. This level of monitoring and control provides a unique opportunity to manage the campus efficiently and be a living laboratory for faculty and students to study and advance building energy science.

UC MERCED'S ENVIRONMENTAL STEWARDSHIP: LANDSCAPE PRESERVATION

Thanks to support from the State of California, the Virginia Smith Trust and groups such as the David and Lucile Packard Foundation and The Nature Conservancy, the creation of UC Merced will help protect an important part of California's natural wetland and rangeland heritage. The Packard Foundation's historic gift to UC Merced preserves more than 5,000 acres of vernal pool habitat next to the new campus. Funding from the State of California has supported conservation easements, allowing continued grazing and preservation of thousands of acres of additional seasonal wetland habitat in eastern Merced County. As Founding Chancellor Carol Tomlinson-Keasey has observed, "The creation of UC Merced provides an unparalleled opportunity for environmental preservation. Vernal pool habitat in eastern Merced County has been disappearing for decades. The preservation efforts undertaken as part of the creation of our campus will permanently protect thousands of acres of this sensitive habitat."

UC MERCED'S ENVIRONMENTAL STEWARDSHIP: RECYCLING PROGRAM

UC Merced has made a commitment to campus recycling and currently uses a "single stream" recycling methodology. This process is in place on the main campus, at the Castle Facility, and in the Mondo Building. All recyclable metal, glass, plastic and paper products are placed into containers positioned at each individual residence, workstation and throughout campus. Materials are collected by custodial and grounds staff and shipped to sorting stations by a contract waste hauler. The Environmental Health & Safety Office coordinates the recycling of all electronic waste, light bulbs, batteries, and cell phones per state and federal law. Campus green waste is sent to the local landfill for mulching and reuse. Facilities Management and Dining Services continue to work cooperatively to address food related waste and a pre-consumer food composting program is in the planning stages. The university is committed to increasing its percentage of recycled materials that are diverted away from the county landfill.

Principles Of Community

The University of California, Merced is committed to serving the people of the San Joaquin Valley, California, the nation and the world through excellence in education, research and public service. We strive to provide educational opportunities for all.

Our founding principles of community guide both the individual and collective behaviors of students, faculty and staff. The university expects that all of its members will emulate these fundamental principles as individuals and as a community.

We celebrate the spirit of academic excellence and strive to promote our University and its strengths through our daily interactions with students, staff, faculty and the community at large.

We maintain a working and learning environment based on integrity, fairness, cooperation, professionalism and respect.

We are a community comprised of individuals with multiple cultures, lifestyles and beliefs. We celebrate this diversity for the breadth of ideas and perspectives it brings.

We value the creativity of our students, staff and faculty, and acknowledge both their individual and collaborative achievements.

We encourage health and wellness and strive to develop a sense of environmental responsibility and stewardship among all the members of our community.

We are committed to achieving tolerance in our community. All persons – faculty, staff and students – regardless of background or lifestyle should participate and work together in a collegial atmosphere that we strive to make free of any and all acts of discrimination or harassment.

We respect, support and value the civil and respectful expression of individual beliefs and opinions.

APPROVED: JANUARY 2003

Note: These are the Founding Principles of Community of the University of California, Merced. In the years ahead, they will undoubtedly be reviewed and modified by future UC Merced faculty, students and staff.

For those who wish to review Academic and Staff Personnel Policies regarding nondiscrimination, please refer to www.atyourservice.ucop.edu. For further information, please contact Human Resources at ucmercedjobs@ucmerced.edu.

UC MERCED'S ENVIRONMENTAL STEWARDSHIP: ENVIRONMENTAL PREFERABLE PURCHASING PROGRAM (EPP)

EPP considerations are incorporated into the qualitative analysis of competitive bids and contract awards. Campus furnishings, equipment, supplies and services are procured with a cradle-to-cradle focus on environmentally preferable characteristics from raw material acquisition in manufacturing through the entire life cycle. Some examples of campus EPP results include: wood furniture from renewable forests, campus office seating up to 99% recyclable with 44% recycled content, Energy Star office equipment, computers, water coolers; laundry equipment among the highest rated in energy and water efficiency; copy paper with a minimum of 30% recycled content, library stacks and dorm room bed frames are recycled steel; and locally grown food and food containers composed of sugar cane. UC Merced received the "Best Practices Award" for "Buy Recycled – Sustainable Operations" at the 2006 UC/CSU Sustainability Conference hosted by UC Santa Barbara.

UC Merced has already brought so many new opportunities to not only the students here, but also to the City of Merced and the Central Valley. I came to UC Merced because I knew that it would open up many new opportunities for me. I believe that this campus will only continue to bring more opportunity to many.

—Jaqueline Minas, student, Resident Assistant

Chancellor Kang and 2008-09 Associated Students of UCM President Yaasha Sabbaghian (on right) and 2007-08 ASUCM President Uday Bali.

UC Merced offers small classes and I get the attention that I need.

—Timothy Chung, student, Resident Assistant

UC Merced Mission Statement

The University of California, Merced's mission is embodied in its proud claim of being the first American research university of the twenty-first century. As the tenth campus of the University of California, UC Merced will achieve excellence in carrying out the University's mission of teaching, research and service, benefiting society through discovering and transmitting new knowledge and functioning as an active repository of organized knowledge. As a key tenet in carrying out this mission, UC Merced promotes and celebrates the diversity of all members of its community.

A research university is a community bound by learning, discovery and engagement. As the first American student-centered research university of the twenty-first century, UC Merced's strong graduate and research programs will mesh with high quality undergraduate programs. New knowledge increasingly depends on links among the disciplines, working together on questions that transcend the traditional disciplines. UC Merced fosters and encourages cross-disciplinary inquiry and discovery. Interdisciplinary practice in research will nourish undergraduate learning, building a foundation to connect the ways that academic disciplines understand and grapple with society's problems. Undergraduates will experience education inside and outside the classroom, applying what they learn through undergraduate research, service learning and leadership development. As apprentice scholars, graduate students will build their understanding of and ability to do independent research in their chosen field, as the groundwork for entering professional life. Lifelong learners will continue to hone their knowledge and workplace skills.

The twenty-first century has opened with the promise of new ways of connecting people to new knowledge and to one another. UC Merced is a network, not simply a single place, linking its students, faculty and staff to the educational resources of the state, nation and world. The idea of network extends to UC Merced's relationships with neighboring institutions: educational, cultural and social. Born as a member of the distinguished network known as the University of California, UC Merced seeks strong and mutually supportive relationships with a variety of collaborators in its region: public and private colleges and universities; federal and state organizations that share UC Merced's educational and research goals; and cultural and social institutions.

The idea of network will also be realized through the physical and intellectual integration between UC Merced and its surrounding community. The campus is planned as a model of physical sustainability for the twenty-first century, inviting all members of the campus and surrounding community to think and act as good stewards of the environment that they will convey to future generations.

UC Merced celebrates its location in the San Joaquin Valley, reflecting the poetry of its landscape, history, resources and diverse cultures, while capitalizing on and expanding the Valley's connections to the emerging global society. UC Merced recognizes that research that begins with the natural laboratory at home can extend what is known in the state, nation and world.

Vice Chancellor Mary Miller helps students during Fall "move in" to the Valley Terraces.

Overview Of Undergraduate And Graduate Study

COLLEGE ONE

College One is responsible for overseeing the general education experience at UC Merced, including the required Core Course sequence. College One provides a network to connect students with advising and coursework that meet the UC Merced faculty principles for a well-rounded education.

SCHOOL OF ENGINEERING

Engineering combines scientific understanding with technical innovation to build things that determine our quality of life: new products and services, new technologies and methodologies, and new technological processes and industries. Engineering education at UC Merced provides students with the knowledge and know-how to solve societal problems and to become the technical leaders of tomorrow. The School of Engineering offers undergraduate majors in the fields of: Bioengineering, Computer Science and Engineering, Environmental Engineering, Materials Science and Engineering and Mechanical Engineering.

SCHOOL OF NATURAL SCIENCES

The School of Natural Sciences encompasses fields of study that are devoted to understanding our physical and natural world: mathematics, biology, physics, chemistry and Earth and environmental sciences. Advances in these fields promise solutions to many of humankind's most pressing problems, from fighting new diseases to creating sustainable energy sources. Students will gain a deep understanding of physical, chemical and biological processes. Natural Sciences currently offers five undergraduate majors: Applied Mathematical Sciences, Biological Sciences, Chemical Sciences, Earth Systems Science and Physics; two minors are available: Physics and Natural Sciences Education.

SCHOOL OF SOCIAL SCIENCES, HUMANITIES AND ARTS

The educational mission of the School of Social Sciences, Humanities and Arts is to create a rich learning environment for looking at human nature through the lenses of the many disciplines represented within the School as well as the disciplinary intersections where the interesting questions lie. Social Sciences, Humanities and Arts offers seven undergraduate majors—Anthropology, Cognitive Science, History, Literatures and Cultures, Management, Psychology and Political Science — as well as minors in American Studies, Anthropology, Arts, Cognitive Science, Economics, History, Literatures and Cultures, Management, Philosophy, Political Science, Psychology, Services Science, Sociology, Spanish and Writing.

GRADUATE EDUCATION AND RESEARCH

The UC Merced Division of Graduate Studies oversees master's and doctoral degree education. Society's most intractable problems are broad based and multifaceted. Viable solutions to these problems require multidisciplinary approaches that can benefit the people of California and the world beyond. UC Merced is committed to offering graduate students an opportunity to work on many of society's most pressing and important problems. UC Merced offers an individually tailored graduate program with emphases in nine areas: Applied Mathematics; Biological Engineering and Small-Scale Technologies; Electrical Engineering and Computer Science; Environmental Systems; Mechanical Engineering and Applied Mechanics; Quantitative and Systems Biology; Physics and Chemistry; Social and Cognitive Sciences; and World Cultures. Each of these is highly interdisciplinary in approach and designed to facilitate interactions between faculty and students from a broad scope of traditional academic disciplines.

Research at UC Merced is integral to the educational experience. As apprentice scholars, graduate students join faculty in the work of discovery of new knowledge. Faculty research enriches undergraduate education through the continual updating of courses and curriculum, and special opportunities such as freshman seminars and undergraduate research programs. Interdisciplinary faculty research is fostered through research organizations such as the Sierra Nevada Research Institute, World Cultures Institute, Center for Non-Imaging Optics and the Biomedical and Systems Biology Research Institute.

Professor Evan Heit meets with students.

The UC Merced Library

Not what research libraries are...

what they will be.

As a research library for the 21st century, the University of California, Merced library is both a place on campus–in the form of the Leo and Dottie Kolligian Library–and an information nexus– in the form of a digital presence on student and faculty computers.

The Kolligian Library houses a concentrated, highly dynamic collection of information resources and serves as a center for study, collaboration and research. The library's collections and services support undergraduate and graduate instructional programs as well as advanced research. Library resources and services are available throughout the campus as well as from remote computers connected to the campus virtual private network. Some library resources are in physical packages that sit on the shelves in such forms as books and DVDs. Others are in digital packages such as online journal articles, collections of sound recordings, data sets and geographic information systems.

In addition to library services and collections, the Kolligian Library houses many Student Affairs departments and campus administrative offices.

The main entrance to the building opens onto the Ed and Jeanne Kashian Floor, an open-air breezeway during fair weather and a lively focal point for social, educational and research activities on campus. The entrance way reading room has an adjacent coffee house and bookstore. Quieter spaces and collaborative workrooms are found throughout the building. Wireless and hard-wired computer network access is available in all library spaces. Equipped with the latest instructional technologies, the Gonella Discovery Room on the second floor is the hub for teaching UC Merced students the retrieval, evaluation and application of information resources. UC Merced librarians are just as likely to show up in classrooms where they collaborate with faculty to improve the information literacy of students. The magnificent McFadden/Willis reading room on the fourth floor is open to all for study and quiet reflection.

As an information nexus, UC Merced's library provides instant, around-the-clock access to the resources of the California Digital Library, an unequaled collection of more than 500,000 online books, 20,000 online scholarly journals, 4,500 online statistical files, 250 reference databases and one of the world's largest online collections of historical art images—more than 300,000 digital images representing works in architecture and the visual arts. The 32 million volumes held by the libraries of the University of California system surpass the number of volumes held by the Library of Congress and constitute one of the largest collections in the world.

Using the UC MELVYL catalog, members of the UC Merced community can request rapid delivery of books and articles from any UC system library. The UC Merced library is actively involved in creating digital access to research information and fine art as well, and works with faculty to digitize, manage, and preserve materials used for teaching and research. For further information, contact us at library@ucmerced.edu or visit ucmercedlibrary.info.

The fact that I can actually contact most of my teachers out of office hours is why I love UC Merced!

—Ron Betty, student, peer tutor

Information Technology

The use of computers and networks has become pervasive in higher education. The UC Merced vision for information technology supports the campus commitment to deploying the best of current and emerging technologies and practices to help students make maximum use of information technology for academic purposes, administrative transactions and other activities. Students can reach virtually all applications and information, including e-mail, course software, registration materials and much more, via a single electronic ID and a customizable portal, myUCMerced (my.ucmerced.edu).

From applying to UC Merced and tracking the application process to registering for courses and ultimately seeing grades, students use the Internet. For courses in which they are enrolled, the myUCMerced portal allows students to connect with a web site for each course. UC Merced's collaborative learning soft ware puts students in touch with syllabi, course materials, library resources, assignments, grade books and course calendars; and lets students submit assignments and chat or send e-mail to other students and faculty in the course. The campus is laptop friendly, with wireless access common in outdoor areas, as well as in classrooms. Inside the library, wireless access is available in the stacks, with electrical outlets in carrels and other work areas.

Students living on campus have 10/100 MB Ethernet connectivity to the campus network and secure access to the campus network is available for those living off campus. In the Valley and Sierra Terraces, all residents have their own connection to the network, with additional ports in the common rooms and wireless access in residences, the student activity building and the Yablokoff -Wallace Dining Commons. Additional residence service includes a drop-in computer lab and group laptop study area.

All students are supported through online assistance and a Student Help Desk, open every weekday. Several computer labs on campus permit instructional and drop-in use. The Library is equipped with wireless and plug-in Ethernet ports for internal and Internet information access. Students can check out laptops for use within the library.

In the classroom, too, students will find a learning environment enriched by information technology. All rooms support projection of computer-based information, as well as video. Some rooms permit recording of lectures for streaming video on individual course web sites. Videoconferencing rooms support real-time interaction with remote sites via audio and video.

Because of the pervasive use of computer technology at UC Merced, it is strongly advised that students have their own personal computers, which should be capable of running typical Web and word processing applications. Students may find that their School has additional recommendations or requirements. Check the UC Merced web site for more specific School information.

Recreational Activities

The Campus Recreation and Athletics program provides a wide variety of sports and recreational activities from aerobics and other group fitness classes to diverse intramural sports and comprehensive outdoor adventures trip programs.

The Joseph Edward Gallo Recreation and Wellness Center features a full complement of fitness classes, cardiovascular machines, weights and drop-in recreation such as basketball and volleyball. The Campus Recreation program also provides structured recreational opportunities in intramural sports such as flag football, basketball, volleyball and many more.

For those students who are looking for more competition, the Club Sports program offers students the opportunity to be a part of teams that compete against other California colleges and universities. Our current list of competitive sport club teams includes Women's Volleyball, Men's and Women's Soccer, Baseball, Softball, Men's Lacrosse, Badminton, Archery and Cricket. For complete information on all Campus Recreation activities, visit recreation.ucmerced.edu.

Campus Recreation & Athletics also offers a full range of group fitness classes for students. These classes range from group cycling and Yoga to Cardio and Core Stability classes. There is a class to fit everyone's interest and ability. In addition to group fitness classes, the Campus Recreation Fitness program also offers one-on-one personal training sessions and "Ask the Trainer" sessions in the weight room to answer any fitness related question you may have.

The Joseph Edward Gallo Recreation Center is also the home to the Wilderness Center. The Wilderness Center serves as the "portal to the outdoors" for UC Merced students. The Wilderness Center has resources on Yosemite National Park, Sequoia and Kings Canyon National Parks and many other National Parks in the western US. Equipment rental is also available from the Wilderness Center.

Recreational opportunities are plentiful at UC Merced. Immediately adjacent to the campus, Lake Yosemite offers swimming, boating and other outdoor activities. The city of Merced has an extensive network of biking and running paths, as well as city parks including a zoo and children's amusement area. The nearby Yosemite, Sequoia and Kings Canyon National Parks and other Sierra recreation areas provide easy access to a broad range of outdoor sports such as snow skiing and snow boarding, hiking and backpacking, boating, whitewater rafting and kayaking, horseback riding and much more.

Student Life

ARTS AND ENTERTAINMENT

UC Merced is part of a vibrant community in the San Joaquin Valley and is located close to the city of Merced. The city has a population of 75,000 and offers restaurants, parks, a weekly farmers market and an active multicultural arts center. In addition to the local cinemas, Playhouse Merced has a full calendar of live performances and films. A variety of speakers and shows make appearances in town, and UC Merced works with faculty, staff and student clubs and organizations to add to those events.

In addition, Modesto (45 minutes to the north of Merced), Fresno (one hour to the south of Merced) and the San Francisco Bay area (two hours to the west of Merced) have an abundance of museums, theaters, arts centers and events. The San Joaquin Valley region is home to a variety of attractions such as the Lee Institute for Japanese Art in Hanford, Gallo Art Center, Hilmar Cheese Factory, Castle Air Museum, and Mariposa Museum and History Center, with many other destinations to be found on the Merced Conference and Visitors Bureau web site at www. yosemitegateway.org/ attractions.htm.

STUDENT LIFE ACTIVITIES AND SPECIAL EVENTS

UC Merced is a place where our students have the desire and opportunity to create traditions and leave legacies that will carry forward for years to come. For students looking to get involved on campus, Student Activities opportunities abound. On a weekly basis activities and events are provided for students to enhance their out of the classroom experience. UC Merced activities and events range from concerts to carnivals, fashion shows to festivals, and also include off campus adventures to places like San Francisco, Fresno, and Modesto for shopping sprees, cultural activities, and athletic events like attending a Modesto Nuts Baseball Game.

The Office of Student Life also partners with faculty, staff, and students to organize large campus events such as Welcome Week, Family Weekend, Winter Masquerade Ball, the Cinco de Mayo Fiesta, and New Student Convocation.

If planning events and bringing spirit to campus is your joy, then joining the Student Programming Board (SPB) may be just what you're looking for. The Student Programming Board leads the way in coordinating and sponsoring exciting activities for UC Merced students, and is a great way to get involved in campus life.

STUDENT GOVERNMENT, CLUBS AND ORGANIZATIONS

In its initial years, UC Merced students have had the unique opportunity to establish UC Merced's Associated Student Government (http://www.asucm.org/), as well as the first clubs and organizations that enrich campus life. These organizations provide opportunities for students with common interests to help shape the direction of the new campus, build friendships, learn from each other and provide opportunities for social and academic networking. Over 60 clubs and organizations have been formed and fall into the following categories: cultural, special interest, community service, religious, academic/professional, wellness and art/music/dance. The establishment of Greek life on campus is also in the works at UC Merced. UCM students are in the process of forming the first Greek letter organizations for the campus, furthering opportunities for student leadership and involvement.

LEADERSHIP AND INTERCULTURAL PROGRAMS

Leadership development is an exciting part of student life at UC Merced. Whether you are a new, emerging, or seasoned student leader, with options that include conferences, mentor programs, workshops, lecture series, and participation in programs such as the Bobcat Leadership Series, and the Yosemite Leadership Program, there are learning and leadership opportunities for everyone.

Not to be overlooked is the wonderfully rich diversity of cultures at UC Merced. Through Intercultural Programs, students, staff, faculty, and the local community are exposed to film series, festivals, guest speakers and workshops that examine and celebrate the diversity of our world. Annual events like the Rainbow Festival, Pride Week, Women's Herstory Month, Taste The World Food Festival, and the Clothesline Project, provide UCM students an opportunity to learn, share, and celebrate the rich fabric of diversity and culture evident both on campus and beyond.

For a list of registered clubs and organizations, or for more information on student life activities, visit the Student Life web site at studentlife.ucmerced.edu or e-mail: studentlife@ucmerced.edu .

CAMPUS AND STUDENT CONDUCT POLICIES

UC Merced strives to create an environment that fosters individual growth, freedom of expression and sense of community. The viability of this community depends on a common understanding among its members regarding their rights and responsibilities.

The Student Handbook: Policies Applying to Campus Activities, Organizations and Students (http://studentlife.ucmerced.edu/docs/campus_regs_082607.pdf) lays the foundation for that understanding and governs the conduct of all University of California, Merced students. It articulates the University's expectations regarding standards of conduct – in both academic and non-academic settings. In addition, the campus' Principles of Community, located toward the beginning of this catalog, further reinforce the expectations, obligations and privileges of participating as a member of the UC Merced community.

THE BOBCAT BOOKSTORE

The UC Merced Bobcat Bookstore is your principal source for textbooks, electronic items, Bobcat apparel, school supplies and snacks. Visit our web site at bookstore.ucmerced.edu for more information.

UC Merced – Bobcat Bookstore
P.O Box 2039
Merced, CA 95344
Phone (209) 228-2665
Fax (209) 228-4284
Web site: bookstore.ucmerced.edu

Books and Class Materials

New or used class textbooks can be purchased through our online bookstore. Books will be delivered to campus, bundled together by our staff and marked with your name and ID for pickup in the Textbook Annex. At the end of the semester, the bookstore buys back used textbooks for cash.

Students chat over a meal in the Yablokoff-Wallace Dining Commons.

Student Housing

LIVING ON CAMPUS

New students

New students who meet the contract deadline are guaranteed housing on campus within the safe and comfortable Sierra and Valley Terraces communities. The Sierra Terraces facility, which opened in 2007, was intentionally designed to promote interaction among residents making it an ideal community for freshmen. New transfers, continuing students, and some freshmen will make their home-away-from-home in the apartment-style suites at the Valley Terraces. Serving up a range of healthy and satisfying cuisine for breakfast, lunch and dinner, the YablokoffWallace Dining Center caters to on-campus and commuter students, faculty, and staff. Visitors and members of the campus community seeking a quick meal on the run, a light snack or a cup of coffee can find what they're looking for as well.

LIVING IN MERCED

In the neighboring city of Merced, students interested in living off campus will find suitable housing options and a fine quality of life. Currently home to some 75,000 people, the city retains the charm of a small town and boasts an average commute time of only 15 minutes.

Many educational, cultural and co-curricular activities connect students with the city of Merced and the surrounding region, and students are encouraged to experience the warmth of UC Merced's host community and discover its treasures.

OFF-CAMPUS HOUSING OPPORTUNITIES

A variety of off-campus housing options are highlighted on UC Merced Housing Office's web site, where information about local apartment complexes and an active property search database are available. The site includes valuable information that students should know before deciding to live off-campus. Please go to our web site at housing.ucmerced.edu or contact the Student Housing Office for more information about living off-campus in Merced and Atwater.

ON-CAMPUS HOUSING

Housing is guaranteed to incoming freshmen and transfer students who meet their respective contract submission deadlines. The first 300 continuing students to apply to live on campus will also be guaranteed. Living on campus helps you make friends and become familiar with the growing campus. Student and full-time residential life staff live on campus, providing the resources, programs and services that are essential to a safe and comfortable living environment.

> STUDENT HOUSING IS AN AWESOME COMMUNITY TO BE A PART OF.
>
> —Samuel Kim, student

The Sierra Terraces was designed to accommodate first-year students in this interactive community. Students living here enjoy two bedrooms sharing a private bathroom. UC Merced's first residential community, the Valley Terraces, offers apartment-style suites located in nine two-story buildings. Each suite has two or three bedrooms attached to a furnished living room. All residence halls offer workshops and events for getting to know faculty better. Bedrooms have a bed, desk, drawer and closet space for each resident. A limited number of singles also are available, mainly for continuing students. Study, recreation, laundry, meeting rooms and mail facilities are located in the Terrace Center near the Student Housing administrative offices.

Room and board rates are posted on the UC Merced web site at housing.ucmerced.edu. All freshmen and transfer students are strongly encouraged to consider on-campus housing. Nothing compares to the convenience and experience of living on campus.

For further information about housing, on- or off-campus, contact Student Housing and Residence Life at housing@ucmerced.edu or check our web site at housing.ucmerced.edu.

Student Services

HEALTH PROMOTION

The ancient Greek physician Herophilus wrote, "When health is absent, wisdom cannot reveal itself, art cannot manifest, strength cannot fight, wealth becomes useless, and intelligence cannot be applied." Our mission is to educate and support graduate and undergraduate students in leading healthy and productive lives by:

- Providing students with accurate and up to date information on a variety of health topics such as nutrition, physical activity, body image, alcohol, tobacco, other drugs, eating disorders, sexual health, stress, suicide, depression, relationships, and anxiety;
- Encouraging students to make informed decisions about their health, and practice healthy life styles;
- Connecting students to resources such as medical providers, counselors, health educators, dietitians and peer organizations;
- Assisting the campus in assessing and addressing health-related issues through the use of surveys and evidence-based, data-driven programs.

Who is eligible for these services?

Health Promotion is housed in the H. Rajender Reddy Health Center, on the 2nd floor of the Joseph Edward Gallo Recreation and Wellness Center. All registered graduate and undergraduate students may use its services even if they opt out of the Student Health Insurance Plan. All services are confidential and offered at no charge to registered students.

Services

Health Promotion offers individual and group support for students with concerns involving nutrition, physical activity, body image, eating disorders, sexual health, alcohol, tobacco, other drugs, stress management, relationships and anxiety. If you have a concern about yourself or a fellow student, friend or family member, we can provide information, support and resources to help you.

HEALTH SERVICES

All registered graduate and undergraduate students may use the services of the H. Rajender Reddy Health Center at UC Merced. The Center is located on the 2nd floor of the Joseph Edward Gallo Recreation and Wellness Center.

Services include: consultation with medical service providers for injury, illness, or chronic health conditions; laboratory testing; medications, immunizations and injections; and health and wellness education. Most core services are covered by registration and health fees and are provided at no cost. There may be a cost for some laboratory work and for radiology, pharmaceutical medication and some immunizations.

The Health Center provides basic treatment and prevention services provided by board-certified physicians and certified nurse practitioners and physician's assistants. Staff and peer health educators also provide information on alcohol, tobacco and other drugs, sexual health, stress management, nutrition, body image and smoking cessation. We encourage students to become active partners in promoting their own health and wellbeing.

Students First Center

What is the Students First Center?
UC Merced is one of the few schools in the country that offers the convenience of a "one stop shop" for student services. The Students First Center (SFC) is the gateway to the offices of Admissions, Financial Aid, and the Registrar. It should be your first stop for questions about admissions, financial aid, scholarships, student records, student billing and registration.

How Can I Access Students First Center Services?
You can reach the SFC by phone at (209) 228-7178 (CATS-1ST), by email at studentsfirst@ucmerced.edu, in person in Kolligian Library 122, or at our web site studentsfirst.ucmerced.edu. For your convenience the SFC web site can answer almost all of your questions about being a student at UC Merced. Some of the topics featured on the SFC web site include: campus services hours of operation, important announcements, upcoming dates and deadlines, FAQ's for some of your more complex inquiries and a comprehensive UC Merced calendar of events.

When is the SFC Open?
Hours of operation are Monday – Thursday 8:30 a.m. to 5:30 p.m. and Friday 8:30 a.m. to 5:00 p.m. If we are unavailable, be sure to leave us a voicemail or send us an email. We promise to respond within 24 hours (unless it is a weekend or the campus is closed). Students come first at UC Merced and at the SFC. Stop by and see how easy it can be to get the assistance you need!

Medical Insurance
All registered graduate and undergraduate students attending the UC are required to have major medical health insurance as a condition of enrollment. Unless a student shows proof of prior insurance coverage and requests a waiver, the student is automatically enrolled in UC Merced's Student Health Insurance Plan (SHIP) and billed through the student's account. SHIP offers comprehensive and affordable health insurance: it supplements the Health Center's medical services and provides for extended medical care, emergency services, hospitalization, specialty care and out-of-area care while you are traveling. The program fee covers the cost of the UC Merced group insurance plan and program administration.

A student who is covered by another health insurance may waive SHIP by demonstrating that the coverage is comparable to that provided under SHIP. The student must apply for a waiver of SHIP by the specified deadline. All registered students are eligible to utilize the campus health center even if SHIP is waived. For information on insurance, including the waiver process and deadline, refer to the health services web page at health.ucmerced.edu or contact insurance@ucmerced.edu.

Mandatory Hepatitis B and MMR Requirement and Optional Immunizations
The California State Health & Safety Code mandates that all students entering the University of California who are under the age of 19 years old must be immunized against or provide proof of immunity from the Hepatitis B virus prior to enrollment. In addition to the Hepatitis B requirement, UC Merced requires that all entering students have received the MMR (measles, mumps and rubella) vaccine. Students must provide Health Services with documentation demonstrating compliance with these immunization requirements prior to registration.

The Center for Disease Control's Advisory Committee on Immunization Practices (www.cdc.gov) and the American College Health Association (www.acha.org) recommend the following additional immunizations for college students. They are not required but are strongly recommended:

- Menactra vaccine (for meningitis). Recommended for high risk students and as a consideration for all college students.
- Tetanus (Td). Booster at age 11-12 years old and every 10 years.
- Varicella (chickenpox). Two doses one month apart for those who never had chickenpox or if a blood test does not show immunity.

For information regarding immunizations, visit the H. Rajender Reddy Health Center, call 209 CAT-CARE (209-228-2273) or review information at www.health.ucmerced.edu.

CAREER SERVICES

Career Services Center

The UC Merced Career Services Center, located in Kolligian Library 127, assists students with a wide range of career-related programs and services, and connects students with on- and off -campus part-time jobs, internships, research opportunities and career positions. The Career Services Center staff helps students to learn about their unique interests and abilities, explore career options, determine career goals and develop skills to conduct a successful job search. The Center also assists students interested in pursuing graduate or professional education following graduation from UC Merced. To schedule an appointment with one of the Career Services Center staff, please contact us at careerservices@ucmerced.edu.

On-Campus Student Employment

The Career Services Center coordinates all on-campus, part-time student employment. Students can view current listings and apply for on-campus positions online at the Career Services Center web site at careerservices.ucmerced.edu: just click on "Jobs."

Provost Alley congratulates Student Employee of the Year William Ngo.

Internship Programs

Internship programs provide students with the opportunity to obtain career-related work experience in local, regional and national, profit and nonprofit organizations. Students may complete internships, some of which may be paid, during the academic year or during the summer. Employers from all fields are increasingly expecting students to have internship experience in addition to their academic preparation. To take advantage of internship opportunities related to any area of academic study, contact the Career Services Center at careerservices@ucmerced.edu.

UC Center Sacramento (UCCS)

The UCCS Academic Program gives undergraduate and graduate students a rare opportunity to learn about California's public policy and journalistic processes firsthand. The program includes rigorous coursework as well as professional experiences built while living, interning and conducting research in the State Capitol.

Offered during academic terms and summer, students enroll in classes while working 24-40 hours per week in internship placements. For more information, please visit http://uccs.universityofcalifornia.edu/ or e-mail careerservices@ucmerced.edu.

COUNSELING AND PSYCHOLOGICAL SERVICES

UC Merced's Counseling and Psychological Services promote the academic and personal success of all students at UC Merced, providing short-term individual and group counseling at no cost to registered UC Merced students. The service you receive is based upon a determination of your therapeutic goals and Counseling and Psychological Services resources. If Counseling and Psychological Services cannot meet your goals, you will be referred to other resources to help you. Individual consultation is available to UC Merced students, parents, faculty and staff. Counseling and Psychological Services is located in Joseph E Gallo Recreation and Wellness Center.

Because UC Merced is so new, it allowed me to get involved not only with the school, but with the community, too.

—Joy Moore, student, Resident Assistant

DISABILITY SERVICES

The Disability Services Office, located in the Kolligian Library, supports students with disabilities by providing them with opportunities to participate fully in the academic community at UC Merced. Students with varying types of disabilities including those with mobility, visual, hearing, learning disabilities and other chronic medical conditions may be eligible for the provision of reasonable disability accommodations through this program.

Students who have a qualifying disability must provide appropriate documentation about their disability(ies) to the Disability Services Office. Documentation provided to the office is confidential and is used solely for purposes of determining the student's eligibility and the appropriate accommodations to be made. It is the responsibility of the applicant or student to provide this documentation and, if necessary, to pay for the cost of the documentation provided, including the cost for professional assessments for disabilities, such as learning disabilities, attention deficit disorder and psychological/psychiatric disabilities. UC Merced staff assists qualified students from the point of their admission to graduation. Specialized services may include testing accommodations, priority registration, mobility assistance, adaptive equipment, readers, note-takers, interpreters, real-time captioning, liaison with faculty and campus departments and special parking.

The provision or use of a disability accommodation does not guarantee or ensure a certain level of academic achievement for the students. Students with disabilities must meet the same standards as all other students. Depending on the type of academic accommodation requested by the student, the approval of the appropriate School dean may be required.

Students with disabilities who need staff or time intensive accommodations (e.g., reader services, interpreter services, text conversion, etc.) should contact the Disability Services Office as soon as possible to make necessary arrangements for these services. It is the student's responsibility to assure that such notification occurs in a timely fashion. Failure to do so may delay or in some cases preclude our ability to provide certain accommodations.

For further information on disability services, contact the Disability Services Offices at disabiltyservices@ucmerced.edu.

STUDENT ADVISING AND LEARNING CENTER (SALC)

UC Merced faculty and staff are committed to the academic success of every student. The Student Advising and Learning Center, located in Kolligian Library 172, is responsible for advising students who are undecided about their majors, students who are interested in pursuing law careers following graduation and any student who has questions about degree or University requirements. The advisors in the Schools and the Student Advising and Learning Center work closely with the faculty to ensure that students receive accurate and timely advising. The Student Advising and Learning Center also assists students to acquire the skills they need to develop intellectually, become successful learners and achieve their academic goals.

Center staff members offer programs focusing on effective study skills, critical reading and analytical writing that help all students, regardless of major. Mathematics, science, writing and many other classes often present difficulties for students. Individual tutoring and group study sessions, led by peer tutors, are available through the SALC to provide assistance to students of all levels of ability and preparation. Additional programs and workshops also help students adapt to the demands of college. It is common for college students to find that they need to explore new methods for reading, note-taking, time management and other skills in order to meet the demands and pace of college learning. The Student Advising and Learning Center, working closely with Career Services, Residence Life and many other areas, ensures that students receive the support they need to plan and succeed in their chosen course of study and beyond. Students with advanced skills in science, math or writing should speak to their professors or staff at the Center to find out how to become a trained, paid tutor on campus.

The SALC is headquarters for New Student Orientation, and this includes an orientation program offered to parents and family members of new students, as well. The Center also produces the *Partners in Success* parents' and families' newsletter each semester. Student Success is made possible by a combined, unified effort on the part of all who play a role in influencing students' lives, and therefore the SALC makes constant efforts to collaborate with as many constituencies as possible in promoting an effective learning environment.

The SALC also provides guidance to academically-elite students interested in participating in prestigious academic competitions. Contact the Student Advising and Learning Center for more information or visit our web site at learning.ucmerced.edu.

Veteran Services

UC Merced Veteran Services staff acts as a liaison between students and the Department of Veteran Affairs. This includes providing educational certifications for veterans, reservists, active duty military, and dependents of veterans. The California Department of Veterans Affairs college fee-waiver program also is available for children and spouses of veterans who have service connected disabilities or who have died from service related causes. To ascertain eligibility, the students, who must be California residents, apply for the college fee-waiver program through a county Veterans Service Office. Once approved by the county Veteran Services Office, the UC Merced Veteran Services staff processes the paperwork associated with administering the program and reducing the fees. More information on the documentation required to initiate Veterans' benefits may be found at the UC Merced Veteran Services web site located at veteranservices.ucmerced.edu.

Students who are veterans or dependents of veterans should contact the UC Merced Veteran Services staff if they have any questions or as soon as they receive notification of admission to UC Merced. Veteran Services is located in the Registrar's Office in Kolligian Library 122. An appointment may be arranged by calling (209) 228-2737 or by e-mail at registrar@ucmerced.edu.

Education Abroad Program

The University of California offers international study programs in cooperation with some 140 host universities and colleges in 32 countries throughout the world. More than 4,000 UC students, primarily undergraduates, are expected to take part in this program. Participating students remain registered on their home campuses while studying abroad and receive full academic credit for their work.

UC Merced students have access to all of the University of California EAP options. These include yearlong, semester-length, and several summer programs. Students in every discipline are encouraged to consider fulfilling a portion of their degree requirements abroad, as every career path intersects with global issues in some way. Students may participate as early as the sophomore year, and as late as the senior year. Transfer students may also begin the application process before enrolling in UC courses to participate during their second term at UC Merced.

The personal growth that students experience while living in a different country cannot be matched by any learning adventure that they engage in on their home campus or in their own community. Many of the curricula in the several dozen participating countries are offered in English, and there are opportunities to take courses that fulfill general education requirements, major requirements, or electives.

Selection of UC undergraduate students for EAP requires the following: serious academic goals and a clear plan for integrating EAP studies into the student's UC degree program; maturity, flexibility, and the ability to succeed within the host culture; willingness to abide by program regulations; endorsement by the UC Merced EAP Coordinator; and completion of language or other specific requirements. Language prerequisites and GPA requirements vary by program.

EAP opportunities are also open to qualified graduate students who have completed at least one full year of graduate work and have the support of their academic department and graduate dean. A detailed statement of the projected program of study is required.

University of California faculty, who serve as directors at many Study Centers, provide academic counsel to students while abroad. Full credit is granted for courses satisfactorily completed, and approved courses are recorded on official UC transcripts. With careful planning, students may study abroad without delaying graduation. Application of units earned abroad toward major or college requirements depends upon UC major or school criteria.

> The people, students, professors, staff, and even the community, have made my experience in Merced very enjoyable. The relationships that have been and will be established in the next few years is life-changing for me.
>
> —Allison Gambol, Gardena, Psychology Major

The cost of studying on EAP is comparable to the cost of studying at UC Merced. In some cases, EAP may cost less. While on EAP, students are eligible for financial assistance. Those already receiving UC financial aid continue to receive grants, loans, and scholarships while abroad. Aid is based on the cost of studying at each EAP location and on individual need. Students who do not currently receive UC financial support may qualify for financial aid while on EAP. In addition to UC financial aid, EAP provides support through various scholarships and grants. Students should contact the UC Merced EAP Coordinator and Financial Aid Office for additional information.

Please visit eap.ucop.edu to browse the programs, and contact the EAP Coordinator at 209-228-2735 to find out about the application process. Applications may be due as early as ten months in advance of the program so students are encouraged to visit the EAP Coordinator and their academic advisor(s) in advance to begin planning.

EAP HOST COUNTRY	YEAR	FALL	SPRING	SUMMER	SOPHMORE	JUNIOR	SENIOR	GRADUTE
Australia*	•	•	•			•	•	•
Barbados	•	•				•	•	•
Brazil*	•	•	•		•	•	•	•
Canada	•	•	•			•	•	•
Chile*	•	•	•		•	•	•	•
China	•	•	•	•	•	•	•	•
Costa Rica		•	•			•	•	•
Denmark	•	•		•	•	•	•	•
Egypt	•					•	•	•
France	•	•	•	•	•	•	•	•
Germany	•	•	•		•	•	•	•
Ghana	•	•	•		•	•	•	•
Hong Kong	•	•	•			•	•	•
Hungary	•	•	•			•	•	•
India		•	•			•	•	•
Ireland	•		•			•	•	•
Italy	•	•	•	•	•	•	•	•
Japan	•	•	•		•	•	•	•
Korea	•	•	•	•	•	•	•	•
Mexico	•	•	•	•	•	•	•	•
Netherlands	•	•	•		•	•	•	•
New Zealand*	•		•			•	•	•
Russia		•			•	•	•	•
Singapore	•	•	•		•	•	•	•
South Africa*	•	•	•			•	•	•
Spain	•	•	•	•	•	•	•	•
Sweden	•	•		•	•	•	•	•
Taiwan	•	•	•			•	•	•
Thailand	•	•	•			•	•	•
Turkey	•	•	•			•	•	•
United Kingdom	•	•	•	•	•	•	•	•
Vietnam		•				•	•	•

* The regular academic year begins in January or February rather than during the fall.

Transportation And Parking Services

BICYCLES

Bicycles are welcome and encouraged at UC Merced. With a flat terrain and mild climate, the city and county of Merced offer excellent conditions for bicycle riding. In addition, the city of Merced boasts over 12 miles of class one, grade-separated bike paths, which, along with the city's other bike lanes, connect most of Merced's open-space park system. Special areas have been set aside near UC Merced's academic buildings for bicycle parking. Please do not bring bicycles into buildings or secure them to anything but a bike rack. If you plan to bring your bicycle to campus, you are encouraged to register it. The process is quick and simple, and the cost is $5.00 for a three year license. Bicycles may be registered between 8:00 a.m.- 1200 Noon & 1:00 p.m.-4:00 p.m. in Merced at:

The City of Merced Police Department
611 West 22nd Street
Merced, CA 95340

PUBLIC TRANSIT

As parking is limited on campus, UC Merced encourages students, faculty and staff to use alternative public transit. Merced County boasts a full service, comprehensive transit system, "THE BUS". UC Merced is working with the public transit authority to provide routes between the campus and various locations in Merced County. The Transit Authority can be reached at: (209) 384-3111 or (800) 345-3111.

CAMPUS TRANSIT

CatTracks

UC Merced offers a campus-based shuttle service called CatTracks, which provides service to retail, transportation, entertainment and some apartment complexes in the local community. In addition, we offer a shuttle service called NiteCat, sponsored by Riggs Ambulance Service (RAS). The NiteCat shuttle provides safe rides to and from local entertainment centers between the hours of 10:00 p.m. and 2:00 a.m. on Friday and Saturday nights when school is in session.

You may view our current shuttle schedule in its entirety by going to our web site: taps.ucmerced.edu and choosing the CatTracks shuttle option or www.cattracks.org.

VEHICLE PARKING

Parking, while limited, is available on campus. Traffic is restricted within the academic core of the main campus. All vehicles parking in designated parking lots on campus must display a valid regular or visitor UC Merced parking permit from 7 a.m. through 6 p.m. daily, Monday through Friday. Specific parking lots are reserved for students living on campus in the residence halls as well as for students commuting to campus. Resident and commuter students will have an opportunity to purchase parking permits prior to the start of classes. We encourage all students to complete the permit application and purchase parking permits through the e-pay system at https://epay.ucmerced.edu. You may also complete your permit application and purchase your parking permit at the Cashier's Office located on the first floor of the Kolligian Library next to the Students First Center. Please note that carpool permits are also available and offer prime parking locations to carpool permit holders. To be eligible for a carpool permit, you must have two or more people in the vehicle driving to campus at least three days of the week. Information on permits, fees and campus parking regulations can be obtained from the TAPS website listed above in the CatTracks section. Please read the parking regulations before you park on campus.

Transportation and Parking Services (TAPS)
UC Merced – Facilities Management
(209) 228-6981

> Living on campus is a great way to meet people and it's great waking up 5 minutes before class and not being late because all I have to do is run up the hill!
>
> —Timothy Chung, student, Resident Assistant

Advisor Cynthia Donahue prepares to greet prospective students and their families at Bobcat Day.

Fees And Expenses

AVERAGE ANNUAL EXPENSES

The range of estimated nine-month expenses, including fees, for students attending UC Merced during the 2008-09 academic year is shown below. Cost-of-living expenses are adjusted annually and fees are subject to change. These figures are only a guide in computing average expenses, and your own living expenses may differ somewhat from these. If you will need funds beyond those that you and your family can provide, you should apply for financial aid well in advance of enrollment. Please see the appropriate Undergraduate or Graduate sections on Financial Aid and Scholarships for more information.

AVERAGE ANNUAL EXPENSES (ESTIMATES ONLY)

Student Status	Living Arrangement	9-Month Expenses
Undergraduate (CA resident*)	On-campus	$24,426
	Off-campus	$21,440
	At home	$17,906
Graduate (California resident*)	Off-campus	$26,766

*Nonresident undergraduate students should add $20,608 and nonresident graduate students should add $15,006 for additional fees and nonresident tuition.

2008-09 FEE SCHEDULE

Note: Fees shown are per semester

Undergraduates	Residents	Nonresidents
Educational Fee	$3,131.00	$3,424.50
University Registration Fee	$432.00	$432.00
Health Services fee	$50.00	$50.00
Transportation fee	$35.00	$35.00
Student Life fee	$15.00	$15.00
Associated Students fee	$65.68	$65.68
Recreation fee	$146.00	$146.00
Student Health Insurance*	$308.00	$308.00
Non-Resident Tuition	N/A	$10,010.50
TOTAL	**$ 4182.68**	**$14,486.68**

Graduates	Residents	Nonresidents
Educational Fee	$3,561.00	$3,717.00
University Registration Fee	$432.00	$432.00
Health Services fee	$50.00	$50.00
Transportation fee	$35.00	$35.00
Student Life fee	$15.00	$15.00
Associated Students fee	$10.00	$10.00
Recreation fee	$146.00	$146.00
Mandatory Health Insurance*	$573.00	$573.00
Non-Resident Tuition	N/A	$7,347.00
TOTAL	**$4,822.00**	**$12,325.00**

* As a non-academic condition of enrollment, undergraduate and graduate students must purchase the Student Health Insurance Plan (SHIP) or request a waiver of this fee. The Fall undergraduate health insurance fee provides coverage from August through December; the Spring fee provides coverage from January through August. The Spring undergraduate health insurance fee is $432.00, for graduate students the rate is $778.00. Graduate students who wish to cover spouses, domestic partners or children should contact Health Services at health@ucmerced.edu for rates.

UC Merced students showing their Bobcat Spirit.

Fee Disclaimer

The amounts shown in this document represent fees as currently approved. However, all University fees are subject to change, and the fee amounts billed for this period may be adjusted at a future date. Detailed information regarding on campus room and board charges is available at housing.ucmerced.edu. Detailed information regarding parking fees, regulations and rules is available at taps.ucmerced.edu.

UC Merced has been awesome for me. I could not have had these amazing experiences had I gone to another university.

—PJ Solomon, student

COURSE MATERIALS FEES

Students may be charged fees in some courses for the use, rental or consumption of materials, tools or equipment, or for the costs of materials or services necessary to provide a special supplemental educational experience. For example, course materials fees may

Being at UC Merced opened up opportunities for me that students in other universities can't get: more intimate student-faculty communication/relationships, undergraduate research opportunities, and initiating and founding clubs and organizations. Also, I have the privilege of being in what feels like a private university, without paying the private university tuition/costs!

—Janice Cosio, student, peer tutor

cover the cost of chemicals and glassware for a science laboratory or art supplies for a studio class. They also might cover film rentals, field trips or the purchase/rental of specific equipment

UC EMPLOYEE-STUDENT FEES

Reduced fees are available to UC career employees and certain UC retirees who are eligible for admission to the university. Once admitted, the employee-student must file a petition for the reduction in fees before each semester of enrollment. Employee-students pay one-third of the full-time registration fee and one-third of the full-time educational fee. Employee students may enroll for up to nine (9) units or three (3) courses per semester, whichever is greater. Contact the Office of Human Resources for further information.

PART-TIME STUDY

Students approved for enrollment on a part-time basis pay the same registration fees as full-time students, but pay only one-half of the Educational Fee. Part-time, non-resident students pay full registration fees, one-half of the Educational Fee and one-half of the nonresident tuition fee. Undergraduate students must file their petition for part-time study with the Office of the Registrar. Graduate students must file their petition with the Division of Graduate Studies. For more information on the eligibility requirements for part-time study, please see the Academic Policies section of this catalog.

PAYMENT OF REGISTRATION FEES

Registration at UC Merced is a two-step process: (1) enrollment in classes and (2) payment of fees. You must enroll first so that your fees can be assessed. You can pay fees at any time after you enroll in classes, but a failure to pay fees in full by the 10th day of instruction will result in you being dropped from your courses for non-payment and officially withdrawn from the university. Note: the Student Health Insurance Plan (SHIP) fee is part of registration fees and is due and payable, unless waived, at the time registration fees are paid.

An electronic billing statement will be available to you after enrollment; however, if you wait to enroll just prior to the enrollment deadline, do not wait for a billing statement to pay your fees. Fees are due and payable by the published deadline whether or not a billing statement is available.

Your billing statement from the University will list charges and credits. Charges include registration fees, housing charges and any additional billable services. Credits include all payments, as well as financial aid disbursements. If you are a financial aid recipient, the aid will be applied to allowable charges on your account. All financial aid, less allowable charges, will be refunded to you. You are responsible for the payment of any charges not covered by your financial aid.

METHODS OF PAYMENT

MyBill.ucmerced.edu

Monthly financial activity is displayed for the current month, as well as account activity for the prior semester(s) at MyBill.ucmerced.edu. Students may pay their account balance electronically using MasterCard, American Express, Discover or E-Check.

In-Person Payment

Students can also print a remittance document and mail in payments with a check or money order. Students may make payments in person at the Campus Cashiering Office located in Kolligian Library next to the Students First Center, 10 a.m. to 4 p.m., Monday through Friday, except holidays.

Continuous Deferred Payment Plan (DPP)

The Deferred Payment Plan (DPP) offers students the option to pay their registration fees and student housing contract amount (if applicable) in three monthly installments per semester. Students receiving sufficient financial aid to cover their registration fees and room and board costs do not qualify for the plan. To qualify for the UC Merced DPP, you must have a semester account balance of $1,500, or greater, after any authorized financial aid has been posted to your student account. If eligible, your first installment payment amount will be 40% of the semester account balance. The second and third installments will be 30% each of the remainder. There will be a non-refundable participation fee of $40.00 per semester, which will be billed to your student account upon enrollment in the DPP. If you enroll for the Fall 2008 semester, you will automatically be enrolled for the Spring 2009 semester.

How do I apply for the DPP?
To sign up for the DPP, visit the MyBill link accessed from the MyBill website. To finalize enrollment in the DPP, students must make the first installment payment of 40% of the semester fees by the semester payment deadline. Students must remember to pay any previous account balance due along with the first installment payment.

Eligible students who wish to enroll in the plan must do so no later than one day prior to the semester payment deadline. The deadline for enrollment for the Fall 2008 semester is **Friday, August 15, 2008**, and for the Spring 2009 is **Friday, January 09, 2009**. Note: Students who have once enrolled in the DPP are automatically enrolled for subsequent semesters.

What are the due dates for DPP payments?
Due dates for the installment payments are:

	Fall Semester	Spring Semester
First Installment	August 19, 2008	January 13, 2009
Second Installment	September 20, 2008	February 20, 2009
Third Installment	October 20, 2008	March 20, 2009

What if I am late with a DPP payment?
If installment payments are not credited to the account by the required due date, the following may result:

- A late fee of $50.00 will be charged for the late receipt of an installment payment;
- A hold may be placed on your registration for future semesters;
- You may be dropped from the rolls of the University, i.e. grades will not post to your transcript until all DPP installment payments have been paid in full;
- You may be ineligible for future DPP enrollment;
- Per section 15 of the Housing contract, the following administrative actions may result against the student's status in the University:
    - A hold on records
    - Initiation of termination of tenancy proceedings
    - Eviction

For more information about the DPP, please contact Student Business Services via email at sbs@ucmerced.edu or phone at (209) 228-4114.

DEADLINES AND PENALTY FINES

You must pay all prior delinquent debts prior to registering. An additional charge will be made for failure to pay required fees or deposits by the dates announced. If you enroll in courses after the enrollment deadline, you may be assessed a late enrollment fee and possibly, a late payment fee.

Returned Check Policy

Campus cashiering accepts personal checks as well as cash payments. Returned Check Fee: $20.00.

Cash-Only Policy for Returned Check Writers. Any person who has more than two checks returned unpaid to the University is placed on a cash-only basis (i.e. cash, credit card, cashier's check or money order) for all future transactions. A letter will be mailed to the current mailing/billing address on file, and no future checks will be accepted.

Cancellation, Withdrawal And Fee Refunds

To cancel registration before the first day of instruction or to withdraw from the University on or after the first day of instruction, you must complete a Cancellation/Withdrawal form and return the form to the Office of the Registrar. If you do not submit a Cancellation/Withdrawal form, you will be liable for fees according to University policy (below). It is very important that you contact the Office of the Registrar and initiate withdrawal/leave of absence procedures even if your fees are fully paid by financial aid or other programs. Failing to do so may result in you owing money to the University.

The effective date for determining a refund of fees is the date a completed Cancellation/Withdrawal form is received by the Office of the Registrar. It is presumed that no University services will be provided to the student after that date. If a student is enrolled in classes, he or she will be dropped from all courses automatically when the Cancellation/Withdrawal form is processed.

The percentage of fees that may be refunded is determined by the number of calendar days (not school days) elapsed, beginning with the first day of instruction of the semester. For students who paid fees and then canceled or withdrew by filing with the Office of the Registrar, fees may be refunded according to the Schedule of Refunds.

UC Merced cheerleaders and Mascot perform during Bobcat Day.

Best part of being at UC Merced: Being on the ground floor of an upstart startup campus!

—Professor Gregg Herken, History

New undergraduate students: The $100 deposit paid with the Statement of Intent to Register (SIR) is not refundable. Because it is not refundable, it is not included in the balance when applying the Schedule of Refunds. Thus, before or on the first day of instruction, registration fees paid are refunded in full minus $100.

All continuing students, readmitted students and new graduate students: On or before the first day of instruction, registration fees are refunded in full for cancellation/withdrawal. After the first day of instruction, the Schedule of Refunds is applied to the total of fees assessed.

Failure to submit a Cancellation/Withdrawal form: If you are not a financial aid recipient and you fail to submit a Cancellation/Withdrawal form to the Office of the Registrar, you will be presumed to have left at the end of the semester and will not be eligible for a fee refund. If you are a financial aid recipient, you must contact the Office of Financial Aid and Scholarships for information on how this will affect your refund.

SCHEDULE OF FEE REFUNDS

The Schedule of Fee Refunds applies to all new students who do not receive federal financial aid and continuing and readmitted students. New students who receive federal financial aid and withdraw during their first academic term may be refunded fees according to a Modified Fee Refund Schedule, available at the Office of Financial Aid and Scholarships.

The Schedule of Refunds refers to calendar days beginning with the first day of instruction of the semester. The number of days elapsed is determined from the date the completed Notice of Cancellation/Withdrawal form is received in the Office of the Registrar. Percentages listed should be applied respectively to the University registration fee, educational fee, nonresident tuition and other student fees.

UNIVERSITY REGISTRATION FEE, EDUCATIONAL FEE, NONRESIDENT TUITION, FEE FOR SELECTED PROFESSIONAL STUDENTS AND OTHER STUDENT FEES:

New Students Who Receive Title IV Federal Financial Assistance and Withdraw During their First Academic Term

CALENDAR DAYS ELAPSED	PERCENTAGE OF FEES REFUNDED
0-7 days	100% less any applicable fees
8-14 days	90%
15-28 days	80%
29-35 days	70%
36-49 days	60%
50-56 days	50%
57-63 days	40%
64 days or more	0%

All Continuing and Readmitted Students and New Students Who Do Not Receive Federal Financial Aid

CALENDAR DAYS ELAPSED	PERCENTAGE OF FEES REFUNDED
0-1 days	100% less any applicable fees
2-11 days	90%
12-27 days	50%
28-53 days	25%
54 days or more	0%

Federal regulations require UC Merced to calculate the amount of federal financial aid that has been "earned" for all students who are receiving financial aid and withdraw from UC Merced during a semester. If the student withdraws prior to completing 60 percent of the semester, a pro rata portion of the aid must be returned to the federal government. Any portion of unearned aid that must be returned to federal aid programs by UC Merced will be deducted from the amount of the tuition and fee refund. If the amount UC Merced must return to federal aid programs exceeds the amount of the student's institutional refund, the student's account may be billed for the balance.

REFUND OF HEALTH INSURANCE FEE

Health insurance is mandatory for all students, both graduate and undergraduate, as a non-academic condition of enrollment. All students will be assessed the health insurance fee; however, students who already have adequate health insurance should request a waiver of this fee. If you have paid the health insurance fee and cancel your registration on or before the first day of instruction, you are entitled to a full refund of this fee. Insurance fees are not refundable after the first day of instruction and coverage remains in effect until the date specified by the insurance plan.

OTHER REFUNDS

Charges other than the registration fee, the educational fee, nonresident tuition and campus-based fees are refunded according to guidelines and schedules published by the appropriate department.

Undergraduate Admissions

UNDERGRADUATE ADMISSION

Prospective students interested in attending the University of California, Merced are encouraged to contact the Admissions office well in advance of their intended entrance. The office provides information and advice for prospective students as they prepare for university work. Future UC Merced students planning to enroll as freshmen or transfer students can get assistance in planning their pre-university course work and with the application process. If you are interested in enrolling at UC Merced, Admissions/ Relations with Schools staff members are available to assist you via e-mail, telephone or in person.

OFFICE OF ADMISSIONS

5200 N. Lake Road
Merced, CA 95343-5603
(209) 228-4682
(866) 270-7301 (toll-free in California)
Web site: admissions.ucmerced.edu
E-mail: admissions@ucmerced.edu
E-mail: transfer@ucmerced.edu

- Campus tours
- Admissions presentations
- Pre-application advising
- Transfer advising
- Transfer Admission Guarantees (TAG)

FINANCIAL AID AND SCHOLARSHIPS

See the Financial Aid section of this catalog.

Financial Aid code for UC Merced: 041271

UNIVERSITY OF CALIFORNIA ONLINE RESOURCES

Admissions information:
www.ucop.edu/pathways

Examination and Subject requirements:
www.universityofcalifornia.edu/admissions/undergrad_adm/pathstoadm.html

Online application:
www.universityofcalifornia.edu/apply

Approved high school courses:
www.ucop.edu/doorways/list

Transferable California Community College courses:
www.assist.org

Financial Aid information:
www.universityofcalifornia.edu/admissions/paying.html

REGISTRATION INFORMATION FOR REQUIRED EXAMINATIONS:

www.act.org
ACT code for UC Merced: 0450

www.collegeboard.com
College Board code for UC Merced: 4129

UC Merced is a great place to get to know brilliant professors personally.

—Samantha Bryant, student, Resident Assistant

Two 2006 UC Merced graduates celebrate.

Application Process

HOW TO APPLY

The University of California Undergraduate Application for Admission & Scholarships is available online at www.universityofcalifornia.edu/apply. Students may apply to UC Merced and any number of the additional eight general campuses of the University of California with one application. The San Francisco campus, which is devoted to the health sciences, has its own application and filing procedures.

Students who cannot apply online at their home, school or local library may contact the Office of Admissions for assistance. The application can be downloaded in printable format from the Web site: www.universityofcalifornia.edu/apply.

When To Apply

To ensure that applicants are considered for admission, the completed application and the application fee should be electronically filed or postmarked during the priority filing period shown below.

Semester Of Attendance	Priority Filing Period
Fall	November 1 – 30
Spring	July 1 – 31

The online application center opens for fall applications prior to November 1, usually during early October, and in July for spring applications. Students can begin the application, save their information on the secure site and continue filling out the application at their convenience up to the filing deadline. Applicants must meet the deadline (last day of the application filing month). Students who miss the November 30 deadline for fall or the July 31 deadline for spring should contact the Office of Admissions for assistance.

NOTIFICATION AND ENROLLMENT

On-time applicants for admission to a fall semester will be notified of their admission decision between March 1 and 31 (freshman applicants) and March 15 through April 30 (transfer applicants). To reserve your space after being admitted to the entering class, you must submit the Statement of Intent to Register (SIR) along with a $100 deposit by May 1 for freshmen and June 1 for transfer students. If you cannot afford the $100 deposit, contact the Office of Admissions immediately. Applicants for spring semester will be notified of their admission decision between September 1 and October 7. The SIR deadline for spring semester is typically October 15. Admission is specific to a particular semester. If you have questions about deferring your admission to another semester, contact us for assistance.

APPLICATION ADVICE

All applicants are asked to provide self-reported academic records on the application. Obtain copies of your grades and test scores prior to completing the application. Do not rely on memory. Your admission to UC Merced is provisional, based on verification of the information you provide. If admitted, you will be asked to submit final, official transcripts from all schools and colleges attended and official test score reports for the purpose of verifying the information you provided on your application.

APPLICATION ACKNOWLEDGMENT

After you submit your application for admission you will receive notification that it was received. If you do not receive notification that UC Merced received your application within six weeks of submitting it, contact the Office of Admissions immediately by calling (209) 228-4682 or toll free in California: (866) 270-7301, or send an e-mail message to admissions@ucmerced.edu.

APPLICATION FEES / FEE WAIVER

Students applying to UC Merced must submit the application fee following the submission of the online application or along with the paper application. If you apply to more than one campus, a per-campus fee must be submitted. Application fees are not refundable.

If you cannot afford the application fee and you are a U.S. citizen or permanent resident, you may request a fee waiver in advance or at the time of submitting the online or paper application. If your family income and the number of dependents in your household meet specifications of the University of California fee waiver guidelines, the fee will be waived for a maximum of four campus choices. Students who qualify for fee waivers and who wish to apply to more than four campuses must pay a fee for each additional campus choice.

How to Obtain a Fee Waiver

High school students may use the College Board fee waiver, available from your school counselor, or may obtain a fee waiver authorization from any UC campus Admissions and Relations with Schools or Educational Opportunity Program office. California community college students enrolled in Extended Opportunity Programs and Service (EOPS) can obtain a fee waiver authorization from the EOPS office. All students: If you cannot afford the application fee simply request a fee waiver when you submit the online or paper application. Be prepared to answer questions about your gross family income and family size.

CATEGORIES OF APPLICANTS

Undergraduate or regular status applicants are students who wish to enroll in an established curriculum at UC Merced for the purpose of completing the Bachelor of Arts or Bachelor of Science degree.

Freshman applicants are students who are currently enrolled in high school at the time of application, or students who have graduated from high school but have not enrolled in a college or university since the summer after leaving high school. Students who have completed a California Certificate of Proficiency or an equivalent proficiency examination from another state or the General Education Development (GED) certificate also may be freshman applicants if they have not enrolled in a college or university since completion of their high-school equivalency. All college or university work must be reported.

Transfer applicants are students who have enrolled in a regular term at a college or university after leaving high school. Students who meet this definition cannot disregard their college record and apply as freshmen. All college or university work must be reported.

Nonresident applicants are students whose legal permanent residence (as determined by the University) is outside the State of California. Nonresident applicants are generally required to pay nonresident tuition and must also present a higher grade point average than is required of California residents.

International applicants are students who hold or expect to hold student, exchange, visitor or diplomatic visas. International applicants are required to pay nonresident tuition and must also present a higher grade point average than is required of California residents. Prospective international students are encouraged to contact the Admissions Office for information prior to filing an application.

Second baccalaureate applicants are college or university graduates whose educational objective has changed substantially after receiving the bachelor's degree. Applicants for the second bachelor's degree must be fully eligible for admission to UC Merced and have strong promise of academic success in the new major. All such admissions are subject to the approval of the dean of the UC Merced School in which the second degree will be earned. Candidates for a second bachelor's degree are subject to the general requirements for the bachelor's degree and to the particular requirements of the School in which they are enrolled.

Limited status applicants are students whose special attainments qualify them to take certain courses in the university toward a definite and limited objective. To apply for limited status admission, students must either have a bachelor's degree but not be a candidate for an advanced degree, or have completed a substantial amount of college work with a satisfactory grade point average. Prospective students must submit an undergraduate application with fees, as well as a limited status petition and official transcripts from all schools attended. Limited status students are expected to maintain a certain scholarship average during a predetermined time of enrollment. Admission requires the approval of the dean of the School in which the student intends to study.

NOTE: Students returning to UC Merced after a voluntary absence or academic disqualification are required to apply for readmission through the Office of the Registrar. See below.

Readmission To UC Merced

Students who were formally admitted, registered and enrolled at UC Merced, then interrupted their studies for any length of time other than summer, must apply for readmission to the campus. The Readmission Policy and Process can be found on the Office of the Registrar's Web site (registrar.ucmerced.edu).

IMPORTANT DEADLINES RELATED TO ADMISSION

November 30	Application priority filing deadline for admission to fall semester
March 2	Financial aid priority deadline: FAFSA and CAL Grant GPA verification Check the Financial Aid section of the UC Merced catalog for more information and deadlines
May 1	Statement of Intent to Register (SIR) fall semester priority filing deadline: freshmen
June 1	Statement of Intent to Register (SIR) fall semester priority filing deadline: transfers
July 15	Final, official transcripts due to the Office of Admissions (fall semester applicants)
July 31	Application priority filing deadline for admission to spring semester
October 15	Statement of Intent to Register (SIR) spring semester priority filing deadline
January 6	Final, official transcripts due to the Office of Admissions (spring semester applicants)

PREPARING FOR UNIVERSITY WORK

As a prospective UC Merced undergraduate, you are encouraged to give careful thought to preparing yourself adequately in reading, writing, mathematics and other subject areas relevant to your intended major. Many undergraduate majors require preparation in mathematics beyond the three years required for admission to the University. The more comprehensive and challenging your high school or college program is, the better prepared you will be for your course work at UC Merced. Honors-level, Advanced Placement and college courses are good preparation for UC Merced. These challenging courses will help you develop the good study habits and skills you will need at UC Merced. Give priority to completing the high school or college course patterns required for admission and for your interest area. Check the UC Merced Admissions Web site at admissions.ucmerced.edu for the most current information.

University of California Entry-level Writing Requirement/Analytical Writing Placement Exam (formerly Subject A):

Every undergraduate is required to demonstrate an acceptable level of ability in English composition. For further details on the UC Entry-Level Writing Requirement (ELWR) and Analytical Writing Placement Exam, see the General Education section of this catalog.

Freshman Admission

California Residents

There are three pathways of eligibility for resident students to enter UC Merced as freshmen: eligibility in the statewide context, eligibility in the local context and eligibility by examination alone. Eligibility in the statewide context is the path by which most students attain UC eligibility. To be eligible in the statewide context, students must satisfy the subject, scholarship and examination requirements described below.

I LOVE SEEING HOW THE DIFFERENT CLUBS AND ORGANIZATIONS STARTED AND CONTINUE TO CONTRIBUTE TO THE VITALITY OF THE CAMPUS.

—Samuel Kim, student

SUBJECT REQUIREMENT

To satisfy the subject requirement you must complete, with grades of C or better, the 15 units of high school course work listed in the following subject pattern, known as the A-G subjects or requirements. A one-year course is equivalent to one unit and a one-semester course is equal to one-half unit. Courses certified to meet the A-G requirements are identified for each California high school on the UC-certified course list available online at www. ucop.edu/doorways/list, or in paper format from your principal or guidance counselor. Courses from schools and colleges outside California must provide the same rigor and level of instruction to meet the A-G requirement.

A-G Subject Requirements

A. History/Social Science: 2 years required. Two years of history/social science, including one year of world history, cultures and geography; and one year of U.S. history or one- half year of U.S. history and one-half year of civics or American government.

UC Merced Bobcat Baseball team playing against Humbolt State University.

B. English: 4 years required. Four years of college-preparatory English that include frequent and regular writing, and reading of classic and modern literature. No more than one year of approved ESL-type courses can be used to meet the requirement.

C. Mathematics: 3 years required; 4 years recommended. Three years of college preparatory mathematics which include the topics covered in elementary and advanced algebra and two- and three-dimensional geometry. Approved integrated math courses may be used to fulfill part or all of the requirement, as may other Mathematics courses taken in the seventh and eighth grades that your high school accepts as equivalent to its own math courses.

D. Laboratory Science: 2 years required; 3 years recommended. Two years of laboratory science providing fundamental knowledge in at least two of these three disciplines: biology, chemistry and physics. Advanced laboratory science courses that have biology, chemistry or physics as prerequisites and offer substantial additional material may be used to fulfill this requirement. The final two years of an approved, three-year integrated science program may be used to fulfill this requirement.

E. Language other than English: 2 years required; 3 years recommended. Two years of the same language other than English. Courses should emphasize speaking and understanding, and include instruction in grammar, vocabulary, reading and composition. Courses in a language other than English taken in the seventh and eighth grades may be used to fulfill part of this requirement if your high school accepts them as equivalent to its own courses.

F. Visual and Performing Arts (VPA): 1 year required. One year-long approved arts course from a single VPA discipline: dance, drama/theater, music or visual art.

G. College-Preparatory Electives: 1 year required. One year (two semesters), in addition to those required in "A-F" above, chosen from the following areas: visual and performing arts (non-introductory level courses), history, social science, English, advanced mathematics, laboratory science and language other than English (a third year in the language used for the "e" requirement or two years of another language).

SCHOLARSHIP REQUIREMENT

The scholarship requirement defines the grade point average (GPA) you must attain in the "A-G" subjects to match the eligibility index (described below in Examination Requirement) to be eligible for admission to the university.

The university calculates your GPA in the "A-G" subjects by assigning point values to the grades you earn, totaling the points and dividing by the total number of "A-G" course units. Points are assigned as follows: A=4 points, B=3 points, C=2 points, D=1 point and F=0 points. Only the grades you earn in "A-G" subjects in the tenth, eleventh and twelfth grades are used to calculate your GPA. Courses you take in ninth grade can be used to meet the subject requirements if you earned grades of C or better, but they will not be used to calculate your GPA.

California residents must earn, at minimum, a 3.0 GPA in "A-G" courses to meet the Scholarship Requirement.

Honors courses: The University assigns extra points for up to 4 units of certified honors-level and Advanced Placement courses taken in grades 10 – 12: A=5 points, B=4 points and C=3 points. No more than 2 units of certified honors-level courses taken in grade 10 may be assigned extra points. Grades of D are not assigned extra points. The courses

UC Merced's Folklórico performs at many campus events.

must be in the following "A-G" subjects: history, English, advanced mathematics, laboratory science and visual and performing arts. In these fields, as well as in the fields of computer science and social science, courses that are designed to prepare students for Advanced Placement Examinations, the International Baccalaureate Higher Level Examination and college courses that are transferable to the University are acceptable honors-level courses.

D or F and repeated grades: Students who receive D and F grades in "A-G" courses must repeat those courses with grades of C or better. In the subject areas of mathematics and foreign language, however, a D or F grade can be "validated" by earning a C grade or better in the second semester or more advanced level in the same subject. Courses that have been "validated" with a more advanced-level course cannot be subsequently repeated for a better grade. Consult the Office of Admissions or your counselor to determine how D or F grades can be improved and how the University will use them in evaluating your scholarship record. Grades will not be used for repeated courses in which you initially received a C or better.

EXAMINATION REQUIREMENT

Students applying for admission must submit the following test scores:

- Either the ACT Assessment Plus Writing test or the SAT Reasoning Test, and
- Two SAT Subject Tests, in two different subject areas selected from history, literature, mathematics (Math Level II only), science or a language other than English.

The University will use the highest test scores you earn in computing your eligibility for admission, and there is no penalty for taking the examinations more than once. For more information about taking the tests to fulfill the examination requirement, visit the Web site: www.universityofcalifornia.edu/admissions/, talk to your school counselor or contact the appropriate testing organization.

Information for the ACT is available at www.actstudent.org and for the SAT at www.collegeboard.com. The University requires you to take these tests no later than December of your senior year. To be eligible in the Statewide Context, your combined test scores must match or exceed the scores indicated for your "A-G" GPA. To calculate your UC Score according to the Eligibility Index, please use the online calculator at www. universityofcalifornia.edu/admissions/undergrad_adm/paths_to_adm/freshman/scholarship_reqs.html.

Eligibility in the Local Context

Under the Eligibility in the Local Context (ELC) path, the top 4 percent of students at each participating California high school are designated UC eligible for admission. To be considered for ELC, a student must complete 11 specific units of the "A-G" subject requirements by the end of the junior year. With the assistance of each participating high school, the University will identify the top 4 percent of students on the basis of GPA in the required course work. The 11 units include 1 unit of history/social science, 3 units of English, 3 units of mathematics, 1 unit of laboratory science, 1 unit of language other than English and 2 units chosen from among the other subject requirements. The University will notify ELC students of their status at the beginning of their senior year. If you are designated UC eligible through ELC, you must submit the University's undergraduate application for admission during the November filing period and complete remaining eligibility requirements—including the subject and examination requirements—to enroll.

Eligibility by Examination Alone

If you do not meet the requirements for Eligibility in the Statewide Context or Eligibility in the Local Context, you may be able to qualify for admission to the University by examination alone through achieving high scores on the ACT Assessment plus Writing or SAT Reasoning Test and two SAT Subject Tests.

To qualify for admission to the University by examination alone, you must achieve a minimum UC Score Total—calculated according to the Eligibility Index instructions—of 410 (425 for nonresidents). In addition, you must earn a minimum UC Score of 63 on each component of the ACT or SAT Reasoning Test and on each SAT Subject Test. See www.universityofcalifornia.edu/admissions to

calculate your UC Score.

You may not use a SAT Subject Test to meet these requirements if you have completed a transferable college course in that subject with a grade of C or better.

Nonresident Freshman Applicants

There are two paths to UC eligibility for nonresidents at the freshman level: Eligibility in the Statewide Context and Eligibility by Examination Alone. Both paths are similar to those described above, with the following exceptions: Scholarship Requirement: Your grade point average in the "A-G" subjects must be 3.4 or higher, regardless of your test scores.

Students with a grade point average below 3.45 must have a UC Score of 147.

ELIGIBILITY VS. SELECTION: FRESHMAN APPLICANTS

If the number of applicants exceeds the spaces available for a particular term or major, UC Merced may use selection criteria beyond minimum eligibility requirements to identify applicants who will be admitted. The following factors may be considered in a comprehensive review of eligible applicants for admission to UC Merced as freshmen:

- Academic grade point average in all required "A-G" courses, including additional points for completion of University-certified honors courses.
- Scores on the ACT plus Writing or SAT Reasoning Test, and two SAT Subject Tests.
- Number, content of and performance in academic courses beyond the minimum "A-G" requirements.
- Number of and performance in University-approved honors courses and Advanced Placement, International Baccalaureate and transferable college courses.
- Identification as being ranked in the top 4 percent of your high school class at the end of your junior year ("eligible in the local context").
- Quality of your senior-year program, as measured by the type and number of academic courses in progress or planned.
- Quality of your academic performance relative to the educational opportunities available in your secondary school.
- Outstanding performance in one or more academic subject areas.
- Outstanding work in one or more special projects in any academic field of study.
- Recent, marked improvement in academic performance, as demonstrated by your academic GPA and the quality of course work completed or in progress.
- Special talents, achievements and awards in a particular field, such as visual and performing arts, communication or athletic endeavors; special skills, such as demonstrated written and oral proficiency in other languages; special interests, such as intensive study and exploration of other cultures; experiences that demonstrate unusual promise for leadership, such as significant community service or significant participation in student government; or other significant experiences or achievements that demonstrate your promise for contributing to the intellectual vitality of the campus.
- Completion of special projects undertaken either in the context of your high school curriculum or in conjunction with special school events, projects or programs.
- Academic accomplishments in light of your life experiences and special circumstances.
- Location of your secondary school and residence.

Transfer Admission

If you enrolled in a regular session of college or university-level course work after leaving high school, you are considered to be a transfer student and cannot ignore your college records to apply as a freshman. UC Merced is firmly committed to enrolling well-prepared transfer students. Following California's Master Plan for Higher Education, UC Merced will give highest priority to students transferring from California's community colleges. UC Merced will give priority to junior-level transfer students—students who have completed at least 60 and no more than 80 transferable semester units (90 to 120 quarter units). While preparing to transfer at the junior level, we encourage you to complete a pattern of courses that will best prepare you for upper division work in your chosen field of study. It is helpful if you identify an intended major early in your college course work. Contact the Office of Admissions for assistance in planning to transfer. Information about UC Merced majors and transfer preparation is available at admissions.ucmerced.edu. If you plan to transfer from a California Community College, contact the Admissions Office to inquire about Transfer Admission Guarantee contracts and visit www.assist.org for information on courses to take to prepare for your major.

> I came to UC Merced from Boston University and Santa Monica College because of the opportunity to stand out and be known. Then I met the faculty and I found out that the smaller student population really allows them to be accessible. Even at the larger universities with small faculty to student ratios you can't get the same attention. Trust me, I've experienced it.
>
> —Drew E. Glaser, student, Resident Assistant

Transferable College Units and Grade Point Average (GPA)

The University awards transfer credit for courses that are determined by the Office of Admissions to be essentially the same as those offered for the undergraduate degree at any UC campus, and taken at a regionally accredited institution of higher education. Transferable courses offered by California Community Colleges are listed on the UC Transferable Courses section of the California

public institution articulation database, found on the Web site: www.assist.org.

Grade points for all UC-transferable courses attempted on a letter grade basis will be computed into the grade point average (GPA) that will be used to determine admission. Units for courses in which you earned grades of W, Pass or Credit, and No Pass or No Credit, are excluded from the computation of your grade point average. Honors courses taken in college are not weighted when computing the transferable GPA for admission. For more information about determining your GPA, contact the Admissions office or visit the Web site: admissions.ucmerced.edu.

If you have attended only community colleges or two-year postsecondary institutions, all of your UC-transferable college courses will be accepted in transfer for subject credit and your GPA for admission is computed using all UC-transferable college courses attempted. When you transfer, however, the total number of units is limited to a maximum total of 70 semester units (105 quarter units).

Excess Units

Students transferring to UC Merced from a regionally accredited four-year college or university may have up to 80 transferable semester (120 quarter) units and still be eligible to transfer. It is important to note, however, that UC Merced considers students who have completed more than 80 semester units to have excess units and will not admit those students without special approval. A student who completes 80 or fewer units at a four-year institution, then transfers to a community college to complete course work that is necessary for admission, will not have excess units and can be considered for admission to UC Merced.

ADMISSION ELIGIBILITY FOR TRANSFERS

California Residents

There are three ways for you to meet the University's minimum eligibility requirements for transfer admission. Meeting the minimum eligibility requirements does not guarantee admission.

1. Eligible for admission upon high school graduation: If you were eligible for admission to the University when you graduated from high school – meaning you satisfied the Subject, Scholarship and Examination requirements – you are eligible to transfer if you have a C (2.0) grade point average in your transferable college course work.

2. Lacking only subject requirements upon high school graduation: If you met the scholarship and examination requirements but you did not satisfy the subject requirements when you graduated from high school, you must take transferable college courses in the subjects you are missing, earn a grade of C or better in each of these required courses and earn an overall C (2.0) average in all transferable college course work to be eligible to transfer.

3. Lacking the scholarship requirement upon high school graduation: If you were not eligible for admission to the University when you graduated from high school because you did not meet the scholarship and examination requirement, you must complete all of the following in (a) and (b) below.

Any student planning to enter UC Merced as a junior-level transfer student may complete the following requirements in place of (1) or (2) above.

(a) 60 semester units (90 quarter units) of UC-transferable college course work with a grade point average of at least 2.4. No more than 14 semester units (21 quarter units) may be taken Pass/Not Pass; and

A member of the Bobcat Band plays during a campus event.

(b) the transfer course pattern requirement to include:

- Two transferable college courses (3 semester or 4-5 quarter units each) in English composition, and
- One transferable college course (3 semester or 4-5 quarter units) in mathematical concepts and quantitative reasoning, and
- Four transferable college courses (3 semester or 4-5 quarter units each) chosen from at least two of the following subject areas:
- Arts and humanities
- Behavioral and social sciences
- Physical and biological sciences

Students who have completed courses listed on the Intersegmental General Education Transfer Curriculum (IGETC) before they transfer to the University will have satisfied the transfer course pattern requirement.

ELIGIBILITY VS. SELECTION: TRANSFER APPLICANTS

If the number of transfer applicants exceeds the number of transfer enrollment spaces available, UC Merced may use supplemental criteria to select from among the qualified transfer applicants. Highest-priority consideration at the transfer level is given to students transferring from a California Community College who meet the University's definition of a California Community College student.

Definition of a California Community College student: A California Community College student applying for admission to the University of California in advanced standing will be given priority admission over all other applicants if: 1) he/she was enrolled at one or more California Community Colleges for at least two terms (excluding summer sessions); 2) the last college he/she attended before admission to a UC campus was a California Community College (excluding summer sessions); and 3) he/she has completed at least 30 semester (45 quarter) UC transferable units at one or more California Community Colleges.

Transfer Requirements For Nonresidents

Transfer students who are not residents of California must meet the same requirements as California residents and have a grade point average (GPA) of 2.8 or better in all transferable college work.

SELECTION CRITERIA FOR TRANSFER APPLICANTS:

- Completion of a specified pattern or number of courses that meet breadth or general education requirements
- Completion of a specified pattern or number of courses that provide continuity with upper division courses in your major
- Your grade point average in all transferable courses
- Participation in academically selective honors courses or programs
- Special talents, achievements and awards in a particular field, such as visual and performing arts, communication or athletic endeavors; special skills, such as demonstrated written and oral proficiency in other languages; special interests, such as intensive study and exploration of other cultures; experiences that demonstrate unusual promise for leadership, such as significant community service or significant participation in student government; or other significant experiences or achievements that demonstrate your promise for contributing to the intellectual vitality of the campus
- Completion of special projects undertaken in the context of your college curriculum or in conjunction with special school events, projects or programs
- Academic accomplishments in light of your life experiences and special circumstances
- Location of your college and residence

IGETC NOTES FOR CALIFORNIA COMMUNITY COLLEGE TRANSFERS

As a transfer student, if you complete the Intersegmental General Education Transfer Curriculum (IGETC) prior to transfer, the campus-specific, lower-division general education requirements for graduation from UC Merced will be waived. Official certification of your completed IGETC must be sent to the Office of Admissions at UC Merced, along with your final, official transcript from the last community college you attended.

If you are already enrolled at a University of California campus as a degree-seeking student, you may apply to UC Merced as a transfer student. Intercampus transfers follow the same procedures and deadlines as transfers from other colleges and universities. If you complete the general education or breadth requirements for your UC school or college prior to transfer and obtain a letter from the dean declaring your requirements satisfied, UC Merced will use your letter to waive campus-specific, lower-division general education requirements at UC Merced.

TRANSFER ADMISSION GUARANTEE (TAG)

UC Merced offers Transfer Admission Guarantee (TAG) contracts for California Community College students throughout California. TAG contracts specify the courses to be completed and grade point averages students must earn at the community college to be guaranteed admission to their major. If you are interested in receiving a TAG contract, call the Office of Admissions at (209) 228-4682 or (866) 270-7301 (toll free in California).

INTERNATIONAL STUDENTS

International students enrolled in California Community Colleges will be considered for admission for Fall 2008 and later if they will complete at least 60 transferable semester units, with the last 30 units coming from the California Community College. Students meeting these specifications will be considered for admission according to the same guidelines and requirements as those required of domestic transfer students, except that they must present a grade point average of at least 2.8 for admission consideration.

Courses comparable to those offered for undergraduate degree credit in the University of California and completed in post-

Make UC Merced Your Transfer Destination

Transfer students who joined UC Merced's inaugural class formed an association, and they are exchanging views and experiences on life at a start-up university. They have come together to form the Student Outreach Transfer Mentor Program (STOMP) to foster relationships among current and prospective transfer students. As UC Merced ambassadors, our transfer students are visiting California Community Colleges to let students know what a research university has to offer them and which services are available to support their educational success at UC Merced.

UC Merced aspires to be the top destination for transfer students. Come help your fellow transfer students make this program bigger and better. A number of paid openings are available to help the program grow. Partner with UC Merced's first classes, as the pioneering work of university-building continues. Check out this Web site: transfer.ucmerced.edu.

Faculty Advisor Professor Jeffrey Yoshimi, seated right, with students (l. to r.) Heidi Kang, James Ebright and Sanjeev Singh Chahal.

secondary institutions outside the United States will transfer to UC Merced if taken at institutions recognized by the Ministry of Education in the institution's home country. International students with previous college attendance cannot disregard their academic records and apply as freshmen.

International students whose native language is not English must demonstrate language proficiency by one of the following methods:

- Take the Test of English as a Foreign Language (TOEFL) and earn a minimum score of 220 (computer-based TOEFL), 83 (internet-based TOEFL) or 550 (paper-based TOEFL). Information about the TOEFL is available at www.toe.org.
- Take the International English Language Testing System exam (IELTS) and earn a minimum score of 7. Information about IELTS is available at www.ielts.org.
- Earn a score of 3, 4 or 5 on the Advanced Placement International Advanced Placement International English Language (APIEL). Information about the APIEL is available at www.collegeboard.com/ap/students/apel.
- Earn grades of B or better in two UC-transferable English composition courses taken at any regionally accredited post-secondary institution in the United States.

Prospective international students are strongly encouraged to contact the Admissions office to discuss their academic background, English proficiency and visa status prior to application.

COST OF ATTENDANCE AND FINANCIAL AID

See the Financial Aid section of this catalog for detailed information about the estimated cost of attendance and information regarding financing your education.

VERIFICATION OF SELF-REPORTED ACADEMIC RECORDS

All admission offers are provisional and subject to cancellation if official documents to verify self-reported academic information are not received in the Office of Admissions by the deadline pertaining to the term of entrance. Required documents include official test scores and final, official transcripts from high schools and colleges attended. Students admitted to fall semesters must be sure their official documents arrive five business days prior to their scheduled New Student Orientation session or by July 15, whichever date comes first. Students admitted to spring semesters must be sure their official documents are received by January 6.

ORIENTATION FOR ADMITTED STUDENTS

All admitted students are required to attend New Student Orientation during summer for fall semester and during January for spring semester. At Orientation, students will meet with an academic advisor, plan their program of study and enroll in classes. Final, official transcripts and official test scores must arrive in the Office of Admissions by July 15th or at least five business days prior to their scheduled New Student Orientation session (whichever is earlier) or registration for courses will be delayed.

CALIFORNIA RESIDENCY STATUS

The manner in which legal residence is defined for tuition purposes is different than that for admission purposes. If you have questions about your residency status for tuition purposes, contact the Office of the University Registrar (see the Registrar section of this catalog).

ADVANCED PLACEMENT (AP) AND INTERNATIONAL BACCALAUREATE (IB) EXAMINATIONS

The University awards credit for successful completion of the College Board Advanced Placement (AP) and the International Baccalaureate Higher Level Examinations (IB). Students must have official test score reports sent directly from the testing service to UC Merced to receive credit. Students will meet with advising staff during orientation to discuss which courses or requirements they may have waived based on their scores in these and other examinations.

CREDIT FOR AP EXAMS

UC Merced grants elective credit for all College Board AP examinations on which a student scores 3 or higher. Some examinations passed with scores of 3 or higher may award exemptions for degree requirements. The number of elective units awarded for each examination can be viewed on the chart in this section.

CREDIT FOR IB EXAMS

The International Baccalaureate Organization (IBO) awards either a diploma or awards a certificate for individual IB exams. Students completing the IB diploma with a score of 30 or above will receive a total of 20 semester units of elective credit toward their UC Merced undergraduate degree, as approved by UC faculty for implementation in 2002. To complete the IB diploma, students are required to take one subject from each of the six subject groups and complete an extended essay. At least three of the six subjects must be taken at the Higher Level. The University grants 5.3 semester units to students who receive IB certificates for each individual Higher Level Exam on which the student scores 5, 6, or 7. The University does not grant credit for Standard Level exams.

Prior to enrolling in their first classes at UC Merced, students will meet with an academic advisor to discuss their academic plans and test scores. The following chart provides guidelines used for awarding units (elective credit) and exemptions for degree requirements. Students who choose to take a course from which they are otherwise exempt will receive credit for the UCM course but not the units for the exam.

CREDIT FOR AP/IB EXAMS

Credit will be granted for either the IB or AP Exams in any one subject area.

SUBJECT EXAM	UNITS	COURSE EXEMPTIONS AND GENERAL EDUCATION
IBH Visual Arts:	5.3	Score 5 or above exempts one (1) course in ARTS
AP Art (Studio): Drawing	5.3	Score 4 or 5 on Drawing exempts one (1) course in ARTS
2-D Design	5.3	Score 4 or 5 on 2-D Design exempts one (1) course in ARTS
3-D Design	5.3	Score 4 or 5 on 3-D Design exempts one (1) course in ARTS
		5.3 units max AP Art Studio
AP Art History	5.3	Score 4 or 5 exempts one (1) course in Arts
AP Biology	5.3	Score 4 or 5 exempts BIO 1

SUBJECT EXAM	UNITS	COURSE EXEMPTIONS AND GENERAL EDUCATION
AP Chemistry	5.3	Score 3 or above exempts Chemistry Readiness Exam Score 4 or 5 exempts CHEM 2
AP Computer Science: Comp Science A Comp Science AB	 1.3 2.7	*2.7 unit maximum both tests
IBH Economics **AP Economics:** Macroeconomics Microeconomics	5.3 2.7 2.7	Score 6 or 7 exempts ECON 1 Score 4 or 5 on both Microeconomics AND Macroeconomics exempts ECON 1
IBH English Language **AP English:** Language/Composition Literature/Composition	5.3 5.3 5.3	Score 5 or above satisfies WRI 1 and ELWR Score of 6 or 7 exempts WRI 10 Score 3 or above on either AP exam satisfies WRI 1 and ELWR Score 4 or 5 Lang/Comp exempts WRI 10 Score 4 or 5 Lit/Comp exempts LIT 20-21, 30-31, 40-41 or sequence *5.3 unit max AP English*
AP Environmental Science	2.7	Score 4 or 5 exempts ESS 1
AP Government and Politics: United States Comparative	 2.7 2.7	 Score 4 or 5 exempts POLI 1 Score 4 or 5 exempts POLI 3
IBH History **AP History:** US History European History World History	5.3 5.3 5.3 5.3	Score 6 or 7 exempts one (1) lower division history sequence Score 4 or 5 exempts HIST 16-17 Score 4 or 5 exempts HIST 30-31 Score 4 or 5 exempts HIST 10-11
IBH Geography **AP Human Geography:**	5.3 2.7	
IBH Language Other Than English Chinese French German Japanese Spanish **AP Language Other Than English:** Chinese French Literature/ French Language German Literature/German Language Japanese Spanish Literature Spanish Language	 5.3 5.3 5.3 5.3 5.3 5.3 5.3 5.3 5.3 5.3	 Score 6 or 7 on Chinese exempts CHN 4 and/or Literature/Cultures or History major foreign language requirements Score 6 or 7 on French exempts FREN 4 and/or Literature/Cultures or History major foreign language requirements Score 6 or 7 on German exempts Literature/Cultures or History major foreign language requirements Score 6 or 7 on JPN 4 and/or Literature/Cultures or History major foreign language requirements Score 6 or 7 exempts SPAN and/or 4 Literature/Cultures or History major foreign language requirements Score 4 or 5 on Chinese language exam exempts CHN 4 and/or Literature/Cultures or History major foreign language requirements Score 4 or 5 on French language/French Literature exempts FREN 4 and/or Literature/Cultures or History major foreign language requirements Score 4 or 5 on German exempts Literature/Cultures or History major foreign language requirements Score 4 or 5 on Japanese language exam exempts JPN 4 and/or Literature/Cultures or History major foreign language requirements Score 4 or 5 exempts SPAN 4 and/or Literature/Cultures or History major foreign language requirements Score 4 or 5 exempts LIT 50-51; score of 3 fulfills the foreign language requirement for those majoring in Literature and cultures with a concentration in "Literatures of the English Speaking World" and a score of 4 or 5 fulfills Spanish language requirement for those majoring in Literature and Cultures with the concentration "Literatures of the Spanish Speaking World"
AP Latin: Latin Literature	 2.7	 None
AP Mathematics Calculus AB Calculus BC Calculus BC Subscore AB	 2.7 5.3 2.7	*Score 4 or 5 either exam exempts Math readiness Exam and SSHA's Quantitative Reasoning Requirement Score 4 or 5 exempts MATH 21 Score 3 exempts Calculus Readiness exam and MATH 21; Score 4 or 5 exempts MATH 21 and MATH 22 Score 4 or 5 exempts MATH 21 *5.3 unit maximum both tests
IBH Music **AP Music Theory**	5.3 5.3	Score 6 or 7 exempts one (1) GE course in ARTS None *5.3 unit maximum both tests
AP Physics: Physics B Physics C Mechanics Physics C Electricity and Magnetism	 5.3 2.7 2.7	*5.3 unit maximum both tests None Score 5 exempts PHYS 8 None
IBH Psychology **AP Psychology**	5.3 2.7	Score 6 or 7 exempts PSY 1 Score 4 or 5 exempts PSY 1
IBH Social and Cultural Anthropology	5.3	Score 6 or 7 or above exempts ANTH 1
AP Statistics	2.7	Score 4 exempts MATH 15; SSHA quantitative reasoning requirement, PSY 10 Score 5 exempts ECON 10 or POLI 10
IBH Theatre Arts	5.3	Score 5 or above exempts one (1) GE Course in Arts

Financial Aid And Scholarships

The Office of Financial Aid and Scholarships strives to make a college education affordable for all students regardless of their families' financial situations. While students are expected to contribute a certain amount toward their education, UC Merced offers a number of financial aid and scholarship resources to assist students in meeting their educational expenses. (Exceptions: The Office of Financial Aid and Scholarships does not have funds available to offer assistance to students on special or limited status or students enrolled in the Division of Professional Studies.)

All students, regardless of family income, are encouraged to apply for financial aid. In 2007-08, 68 percent of UC Merced undergraduate students received some form of financial assistance. Financial aid is intended both to remove financial barriers for families who cannot afford the cost of a higher education and to fill in the gap for families who can afford only part of the cost. A number of factors in addition to family income are considered in determining your financial eligibility, including the size of your family and the number of family members in college. Although most grant awards are based on financial need, some loans and scholarships are available regardless of need.

The Office of Financial Aid and Scholarships is dedicated to helping students and their parents understand the financial aid opportunities available as well as the criteria used in determining eligibility for the various financial aid programs available at UC Merced. The Office of Financial Aid and Scholarships welcomes your questions and is here to provide services and guidance that will contribute to your educational experiences at UC Merced. If you have questions or need additional information, please do not hesitate to contact us.

OFFICE OF FINANCIAL AID AND SCHOLARSHIPS:

Web site: financialaid.ucmerced.edu
E-mail: finaid@ucmerced.edu
Phone: (209) 228-4243
Address: Office of Financial Aid and Scholarships
5200 N. Lake Road
Merced, CA 95343

OTHER IMPORTANT WEB ADDRESSES:

Web site: FAFSA: www.fafsa.ed.gov
Web site: CSAC: www.csac.ca.gov

HOW TO APPLY

Students applying for financial aid from UC Merced, the federal government and/or the state of California must complete the Free Application for Federal Student Aid (FAFSA).

For faster and more accurate filing, students can apply for financial aid online at www.fafsa.ed.gov. The FAFSA as well as the Cal Grant GPA Verification form should be completed and submitted as soon as possible after January 1 and no later than March 2nd. If the March 2nd deadline has already passed, some funding may still be available. Apply as soon as possible! We receive and process financial aid applications throughout the year and students will be considered for Federal Grants and Loans at all times. A financial aid advisor is available to assist students and parents with the financial aid application and award process, and can review special circumstances that may affect eligibility. Please contact the Office of Financial Aid and Scholarships for assistance.

Applying for Financial Aid is as easy as 1, 2, 3!

New Students

1. Complete and submit the University of California Application for Admissions & Scholarships by November 30th.

2. Complete and submit the Free Application for Federal Student Aid (FAFSA) and a GPA Verification form by March 2nd.

3. Complete and return any additional documents requested by the Office of Financial Aid and Scholarships.

Continuing Students

1. Complete and submit the Free Application for Federal Student Aid (FAFSA) by March 2nd.

2. Complete and submit a Continuing Student Scholarship Application by March 2nd.

3. Complete and return any additional documents requested by the Office of Financial Aid and Scholarships.

TYPES OF FINANCIAL AID

Students who receive financial aid may receive funds from one or more of the following sources: scholarships, grants, loans and work-study.

SCHOLARSHIPS

The University of California, Merced administers a number of scholarship funds designed to benefit students. These scholarships are provided through the generosity of UC alumni; friends of UC Merced; corporations, businesses, professional associations; and the University itself. We have a variety of scholarships with a vast range of criteria available. There are merit-based and need-based scholarships for new and continuing students at all class levels.

New students are automatically considered for all merit-only scholarships as well as need-based scholarships simply by completing a Free Application for Federal Student Aid (FAFSA). Continuing students need to submit a Continuing Student Scholarship Application by March 2nd of each year.

Following is a partial list of scholarships that are available or will be available in the future for UC Merced students:

Bank of America Management Scholarship

Caroline L. Adams Endowed Scholarship

Chancellor's Scholarship

Dan David Solar Endowment Fund

Eich Family Scholarship

Ernest S. and Bettine Kuh Scholarship

Floyd Family Foundation Scholarship

Frances M. Benton Scholarship

Golden Bobcat Scholarship

Great Valley Center Book Scholarship

Grossman Family Endowed Scholarship

Hildebrand Scholarship

Joe and Margo Josephine Scholarship

John C. "Jack" Pjerrou Endowed Scholarship

Ken and Midge Riggs Endowed Scholarship

Kris-Tangella Academic Excellence Endowed Scholarship

Leon O. and Diana Chua Scholarship

Louis P. Gonella Scholarship

Lucia R. Myers Endowed Scholarship

Marvin Peletz Scholarship

Merced County Association of Realtors Scholarship

Merced Mall Regional Shopping Center Scholarship

Nina Wack Special Education Fellowship

Professor Roland Winston Endowed Scholarship

Provost's Scholarship

Ray and Joan Dezember Scholarship

Ruth Solomon Hoffman Scholarship

SBC Pacific Bell Scholarship

Speck Family Scholarship

Stephen D. Peterson Endowed Scholarship

Stewart A. Resnick-Paramount Farms Scholarship

Theodore and Doris Koerner Scholarship

UC Merced Donor Scholarship

UC Merced Employees' Scholarship

UC Regents' Scholarship

Wally Coats Scholarship

Wells Fargo Scholarship for High School Students

Wells Fargo Scholarship for Transfer Students

Wendy Leone Olson Endowed Scholarship

Willer/BUR Scholarship

Please note: All new students must have at least a 3.25 GPA and all continuing students must have at least a 3.0 GPA to be considered for scholarships.

GRANTS

Grants are awarded on the basis of financial need and do not have to be repaid. The federal government provides funds for some grants (Federal Pell Grants, Federal ACG Grants and Federal SMART Grants). The State of California also offers grants to qualified undergraduate students (Cal Grants A and B). In addition, grant funds are provided by the University of California.

Federal Pell Grants

To be eligible for a Federal Pell Grant, applicants must be U.S. citizens or eligible non-citizens, be enrolled as undergraduates, have not previously received a bachelor's degree and demonstrate financial need. The amount you receive depends on your financial need as determined by completing the FAFSA.

Federal ACG Grants

To be eligible for ACG Grants, applicants must be US citizens, enrolled as undergraduates, have not previously received a bachelor's degree, receive a federal Pell Grant , demonstrate financial need and meet other important requirements.

National SMART Grants

To be eligible for SMART Grants, applicants must be US citizens, enrolled as undergraduates, have not previously received a bachelor's degree, receive a federal Pell Grant , demonstrate financial need and meet other important requirements.

Cal Grants

To be eligible for a Cal Grant award, applicants must be California residents, demonstrate financial need and meet appropriate deadlines. The California Student Aid Commission (CSAC) administers the Cal Grant program. Go to the CSAC web site at www.csac.ca.gov for more information.

Cal Grant A awards are based on financial need and academic achievement. This grant pays the majority of University fees.

Cal Grant B awards are based on financial need and are for entering undergraduate students, primarily from low-income backgrounds. Cal Grant B pays a stipend each semester for living expenses for first-year students, and the majority of University fees plus a stipend each semester for living expenses for students in their second through fourth years. It is UC Merced's policy to apply the stipend portion of your Cal Grant B award to fees first. If you would like the stipend to instead be refunded to you, please contact our office.

University Grants

The University of California returns a portion of all educational fee revenue to financial aid programs. UC Merced uses this funding to provide a need-based institutional grant and scholarship program (Bobcat Grants and Scholarships) to eligible students. The grant and scholarship program strives to ensure that all students who are eligible to attend the University of California, Merced, have the financial resources to do so.

LOANS

Loans are financial aid awards that require repayment. They offer the opportunity to defer the cost of your educational expenses by borrowing now and repaying later. While some loan programs are based on financial need, there are loan programs available to all students regardless of income. Loan programs available through UC Merced are federally funded, providing long- term, low-interest loans.

Federal Stafford Student Loans

Federal Stafford Loans are guaranteed, low-interest loans for students. Banks and credit unions provide funding for this federal loan program.

Federal Subsidized Stafford Loan: The federal government pays the interest on the loan while the student is in school and for six months after the student graduates or ceases to enroll at least half-time working toward a degree.

Federal Unsubsidized Stafford Loan: The student is responsible for paying interest while in school, but can defer any interest payment until after graduation or ceasing to be enrolled at least half-time working towards a degree.

The Federal Stafford Loan interest rate is fixed at 6.8%. This fixed interest rate is applicable during in-school, grace, deferment, forbearance and repayment periods.

Federal Parent Loan for Undergraduate Students (PLUS)

A Federal PLUS Loan is a low-interest loan for biological or adoptive parents to borrow to help pay the educational expenses for their dependent student. The parent must be a U.S. citizen or eligible non-citizen with a good credit history. The dependent student must also be eligible to receive federal financial assistance. Like the Federal Stafford Loan, banks and credit unions provide funds for the Federal PLUS program.

The parent may borrow up to the school's cost of attendance, minus any aid the student received. The Federal PLUS loan has a fixed interest rate of 8.5%. Different repayment options are provided by the lender and are designed to provide flexibility in meeting repayment obligations.

PLUS Loans for Graduate and Professional Degree Students

Graduate and professional degree students are eligible to borrow under the PLUS Loan Program up to their cost of attendance minus other estimated financial assistance in. The terms and conditions applicable to Parent PLUS Loans also apply to Graduate/Professional PLUS loans. These requirements include a determination that the applicant does not have an adverse credit history, repayment beginning on the date of the last disbursement of the loan, and a fixed interest rate of 8.5 percent in the student loan program. Applicants for these loans are required to complete the Free Application for Federal Student Aid (FAFSA). They also must have applied for their annual loan maximum eligibility under the Federal Subsidized and Unsubsidized Stafford Loan Program before applying for a Graduate/Professional PLUS loan.

WORK-STUDY

Work-Study is an opportunity for students to obtain employment and earn money for educational expenses. This need-based award allows students to report work-study earnings on Worksheet C on the FAFSA the following year.

Financial Aid and Scholarships Director Diana Ralls marches at the UC Merced Opening Day Celebration.

The award is not a guarantee of employment but we have found that most students who want to work are able to find employment. Students will need to obtain a student employment position and the money they earn from that position will be paid to them through payroll like any other employment opportunity. The Career Services Center is available to assist students in obtaining a student employment position.

Work-study is awarded first-come, first-served on the basis of need. However, students are not precluded from working if they are not awarded a Work-Study award. Work-study students are given priority for on-campus positions but all students are welcome to apply for all positions.

GENERAL ELIGIBILITY REQUIREMENTS

Federal financial aid programs are subject to regulations that define the criteria students must meet to qualify and maintain eligibility for those programs. The regulations state that a student must: (1) be a U.S. citizen or an eligible non-citizen of the U.S.; (2) be accepted for admission to the University; (3) be enrolled in good standing at the University (units taken through the Division of Professional Studies are not counted toward half- or full-time enrollment); (4) demonstrate financial need (except for Federal Unsubsidized Loans and Federal PLUS Loans); (5) maintain satisfactory academic progress for financial aid, as outlined below; (6) be registered for the selective service if the student is a male at least 18 years old, born after December 31, 1960, and not on active duty with the armed forces; and (7) not owe a refund on a federal grant or be in default on a federal educational loan. Please note: Financial need is the difference between the reasonable, approved expenses of attending UC Merced and all available resources, including the expected contribution from parents, the student and any outside aid.

Full-time Enrollment

Students not enrolled in an approved part-time program are expected to enroll full time at the university. Students not enrolled full time by the end of the third week of the semester may have to pay back some of their financial aid.

Satisfactory Academic Progress

Financial Aid Programs require that a recipient maintain Satisfactory Academic Progress. This policy pertains to federal and state funds. Note: Some funds have higher academic and/or enrollment requirements.

Qualitative Measurement
An undergraduate student will be placed on academic probation if at the end of any term the student's grade point average:

is less than 2.0, but not less than 1.5, for the term; ***or***
is less than 2.0 for all courses taken within the University of California.

An undergraduate student is subject to academic disqualification for further registration in the University if at the end of any term: the student's grade point average for that term is less than 1.5; or if the student has completed two consecutive terms on academic probation without achieving a cumulative grade point average of 2.0.

Quantitative Measurement
Students must complete 24 cumulative UC units for two semesters in an academic year to remain eligible for financial aid. Students who attend only one semester are required to complete only 12 UC units for that semester. If a student fails to complete sufficient units, s/he will be placed on academic probation and sent a warning letter. All deficient academic units must be made up in the next consecutive academic year in addition to the minimum (24) units required in that academic year. If the student meets the next applicable minimum progress requirement for quantitative standards, the student will return to good standing. If a student has not returned to good standing for quantitative standards in the next consecutive academic year, the student will be subject to disqualification.

Dropped, failed and incomplete courses; remedial courses for which no credit is received; and repeated courses (in which you previously received a passing grade) do not count toward unit credit. To earn units for a course, you must complete and pass that course. Units are measured and warning letters are mailed at the end of the spring semester.

Limited Number of Semesters

Financial aid is not available for an indefinite period. You are allowed up to 10 semesters of financial aid eligibility, depending on your class standing when you were admitted. The semester limit applies to time you have spent at any college or post-secondary institution; it includes semesters during which you received no financial aid, as well as terms during which you withdrew. It does not include semesters when you were not registered or summer sessions. The initial class level is assigned by the Office of Admissions and Relations with Schools and Colleges, based on transfer credits accepted, including Advanced Placement units. Note: Terms that you withdraw count toward the total number of semesters.

Entering Grade Level	Financial Aid Eligibility at UC Merced
Entering freshman	12 semesters
Entering sophomore	9 semesters
Entering junior	6 semesters
Entering senior	3 semesters

You may receive financial aid while you are on probation, but you will lose all financial aid if you are dismissed. Students are allowed to receive financial aid while on probation for a maximum of two consecutive terms.

APPEALS

If your financial aid is denied, suspended or terminated for failure to achieve satisfactory academic progress, you may appeal if extenuating circumstances hindered academic performance. Appeal forms are available from the Office of Financial Aid and Scholarships. To file an appeal, complete the form, obtain and attach all documents that support the basis for your appeal, and return the form and documentation to the Office of Financial Aid and Scholarships. You are strongly encouraged to file your appeal form immediately after receiving notification that your aid has been denied. You are not eligible to receive financial aid while your appeal is under consideration, and the appeal process normally takes 2-4 weeks.

EFFECTS OF WITHDRAWING ON FINANCIAL AID

An undergraduate student withdrawing from UC Merced during a semester or for a future semester must file an Official Notice of Withdrawal Form with the University Registrar. When a

> The close relationships with friends and faculty that I have formed here have had a personal impact and positive influence on my life. The people here have gone a long way in making me feel welcome here, and Merced has become home to me thanks to them.
>
> —Zain Memon, Davis, Management Major

student withdraws from UC Merced, the withdrawal date used in determining the amount of financial aid that needs to be returned is the earliest of the date: 1) the student files the Official Notice of Withdrawal Form with the University Registrar, or 2) the student officially notifies the Registrar's Office of his/her intent to withdraw; or 3) UC Merced determines what most accurately reflects the last date of an academically related activity of the student.

If the student leaves without beginning UC Merced's official withdrawal process or otherwise providing official notification of his/her intent to withdraw, the withdrawal date for the return of federal funds will be the 50% point in the term. In this instance, UC Merced could determine an earlier withdrawal date if circumstances beyond the student's control (e.g., illness) prevented him/her from beginning the official withdrawal process. UC Merced could also determine the last date of an academically related activity of the student.

The date used to determine the return of federal funds may be different than the date used by UC Merced to determine institutional refunds.

For additional detailed information about Return to Title IV Funds at UC Merced, please see the "Return to Title IV Aid" guide available at the Office of Financial Aid and Scholarships.

IMPORTANT WARNING:
Your semesters of financial aid eligibility are limited. When you withdraw you use up one semester of eligibility!

DISBURSEMENT OF FINANCIAL AID

Generally, financial aid is offered for two semesters each academic year and an equal amount is made available each semester to eligible students. The Office of Student Business Services is responsible for the disbursement and delivery of financial aid.

If all necessary requirements are complete, Financial Aid proceeds are distributed to the student's account no sooner than 10 days prior to the first day of classes. This money will be applied towards institutional charges first. The remaining amount will be applied toward the authorized charges on the student's account or will be refunded to the student or parent as appropriate.

FOR ADDITIONAL INFORMATION: Please refer to our web site financialaid.ucmerced.edu

Academic Policies And Procedures

THE ACADEMIC YEAR

The Semester System

The University of California, Merced is on the semester system. The academic year is divided into two semesters and summer sessions during the summer term. Quarter units earned previously at another institution are converted to semester units by dividing the quarter units earned for each course by 1.5; for example, 4 quarter units equals 2.667 semester units.

Summer Session

Every summer, students can earn units, expand their knowledge, take special study courses, fulfill prerequisites and complete general education or major requirements by enrolling in summer courses.

UC Merced offers multiple summer session options. A wide variety of courses are offered each summer in subjects that are transferable to most campuses. Enrollment in summer session courses is open to UC Merced students and other UC students, as well as students from other colleges and universities, adults and high school juniors and seniors. For additional information about summer courses, contact summersession@ucmerced.edu.

OFFICE OF THE REGISTRAR

Web site: registrar.ucmerced.edu
E-mail: registrar@ucmerced.edu
Phone: (209) 228-2734
Address: 5200 N. Lake Road
Merced, CA 95343

Enrollment

ENROLLING IN COURSES

UC Merced students register each semester using the online registration system, MyRegistration (accessible via the MyUCMerced portal at my.ucmerced.edu). The registration process includes enrolling in classes, paying fees and other financial obligations, filing a current address with the Office of the Registrar, and completing and filing other information forms. MyRegistration allows the student to enroll in classes via the Internet. With UC Merced's Internet registration, students will always receive the most up-to-date information regarding their registration and class enrollment. Pre-assigned appointments that are spread throughout the registration period regulate access to the registration system. For security purposes, students are assigned a unique login user code and password/PIN that must be entered to access MyRegistration. Students may make changes to their course schedule through the adjustment period. Courses may be added by the web through the first week of instruction and may be dropped by the web through the fourth week of instruction. A new or readmitted student must also:

- Obtain a student ID card, and
- Complete the online Statement of Legal Residence petition on the Office of the Registrar's website (registrar.ucmerced.edu) under the California Residency and Fees section.

REGISTRATION PRIORITY

Access to registration (via MyRegistration) is by priority groups. The groups are established according to student class level as determined by the number of units completed, with the seniors registering first, juniors second, etc.

The number of semester units a student has completed determines undergraduate classification:

Class Level	Units
Freshman	0.0–29.9
Sophomore	30.0–59.9
Junior	60.0–89.9
Senior	90.0 or more

LATE ENROLLMENT/REGISTRATION

Students who have not registered prior to the first day of instruction are considered late enrollments. Late enrollment begins on the first day of instruction and extends through the 10th day of instruction. Students may be assessed a $50 late enrollment fee. Approval from the student's School is required to register late. Students are also required to pay their fees in full approximately seven days prior to the first day of instruction. If the fees are not paid in full by the published deadline, a $50 late payment fee may be assessed.

UC Merced's Dance Coalition (D-Co) performing at their third annual show: Red Carpet Exposed!

ADDING AND DROPPING COURSES

Adding a Course

During the first week of instruction, students may add a course or courses if space is available. During the second and third weeks of instruction, a student may add courses only with the permission of the instructor. After the third week of instruction, students may add a course only with the permission of both the instructor and the dean of the School with which the student is affiliated. A fee will be assessed for adding a course after the third week.

- First week: Students may add if space available
- Second and third weeks: Students may add only with instructor's approval
- After third week: Students may add only with instructor's and appropriate dean's approvals; fee assessed

Dropping a Course

During the first four weeks of instruction, students may drop a course or courses without paying a fee and without further approval. After the fourth week of instruction and until the end of the tenth week of instruction (close of business on the Friday of that week), a student may drop for emergency reasons of for good cause with the signed approval of the instructor of record and confirmed by the dean of the school with which the student is affiliated, provided:

(1) The student is not on special probation (i.e. students who have successfully appealed disqualification),

(2) Dropping the course would be to the educational benefit of the student (in the judgment of the instructor and dean) and

(3) The student is not being investigated for academic dishonesty in that course.

Dropping between the 5th and 10th weeks will be approved only provided the student submits a written description of the special circumstances warranting this action; therefore students should continue to attend the course until their drop request is approved. Any request to drop beginning in the eleventh week of instruction will only be considered under exceptional circumstances (illness or injury substantiated by a doctor's note, recent death in the immediate family or other circumstances of equal gravity), and will only be considered following both signed approval of the instructor of record and submission of a petition that is approved by the dean of the School with which the student is affiliated. All drops must be received by the Office of the Registrar by the deadlines specified. For students dropping after the fourth week of instruction, a fee will be assessed and a "W" notation will be assigned by the Office of the Registrar and appear in place of a grade on the student's permanent transcript. Courses in which a "W" has been entered on a student's record carry no grade points, are not calculated in the grade point average, and will not be considered as courses attempted in assessing the student's progress to degree. Nevertheless, it is a marker used to indicate that the student was enrolled in the class beyond the third week of instruction. It does not indicate whether the student was passing or failing.

Course Substitutions

Students may petition the appropriate dean to substitute a suitable course in place of a required course (for a general education course: petition the dean of College One; for a major course: petition the dean of the School in which the major resides). Petition forms are available on the following websites: Office of the Registrar, the Student Advising & Learning Center, College One and the Schools.

Retroactive Add

In some rare circumstances, students are allowed to add a course after the course is completed. Petitions for retroactive adds are available from the Office of the Registrar. Each petition must include the reason for the student's failure to add the course during the semester in which it was offered. The petition must be supported by the instructor's signed approval, together with a statement from the instructor indicating knowledge of the student's participation and performance during the presentation of the course in question and the instructor's understanding as to the reason for the student's failure to add the course before the end of the semester. Once the petition is complete, it should be forwarded to the appropriate School dean for review and approval. A course grade must be assigned by the instructor. A fee is assessed on all retroactive adds.

Retroactive Drop

Occasionally, in exceptional circumstances, students are allowed to drop a course after the course is completed. Reasons for seeking a retroactive drop are very specific: medical problems, severe emotional difficulties or recent death or severe illness in the immediate family. Petitions are available from the Office of the Registrar and should include a detailed account of the problem, appropriate documentation and an adequate explanation of why an "I" grade or late drop was not taken during the semester in which the problem occurred. The instructor's signature is required on the petition. Once the petition is complete, it should be forwarded to the appropriate School dean for review and approval. A fee is assessed on all retroactive drops.

REPETITION OF COURSES

A student may repeat only those courses in which a grade of D+, D, D-, F, U, or Not Passed was received. Undergraduate courses in which a grade of D+, D, D-, or F has been earned may not be repeated on a passed/not passed basis. Similarly, a graduate course in which a C, C-, D+, D, D- or F grade is received may not be repeated with the S/U option. Repetition of a course more than once requires approval by the appropriate dean in all instances. Degree credit for a course will be given only once, but the grade assigned at each enrollment shall be permanently recorded.

Only the most recently earned grade and grade points shall be used for the first 16 University of California units repeated. In the case of further repetitions, the grade point average shall be based on all grades assigned and total units attempted.

ENROLLMENT STATUS

Certification of Full-Time Status: Undergraduate students must carry a study load of at least 15 units (including workload units) each semester in order to maintain normal progress toward their degree. At least 12 units are required for undergraduates to be certified as full-time students for financial aid purposes and to meet minimum progress requirements. Graduate students must carry a study load of at least 12 units each semester in order to be certified as full-time students.

Part-Time Student Status: If, for reasons of occupation, family responsibility, health or graduating senior status (one term only), a student is unable to attend the university on a full-time basis, he/she may qualify for enrollment in part- time status. The student must file for part-time status each semester. To be considered eligible during the specific semester, undergraduate students must be registered for 10 units (including workload units) or fewer by the 10th day of instruction and graduate students must

be registered in 6 units or fewer by the 10th day of instruction. Minimum progress requirements are waived for approved part-time students. Undergraduate petitions are available on the Office of the Registrar's website at registrar.ucmerced.edu, and at the Graduate Studies website at graduatedivision.ucmerced.edu. Students approved for enrollment on a part-time basis pay the same fees as full-time students, but pay only one-half of the educational fee. Part-time Nonresidents pay one-half of the Nonresident Tuition Fee. Undergraduates file their part-time petition with the Office of the Registrar; graduate students file their petition with the Graduate Studies Division.

PLANNED EDUCATIONAL LEAVE PROGRAM (PELP)

The Planned Educational Leave Program (PELP) allows students to suspend academic work at UC Merced, leave the campus and later resume studies at UC Merced with a minimum of procedural difficulties. Any registered student on the UC Merced campus, undergraduate or graduate, is eligible to enroll in the Planned Educational Leave Program, although restrictions may be imposed on the number of times a student can participate in the program. Undergraduate students apply for PELP at the Office of the Registrar and graduate students apply through the Graduate Studies division. Applications for PELP must be filed no later than the tenth day of instruction, but must be filed by the first day of instruction for a full refund. A $40 application fee must be paid prior to the student's enrollment in the PELP program.

The minimum Planned Educational Leave is one full semester; the maximum leave is one full academic year. Applications for PELP should be filed no later than the first day of instruction. While approved applications can be accepted as late as the tenth day of instruction, filing after the first day of instruction will entitle the student to only a partial refund of fees paid, in accordance with the Schedule of Refunds. The Schedule of Refunds refers to calendar days beginning with the first day of instruction. The effective date for determining a refund of fees is the date the completed and approved PELP form is returned to the Office of the Registrar.

While students may receive academic credit at other institutions and transfer this credit to UC Merced (subject to rules concerning transfer credit), participants are reminded that the intent of the program is to "suspend academic work." Therefore, students should carefully evaluate the desirability of taking academic work while away from the campus during PELP. Students enrolled in PELP are not eligible to enroll in concurrent courses at the UC Merced campus or to earn academic credit at UC Merced during the PELP leave.

Readmission is guaranteed assuming students did not take any courses at another institution while away on the PELP; resume regular academic work at the agreed-upon date; and satisfy any hold that may have been placed on their registration. Students who do not return at the agreed-upon date and who do not officially extend their PELP will be automatically withdrawn from the University.

Grants and other financial aid will be discontinued for the period of the PELP, but every effort will be made, where legally possible, to allow the student to renegotiate loan payment schedules and to ensure the availability of financial aid upon return.

NORMAL PROGRESS TO DEGREE

UC Merced undergraduate degree programs are designed to be completed in eight semesters or four academic years. To meet the normal progress requirement, undergraduate students are expected to enroll in and pass an average of 15 units per semester, completing the 120 units necessary for graduation in four years. An extension of enrollment beyond nine semesters requires the approval of the student's School. In order to remain in good standing, students must meet the minimum progress requirements of the campus (see Minimum Progress section of catalog).

PLANNING FOR A MAJOR

The decision on the choice of a major is a very important one and should be made on the basis of a student's interests and abilities as well as his or her career goals. Students should look carefully into the programs available by using this catalog and visiting Schools in which they are interested.

Students are encouraged to declare a major as soon as possible and should begin thinking about possible majors in their first year at UC Merced. Some major requirements demand a full four years to complete. Since students are expected to declare into a major by the time they have completed 60 units, the lower division major requirements should be planned into the student's program for the first two years.

DECLARATION AND CHANGE OF MAJOR

In order to declare or change a major a student must fill out a Change of Major/Minor petition and have it approved by the dean or other authorized person in the School to which he/she is declaring or transferring and submit it to the Office of the Registrar. This form is available on the Office of the Registrar's website. Current students are only permitted to change their major until the end of the third week of the semester and throughout the summer. Admission into a major program may be denied or deferred if the student is in academic difficulty or has a grade point average (GPA) of less than 2.0 in courses required for the selected major.

Except under unusual circumstances, no change of major will be permitted after a student has attained senior standing (90 units). It is not possible to change or declare a major in the semester in which a student has filed to graduate.

DOUBLE MAJORS

Policy available on the Office of the Registrar website (registrar.ucmerced.edu).

MINORS

In order to declare or change a minor, a student must fill out a Change of Major/Minor petition and have it approved by the dean or other authorized person in the School to which he/she is declaring and submit it to the Office of the Registrar.

ADDITIONAL ENROLLMENT OPPORTUNITIES

Leadership Excellence through Advanced Degrees (UCLEADS)

The goal of the University of California's Leadership Excellence through Advanced Degrees (UC LEADS) program is to educate California's future leaders by preparing promising students for advanced education in science, technology, mathematics and engineering (STEM). The program is designed to identify upper-division undergraduate students with the potential to succeed in these disciplines, but who have experienced situations or conditions

McNair Scholars Program

McNair Scholars are ambitious students from underrepresented groups in the professoriate, who aspire to earn a Ph.D. in any academic discipline. Participants receive summer research funding, as well as access to faculty mentoring, networking opportunities, workshops and field trips, and various other activities that help them to build the confidence that they will need to succeed in graduate school and beyond. This program is open to students of junior standing and higher. The aim of this program is to diversify the professoriate. This program honors the memory of Dr. Ronald McNair, who lost his life in the Space Shuttle Challenger explosion after overcoming the hardships of life in a segregated, impoverished community, and then reaching the heights of a Ph.D. in physics from the University of Maryland.

that have adversely impacted their advancement in their field of study. Participants receive benefits such as research funding and summer room and board.

Once chosen as UC LEADS Scholars, the students embark upon a two-year program of scientific research and graduate school preparation guided by individual faculty mentors. Scholars are provided with an excellent opportunity to explore their discipline, experience a research environment, and improve their opportunities for future study in their chosen field. The Scholar gains valuable educational experience, the University a better prepared and more diverse graduate applicant pool, and the State, well-educated future leaders. Each Scholar is mentored by a member of UC the faculty, who assists the student in designing a plan of research and enrichment activities fitted to the individual interests and academic goals of the Scholar. This "Action Plan" includes:

- academic year research
- paid summer research experience
- participation in the University-wide UC LEADS Symposium
- attendance at professional or scientific society meetings
- travel to another UC campus
- academic enrichment activities, including preparation for the Graduate Record Examination (GRE)

Alliance for Graduate Education and the Professoriate (AGEP)

AGEP is a partnership among the ten campuses of the University of California System and the National Science Foundation (NSF). The goal of this partnership is to increase the number of underrepresented minority students who acquire doctoral degrees in the fields of science, technology, engineering and mathematics (STEM), and ultimately enter the professoriate. Methods used to help see the participants through to doctoral study include:

- faculty mentoring
- campus visitations and networking opportunities
- professional and academic skills workshops
- summer enrichment opportunities

The University of California Washington Center (UCDC)

UCDC is an academic program created in 1997 for the purpose of providing approximately 30 students per term an opportunity to continue their studies while interning for a quarter in Washington D.C. Moreover, the availability of a credit-based research seminar that satisfies upper-division course requirements for a number of majors affords students the opportunity to reflect on and enlist their intern experiences in an academic exercise. UCDC is also a residential program with apartments at the centrally-located, UC Washington Center. Not only does this facilitate relocating temporarily in the nation's capital, the Center offers students a rich exposure to the Washington community through tours and an evening speaker series.

UC Center at Sacramento (UCCS)

The UCCS Academic Program gives undergraduate and graduate students a rare opportunity to learn about California's public policy and journalistic processes firsthand. The program includes rigorous coursework as well as professional experiences built while living, interning and conducting research in the State Capitol.

Offered during academic terms and summer, students enroll in classes while working 24-40 hours per week in internship placements. The UC Center at Sacramento nurtures the ongoing dialogue between the UC and Capitol Communities, promoting excellence in public policy through academics, research and public service.

Intercampus Transfer

Undergraduates may apply for transfer to another University of California campus. Copies of the Application for Undergraduate Admission are available from the Office of Admissions and Relations with Schools and Colleges and must be filed with the University of California Undergraduate Application Processing Service, P.O. Box 4010, Concord, CA 94524-4010.

The application is also available online at UC's PATHWAYS website at www.ucop.edu/pathways. Students may apply online or download a copy of the application to mail to the postal address above. Students who are or have been enrolled in a regular UC Merced semester may apply for an intercampus transfer to another UC campus, provided they have not been registered subsequently in a

regular term at another collegiate institution. A nonrefundable fee is required at the time an application is submitted.

Intercampus Visitor (ICV)

The ICV Program allows qualified undergraduate students at UCM to take advantage of educational opportunities at other UC campuses. This program enables students who are currently in good standing; have completed at least one year in residence on their home campus and have maintained a grade point average of at least 2.0 for work completed; and obtained approval from the dean of their School to take courses that are not available at their home campus, to participate in special programs or study with a distinguished faculty member at another campus for one term. A $60 application fee is also assessed to students wanting to participate in the ICV program. Students who meet the above requirements should contact the Office of the Registrar.

Simultaneous Enrollment

UC students (undergraduate) may enroll, without formal admission and without payment of additional University fees, in courses at another UC campus on a space available basis at the discretion of the appropriate campus authorities on both campuses. Students qualify for this program when they have completed a minimum of 12 units as a matriculated student at the home campus (this requirement can be waived at the discretion of the dean of the appropriate School); are enrolled at both campuses in the current term with a minimum of 12 units as a matriculated student at the home campus; are in good academic standing; and are certified by their home campus as to eligibility, residence, fee, financial aid and health status. To participate in this program, please contact the Office of the Registrar to obtain form(s) that must be filled out by appropriate authorities on both campuses and must assert that the application of a non-home UC course will or will not satisfy degree, graduation, major, General Education or other specific requirements (other than unit credit). Failure to ensure the applicability of the non-home UC course to UC Merced requirements could result in a refusal to allow the course to satisfy any specific requirements (other than unit requirements).

Intercampus Exchange Program for Graduate Students

A graduate student registered on the UC Merced campus may become an intercampus exchange student for a full term at any of the other UC campuses with the approval of the graduate advisor, the director of the graduate group and the deans of Graduate Studies on both the home and host campuses. To be eligible, the graduate student must have attended UC Merced for a minimum of one semester before participating in the intercampus exchange program. Students are limited to a maximum of two consecutive semester-based terms or three quarter-based terms on intercampus exchange. Permission for exchange is done on a semester-by-semester basis. Application forms may be obtained from the Office of the Registrar website and should be submitted four weeks in advance of the semester in which you wish to participate.

Intercampus exchange students register at both campuses and pay fees on their home campus; however, they have access to student services available on the host campus. Students should make arrangements with the Office of the Registrar to follow the enrollment procedure of the host campus so that the grades students obtain in courses taken on the host campus will be transferred to records on their home campus. Grades from courses completed on the host campus will be transferred to the home campus and become part of the student's official graduate transcript. Exchange students are considered graduate students in residence on the home campus and are not formally admitted to the host graduate school and department. For further information, contact Graduate Studies and the Office of the Registrar.

Concurrent Credit from Another Institution:

With the exception of currently registered students participating in the UC/CSU/Community College Intersegmental Cross-Enrollment Program, a student may not obtain transfer credit for courses at a non-University of California campus in a term during which the student is registered as a full-time student at UC Merced. An exception can be obtained only by petitioning the appropriate School dean well in advance of the desired registration, and the student must still be enrolled in at least 12 units at the UC Merced campus during the term in which the exception applies.

Examinations

MIDTERM EXAMINATIONS

The number of midterm examinations varies at the discretion of the instructor. In undergraduate courses for which a midterm examination is required, each student has the right to take the midterm (or submit the take-home examination as required by the instructor) during one of the regularly scheduled class meetings as defined in the Schedule of Classes. Dates and times for mid-terms scheduled outside of regularly scheduled class meeting times must be listed in the Schedule of Classes prior to registration. If an out-of-class exam is not listed in the Schedule of Classes, the scheduling of a midterm examination at a time other than a regularly scheduled class meeting requires mutual consent of the instructor and each student registered in the course. A student who does not consent in writing to the different time must be permitted to take the examination (or submit the take-home examination) at the officially scheduled time. A student who consents in writing to the change of examination time waives the right to take the midterm at the officially scheduled time.

FINAL EXAMINATIONS

Scheduling: The Schedule of Classes lists the times that final examinations are to be held. These are set up according to the day-and-hour periods in which the classes are given during the semester. This information is available online or in the Schedule of Classes each semester so that students can avoid final examination conflicts. A student who has multiple exams on the same day may discuss the situation with the instructors of the course. An instructor has the option to agree to provide the student the exam on a different day, but is not required to do so. If a change to the time of a scheduled final exam is necessary, all students in the class must agree to the schedule change in writing.

Disabilities

Students with documented disabilities may be entitled to in-class accommodations. The student must provide the instructor with a letter from the Disability Services Office recommending those academic accommodations that the instructor is responsible for

providing. Students must request accommodation as soon as possible to allow the university reasonable time to evaluate the request and offer necessary adjustments. No accommodations shall alter the nature of the academic demands made of the student nor decrease the standards and types of academic performance, nor require facilities or personnel that cannot reasonably be provided. The instructor should consult with the student and the Disability Services Center with any questions or concerns.

Religious Observances

UC Merced seeks to accommodate any student who, in observance of a religious creed, encounters an unavoidable conflict with an examination schedule. In order to request accommodation, the student is responsible for providing, in writing and at the beginning of the semester, notification of a potential conflict to the individual responsible for administering the examination. Instructors will consider such requests on a case-by-case basis and determine whether such conflicts can be resolved without imposing on the instructor or the other students in the class an undue hardship that cannot be reasonably avoided. If so, the instructor will determine, in consultation with the student, a time during which the student can take the examination without incurring a penalty or violation of the student's religious creed.

CREDIT BY EXAMINATION

Students currently registered in any regular semester and in good academic standing who by reason of advance preparation believe themselves to be adequately grounded in the materials and principles of a given course may petition for credit by examination for any course offered at UC Merced without formally enrolling in that course. Students may obtain a petition and a copy of the prescribed conditions from the Office of the Registrar's website at registrar.ucmerced.edu.

The petition is subject to the approval of the instructor giving the examination and the dean of the School involved. Once the petition has the signed approvals of the appropriate dean, it should be submitted to the Office of the Registrar, accompanied by the mandatory fee.

Owing to special features of the instruction, such as extensive laboratory work, certain courses may not be considered appropriate for obtaining credit by examination. In addition, credit by examination will not be approved in the following circumstances:

(1) for a student who has had prior instruction in the topic,

(2) for the purpose of repeating a course,

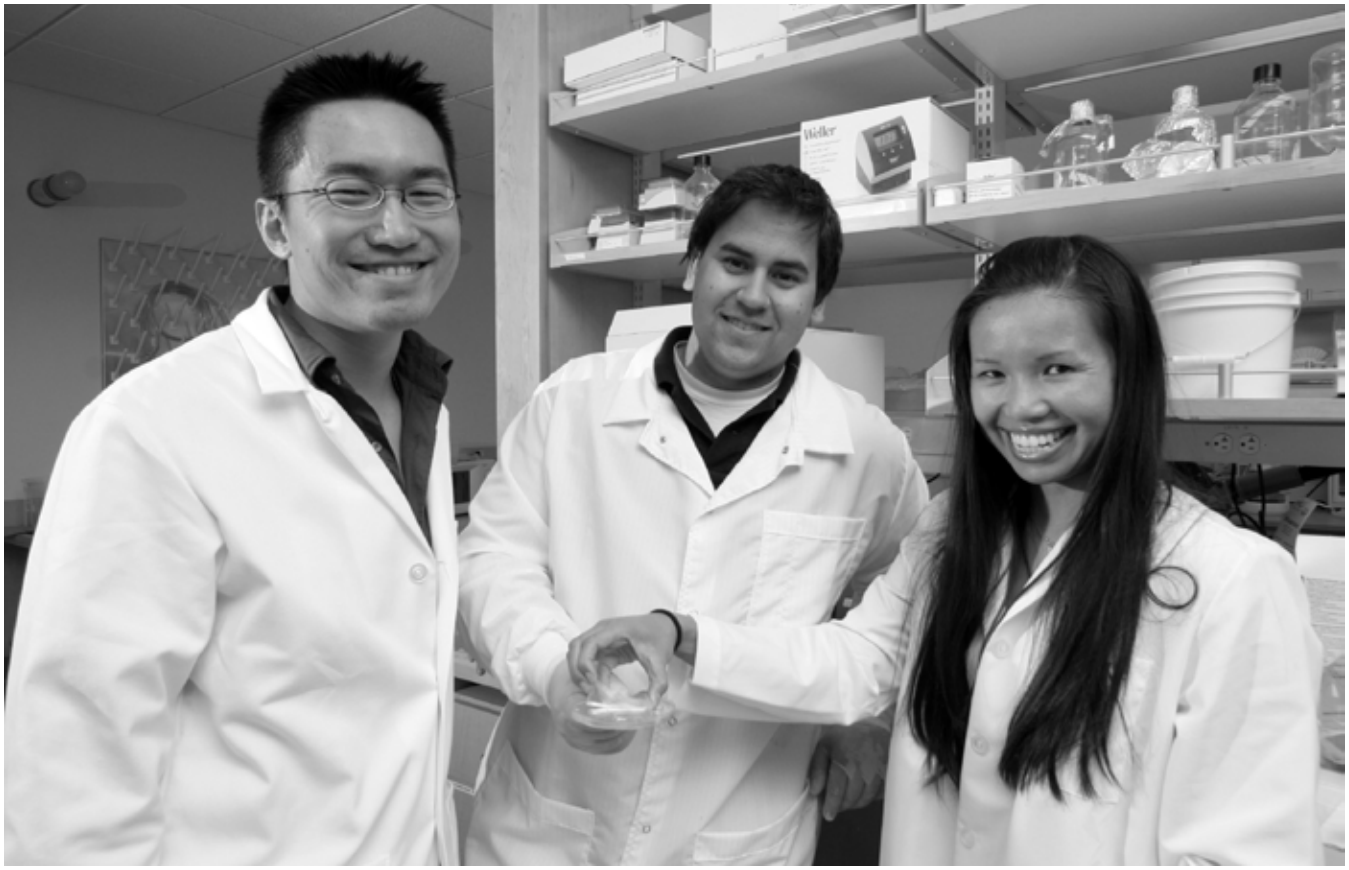
(3) for courses in subjects in which the student has completed more advanced work,

(4) for elementary and intermediate courses in a student's native language or

(5) for granting credit for a course which the student has attended and audited.

To earn credit through the credit by examination process, the examination must be given by a UC Merced instructor and be for a course listed in the current General Catalog. The final results will be reported to the Office of the Registrar, who will record the appropriate grade and grade points. Since failure to pass the examination will be recorded as an F, students are encouraged to prepare fully for such an examination before attempting it.

Students Chi-Shuo Chen and Anthony Grimes work with Professor Michelle Khine on shrinky-dink microfluid devices.



Grades, Progress To Degree And Dismissal

GRADES

The work of all students on the UC Merced campus is reported in terms of the following grades:

A	(excellent)
B	(good)
C	(fair)
D	(barely passing)
F	(not passing)
P	(passed at a minimum level of C- or better by an undergraduate student)
S	(satisfactory - passed at a minimum level of B or better by a graduate student)
NP	(not passed)
U	(unsatisfactory)
I	(incomplete)
IP	(in progress)
NR	(no report, when an instructor fails to report a grade for a student)
W	(withdrawn from the course-after the fourth week of instruction).

Grades of A, B, C and D may be modified by a plus (+) or minus (-).

Credit Toward Degree Requirements

A course in which the grade A, B, C, D, P or S is received is counted toward degree requirements. A course in which the grade F, NP or U is received is not counted toward degree requirements. Grades of I or IP are not counted until such times as they are replaced by grades A, B, C, D, P or S.

Grade Points

Grade points are assigned as follows: A+ = 4.0, A =4.0, A-= 3.7, B+ = 3.3, B = 3.0, B- = 2.7, C+ = 2.3, C = 2.0, C- =1.7, D+ = 1.3, D = 1.0, D-= 0.7, F = 0.0, I=0.0. The grades P, S, NP, U, I and IP carry no grade points and the units in courses so graded are excluded in determination of the grade point average.

Grade Point Average

A student's grade point average is computed on courses undertaken in the University of California, with the exception of courses undertaken in University Extension. Grades A, B, C, D and F are used in determining the grade point average; grades I, IP, P, S, NP and U carry no grade points and are excluded from all grade point computations.

Change of Grade

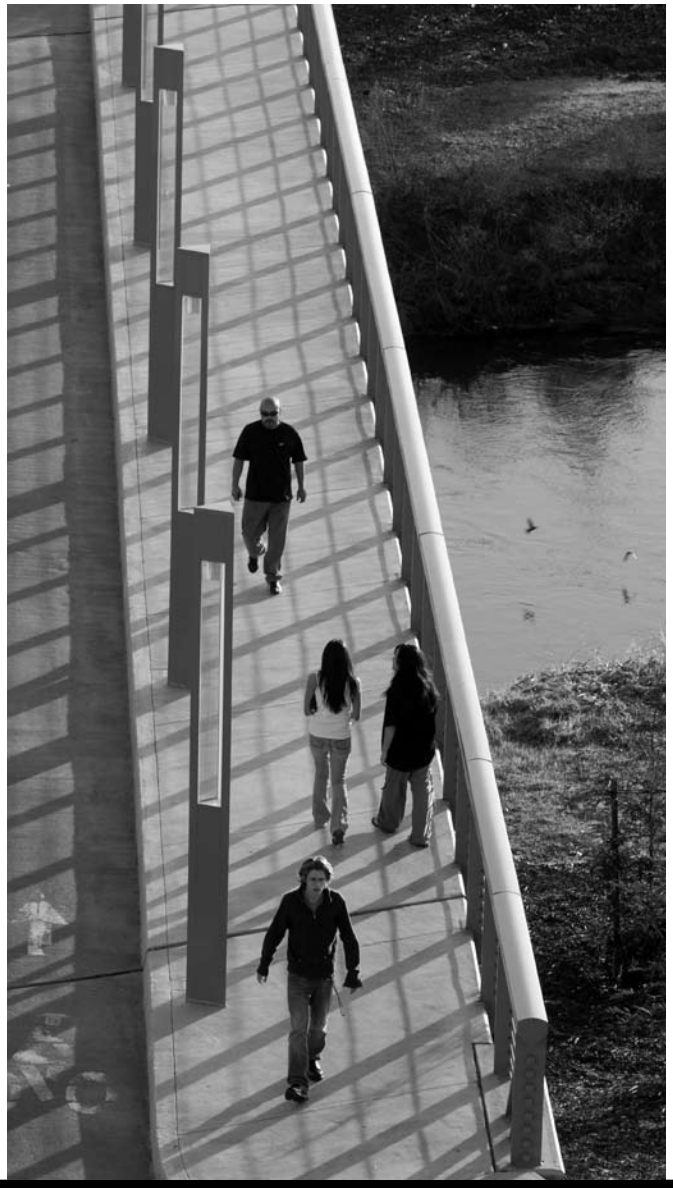
All grades except Incomplete and In-Progress are considered final when assigned by an instructor at the end of a term. An instructor may request a change of grade when a computational or procedural error has occurred in the original assignment of a grade, but a grade may not be changed as a result of re-evaluation of a student's work. No final grade may be revised as a result of re-examination or the submission of additional work after the close of the semester.

Grade changes for "clerical" errors (such as incorrect addition of points), upon documentation, are automatically granted. Requests to interchange P, NP, S or U grades with normal letter grades based upon student need (such as to allow graduation or to meet entrance requirements for professional school) do not involve clerical or procedural errors and are automatically denied. Thus, students should exercise the Passed/Not Passed or Satisfactory/Unsatisfactory grading options with caution.

Students are reminded of their responsibility to be aware of the procedures and regulations contained in this catalog and the Schedule of Classes, to verify their class schedule and to familiarize themselves with the expectations of their instructors. No changes, except completion of an I grade as noted above, can be made to the student's record once he or she has graduated.

I came to UC Merced to get a UC-level education close to home.

—Katie Heaton, student, Resident Assistant



Grade I (Incomplete)

The grade of I may be assigned when the instructor determines that a student's work is of passing quality and represents a significant portion of the requirements for a final grade, but is incomplete for a good cause (good cause may include current illness, serious personal problems, an accident, a recent death in the immediate family, a large and necessary increase in working hours or other situations of equal gravity). It is the student's responsibility to obtain written permission from the instructor to receive an I grade as opposed to a non-passing grade. An Incomplete petition is available from the Office of the Registrar's website and must be filed prior to the end of the final examination period. If, however, extenuating circumstances exist where submission of the I grade petition is not possible before the end of the final examination period, an instructor may submit an I grade; however, the petition, including student and instructor signatures, must be submitted to the Office of the Registrar before the first day of instruction of the next semester (which would include the summer sessions). If the petition is not received by the Office of the Registrar before the first day of instruction of the next semester, then the I grade will revert to an F, NP, or U.

If an I grade is assigned, students may receive unit credit and grade points by satisfactorily completing the coursework as specified by the instructor. Students cannot re-enroll in the course to complete an I grade doing so would result in the course being recorded twice on the transcript.

I grades are not counted in computing the grade point average. Except as noted below, any I grade that has not been replaced within the deadlines will revert to an F, NP, or U. The grade will retroactively be counted in computing a student's grade point average.

Exception: If a degree is conferred before the end of the deadlines above following the assignment of an I grade, the grade will not be converted to an F, NP, or U. However, the student still has the option of removing the I grade within the deadlines above. Students with 15 or more units of I on their record may not register without permission of the appropriate dean.

Grade IP (In Progress)

For a course extending over more than one semester where the evaluation of the student's performance is deferred until the end of the final semester, provisional grades of In Progress (IP) shall be assigned in the intervening terms. The provisional grades shall be replaced by the final grade if the student completes the full sequence. The grade IP is not included in the grade point average. If the full sequence of courses is not completed, the IP will be replaced by a grade of Incomplete. Further changes in the student's record will be subject to the rules pertaining to I grades.

At UC Merced there's a special spirit and community within the classroom and across campus. It's exciting to both witness and participate in the growth of such a dynamic institution.

—Professor Kathleen Hull, Anthropology

Executive Vice Chancellor and Provost Keith Alley talks to a student group.

Grade Passed/Not Passed (P/NP)

Undergraduate students in good standing who are enrolled in at least 12 units may take certain courses on a passed/not passed (P/NP) basis. Students may enroll in one course each term on a P/NP basis (two courses if they have not elected the P/NP in the preceding term), not including Freshman Seminars which are always P/NP courses.

Changes to and from the P/NP option must be made during the enrollment period. No changes can be made after the first two weeks of classes without the approval of the appropriate dean. A student may not repeat on a P/NP basis a course that was previously taken on a letter-graded basis.

The grade P is assigned for a letter grade of C- or better. If the student earns a grade of D+ or below, the grade will be recorded as NP. In both cases, the student's grade will not be computed into the grade point average.

Credit for courses taken on a P/NP basis is limited to one-third of the total units taken and passed on the UC Merced campus at the time the degree is awarded.

A course that is required or a prerequisite for a student's major may be taken on a P/NP basis only upon approval of the faculty. Schools may designate some courses as passed/not passed only. Students do not have the option of taking these courses for a letter grade.

Grade Satisfactory/Unsatisfactory (S/U)

The grade of S is awarded to graduate students for work in graduate courses that otherwise would receive a grade of B or better.

Graduate students, under certain circumstances, may be assigned grades of S or U, but units earned in this way will not be counted in calculating the grade point average. Petitions to elect S/U grading are available from the Graduate Division's website at gradstudies.ucmerced.edu and must be signed by the student's graduate advisor. Graduate students may petition to take no more than one course per semester on an S/U grading basis. A graduate course in which a C, D or F grade is received may not be repeated with the S/U option.

In specific approved courses, instructors will assign only Satisfactory or Unsatisfactory grades. Such courses count toward the maximum number of units graded S allowable toward the degree, as specified by each degree program.

GRADING OPTIONS

Unless otherwise stated in the course description, each course is letter graded with a P/NP or S/U option (unless required for your major or graduate program), not including Freshman Seminars which are always P/NP courses.

Students have until the end of the second week of each semester to change the grade option on a course via MyRegistration, accessible through MyUCMerced. After the second week of each semester and up until the last day of instruction for that semester, a student may only change the grade option on a course with the approval of their School dean using the Course Addition/Change form available on the Office of the Registrar's website: registrar.ucmerced.edu. Students in good standing who are changing a grade option for a course from a letter grade to a P/NP option must conform to the rules guiding the taking of courses on a P/NP basis (see section on Passed/Not Passed).

MID-SEMESTER GRADES

Mid-semester grades provide students in lower division courses with early feedback (both positive and negative) about their academic performance. Mid-semester grades provide an opportunity for students to receive positive reinforcement and motivation if they are doing well, and to identify those who are struggling. Mid-semester grades allow faculty, advisors and services on campus to intervene with students who are in academic difficulty, while there is still time in the semester. Mid-semester grades for all lower division courses only are reported at the end of the seventh week of the semester, and all grades are submitted as letter grades for letter-graded courses (regardless of whether the student has elected to take the course as P/NP). If a course is P/NP only, all grades will be submitted as P/NP. Mid-semester grades are notational grades which are used to help ensure the academic success of UC Merced students in lower division courses. These grades are not recorded in any permanent record or on a student's academic transcript.

All mid-semester grades of D+, D, D- or F on any course requires freshmen-only students attend a one-hour Academic Success Workshop. Attendance is mandatory and a hold for future semester course registration can only be removed by fully participating in the one- hour workshop. Sophomores with a D+, D, D- or F grade are encouraged to attend an Academic Success Workshop; however, they can have the hold for future semester course registration released by meeting with their academic advisor.

FINAL GRADES

After grades are recorded for a semester or summer session, they are available online via MyStudentRecord (accessible via MyUCMerced). With the availability of online grade reporting, students can print their grade reports from the Internet.

Dean's Honor List

Students will be eligible for the Dean's Honor List if they have earned in any one semester a minimum of 12 graded units with a 3.5 grade point average or better with no grade of I or NP. Dean's Honors are listed on student transcripts. Any student who has been found to violate the academic integrity policies during an academic year will not be eligible for the Dean's Honor List during that academic year.

Chancellor's Honor List

Students who are placed on the Dean's Honor List for both semesters in a single academic year (fall and spring) will be placed on the Chancellor's Honor List for that academic year.

Minimum Progress

The following provisions apply to all undergraduates. Graduate and professional students with scholarship deficiencies are subject to action at the discretion of the Division of Graduate Studies.

a. Minimum Progress-Qualitative Standards
An undergraduate student will be placed on academic probation if at the end of any term the student's grade point average:

UC Merced's Womens' Volleyball team prepares for a game.

is less than 2.0, but not less than 1.5, for the term

or

is less than 2.0 for all courses taken within the University of California.

An undergraduate student is subject to academic dismissal from the University if at the end of any term:

the student's grade point average for that term is less than 1.5;

or

the student has completed two consecutive terms on academic probation.

In the case of probation or dismissal, the official transcript will state "Academic Probation or Academic Dismissal." Once a student has met qualitative standards for scholarship, the student will return to good standing.

B. Minimum Progress-Quantitative Standards
An undergraduate student is subject to probation if he or she does not complete a minimum of 12 UC units if he or she attends only one semester in an academic year or 24 UC cumulative units for two semesters in an academic year (minimum progress is not calculated in the summer, although course work taken in summer can allow a student to catch up or get ahead of the minimum progress requirements). All deficient academic units must be made up in the next consecutive academic year in addition to the minimum (24) units required in that academic year. If the student meets the next applicable minimum progress requirement for quantitative standards, the student will return to good standing. If a student has not returned to good standing for quantitative standards in the next consecutive academic year, the student will be subject to disqualification.

Minimum progress requirements do not apply to students who have a dean's approval to carry less than the minimum progress load because of medical disability, employment, a serious personal problem, a recent death in the immediate family, the primary responsibility for the care of a family or a serious accident involving the student.

PROBATION AND DISMISSAL

An undergraduate student on academic probation or subject thereto is under such supervision as the faculty of that student's School may determine. Continued registration of an undergraduate student subject to academic disqualification is at the discretion of the faculty concerned, or its authorized agent, and is subject to such conditions as that faculty may impose.

A student will be placed on probation or subject to disqualification for failure to meet qualitative or quantitative standards of scholarship as described in the minimum progress section.

The qualitative standards of scholarship require that a student maintain a C average (2.0) or better for all work undertaken in the University and for the work undertaken in any one semester.

The quantitative standards, referred to as minimum progress requirements, define scholarship in terms of the number of units that a student must satisfactorily complete. It is assumed that a student will earn the 120unit minimum degree requirement within 8 semesters (four years). This means students must plan to complete, on average, 15 units per semester.

DISMISSAL

Undergraduate students may be dismissed for either qualitative or quantitative reasons (defined above) based on the decision of the dean of the School in which the student is affiliated. Should a former UC Merced student later wish to be readmitted to UC Merced, the authority to do so rests with the dean of the School from which the student was dismissed (see Readmission Policy). Students are encouraged to see their advisor or go to the dean's office of their School or to the Student Advising and Learning Center if they need academic advising in regards to probation and dismissal.

Readmission/Reinstatement

Policy available on the Office of the Registrar website (registrar.ucmerced.edu).

Transfer with Scholastic Deficiencies

To transfer from one campus of the University to another, or from one School to another on the same campus, a student who has been academically disqualified or is on academic probation must obtain the approval of the dean to whose jurisdiction the student seeks to transfer.

TRANSCRIPTS AND RECORDS

Transcripts may be ordered via the National Clearing House website (for routine request) or the Office of the Registrar (for rush request and overnight delivery). See the Office of the Registrar's website at registrar.ucmerced.edu for further information. At times other than the end of the semester, the normal period required for processing and issuing transcripts for both registered and former students is 7 to 10 working days after receipt of the student's request (plus mailing time). There is a $7 charge for each routine transcript request and $14 charge for each rush transcript request. There is an additional $15 dollar per address charge for overnight delivery. The alumnus/a student's financial account must be paid in full prior to the processing of the transcript request, and the transcript fees must be either paid online through the National Clearing House or accompany the application. Students who urgently need a transcript that would normally take 7 to 10 days to issue can expect processing within 2 days for the rush transcript request (plus mailing time).

Transcripts of all work done through UC Merced's Division of Professional Studies must be requested directly from that division. Contact Professional Studies at (559) 241-7400. Transcripts of work completed at another campus of the University or at another institution must be requested directly from the campus or institution concerned.

Access to Records: Students are entitled by law and University policy to examine and challenge most of the records that the University maintains on them. These records are confidential and in most circumstances may be released to third parties only with the student's prior consent.

CHANGE OF NAME AND ADDRESS

Students may petition to change their name on official University records. The form can be downloaded from the Office of the Registrar's website. Legally recognized proof of the change of name will be required before the petition is accepted and processed. (Students planning to graduate should file this petition no later than the fifth week of the semester in which they intend to graduate.)

Students may also update their address(es) using MyStudentRecord

or submit a Change of Address form downloaded from Office of the Registrar's website.

LEAVING UC MERCED

Students who find that they cannot attend the University for a semester in which they have enrolled may cancel their registration only if instruction for that semester has not yet begun. To do so, they must formally request a cancellation of their registration from the Office of the Registrar. If instruction has already begun and students find it necessary to stop attending all classes, they must formally request withdrawal from the University. When a completed withdrawal form is approved by the dean of the School with which the student is affiliated (after the fourth week of instruction), a W notation will be assigned for each course in which the student has been enrolled. Students will not be eligible to re-enroll until they have been readmitted. Students who withdraw during a semester must file a Notice of Cancellation/Withdrawal, available from the Office of the Registrar's website at registrar.ucmerced.edu. Before considering a complete withdrawal, students are urged to consult an academic advisor and the Office of Financial Aid and Scholarships, if appropriate, to consider the full implications of this action.

Please see the refund policies for specific details on refund rules. Students who fail to submit an approved petition for cancellation/withdrawal will receive F, NP or U grades, as appropriate, for all courses in which they are enrolled for that semester.

Graduation

Residency Requirement

Each candidate for the bachelor's degree must complete 24 of the last 36 units in residence in the school of the University of California in which the degree is to be earned. Under certain circumstances, exceptions may be granted by the appropriate dean, such as when a student attends classes at another UC campus as an approved visitor or participates in one of the following: UC Education Abroad, UC Washington Center Program or UC Sacramento Center.

Scholarship Requirement

To receive a bachelor's degree, a candidate must have a 2.0 grade point average in all courses attempted at the University.

UNDERGRADUATE STUDENTS

Declaration of Candidacy: Students expecting to complete work for their degree by the end of a semester must declare their candidacy by filing a Declaration of Candidacy, accompanied by the appropriate fee, with the Office of the Registrar for the semester in which they plan to receive the degree. Students have until December 1 of each year to file to graduate in the following Spring or Summer terms, or until April 1 of each year to file to graduate in the following Fall term.

Degree Check

The Office of the Registrar will check all pertinent records to ensure that the student has completed a minimum of 120 units and appropriate institutional requirements and is in good academic standing. The student's School will check for the fulfillment of major and School requirements.

Honors at Graduation

To be eligible for honors at graduation, a student must have completed a minimum of 50 semester units at the University of California, of which a minimum of 43 units must have been taken for a letter grade and a minimum of 30 units must have been completed at UC Merced. The grade point average achieved must rank in the top 2 percent of the student's School for highest honors, the next 4 percent for high honors, and the next 10 percent for honors at graduation. The number of recipients eligible under these percentages shall be rounded up to the next higher integer.

GRADUATE STUDENTS

Before a graduate degree can be conferred, candidates must have been advanced to candidacy and completed the master's thesis or doctoral dissertation and any required comprehensive or oral examinations. Students will receive an electronic notification indicating whether they have been advanced to candidacy. To report an error, go to the Office of the Registrar.

COMMENCEMENT

UC Merced conducts its annual Commencement ceremony following the spring semester. Graduating students are strongly encouraged to participate with their classmates. Commencement celebrates the academic achievements of our undergraduate and graduate students and the impact they will have as they transition from the University to the world beyond.

Each student may participate in only one Commencement ceremony as an undergraduate. Graduate students may participate in two ceremonies if masters and doctoral degrees are conferred in separate years. Undergraduates may choose to participate in the Commencement ceremony if they completed their degree requirements the prior fall, or if they anticipate completing their degree requirements in spring, summer or the next fall semester.

Students who complete their degree requirements in a fall semester may elect to participate in Commencement the spring prior to their completion date or they may cross the stage the following spring.

Participating in Commencement does not indicate confirmation that degree requirements have been fulfilled. Diplomas are not distributed at Commencement and degrees are not awarded until all requirements are completed.

DIPLOMAS

Diplomas are not distributed at commencement but are available several months afterward. Diplomas will be available for students to pick-up approximately 3 months after the semester or term that degree requirements were completed. The Office of the Registrar can mail diplomas to the address listed on the Declaration of Candidacy form (Domestic/International fees are applicable). The Office of the Registrar will retain diplomas for five years only.

General Education And College One

> EDUCATION IS WHAT REMAINS AFTER ONE HAS FORGOTTEN EVERYTHING...LEARNED IN SCHOOL.
>
> —Albert Einstein, Recipient of Nobel Prize In Physics and Professor of Theoretical Physics, Princeton University

General Education

What is general education? All universities aspire to educate the whole student. General education provides you with the practical skills and diverse knowledge base that you will need to become a good problem-solver after graduation. You will be entering the workplace in an era of rapid change; your future career may ultimately be in a field that doesn't exist today. Through general education, you will craft for yourself the tools that will let you continue to grow in a world that demands lifelong learning for success.

General education at UC Merced will help you grow intellectually by:

- Strengthening your abilities in quantitative reasoning and written, oral and other communication skills; and
- Introducing and teaching you to integrate broad domains of knowledge: arts and humanities; social and cognitive sciences; natural sciences; and technologies and engineering methods.

Throughout your undergraduate years, UC Merced's general education program will help you fine-tune your ability to communicate through words, numbers, images, and actions; and enable you to discover the many ways in which knowledge is created and put to good use.

General education at UC Merced places a high premium on demonstrating the ways in which different disciplines can make links with each other. There will also be an emphasis on practicing and applying what you are learning in the classroom—an educational value also reflected in the undergraduate majors at UC Merced.

The faculty has created a set of principles that embody the kinds of learning to be achieved through general education at UC Merced. You will encounter these principles in action through the Core Course sequence, a unique opportunity for all UC Merced undergraduates to share a common exploration of the issues that will affect your future. All freshmen and juniors will take a Core Course.

GUIDING PRINCIPLES FOR GENERAL EDUCATION AT UC MERCED

UC Merced's educational experiences are designed to prepare well-educated people of the 21st century for the workplace, for advanced education and for a leadership role within their communities. UC Merced graduates will be exceptionally well prepared to navigate and succeed in a complex world. The principles guiding the design and implementation of our academic program are envisioned within a continuum that ranges from preparatory and advanced curricula in general education and in the majors, through a variety of educational activities inside and outside the classroom.

All UC Merced graduates will reflect these principles, which provide the foundation for their education:

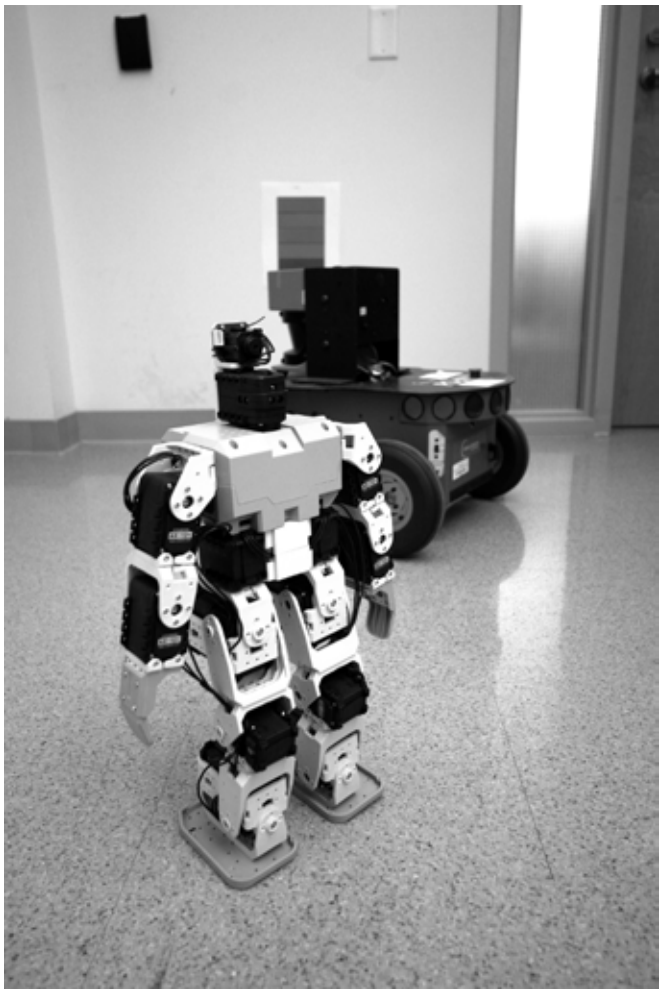
- **Scientific Literacy:** To have a functional understanding of scientific, technological and quantitative information, and to know both how to interpret scientific information and effectively apply quantitative tools;
- **Decision Making:** To appreciate the various and diverse factors bearing on decisions and the know-how to assemble, evaluate, interpret and use information effectively for critical analysis and problem solving;
- **Communication:** To convey information to and communicate and interact effectively with multiple audiences, using advanced skills in written and other modes of communication;
- **Self and Society:** To understand and value diverse perspectives in both the global and community contexts of modern society in order to work knowledgeably and effectively in an ethnically and culturally rich setting;
- **Ethics and Responsibility:** To follow ethical practices in their professions and communities, and care for future generations through sustainable living and environmental and societal responsibility;
- **Leadership and Teamwork:** To work effectively in both leadership and team roles, capably making connections and integrating their expertise with the expertise of others;
- **Aesthetic Understanding and Creativity:** To appreciate and be knowledgeable about human creative expression, including literature and the arts; and
- **Development of Personal Potential:** To be responsible for achieving the full promise of their abilities, including psychological and physical well-being.

GENERAL EDUCATION REQUIREMENTS

The UC Merced general education program consists of courses that are informed by the Guiding Principles and that meet the following graduation requirements:

- University requirements,
- Campus requirements, and
- School requirements.

In consultation with faculty, with advisors in the Student Advising and Learning Center and with advisors in your major program, you should keep track of your progress in fulfilling university, campus and school requirements for general education.



Humanoid robot used by Professor Stefano Carpin.

A. UNIVERSITY REQUIREMENTS

- University of California Entry Level Writing Requirement (formerly, Subject A Requirement)
- American History and Institutions

University of California Entry Level Writing Requirement/ Analytical Writing Placement Exam (formerly, Subject A)

To succeed at UC Merced, you must be able to understand and to respond adequately to written material typical of reading assignments in freshman courses, including being able to structure and develop an essay that uses written English effectively. Any student who has not yet satisfied this entrance requirement through one of the alternatives listed below will be required to complete it by the end of the second semester of enrollment at UC Merced. Failure to complete this requirement in the time allowed will result in a hold on a student's registration. Students may satisfy the University of California Entry Level Writing Requirement in any of the following ways:

• Score 3, 4 or 5 on the College Board Advanced Placement Examination in English (Language or Literature);

• Score 30 or higher on the ACT combined English/Writing Test;

• Score 680 or higher on the College Board SAT Reasoning Test Writing Section or the SAT II: Writing Subject Test;

• Score 5 or higher on the International Baccalaureate Higher Level Examination in English (Language A only);

• Prior to enrolling in the University, complete with a grade of C or better a transferable college course in English composition worth four quarter or three semester units;

• Achieve a passing score on the University's writing proficiency examination, called the University of California Analytical Writing Placement Exam (formerly, Subject A Examination); or

• Complete an acceptable writing course at UC Merced (WRI 1 or other acceptable course).

The University offers the University of California Analytical Writing Placement Exam (formerly, Subject A Examination) each spring on the second Saturday in May at test centers throughout the state for students who plan to enroll in the University the following fall. California residents who will enter the University as freshmen must take the exam if they have not otherwise satisfied the requirement (by one of the methods listed above). Students must pay a nonrefundable fee to cover test administration costs. Students who received admission application fee waivers will automatically have this fee waived.

Students will receive detailed information about the exam in April. Students who are not from California may take an equivalent exam in the fall after enrolling at the University.

University of California Entry Level Writing Requirement/ Subject A Online

Comprehensive information about the University of California Entry Level Writing Requirement/Subject A Requirement and examination is available at www.ucop.edu/sas/sub-a.

American History and Institutions Requirement: As a candidate for an undergraduate degree at UC Merced, you need to demonstrate knowledge of American history and of the principles of American institutions under the federal and state constitutions. You may meet the requirement by completing specific courses or earning a certain score on an examination. Transfer students are urged to complete the requirement before they enroll.

You may satisfy both the American History and American Institutions requirements in the following ways:

1. Complete in high school one year of United States history with grades of C or better, or one semester of United States history and one semester of United States government with grades of C or better;

2. Achieve a score of 3, 4 or 5 on the College Board Advanced Placement Examination in U.S. History;

3. Achieve a score of 550 or better on the SAT II: U.S. History test;

4. Complete acceptable course work at a community college or other accredited institution; or

5. Complete acceptable course work at UC Merced (both HIST 16 and HIST 17).

B. CAMPUS REQUIREMENTS

- Two-Semester CORE Course sequence
- Lower division writing course
- College-Level mathematics/quantitative reasoning course

The World at Home—Planning for the Future in a Complex World

The CORE Course sequence is future-oriented, striving to help students gain the intellectual tools, knowledge and insights that will help informed citizens devise future solutions to real-life problems. The UC Merced CORE Course sequence aims to understand the world at large as it is reflected in the world at home—California. By examining, for example, the local evidence of global problems, you will begin to grapple with the issues that will affect you personally and professionally.

CORE 1 will pose a set of questions as they are framed by the various domains of human knowledge known as the disciplines. CORE 100 will give you a chance to build on what you have been learning during your first two years by returning to the questions introduced in CORE 1 and trying out different ways to find answers. CORE 100 is required of all transfer students as well as all continuing UC Merced students.

In CORE 1, UC Merced faculty will introduce you to how their disciplines define the challenges faced by informed citizens of this new century.

For example:

- Can advances in technology mitigate the effects of burgeoning populations and resource depletion?
- How will a changing climate affect the future migration of human populations?
- How do citizens decide among conflicting ethical choices, each with a compelling claim?

Faculty from all three Schools will join together to show how such complex questions might best be probed through connecting the insights of their disciplines.

CORE Friday!

The CORE Course sequence is College One's unique way to introduce you to how the disciplines understand problems and devise tools to grapple with them. Faculty from all three schools— Natural Sciences, Engineering, and Social Sciences, Humanities and Arts—challenge freshmen to think about ways that academic disciplines connect or debate with one another.

CORE Friday is part of what makes CORE 1 unique. CORE Friday events round out the week's lectures and discussions with a film, documentary, panel discussion, theatrical production or distinguished speaker. CORE Friday programming illuminates ideas presented during the CORE 1 lectures for the week, as well as alternative views.

In my 30 year career, I have never enjoyed teaching as much as I have here at UC Merced. It is the highlight of my day.

—Professor Will Shadish, Psychology

As a junior in CORE 100, you will begin to apply what you have learned during your first two years from your lower division general education and the introductory work in your chosen major. Every society needs people who can solve problems, and increasingly, problem-solving is accomplished by many professions through multidisciplinary team efforts. The goal of this course is to teach students problem-solving skills through the experience of working on a multidisciplinary team to formulate a solution for a societal problem. The team will be composed of students from several majors to provide the breadth needed for a multidisciplinary approach; and will address the pros and cons of proposed solutions from scientific, cultural, ethical and economic perspectives.

Across the two semesters of the CORE Course sequence, you will:

- work together in groups on joint projects or problems, to build your leadership and teamwork abilities;
- learn to think analytically and communicate effectively in the context of problems affecting your lives and futures;
- use quantitative methods as well as ethical judgment to make decisions and defend those decisions to your peers; and
- in CORE 100, present your solutions in a public

Famed singer and songwriter Carmencristina Moreno at a Core Friday event celebrating the life of Cesar Chavez.

presentation, which would include written, graphic and oral elements and even allow you to write and perform brief plays or songs, or create art in other media.

Lower Division Writing Course

Analytical writing is a means for understanding better what you are learning and conveying your ideas to different audiences: your instructors, your fellow students and people outside the university. The lower division writing requirement will start you on a path of writing development that will continue through your four years at UC Merced.

WRI 10: College Reading and Composition

This course is designed to help you develop your college-level skills in effective use of language, analysis and argumentation, organization, and strategies for creation, revision and editing. It must be completed during your freshman or sophomore year.

Mathematics/Quantitative Reasoning

All students will take a college-level mathematics/quantitative reasoning course. For some of you, mathematics and statistics will be an essential tool for mastering a field in depth. For others, you will build your ability to understand how quantitative methods are applied in society to support arguments and solve problems. A variety of courses will be available to meet this requirement, based on your field of interest. Check the requirements of the major that interests you, in the School section of the catalog, for information on courses that satisfy Mathematics/Quantitative Reasoning.

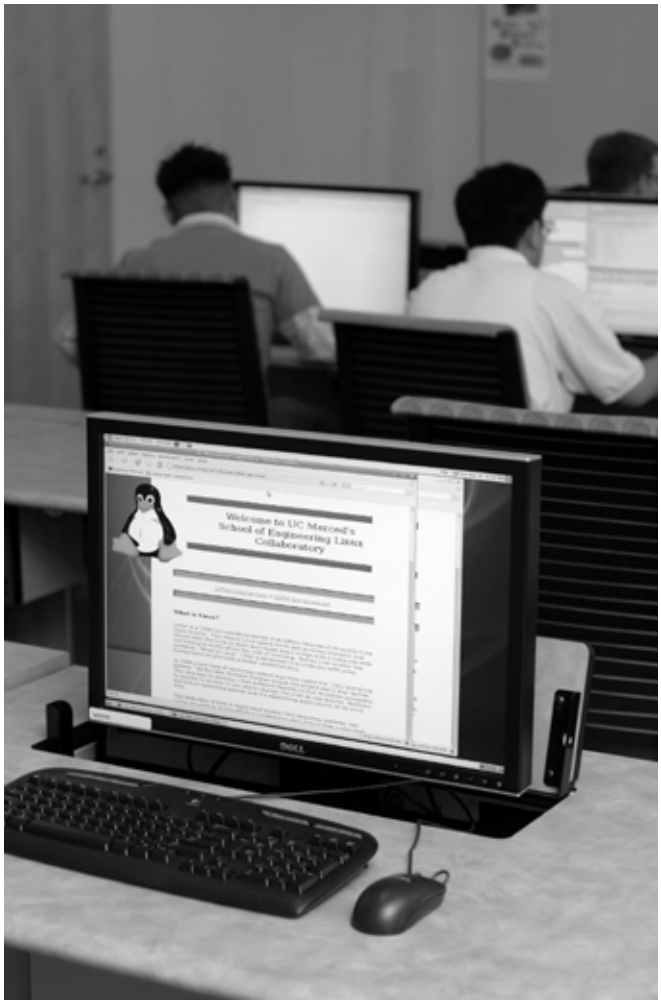
C. SCHOOL REQUIREMENTS

The Schools of Engineering, Natural Sciences, and Social Sciences, Humanities and Arts each have a set of general education requirements to be completed if you choose a major offered by that School. School requirements include courses to help you build the collateral knowledge and skills you will need in order to succeed in your major. School requirements also include courses to help you understand the broad domains of knowledge. Check the School section of this catalog for specific requirements.

FOR TRANSFER STUDENTS: SATISFYING GENERAL EDUCATION

In addition to meeting the transfer admissions requirements described in the Undergraduate Admissions section of this Catalog, transfer students should complete an acceptable general education course pattern and preparatory courses for the intended major, prior to transfer. Successful completion of general education and major preparation will assure that you do not need to take any additional lower division courses at UC Merced. For detailed information on how transfer students can satisfy lower division general education and major preparation requirements, see the Catalog section on the School which offers your intended major. Please note the following:

California Community College transfer students who complete the Intersegmental General Education Transfer Curriculum (IGETC) satisfy all lower division general education requirements at UC Merced. For further details, see the Catalog section on the School which offers your intended major. Transfer students from other University of California campuses who have completed lower division general education requirements at the UC campus have satisfied lower division general education requirements at UC Merced.



Students planning to transfer from other colleges or universities to UC Merced should confer with a UC Merced admissions counselor as early as possible about course patterns that will satisfy UC Merced's lower division general education requirements.

Being at UC Merced makes me feel like I am a part of UC history.

—Mary Panos, student, Resident Assistant

School of Engineering

The mission of the School of Engineering is to provide an exceptional technical and professional education that instills in our students advanced problem-solving skills, effective leadership qualities, and the ability to recognize and build on individual strengths throughout one's career.

THE SCHOOL OF ENGINEERING OFFERS THE FOLLOWING MAJORS:

- Bioengineering (BIOE)
- Computer Science and Engineering (CSE)
- Environmental Engineering (ENVE)
- Materials Science and Engineering (MSE)
- Mechanical Engineering (ME)

What Is Engineering?

Engineering is about problem solving, innovation, and the creation of devices, systems, processes, and structures for human use. Engineers create new ideas and then transform those ideas into products and services that improve people's lives. Engineers apply mathematics and the principles of science—particularly chemistry and physics—to solve problems and meet the needs of society. Engineering spans the very small to the very large, from micro-sensors that can continuously monitor human health, to space stations that can support the exploration of new worlds. It also touches our everyday lives.

Engineering has provided our shelter, our transportation, our entertainment, our medical supplies and technologies, our water supplies, the food we eat, the movies we watch, the appliances that make our lives easier, and the protection of our environment. Engineering careers are among the highest in demand in the United States, and as a result, provide great personal and professional satisfaction and quality of life. Engineering is a "people-serving profession" and a pathway to financial security. In short, engineering makes the world work!

LETTER OF WELCOME FROM THE DEAN

Dear Future Engineer:

I am delighted to learn of your interest in UC Merced and, in particular, your interest in becoming an engineer. Engineering is a remarkable profession—one that provides a solid foundation for careers of leadership and responsibility.

You are about to begin an exciting journey. Your engineering education at UC Merced will be both challenging and satisfying, and will give you the chance to meet some extraordinary people: world-class faculty, committed fellow students, and dedicated staff. These associations will develop during your time at UC Merced, will last throughout your career, and be a source of intellectual nourishment well into the future. From the time you enter our program you will be exposed to new technologies that will become the tools that you will use in solving problems and delivering exciting new products and services to society. Engineers have been and will continue to be the designers and builders of the things that improve people's lives.

Your education in Engineering is a launch pad. Some of you will go on to pursue careers in engineering design, others will become engineering managers, and still others will pursue graduate education in engineering or perhaps go on to other professions such as law or medicine. Once you master the methods of engineering problem-solving, you will have the skills and flexibility to chart your own course, and to adapt to whatever your future holds.

You are to be congratulated for your vision and initiative. I look forward to welcoming you into our program and watching you develop into a technical leader for tomorrow.

Jeff R. Wright
Dean, School of Engineering

SCHOOL OF ENGINEERING REQUIREMENTS

All Engineering students, regardless of major, are expected to meet the minimum requirements for the B.S. degree. First-year Engineering students have a freshman year that lays the foundation for further study in the majors. Students have the opportunity to explore the different UC Merced majors during that year through freshman seminars, service learning, research experiences and informal contact with faculty and graduate students.

Two general education courses are common for all UC Merced students: CORE 1 and 100, The World at Home. These provide a framework for the skills and ideals articulated in the UC Merced Guiding Principles for General Education (see General Education section of this catalog), including decision-making, communication, ethics, responsibility, leadership, teamwork, aesthetic understanding, creativity and an appreciation of diverse perspectives in both the global and community contexts.

Service Learning

Under the advisement of a faculty mentor, students have the opportunity to form service learning teams that work with an approved community not-for-profit organization—or client—to solve practical engineering problems. For example, a team composed of both upper and lower division students might work together to design, develop, implement and test an information system to serve the needs of a local non-profit service organization. Students develop skills to create organizational structures within the team; a communications structure with their client organization; and a strategic plan, mission statement and work plan to guide the activities of the team. Interacting closely and continuously with the client, students learn about the needs of the organization, delineate project objectives, formulate work plans, conduct design activities, implement resulting solutions, and monitor and assess program effectiveness. Students' performance and contribution to the team effort are formally assessed through regular written reports and panel interviews.

ENGINEERING

In addition to obtaining practical experience that complements their formal course work, students gain experience in working in teams, organizing and writing reports and proposals, interacting with clients, performing and evaluating basic engineering designs and formally evaluating outcomes. Because teams and team activities extend across multiple semesters and years, clients are assured of continuity of technical support and ongoing attention to their needs.

Students electing to enroll in the UC Merced Service Learning initiative may earn up to two credits per semester for participation, depending on their leadership position within the team for that semester.

GENERAL EDUCATION REQUIREMENTS (AT LEAST 46 UNITS)

School of Engineering students are required to complete the following list of general education courses:

Lower Division General Education Requirements:

The World at Home (CORE 1) . . . . . 4 units
College Reading and Composition (WRI 10) . . . . . 4 units
Integrated Calculus and Physics (ICP 1A and ICP 1B) or
Math 21 and Physics 8 . . . . . 8 units
Contemporary Biology (BIO 1). . . . . 4 units
Introduction to Computing I and II (CSE 20 and CSE 21) . . . . . 4 units
Probability and Statistics (MATH 32) . . . . . 4 units

Upper Division General Education Requirements:

The World at Home (CORE 100) . . . . . 4 units

Additional General Education Requirements:

General Education Electives (selected from a list of acceptable courses):

Humanities or Arts . . . . . 4 units
Social Sciences . . . . . 4 units
Either 3 upper division Service Learning units, or 3 additional upper division Humanities or Arts or Social Sciences units . . . . . 3 units
Either 3 additional Service Learning units, or 3 additional Humanities or Arts or Social Sciences units; these units can be upper division or lower division . . . . . 3 units

Freshman Seminar (CORE 90X) or Service Learning (ENGR 97 or 197) (1-10 units) One unit of freshman seminar or service learning must be taken during the freshman year.

MAJOR PREPARATION (32 UNITS)

Engineering students are required to complete the following major preparation courses.

General Chemistry (CHEM 2) . . . . . 4 units
Physics II (PHYS 9) . . . . . 4 units
Calculus of a Single Variable II (MATH 22) . . . . . 4 units
Multi-Variable Calculus (MATH 23) . . . . . 4 units
Introduction to Linear Algebra and
Differential Equations (MATH 24) . . . . . 4 units
Probability and Statistics (MATH 32) . . . . . 4 units
Introduction to Computing I and II (CSE 20 and CSE 21) . . . . . 4 units
Contemporary Biology (BIO 1). . . . . 4 units

ENGINEERING FUNDAMENTALS

The following fundamentals course is required for all engineering majors:

Engineering Economic Analysis (ENGR 155). . . . . 3 units

Remaining Engineering Fundamentals courses are determined by specific majors. See specific majors or talk to your advisor to find out which of the following fundamentals courses are required for you.

Introduction to Materials (ENGR 45) . . . . . 4 units
Statics (ENGR 50) . . . . . 2 units

Professor Valerie Leppert with Service Learning team.

Dynamics (ENGR 57) . . . . . 3 units
Strength of Materials (ENGR 151) . . . . . 4 units
Fluid Mechanics (ENGR 120) . . . . . 4 units
Thermodynamics (ENGR 130) . . . . . 3 units
Circuits (ENGR 165) . . . . . 3 units
Spatial Analysis and Modeling (ENGR 180) . . . . . 4 units

MAJOR AREA UPPER DIVISION COURSES

Major Area Upper Division Courses include major core courses, major technical electives and other specified requirements. See specific majors for the list of courses.

Professional Seminar (1 unit, ENGR 191) Must be taken during the senior year.

Transfer Students

Transfer students can satisfy lower division general education and prepare for the majors in Engineering by completing the following:

General Education

All transfer students need to complete at least 7 credits of upper division general education and may need to complete some lower division major preparation or prerequisite courses where equivalents are not offered at other institutions.

Students with more than 45 transferable units, but without IGETC, can satisfy Engineering lower division general education requirements by completing at least 34 credits in the following pattern of transferable courses:

- Two English composition courses
- One mathematics course (a mathematics course that satisfies major preparation will satisfy this requirement)
- Three arts/humanities courses with at least one each in arts and humanities
- Three social sciences courses in at least two disciplines
- Two science courses, one each from biological sciences and physical sciences (sciences courses that satisfy major preparation will also satisfy this requirement)

Students with 45 or fewer transferable units default to the School of Engineering general education pattern.

Major Preparation

Transfer students who wish to enter any major in the School of Engineering should complete the following:

- Three semesters of calculus, plus linear algebra and differential equations
- One semester of general chemistry with laboratory
- Two semesters of calculus-based physics with laboratory
- Two semester introduction to computer science

Transfer students should consult with an Engineering advisor as soon as possible to determine whether they need to complete any additional preparatory courses at UC Merced.

Bioengineering Major

Bioengineering is a highly interdisciplinary field in which the techniques, devices, materials and resourcefulness of engineers are used to address problems in biology and healthcare; and lessons from biology are used to inspire design and inform progress in engineering. During the past 40 years, this synergy between biology and engineering has led to a wide range of implantable materials, diagnostic devices, sensors and molecular characterization techniques, and it has produced tools that greatly expedited the sequencing of the human genome. Along with these practical innovations has come a rapidly increasing need for personnel with the necessary hybrid skills to capitalize on them, and undergraduate bioengineering programs have proliferated alongside the continued growth of bioengineering research.

The undergraduate major in Bioengineering is designed to provide students with both breadth and depth in two exciting and rapidly expanding fields: tissue engineering and nanobioengineering. The nanobioengineering track reflects the fact that synergy is here to stay between the "nano" and "bio" themes in engineering and science. The name also highlights an initial focus on things molecular, supramolecular, cellular and material, which allows the program to draw efficiently on the talents of the biologists, chemists, physicists and other UC Merced faculty in basic engineering and science programs.

An undergraduate degree in Bioengineering is also excellent preparation for application to medical school. The following technical electives are additionally recommended for BIOE students planning to apply to medical school. Organic Chemistry II (CHEM 100), Biochemistry (BIO 101/CHEM 111) and Research credit (BIOE 195).

What is nanobioengineering? Much convergence between engineering and biology are at the nanoscale level – the level of biological molecules, molecular aggregates and cellular processes – has begun to offer new, rich areas of study and commercialization. Examples of the devices, processes, interactions and materials that are of interest in this interdisciplinary context include:

- Computers inspired by biological analogs that are smaller and/or faster and/or process information more efficiently than today's computers; use of individual molecules as switches and data storage media; and methods for manipulating the molecules from which such "hardware" is produced
- Food-related innovations, for example, smart packaging that can sense the internal and external environment and provide a signal (such as a color change) that alerts users to undesirable storage conditions, product spoiling or product tampering
- Adaptive materials that can change their properties (shape, transparency, strength, flexibility) in response to changes in their environment, and self-healing materials
- Interactions between nanoparticles and biological tissue
- Tailored interfaces between biomolecules and artificial substrates
- Self-assembly of materials, structures and devices
- De novo design of proteins and other functional polymers inspired by nature
- Skin-care products and medications containing nanoparticulates that can penetrate into or through skin
- Sensors and "bots" that can replace defective physiological counterparts in humans and animals; implants and prosthetics constructed from nanocomposites that closely resemble natural tissue; and biosensors, which can be designed to nanodimensions, mounted on a single chip and used in remote diagnoses
- Fine-scale ceramic particles for use as precursors for tough monolithic ceramic artifacts (e.g. ceramic turbine blades and car engines) based on ceramic nanoprecipitates produced by bacteria

A second emphasis track in bioengineering focuses specifically on biomedical engineering. Because current medical devices do not repair or replace the diseased tissue, but rather, are designed to either minimize symptoms or partially replace a minimal level of organ functionality. To this end, an emerging and ambitious area of research seeks to build devices that would actually replace diseased tissues/organs with their biological equivalents, thus completely restoring tissue/organ functionality. This area has been termed Tissue Engineering and/or Regenerative Medicine. The area of tissue engineering is, by nature, cross disciplinary in that it employs cell culture methods combined with appropriate materials, scaffolding architecture, technologies for cell delivery, and nutrient transport strategies while also synergizing with nanobioengineering by employing the use of small nanoparticles or nonocomposite scaffolding materials.

UC Merced Bioengineering graduates will find employment in diverse fields encompassing healthcare delivery, medical device technology, drug development, clinical sciences, interdisciplinary research, patent consultancy, materials science, education, food biotechnology, personal care products industries and government agencies. Bioengineers are attractive to employers because, through studying and graduating in this type of especially creative intellectual environment, they have clearly demonstrated an ability to bridge traditional divides between disciplines, communicate flexibly with different intellectual constituencies and thrive in a context where knowledge is being created especially rapidly.

Requirements For The Bioengineering (BIOE) Major

The additional requirements that must be met to receive the B.S. in Bioengineering at UC Merced:

ENGINEERING FUNDAMENTALS (13 UNITS ARE SPECIFIED)

Introduction to Materials (ENGR 45) . . . . . 4 units
Thermodynamics (ENGR 130) . . . . . 3 units
Engineering Economic Analysis (ENGR 155). . . . . 3 units
Circuits (ENGR 165) . . . . . 3 units

BIOENGINEERING CORE (27 UNITS):

The bioengineering core consists of 7 courses (1 lower division and 6 upper division) designed to give all students a common foundation of core knowledge specific to the discipline.

LOWER DIVISION COURSES

Introduction to Bioengineering (BIOE 30) . . . . . 4 units

UPPER DIVISION COURSES

Molecular Machinery of Life (BIO 100) . . . . . 4 units
Physiology for Engineers (BIOE 100) . . . . . 4 units
Biosensors & Bioinstrumentation (BIOE 103)
(or Biosensors BIOE 102) . . . . . 4 units
Biotransport (BIOE 104). . . . . 4 units
The Cell (BIO 110). . . . . 4 units
Bioengineering Design (BIOE 150)
(or appropriate Service Learning Project - by approval only) . . . . . 3 units

ADDITIONAL DEGREE REQUIREMENTS:

Principles of Organic Chemistry (CHEM 8). . . . . 4 units
Principles of Physical Chemistry (CHEM 10) . . . . . 4 units
Professional Seminar (ENGR 191) . . . . . .1 unit
Service Learning (ENGR 97 or ENGR 197) . . . . . 6-10 units
(up to 2 credits could be freshman seminars)

TECHNICAL ELECTIVES:

Technical electives (minimum 9 units) should be selected in a manner that is complementary to, yet integrated with, your major area of study, and should be determined through close interaction with your major area advisor. Up to 3 units of research credit (BIOE 195) may be used.

Tissue Engineering (BIOE 114). . . . . 3 units
Lab on a Chip (BIOE 117) . . . . . 4 units
Modeling Nanoscale Processes in Biology (BIOE 101). . . . . 3 units
Electron Microscopy (ENGR 170 and 170L) . . . . . 3-4 units
Biochemistry (BIO 101) . . . . . 4 units
Advanced Molecular Biology (BIO 102) . . . . . 4 units
Biophysics (BIO 104) . . . . . 4 units
Genetics (BIO 140) . . . . . 4 units
Embryos, Genes, and Development (BIO 150) . . . . . 4 units
Molecular Immunology (BIO 151) . . . . . 4 units
Genome Biology (BIO 142) . . . . . 4 units
Biostatistics (BIO 175) . . . . . 4 units
Computational Biology (BIO 181) . . . . . 4 units
Bioinformatics (BIO 182) . . . . . 4 units
Biomedical Ethics (BIO 185). . . . . 4 units
Material Structure & Characterization (MSE 113). . . . . 3 units
Polymeric Materials (MSE 114) . . . . . 4 units
Intro to Nanotech & Nanoscience (MSE 118). . . . . 3 units
Numerical Analysis (Math 133) . . . . . 4 units
Research credit (BIOE 195) . . . . . 1-3 units

Suggested list of technical electives for emphasis tracks: Courses indicated by a * are considered central to the emphasis track and are recommended highly.

NANOBIOENGINEERING

Lab on a Chip (BIOE 117) . . . . . 4 units
Modeling Nanoscale Processes in Biology (BIOE 101)*. . . . . 3 units
Material Structure & Characterization (MSE 113). . . . . 3 units
Polymeric Materials (MSE 114) . . . . . 3 units
Intro to Nanotech & Nanoscience (MSE 118). . . . . 3 units
Self-Assembling Molecular Systems (BIOE 110) . . . . . 3 units
Electron Microscopy (ENGR 170). . . . . 3 units

TISSUE ENGINEERING

Tissue Engineering (BIOE 114)*. . . . . 3 units
Material Structure & Characterization (MSE 113). . . . . 3 units
Polymeric Materials (MSE 114) . . . . . 3 units
Embryos, Genes, and Development (BIO 150) . . . . . 4 units
Molecular Immunology (BIO 151) . . . . . 4 units
Biostatistics (BIO 175) . . . . . 4 units
Biomedical Ethics (BIO 185). . . . . 4 units
Electron Microscopy (ENGR 170 and 170L) . . . . . 3-4 units
Computational Biology (BIO 181) . . . . . 4 units

SAMPLE PLAN OF STUDY FOR BIOENGINEERING DEGREE

SEMESTER 1

CORE 1	The World at Home	4
BIO 1	Contemporary Biology	4
MATH 21	Calculus I	4
PHYS 8	Physics I	4
Semester Units		**16**

SEMESTER 2

MATH 22	Calculus II	4
CHEM 2	General Chemistry	4
PHYS 9	Physics II (or Physics 19)	4
CSE 20	Introduction to Computing 1	2
ENGR 97 or CORE 90X	Service Learning: Engineering Projects in Community Service (or Freshman Seminar)	1
Semester Units		**15**

SEMESTER 3

BIOE 30	Introduction to Bioengineering	4
CHEM 10	Principles of Physical Chemistry	4
CSE 21	Introduction to Computing 2	2
MATH 23	Multi-Variable Calculus	4
ENGR 97	Service Learning: Engineering Projects in Community Service	1
Semester Units		**15**

SEMESTER 4

MATH 24	Introduction to Linear Algebra and Differential Equations	4
CHEM 8	Principles of Organic Chemistry	4
ENGR 45	Introduction to Materials	4
WRI 10	College Reading and Composition	4
Semester Units		**16**

SEMESTER 5		
ENGR 165	Circuits	3
CORE 100	The World at Home	4
BIO 100	Molecular Machinery of Life	4
MATH 32	Probability and Statistics	4
Semester Units		**15**

SEMESTER 6		
BIOE 104	Biotransport	4
BIOE 100	Physiology for Engineers	4
BIO 110	The Cell	4
	Technical Elective	3
ENGR 97	Service Learning: Engineering Projects in Community Service	1
Semester Units		**16**

SEMESTER 7		
BIOE 103	Biosensors & Bioinstrumentation	4
ENGR 130	Thermodynamics	3
	Technical Elective	3
	General Education Elective	4
ENGR 197	Service Learning: Engineering Projects in Community Service	2
Semester Units		**16**

SEMESTER 8		
BIOE 150	Bioengineering Design	3
ENGR 155	Engineering Economics Analysis	3
ENGR 191	Professional Seminar	1
	Technical Elective	3
	General Education Elective	4
ENGR 197	Service Learning: Engineering Projects in Community Service	1
Semester Units		**15**

Total Program Units	**124**

The four-year plans presented in this catalog demonstrate the recommended sequencing and timing of the required and elective components within each major. In many cases, a student's academic background will require variations in the timing of the coursework listed in the plan. All students are expected to work with their academic advisor to find their best pathway through the degree requirements of their chosen program.

Computer Science And Engineering Major

The undergraduate major in Computer Science and Engineering is designed to provide students with both breadth and depth in the exciting and rapidly expanding fields of:

- Computer science—the study of computation, including algorithms and data structures, and
- Computer engineering—including hardware, software and network architecture.

A degree in Computer Science and Engineering from UC Merced prepares students to assume leadership roles in designing, building and implementing a vast array of powerful new technologies that will continue to advance humankind. As the foundation for innovation in areas ranging from robotics and automation, computer networks, graphics and visualization and computer vision to informatics, machine learning and artificial intelligence careers in computer science and engineering are among the most satisfying and rewarding of any.

Computer Science and Engineering students at UC Merced work with the top computer scientists and engineers in the world. Our faculty has developed a program of study that combines practical exposure to the most modern technologies available, with a theoretical foundation that empowers students to master future changes and innovation as technologies continue to evolve at an astonishing pace. Our graduates will thus have both tools and insights to propel them into positions of responsibility and leadership across virtually any occupation.

Computer science and engineering constitutes one of the strongest industrial sectors in the state and the nation, offering a broad spectrum of career opportunities. Education at UC Merced provides the opportunity to participate in innovative classroom learning experiences, to become involved in laboratory research, to participate with fellow students in team activities and projects, and to interact directly with our remarkable faculty. From introductory programming courses through architecture design experiences, and research and team project activities, our students gain insights that allow them to excel throughout their chosen career path.

The program includes service learning components designed to engage students in the solution of real-world problems in their community. The team projects resemble what is found in actual engineering practice, with increasing responsibility as students progress through the program. Engineers need to understand not only the technical but also the social and political contexts of their work. They must be able to communicate and to plan, finance and market their products and ideas. Social sciences, business, humanities and arts are an important part of the curriculum. The result is a learning experience that is hands-on and creative, engaging and adaptable.

Requirements For The Computer Science And Engineering (CSE) Major

The additional requirements that must be met to receive the B.S. in Computer Science and Engineering at UC Merced include:

COMPUTER SCIENCE AND ENGINEERING CORE (30 UNITS)

The computer science and engineering core consists of 6 courses (2 lower division and 4 upper division) designed to provide students a common foundation of core knowledge specific to the discipline.

LOWER DIVISION CORE COURSES

Introduction to Computer Science and Engineering I (CSE 30). . . 4 units
Introduction to Computer Science and Engineering II (CSE 31) . . 4 units

UPPER DIVISION CORE COURSES

Algorithm Design and Analysis (CSE 100) . . . . . 4 units
Database Systems (CSE 111) . . . . . 4 units
Software Engineering (CSE 120) . . . . . 4 units
Computer Architecture (CSE 140) . . . . . 4 units
Operating Systems (CSE 150) . . . . . 4 units
Computer Networks (CSE 160) . . . . . 4 units

TECHNICAL ELECTIVES

A total of 16 units of CSE technical electives are required. CSE technical electives are all upper division courses (CSE1xx). Upper division core courses taken in excess of the core requirements may be counted as technical electives. Other upper division courses outside your major area of study can be selected with approval

SAMPLE PLAN OF STUDY FOR COMPUTER SCIENCE & ENGINEERING DEGREE

SEMESTER 1

CORE 1	The World at Home	4
CSE 20	Introduction to Computing	2
ICP 1	Integrated Calculus and Physics (ICP 1A and ICP 1B) or Math 21 and Physics 8	8
ENGR 97 or CORE 90X	Service Learning: Engineering Projects in Community Service (or Freshman Seminar)	1
Semester Units		**15**

SEMESTER 2

CSE 21	Introduction to Computing 2	2
MATH 22	Calculus of a Single Variable II	4
BIO 1	Contemporary Biology	4
PHYS 9	Physics II	4
CORE 90X	Freshman Seminar	1
Semester Units		**15**

SEMESTER 3

CSE 30	Introduction to Computer Science And Engineering I	4
MATH 23	Multi-Variable Calculus	4
MATH 32	Probability and Statistics	3
CHEM 2	General Chemistry	4
ENGR 97	Service Learning: Engineering Projects in Community Service	1
Semester Units		**16**

SEMESTER 4

CSE 31	Introduction to Computer Science And Engineering II	4
MATH 24	Introduction to Linear Algebra and Differential Equations	4
WRI 10	College Reading and Composition	4
	Engineering Fundamentals	3
ENGR 97	Service Learning: Engineering Projects in Community Service	1
Semester Units		**16**

SEMESTER 5

CSE 100	Algorithm Design and Analysis	4
	Engineering Fundamentals	4
	Engineering Fundamentals	3
	General Education Elective (Arts/Humanities)	4
ENGR 197	Service Learning: Engineering Projects in Community Service	1
Semester Units		**16**

SEMESTER 6

CSE 150	Operating Systems	4
CORE 100	The World at Home	4
	Technical Elective	4
	Engineering Fundamentals	3
ENGR 197	Service Learning: Engineering Projects in Community Service	1
Semester Units		**16**

SEMESTER 7

CSE 160	Computer Networks	4
ENGR 155	Engineering Economics Analysis	3
	Technical Elective	4
	General Education Elective (Social/Cognitive Sciences)	4
ENGR 197	Service Learning: Engineering Projects in Community Service	1
Semester Units		**16**

SEMESTER 8

	Technical Elective	4
CSE 120	Software Engineering	4
	Technical Elective	4
	Free Elective	3
ENGR 191	Professional Seminar	1
Semester Units		**16**

Total Program Units 126

The four-year plans presented in this catalog demonstrate the recommended sequencing and timing of the required and elective components within each major. In many cases, a student's academic background will require variations in the timing of the coursework listed in the plan. All students are expected to work with their academic advisor to find their best pathway through the degree requirements of their chosen program.

Engineering Professor Christopher Viney in Africa conducting materials science research on hippos.

■ Environmental Engineering Major

The undergraduate major in Environmental Engineering prepares students for careers in both industry and government agencies concerned with managing water, energy, public health and the environment. The program is also a good foundation for further study in Earth science, engineering, business, management, law and public health. The curriculum provides students with a quantitative understanding of the physical, chemical and biological principles that control air, water and habitat quality and sustainability on Earth, along with expertise in the design, development, implementation and assessment of engineering solutions to environmental problems.

Environmental engineers are distinguished from other environmental professionals through their focus on problem solving, design and implementation of technological or management systems. Environmental engineers search for creative and economical ways to use resources efficiently, limit the release of residuals into the environment, develop sensitive techniques to track pollutants once released and find effective methods to remediate spoiled resources. They serve as the vital link between scientific discovery, technological development and the societal need for protecting human health and ecological integrity. In the coming decades, environmental engineers will increasingly be called upon to address broader issues of environmental sustainability by minimizing the release of residuals through altered production processes and choice of materials; by capturing the resource value of wastes through recovery, recycling and reuse; and by managing natural resources to meet competing societal objectives.

UC Merced emphasizes a highly interdisciplinary approach to environmental engineering, combining a strong theoretical foundation with field studies, laboratory experiments and computations. Core courses within the major provide students with a firm foundation in the physical and life sciences and the ways that they apply to energy, hydrology, air and water quality issues. Emphasis areas allow students the flexibility to study in more depth by following tracks developed in consultation with their academic advisor(s). The main areas of emphasis for Environmental Engineering at UC Merced are hydrology, water quality, air pollution and energy sustainability.

Hydrology: focuses on the sources, balance and use of water in both natural and managed environments, including precipitation, mountain snowpack, river runoff, vegetation, water use and groundwater. Both the physical and chemical aspects of the water cycle are included.

Water quality: focuses on engineering solutions to water and waste issues, including measurement technology, water quality assessments, treatment systems and remediation of contaminated waters. Physical, chemical and biological aspects are included.

Air pollution: focuses on the measurement, sources, fate, effects and engineering solutions to air quality problems, both regionally and in a broader national and global context. Both the physical and chemical aspects of atmospheric pollution are included.

Sustainable Energy: focuses on society's demand for and use of energy, and on the planning and design of renewable energy systems, with particular emphasis on solar energy.

The program includes service learning components designed to engage students in the solution of real-world problems in their community. The team projects resemble those found in actual engineering practice, with increasing responsibility as students progress through the program.

Engineers need to understand not only the technical but also the social and political contexts of their work. They must be able to communicate, and to plan, finance and market their products and ideas. Social sciences, business, humanities and arts courses are an important part of the curriculum. The result is a major that is hands-on and creative, engaging and adaptable.

Requirements For The Environmental Engineering (ENVE) Major

The additional requirements that must be met to receive the B.S. in Environmental Engineering at UC Merced are: General Chemistry II (CHEM 10, 4 units), Engineering Fundamentals (19 units), Environmental Engineering Core (16 units), and Technical electives (15-17 units, including at least one Field Methods Course).

ENGINEERING FUNDAMENTALS (19 UNITS; 3 UNITS SPECIFIED)

The following fundamentals course is required:

Engineering Economic Analysis (ENGR 155 . . . . . 3 units

The following fundamentals course sequence (designated by *) is strongly recommended for environmental engineering students preparing for the Fundamentals of Engineering (FE) examination. The additional courses listed may be substituted depending on each student's broader interests. Students may petition to substitute other courses.

Statics (ENGR 50)* . . . . . 2 units
Dynamics (ENGR 57)* . . . . . 3 units
Fluid Mechanics (ENGR 120)* . . . . . 4 units
Thermodynamics (ENGR 130)* . . . . . 3 units
Circuits (ENGR 165)* . . . . . 3 units
Introduction to Materials (ENGR 45) . . . . . 4 units
Strength of Materials (ENGR 151) . . . . . 4 units
Spatial Analysis and Modeling (ENGR 180) . . . . . 4 units

ENVIRONMENTAL ENGINEERING CORE (16 UNITS)

The environmental engineering core consists of 4 courses designed to give all students a common foundation of core knowledge specific to the discipline:

LOWER DIVISION COURSES

Introduction to Environmental Science
and Technology (ENVE 20) . . . . . 4 units

UPPER DIVISION COURSES

Environmental Chemistry (ENVE 100) . . . . . 4 units
Hydrology and Climate (ENVE 110) . . . . . 4 units
Meteorology and Air Pollution (ENVE 130) . . . . . 4 units

ADDITIONAL DEGREE REQUIREMENTS (4 UNITS)

The following course is required:

General Chemistry II (CHEM 10) . . . . . 4 units

TECHNICAL ELECTIVES (15-17 UNITS)

Technical electives should be selected in a manner that is complementary to, yet integrated with, your major area of study, and should be determined through close interaction with your major area advisor. Check carefully for current offerings as some of the courses are offered only in alternate years. Courses should be selected from the following list of approved technical electives, or students can petition to include other upper division courses outside their major. At least one field methods course is required. A maximum of 4 Service Learning (ENGR 97/197) and/or Undergraduate Research (ENGR 99/199) units may be used as technical elective units.

Spatial Analysis and Modeling (ENGR 180) . . . . . 4 units
Environmental Data Analysis (ENVE 105) . . . . . 3 units
Subsurface Hydrology (ENVE 112) . . . . . 4 units
Mountain Hydrology of the Western States (ENVE 114). . . . . 4 units
Applied Climatology (ENVE 116) . . . . . 3 units
Global Change (ENVE 118) . . . . . 4 units
Environmental Microbiology (ENVE 121) . . . . . 4 units
Water Resources and Management (ENVE 140). . . . . 3 units
Remote Sensing of the Environment (ENVE 152) . . . . . 3 units
Decision Analysis in Management (ENVE 155). . . . . 3 units
Sustainable Energy (ENVE 160) . . . . . 4 units
Modeling and Design of Energy Systems (ENVE 162). . . . . 3 units
Contaminant Fate and Transport (ENVE 170). . . . . 3 units
Environmental Organic Chemistry (ENVE 171) . . . . . 3 units
Water and Wastewater Treatment (ENVE 176). . . . . 3 units
Field Methods in Snow Hydrology (ENVE 181). . . . . 1-3 units
Field Methods in Surface Hydrology (ENVE 182) . . . . . 1-3 units
Field Methods in Subsurface Hydrology (ENVE 183). . . . . 1-3 units
Field Methods in Environmental Chemistry (ENVE 184) . . . . . 1-3 units
Watershed Biogeochemistry (ESS 105). . . . . 3 units
Air Pollution Control (ENVE 132) . . . . . 3 units

LIST OF RECOMMENDED COURSE CHOICES FOR EMPHASIS TRACKS

Hydrology

Environmental Data Analysis (ENVE 105) . . . . . 3 units
Subsurface Hydrology (ENVE 112) . . . . . 4 units
Mountain Hydrology of the Western US (ENVE 114) . . . . . 4 units
Remote Sensing of the Environment (ENVE 152) . . . . . 3 units
Water Resources and Management (ENVE 140). . . . . 3 units
Field Methods in Snow Hydrology (ENVE 181). . . . . 1-3 units
Field Methods in Surface Hydrology (ENVE 182) . . . . . 1-3 units
Field Methods in Subsurface Hydrology (ENVE 183). . . . . 1-3 units

Water quality

Environmental Data Analysis (ENVE 105) . . . . . 3 units
Subsurface Hydrology (ENVE 112) . . . . . 4 units
Environmental Microbiology (ENVE 121) . . . . . 4 units
Water Resources and Management (ENVE 140). . . . . 3 units
Contaminant Fate and Transport (ENVE 170). . . . . 3 units
Environmental Organic Chemistry (ENVE 171) . . . . . 3 units
Water and Wastewater Treatment (ENVE 176). . . . . 3 units
Field Methods in Surface Hydrology (ENVE 182) . . . . . 1-3 units
Field Methods in Subsurface Hydrology (ENVE 183). . . . . 1-3 units
Field Methods in Environmental Chemistry (ENVE 184) . . . . . 1-3 units

Air pollution

Environmental Data Analysis (ENVE 105) . . . . . 3 units
Global Change (ENVE 118) . . . . . 4 units
Air Pollution Control (ENVE 132) . . . . . 3 units
Remote Sensing of the Environment (ENVE 152) . . . . . 3 units
Sustainable Energy (ENVE 160) . . . . . 4 units
Environmental Organic Chemistry (ENVE 171) . . . . . 3 units
Contaminant Fate and Transport (ENVE 170). . . . . 3 units

Sustainable energy

Environmental Data Analysis (ENVE 105) . . . . . 3 units
Global Change (ENVE 118) . . . . . 4 units
Decision Analysis in Management (ENVE 155). . . . . 4 units
Sustainable Energy (ENVE 160) . . . . . 4 units
Modeling and Design of Energy Systems (ENVE 162). . . . . 3 units
Heat Transfer (ENGR 135) . . . . . 3 units
Air Pollution Control (ENVE 132) . . . . . 3 units

SAMPLE PLAN OF STUDY FOR ENVIRONMENTAL ENGINEERING DEGREE

SEMESTER 1

CORE 1	The World at Home	4
CSE 20	Introduction to Computing 1	2
MATH 21	Calculus of a Single Variable I	4
PHYS 8	Introductory Physics I	4
ENGR 97 or CORE 90X	Service Learning: Engineering Projects in Community Service (or Freshman Seminar)	1
Semester Units		**15**

SEMESTER 2

MATH 22	Calculus of a Single Variable II	4
CSE 21	Introduction to Computing 2	2
BIO 1	Contemporary Biology	4
PHYS 9	Introductory Physics II	4
ENGR 90X	Freshman Seminar or Service Learning: Engineering Projects in Community Service	1
Semester Units		**15**

SEMESTER 3

WRI 10	College Reading and Composition	4
CHEM 2	General Chemistry	4
MATH 23	Multi-Variable Calculus	4
ENGR 50	Fundamentals - Statics	2
ENGR 97	Service Learning: Engineering Projects in Community Service	1
Semester Units		**15**

SEMESTER 4

MATH 24	Introduction to Linear Algebra and Differential Equations	4
CHEM 10	General Chemistry II	4
ENGR 57	Fundamentals - Dynamics	3
ENVE 20	Introduction to Environmental Science and Technology	4
Semester Units		**15**

SEMESTER 5

MATH 32	Probability and Statistics	4
ENGR 130	Fundamentals - Thermodynamics	3
ENGR 155	Fundamentals – Engineering Econ Analysis	3
	General Education Elective (Arts/Humanities)	4
ENGR 197	Service Learning: Engineering Projects in Community Service	1
Semester Units		**15**

SEMESTER 6

ENGR 120	Fundamentals - Fluid Mechanics	4
ENGR 165	Fundamentals – Circuits	3
ENVE 1xx	Technical Elective	4
CORE 100	The World at Home (or equivalent)	4
Semester Units		**15**

SEMESTER 7

ENVE 100	Environmental Chemistry	4
ENVE 110	Hydrology and Climate	4
ENVE 1xx	Technical Elective	3
	General Education Elective (Soc/Cog Sciences)	4
ENGR 197	Service Learning: Engineering Projects in Community Service	1
Semester Units		**16**

SEMESTER 8

ENVE 130	Meteorology and Air Pollution	4
ENVE 181	Field Methods in Snow Hydrology	2
ENVE 1xx	Technical Elective	3
ENVE 1xx	Technical Elective	3
	Free Elective	4
ENGR 191	Professional Seminar	1
Semester Units		**17**

Total Program Units 123

The four-year plans presented in this catalog demonstrate the recommended sequencing and timing of the required and elective components within each major. In many cases, a student's academic background will require variations in the timing of the coursework listed in the plan. All students are expected to work with their academic advisor to find their best pathway through the degree requirements of their chosen program.

Engineering Service Learning students demonstrating how the Trebuchet that they built works.

■ Materials Science And Engineering Major

UC Merced students majoring in Materials Science and Engineering (MSE) will be equipped for leadership in a field that dictates the pace of technological progress.

Since the beginnings of civilization, technological progress has always relied on the materials that people were able to acquire from nature or through trade or by innovation. Wood, stone, bronze, iron, steel, aluminum, cements, plastics, semiconductors, liquid crystals, nanomaterials and quantum dots all have unique properties that enable—but also limit—what humans can make and do. Nations continue to go to war over access to particular raw materials. The construction of safe dwellings, the conveniences of rapid travel, the efficiency of telecommunications, the calculating and archiving power of computers, the life-prolonging gift of surgical implants and the dazzling performances of athletes all require dependable materials. Future technological progress of any kind will always be driven by the available materials.

Materials Science and Engineering (MSE) applies fundamental principles of physics and chemistry to designing materials with desired combinations of mechanical, optical, electrical, magnetic, electrochemical and other properties. Increasingly, innovative materials are being developed with the benefit of lessons that have been learned from nature. Examples include armor based on the structure of abalone shells and rats' teeth, optical materials that owe a debt to sea urchin spines and peacock feathers, high-performance ballistic fibers modeled on spider silk, self-cleaning surfaces copied from lotus leaves, and strong, reusable adhesives that emulate the behavior of gecko feet. Also encompassed in MSE are the methods by which particular atomic and molecular arrangements (nanostructures and microstructures) are achieved, the overall cost of the ingredients and processes used to produce particular materials, the effects of the environment on materials, the effects of materials and materials processing on the environment, and characterization of materials structure and properties. Because MSE embraces skills from physics, chemistry, mathematics and biology, it is especially appealing to anyone who enjoys interdisciplinary studies and who seeks to apply such knowledge to solving practical engineering problems.

MSE graduates are in demand in a great variety of fields that include manufacturing, energy, utilities, patent law, the financial sector, construction, transportation, aerospace, computer industries, sport, consulting, public policy, education and research. Employers appreciate the ability of MSE graduates to relate to colleagues across a broad spectrum of expertise.

Recent surveys of employment prospects nationally point to a steady growth in the overall MSE job market over the next decade at least. It is expected that the growth will be focused in areas related to the development of new materials, including materials for nanotechnology and biotechnology, rather than traditional areas of materials manufacturing. The MSE major at UC Merced reflects this expectation, with an emphasis on materials issues that will ensure the long-term relevance of our MSE degree.

Requirements for the Materials Science And Engineering (MSE) Major

The additional requirements that must be met to receive the B.S. in Materials Science and Engineering at UC Merced are: Engineering Fundamentals (19 units), MSE Core (22 units), and Technical electives (at least 12 units).

ENGINEERING FUNDAMENTALS (19 UNITS; SPECIFIED)

The following fundamentals courses are required:

Statics (ENGR 50) . . . . . 2 units
Dynamics (ENGR 57) . . . . . 3 units
Strength of Materials (ENGR 151) . . . . . 4 units
Fluid Mechanics (ENGR 120) . . . . . 3 units
Thermodynamics (ENGR 130) . . . . . 3 units
Engineering Economic Analysis (ENGR 155). . . . . 3 units

MATERIALS SCIENCE & ENGINEERING CORE (22 UNITS; SPECIFIED)

The MSE core consists of courses designed to give all students a common foundation of core knowledge and skills specific to the discipline:

LOWER DIVISION COURSES

Introduction to Materials (ENGR 45) . . . . . 4 units

UPPER DIVISION COURSES

Solid State Materials Properties (MSE 110) . . . . . 4 units
Materials Processing (MSE 111). . . . . 4 units
Materials Selection and Performance (MSE 112) . . . . . 3 units
Materials Characterization (MSE 113) . . . . . 4 units
Materials Capstone Design (MSE 120). . . . . 3 units

ADDITIONAL DEGREE REQUIREMENTS:

Six Service Learning units, at least three of which should be upper division

Service Learning (ENGR 97 or ENGR 197) . . . . . 6 units
(up to 2 credits could be freshman seminars)

TECHNICAL ELECTIVES (AT LEAST 12 UNITS)

Technical electives should be selected in a manner that is complementary to, yet integrated with, your major area of study, and should be determined through close interaction with your major area advisor. At least 9 units should be selected from the following list of approved technical electives:

Polymeric Materials (MSE 114) . . . . . 3 units
Ceramic Materials (MSE 115) . . . . . 3 units
Composites (MSE 116) . . . . . 3 units
New Materials (MSE 117) . . . . . 3 units
Introduction to Nanotechnology and Nanoscience (MSE 118) . . . 3 units
Materials Modeling (MSE 119) . . . . . 3 units
Introduction to Electron Microscopy (ENGR 170). . . . . 3 units
Self-assembling Molecular Systems (BIOE 110) . . . . . 3 units
Biomembranes (BIOE 111). . . . . 3 units
Biomolecule-substrate Interactions (BIOE 112). . . . . 3 units
Quantum Chemistry and Spectroscopy (CHEM 112) . . . . . 3 units
Nanodevice Fabrication (MSE 126) . . . . . 3 units

Nanotechnology emphasis:

An emphasis in nanotechnology concurrent to a BS degree is offered to students who complete the following 2 required courses and 1 elective course.

Required courses:

(1) Nanodevice Fabrication (MSE 126) . . . . . 3 units
(2) Introduction to Nanotechnology and Nanoscience (MSE 118). 3 units

Elective courses:

Polymeric Materials (MSE 114) . . . . . 3 units
New Materials (MSE 117) . . . . . 3 units
Materials Modeling (MSE 119) . . . . . 3 units
Self-assembling Molecular Systems (BIOE 110) . . . . . 3 units
Nanoscale Materials Chemistry (CHEM 140) . . . . . 3 units
Introduction to Electron Microscopy (ENGR 170) . . . . . 3 units

SAMPLE PLAN OF STUDY FOR MATERIALS SCIENCE AND ENGINEERING DEGREE

SEMESTER 1

ICP 1	Integrated Calculus and Physics (ICP 1A and ICP 1B) or Math 21 and Physics 8	8
CORE 1	The World at Home	4
CSE 20	Introduction to Computing 1	2
ENGR 97 or CORE 90X	Service Learning: Engineering Projects in Community Service (or Freshman Seminar)	1
Semester Units		**15**

SEMESTER 2

MATH 22	Calculus of a Single Variable	4
PHYS 9	Physics	4
CSE 21	Introduction to Computing	2
BIO 1	Contemporary Biology	4
ENGR 97	Service Learning: Engineering Projects in Community Service	1
Semester Units		**15**

SEMESTER 3

CHEM 2	General Chemistry	4
MATH 23	Multi-Variable Calculus	4
ENGR 50	Statics	2
MATH 32	Probability and Statistics	4
ENGR 97	Service Learning: Engineering Projects in Community Service	1
Semester Units		**15**

SEMESTER 4

ENGR 45	Introduction to Materials	4
MATH 24	Introduction to Linear Algebra and Differential	4
ENGR 57	Dynamics	3
WRI 10	College Reading and Composition	4
Semester Units		**15**

SEMESTER 5

MSE 110	Solid State Materials Properties	4
ENGR 151	Strength of Materials	4
ENGR 130	Thermodynamics	3
	General Education Elective (Arts/Humanities)	4
ENGR 197	Service Learning: Engineering Projects in Community Service	1
Semester Units		**16**

SEMESTER 6

ENGR 120	Fluid Mechanics	4
ENGR 155	Engineering Economics Analysis	3
MSE 111	Materials Processing	4
CORE 100	The World at Home (or equivalent)	4
ENGR 197	Service Learning: Engineering Projects in Community Service	1
Semester Units		**16**

SEMESTER 7

MSE 112	Materials Selection and Performance	3
MSE 113	Materials Characterization	4
	Technical Elective	3
	General Education Elective (Social/Cognitive Sciences)	4
ENGR 197	Service Learning: Engineering Projects in Community Service	1
Semester Units		**15**

SEMESTER 8

MSE 120	Materials Capstone Design	3
	Technical Elective	3
	Technical Elective	3
	Technical Elective	4
ENGR 191	Professional Seminar	1
Semester Units		**14**

Total Program Units 121

The four-year plans presented in this catalog demonstrate the recommended sequencing and timing of the required and elective components within each major. In many cases, a student's academic background will require variations in the timing of the coursework listed in the plan. All students are expected to work with their academic advisor to find their best pathway through the degree requirements of their chosen program.

■ Mechanical Engineering Major

The undergraduate major in Mechanical Engineering provides students with a solid foundation and the necessary skills to assume leadership roles in industry and government agencies. The major also offers a number of opportunities for students intending to continue their education in graduate school. Mechanical Engineering impacts society by developing innovative technologies through the application of analysis for the design and synthesis of mechanical components and systems. The employment opportunities for graduates in this field are many and diverse. Mechanical engineers are recruited in a variety of industries, including automotive, aerospace, power generation, environmental, electronics, bioengineering, food processing, and consulting firms, among many others. Because of the variety of fields that are relevant to this profession, the undergraduate program covers areas in dynamics, materials, thermal/fluids, vibrations, controls, computer aided engineering, design and manufacturing. The innovative curriculum at UC Merced provides hands-on education that exposes students to engineering fundamentals, laboratory work and the use of computational tools to solve realistic engineering problems.

The program also prepares students to pursue graduate work in engineering or other disciplines. Mechanical Engineering is an evolving discipline that adapts to the current needs of society. Some of the exciting current areas of research include advanced energy systems, sustainable energy, autonomous vehicles, biomechanics and biosensors, nano/micro-technology, computational modeling, design optimization and complex systems. The programs at UC Merced emphasize a highly interdisciplinary approach; thus the curriculum offers several technical electives in topics inside and outside the Mechanical Engineering program.

The program includes service learning components designed to engage students in the solution of real-world problems that are relevant to their community. The team projects resemble those found in actual engineering practice, with increasing responsibility as the participating students progress through the program. Engineers need to understand not only the technical but also the social and political contexts of their work. They must be able to communicate, and to plan, finance and market their products and ideas. Social sciences, business, humanities and arts courses are an important part of the curriculum. The result is a major that is creative, engaging and adaptable.

Requirements For The Mechanical Engineering Major

The additional requirements that must be met to receive the B.S. in Mechanical Engineering at UC Merced include:

ENGINEERING FUNDAMENTALS (19 UNITS)

The following fundamentals course is required by the School of Engineering:

Engineering Economic Analysis (ENGR 155) . . . . . 3 units

Remaining engineering fundamentals courses for ME majors are:
Statics (ENGR 50) . . . . . 2 units
Dynamics (ENGR 57) . . . . . 3 units
Introduction to Materials (ENGR 45) . . . . . 4 units
Strength of Materials (ENGR 151) . . . . . 4 units
Thermodynamics (ENGR 130) . . . . . 3 units

Other School of Engineering fundamentals courses may be substituted upon prior approval by major faculty.

MECHANICAL ENGINEERING CORE (29 UNITS)

The Mechanical Engineering core consists of 7 upper division courses designed to give all students a common foundation of core knowledge specific to the discipline.

Fluid Mechanics (ENGR 120) . . . . . 4 units
Component Design (ME 120) . . . . . 3 units
Heat Transfer (ENGR 135) . . . . . 4 units
Numerical Methods I (MATH 131) . . . . . 4 units
Finite Element Analysis (ME 135) . . . . . 3 units
Computer Aided Engineering (ME 137) . . . . . 4 units
Vibration and Control (ME 140) . . . . . 4 units
Capstone Design (ME 170) . . . . . 4 units

TECHNICAL ELECTIVES

Technical electives should be selected in a manner that is complementary to, yet integrated with, your major area of study, and should be determined through close interaction with your major area advisor.

Circuits (ENGR 165) . . . . . 3 units
Mechatronics (ME 142) . . . . . 4 units
Meteorology and Air Pollution (ENVE 130) . . . . . 4 units
Air Pollution Control (ENVE 132) . . . . . 3 units
Sustainable Energy (ENVE 160) . . . . . 4 units
Modeling and Design of Energy Systems (ENVE 162) . . . . . 3 units
Introduction to Nanotechnology and Nanoscience (MSE 118) . . . 3 units

ADDITIONAL DEGREE REQUIREMENTS (6 UNITS)

Service Learning: Engineering Projects in Community Service (ENGR 97 or ENGR 197) . . . . . 6 units

SAMPLE PLAN OF STUDY FOR MECHANICAL ENGINEERING DEGREE

SEMESTER 1

CORE 1	The World at Home	4
CSE 20	Introduction to Computing 1	2
CORE 90X/ENGR 97	Freshman Seminar/Service Learning: Engineering Projects in Community Service*	1
ICP 1	Integrated Calculus and Physics (ICP 1A and ICP 1B) or Math 21 and Physics 8	8
Semester Units		**15**

SEMESTER 2

MATH 22	Calculus of a Single Variable II	4
CSE 21	Introduction to Computing 2	2
BIO 1	Contemporary Biology	4
PHYS 9	Physics II	4
ENGR 97	Service Learning: Engineering Projects in Community Service*	1
Semester Units		**15**

SEMESTER 3

MATH 32	Probability and Statistics	3
CHEM 2	General Chemistry	4
MATH 23	Multi-Variable Calculus	4
ENGR 50	Statics	2
ENGR 97	Service Learning: Engineering Projects in Community Service*	2
Semester Units		**15**

SEMESTER 4

MATH 24	Introduction to Linear Algebra and Differential Equations	4
ENGR 45	Introduction to Materials	4
ENGR 57	Dynamics	3
WRI 10	College Reading and Composition	4
ENGR 97	Service Learning: Engineering Projects in Community Service*	1
Semester Units		**16**

SEMESTER 5

ENGR 130	Thermodynamics	3
ENGR 151	Strength of Materials (Lab)	4
MATH 131	Numerical Methods I	4
	Technical Elective	3
ME 120	Component Design	3
Semester Units		**17**

SEMESTER 6

ENGR 120	Fluid Mechanics (Lab)	4
	Gen. Education Elective (Arts/Humanities)	4
CORE 100	The World at Home (or equivalent)	4
ME 135	Finite Element Analysis	3
ENGR 197	Service Learning: Engineering Projects in Community Service*	1
Semester Units		**16**

WITH THE SMALL COMMUNITY, IT REALLY HAS ALLOWED ME TO PERSONALLY GET TO KNOW MY PEERS, FACULTY, ADMINISTRATORS, AND ESPECIALLY ABOUT MYSELF.

—Kim Che, Union City, Biological Sciences Major

SEMESTER 7

ENGR 135	Heat Transfer (Lab)	4
ME 137	Computer Aided Engineering* with Design	4
	Technical Elective with Lab	4
	Free Elective	3
ENGR 197	Service Learning: Engineering Projects in Community Service*	1
Semester Units		**16**

SEMESTER 8

ME 170	Capstone Design* with Lab	4
ME 140	Vibration and Control* with Design	4
ENGR 155	Engineering Economic Analysis	3
	General Education Elective (Social/Cognit ive Sciences)	4
ENGR 191	Professional Seminar	1
Semester Units		**15**

Total Program Units 125

* Design Component

The four-year plans presented in this catalog demonstrate the recommended sequencing and timing of the required and elective components within each major. In many cases, a student's academic background will require variations in the timing of the coursework listed in the plan. All students are expected to work with their academic advisor to find their best pathway through the degree requirements of their chosen program.

School Of Natural Sciences

The mission of the School of Natural Sciences is to share the joy of discovery of our natural world, to provide a stimulating environment that enables our students to better understand the scientific foundation of the world in which we live and to develop the skills of the next generation of leaders to meet the scientific challenges of the 21st century. Science, technology and innovation are the keys to future prosperity and quality of life.

THE SCHOOL OF NATURAL SCIENCES OFFERS THE FOLLOWING MAJORS:

- Applied Mathematical Sciences
- Biological Sciences
- Chemical Sciences
- Earth Systems Science
- Physics

LETTER OF WELCOME FROM THE DEAN

Dear Science Students:

The UC Merced Natural Sciences faculty invites you to join one of the greatest adventures of all time—discovering how our universe works and applying this knowledge to improve human well-being. You live in an age of immense challenges and equally immense opportunities. Each year brings new crises in human health, energy production and natural resources, yet each year also brings stunning new scientific and technical advances that were unimaginable just a few years earlier. Entering the School of Natural Sciences is the first step towards joining the worldwide team of people working to develop and apply new scientific knowledge. A degree in the sciences opens the door to a vast array of exciting careers. Graduates from the UC Merced School of Natural Sciences will have practical skills to enter the high-tech job market directly, as well as the in-depth knowledge needed to succeed in professional schools or graduate programs. We have created a range of multidisciplinary majors in some of the most exciting and innovative areas of science: applied mathematical sciences, biological sciences (including tracks in molecular and cell biology, ecology and evolutionary biology, human biology, developmental biology and microbiology and immunology), chemical sciences, Earth systems sciences and physics.

I personally welcome you to the exciting world of science and invite you to visit me or any of our faculty members to talk about the many opportunities for you in the School of Natural Sciences.

Sincerely,

Maria Pallavicini
Dean, School of Natural Sciences

THE MOST INCOMPREHENSIBLE THING ABOUT THE WORLD IS THAT IT IS COMPREHENSIBLE.

—ALBERT EINSTEIN (1879–1955)

SCHOOL OF NATURAL SCIENCES REQUIREMENTS

All School of Natural Sciences students, regardless of major, are expected to meet the minimum requirements for the BS degree. The School of Natural Sciences degree requirements are:

At least 120, but not more than 150 semester units to include the following:

- At least 46 general education semester units.
- At least 60 semester units of upper division courses.

GENERAL EDUCATION REQUIREMENTS (46–48 UNITS)

School of Natural Sciences students are required to complete the following list of general education courses.

MATH/SCIENCE PREPARATORY CURRICULA

Calculus of a Single Variable I (MATH 21)* . . . . . 4 units
Probability and Statistics Course . . . . . 4 units
Introductory Physics I (PHYS 8* or PHYS 18) . . . . . 4 units
Computer Science Course. . . . . 2-4 units
General Chemistry I (CHEM 2). . . . . 4 units

*Integrated Calculus/Physics (ICP 1, 8 units) may be taken in place of MATH 21 and PHYS 8

GENERAL EDUCATION COURSES OUTSIDE OF NATURAL SCIENCES AND ENGINEERING

The World at Home I and II (CORE 1 and CORE 100). . . . . 8 units
College Reading and Composition (WRI 10) . . . . . 4 units
General Education elective in the Humanities or Arts. . . . . 4 units
General Education elective in the Social Sciences. . . . . 4 units
Two other General Education electives outside of Natural Sciences and Engineering . . . . . 8 units

(One General Education elective must emphasize written or oral communication and at least one must be an upper division course.)

Students in Natural Sciences have a freshman year that lays the foundation for further study in the majors. Students have the opportunity to explore the different UC Merced majors during that year through freshman seminars, research experiences and informal contact with faculty and graduate students. Currently freshman seminars are not required but *highly encouraged* for students within Natural Sciences. Taking a freshman seminar course and also participating in research experiences gives students the opportunity to work closely with faculty.

Two General Education courses, CORE 1 and CORE 100, The World at Home I and II, are common for all freshmen or sophomores entering UC Merced in the lower division. Transfer students entering in the upper division must take Core 100. These one-semester courses lay the foundation in skills and ideals articulated in the UC Merced Guiding Principles for General Education (see General Education section of this catalog). These include decision-making, communication, ethics, responsibility, leadership, teamwork, aesthetic understanding, creativity and an appreciation of diverse perspectives in both the global and community contexts. All UC Merced students take CORE 1 during their freshman year and CORE 100 during their junior year.

Major area upper division courses and emphasis track requirements are unique to each major. These are presented in the following section on Majors.

SCIENCE IS ABOUT DISCOVERY

The scientist does not study nature because it is useful; he studies it because he delights in it, and he delights in it because it is beautiful. If nature were not beautiful, it would not be worth knowing, and if nature were not worth knowing, life would not be worth living.

—JULES HENRI POINCARÉ (1854–1912)

Mathematics, physics, biology, chemistry and Earth systems science are the links to making discoveries about the natural world, the impact of human activities on that world and the impact of that world on human health. The academic programs in the School of Natural Sciences are designed to help students learn fundamental scientific principles in the context of the real world.

SCIENCE IS ABOUT CREATIVITY, INNOVATION AND TECHNOLOGY

Discovery consists in seeing what everyone else has seen and thinking what no one else has thought.

—ALBERT SZENT-GYORGI (1893–1986)

Answering questions requires creativity and innovation—creativity to think about a problem in a different way; to design the strategy to, for example, discover the gene(s) responsible for asthma, cancer or cardiovascular disease; to generate ideas for new technologies. Students in the School of Natural Sciences receive the foundational learning to create innovative technologies to solve problems and implement solutions.

SCIENCE IS ABOUT STEWARDSHIP OF OUR NATURAL RESOURCES

A thing is right when it tends to preserve the integrity, stability and beauty of the biotic community.

—ALDO LEOPOLD (1887–1948)

Understanding and prediction must precede protection. Students in the School of Natural Sciences fully understand the complex interactions between the physical and biological world and the consequences of society's actions on the Earth and its biota. With this understanding, they are well positioned to manage and preserve our resources for future generations.

SCIENCE IS ABOUT UNDERSTANDING THE HUMAN CONDITION

Louis Pasteur's theory of germs is ridiculous fiction.

—PIERRE PACHET, 1872

The understanding of science has improved and will continue to improve. Health and disease, prevention and treatment rely on understanding complex systems. Students in Natural Sciences at UC Merced are at the forefront of state-of-the art research and technology to unravel biological complexity. They are the world's future scientists, healers and policy makers.

PARTNERSHIP WITH KINGS CANYON, SEQUOIA AND YOSEMITE NATIONAL PARKS

On June 17, 2004, UC Merced signed a second five-year partnership agreement for education and research with Sequoia/Kings Canyon and Yosemite National Parks. In cooperation with schools in the San Joaquin Valley, the partnership has been sponsoring summer environmental education programs for high school students. With the dedication of the Sierra Nevada Research Institute Yosemite Field Station (pictured above), the partnership has kicked off a new phase of research collaboration that will advance scientific and cultural understanding, meet regional needs and enrich university and public education. An affiliated research station in Sequoia/Kings Canyon is also planned.

Transfer Students

General Education: For students with at least 45 transferable semester units who have completed and had certified the Intersegmental General Education Transfer Curriculum (IGETC), no additional lower division general education courses are required. All transfer students need to complete at least 7 units of upper division general education, including CORE 100, and may need to complete some lower division major preparation or prerequisite courses where equivalents are not offered at other institutions. Please consult www.assist.org for suggested course equivalences.

Students with at least 45 transferable semester units, but without certified IGETC, can satisfy Natural Sciences general education requirements by including the following pattern of transferable, one-semester courses within the 45 units:

- Two English composition courses;
- One mathematics course (a mathematics course that satisfies major preparation will satisfy this requirement);
- Three arts/humanities courses with at least one each in arts and humanities;
- Three social sciences courses in at least two disciplines;
- Two science courses, one each from biological sciences and physical sciences (sciences courses that satisfy major preparation will also satisfy this requirement).

Students who transfer with fewer than 45 transferable semester units will need to complete Natural Sciences general education requirements.

Natural Science Majors

■ Applied Mathematical Sciences Major

Mathematics has been a central feature of humanity's intellectual achievements over the past several centuries. Its role in the physical sciences and engineering is well established and continues to aid in their development. Mathematics is also becoming increasingly important in the social and life sciences with a wide range of new applications requiring sophisticated mathematical techniques. Thus, the field of applied mathematical sciences is undergoing remarkable growth.

UC Merced offers an undergraduate major leading to a B.S. degree in the Applied Mathematical Sciences. This educational experience provides students with knowledge of the foundations of mathematics and the skills needed to apply mathematics to real-world phenomena in the social sciences, natural sciences and engineering. The curriculum is composed of courses in the fundamentals while allowing for building expertise in an application area through the emphasis tracks. There is a core set of courses all mathematical sciences students take. Beyond these classes, students complete an emphasis track consisting of courses in other fields. Some examples of emphasis tracks include physics, computational biology, economics, computer science and engineering, and engineering mechanics. New emphasis tracks will be added alongside new programs developing at UC Merced.

A degree in applied mathematical sciences opens the door to a wide variety of careers. Employers understand that a degree in mathematics means a student has been trained well in analytical reasoning and problem solving. Moreover, applied mathematical sciences majors with skills in scientific computing have the additional leverage of substantial computing experience. The market for applied mathematicians has usually been good, especially for those who can relate their mathematics to real world problems. In particular, applied mathematics majors familiar with concepts in management, biology, engineering, economics or the environmental sciences among others are well suited for many specialized positions. In addition, the breadth and rigor of this program provide an excellent preparation to teach mathematics at the elementary or high school levels.

Requirements for The Applied Mathematical Sciences (AMS) Major

Students majoring in Applied Mathematical Sciences must adhere to all UC Merced and School of Natural Sciences requirements. For the Math/Science Preparatory Curricula, students majoring in Applied Mathematical Sciences must take:

- Calculus I (MATH 21)
- Probability & Statistics (MATH 32)
- Introductory Physics I (PHYS 8)

- Introduction to Computing (CSE 20)
- General Chemistry I (CHEM 2)

The additional requirements that must be met to obtain the B.S. degree in the Applied Mathematical Sciences at UC Merced are:

Applied Mathematical Sciences Requirements (62-64 units): The Applied Mathematical Sciences major consists of 16 courses (5 or 6 lower division and 10 or 11 upper division, depending on the emphasis track chosen) designed to give all students a common foundation of core knowledge specific to the discipline, plus breadth in an application area.

LOWER DIVISION COURSES (20 UNITS)

Contemporary Biology (BIO 1), Introduction to Earth Systems Science (ESS 1) or Introduction to Biological Earth Systems (ESS 5)* . . . . . 4 units
Calculus II (MATH 22) . . . . . 4 units
Vector Calculus (MATH 23) . . . . . 4 units
Linear Algebra and Differential Equations (MATH 24) . . . . . 4 units
Introductory Physics II (PHYS 9) . . . . . 4 units

* For the Computational Biology emphasis track listed below, students must take BIS 1.

UPPER DIVISION COURSES (24 UNITS)

Applied Math Methods I (MATH 121) . . . . . 4 units
Applied Math Methods II (MATH 122). . . . . 4 units
Numerical Analysis I (MATH 131). . . . . 4 units
Numerical Analysis II (MATH 132) . . . . . 4 units
Linear Analysis I (MATH 141). . . . . 4 units
Linear Analysis II (MATH 142) . . . . . 4 units

EMPHASIS TRACKS (18-20 UNITS)

The student must complete at least 18 units of approved course work from other programs toward the completion of an emphasis track. At least 10 of these 17 units must be upper division courses. Some examples of emphasis tracks include physics, computational biology, economics, computer science and engineering, and engineering mechanics. These examples appear in the sample course plans below. More application themes will become available as new programs on campus develop.

Additional Requirements for Physics Emphasis Track

Introductory Physics III (PHYS 10). . . . . 4 units
Analytical Mechanics Core (PHYS 105) . . . . . 4 units
Electrodynamics Core (PHYS 110) . . . . . 4 units
Statistical Mechanics Core (PHYS 112) . . . . . 4 units
Quantum Mechanics Core (PHYS 137) . . . . . 4 units

Additional Requirements for Computational Biology Emphasis Track

The Molecular Machinery of Life (BIO 100) . . . . . 4 units
Biostatistics (BIO 175) . . . . . 4 units
Mathematical Modeling for Biology (BIO 180). . . . . 4 units
Survey of Computational Biology (BIO 181). . . . . 4 units
Bioinformatics (BIO 182) . . . . . 4 units

Additional Requirements for Economics Emphasis Track

Introduction to Economics (ECON 1) . . . . . 4 units
History of Economic Thought (ECON 11). . . . . 4 units
Intermediate Microeconomic Theory (ECON 100) . . . . . 4 units
Intermediate Macroeconomic Theory (ECON 101). . . . . 4 units
Econometrics (ECON 130). . . . . 4 units

Additional Requirements for Computer Science & Engineering Emphasis Track

Introduction to Computer Science and Engineering I (CSE 30). . . 4 units
Introduction to Computer Science and Engineering II (CSE 31) . . 4 units
Algorithm Design and Analysis (CSE 100) . . . . . 4 units
Database Systems (CSE 111 . . . . . 4 units
Networking (CSE 160). . . . . 4 units

Additional Requirements for Engineering Mechanics Emphasis Track

Dynamics (ENGR 57) . . . . . 3 units
Fluid Mechanics (ENGR 120) . . . . . 4 units
Finite Element Analysis (ME 135) . . . . . 3 units
Vibrations and Controls (ME 140) or
Analytic Mechanics (PHYS 105). . . . . 3 units
Strength of Materials (ENGR 151) . . . . . 4 units

Transfer Students

Transfer students who wish to major in Applied Mathematical Sciences should complete two semesters of calculus of a single variable, vector calculus, linear algebra and differential equations. In addition, transfer students should complete one semester of general chemistry with laboratory and two semesters of calculus-based physics with laboratory. Students should consult the online student-transfer information system at www.assist.org. Students should also consult the Information for Prospective Students link on the School of Natural Sciences web site naturalsciences.ucmerced.edu for more information.

SAMPLE PLAN OF STUDY FOR APPLIED MATHEMATICAL SCIENCES DEGREE– PHYSICS EMPHASIS

SEMESTER 1

MATH 21	Calculus I	4
PHYS 8	Introductory Physics I	4
CORE 1	The World at Home	4
CSE 20	Introduction to Computing I	2
	Freshman Seminar*	1
Semester Units		**15**

SEMESTER 2

MATH 22	Calculus of a Single Variable II	4
PHYS 9	Introductory Physics II	4
CHEM 2	General Chemistry I	4
WRI 10	College Reading and Composition	4
Semester Units		**16**

SEMESTER 3

MATH 23	Vector Calculus	4
MATH 32	Probability and Statistics	4
PHYS 10	Introductory Physics III	4
	General Education Elective (Arts/Humanities)	4
Semester Units		**16**

SEMESTER 4

MATH 24	Linear Algebra and Differential Equations	4
PHYS 105	Analytic Mechanics Core	4
BIO 1	Contemporary Biology**	4
	General Education Elective (Social/Cognitive Sciences)	4
Semester Units		**16**

SEMESTER 5

MATH 121	Applied Mathematical Methods I	4
PHYS 110	Electrodynamics Core	4
	General Education (communication)	4
	Free Elective	3
Semester Units		**15**

SEMESTER 6

MATH 122	Applied Mathematical Methods II	4
PHYS 112	Statistical Mechanics Core	4
CORE 100	The World at Home	4
	Free Elective	3
Semester Units		**15**

SEMESTER 7

MATH 131	Numerical Analysis I	4
MATH 141	Linear Analysis I	4
PHYS 137	Quantum Mechanics Core	4
	General Education Elective	4
Semester Units		**16**

SEMESTER 8

MATH 132	Numerical Analysis II	4
MATH 142	Linear Analysis II	4
	Upper division sciences/engineering elective	4
	Free Elective	3
Semester Units		**15**

Total Program Units 124

* Freshman Seminar is an optional course; it is not required for Applied Math Majors.

** or ESS 1 Introduction to Earth Systems Science or ESS 5 Introduction to Biological Earth Systems.

The four-year plans presented in this catalog demonstrate the recommended sequencing and timing of the required and elective components within each major. In many cases, a student's academic background will require variations in the timing of the coursework listed in the plan. All students are expected to work with their academic advisor to find their best pathway through the degree requirements of their chosen program.

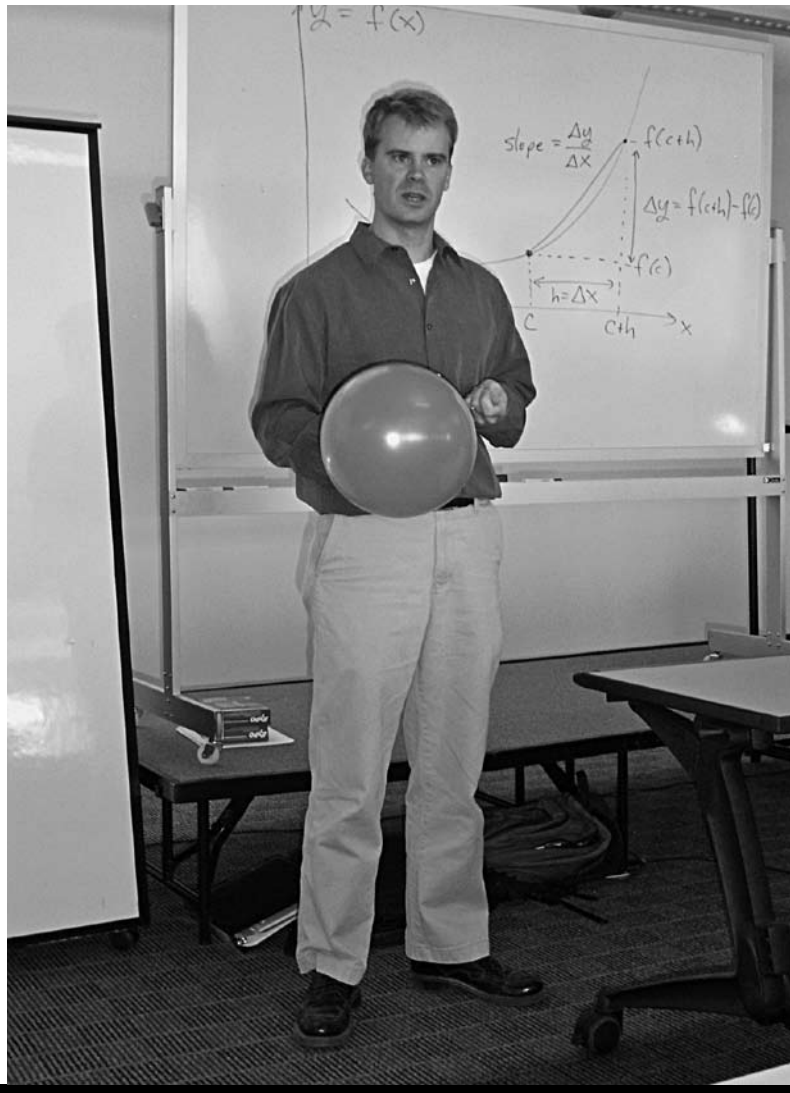
PLAN OF STUDY FOR APPLIED MATHEMATICAL SCIENCES DEGREE–COMPUTATIONAL BIOLOGY EMPHASIS

SEMESTER 1

MATH 21	Calculus I	4
BIO 1	Contemporary Biology	4
CORE 1	The World at Home	4
CSE 20	Introduction to Computing I	2
	Freshman Seminar*	1
Semester Units		**15**

SEMESTER 2

MATH 22	Calculus of a Single Variable II	4
PHYS 8	Introductory Physics I	4
CHEM 2	General Chemistry I	4
WRI 10	College Reading and Composition	4
Semester Units		**16**



Professor Kevin Mitchell, Calculus class.

SEMESTER 3

MATH 23	Vector Calculus	4
PHYS 9	Introductory Physics II	4
BIO 100	The Molecular Machinery of Life	4
	General Education Elective (Humanities and Arts)	4
Semester Units		**16**

SEMESTER 4

MATH 24	Linear Algebra and Differential Equations	4
MATH 32	Probability and Statistics	4
BIO 180	Mathematical Modeling for Biology	4
	General Education Elective (Social and Cognitive Sciences)	4
Semester Units		**16**

SEMESTER 5

MATH 121	Applied Mathematical Methods I	4
BIO 175	Biostatistics	4
	General Education (communication)	4
	Free Elective	3
Semester Units		**15**

SEMESTER 6

MATH 122	Applied Mathematical Methods II	4
BIO 181	Survey of Computational Biology	4
CORE 100	The World at Home	4
	Free Elective	3
Semester Units		**15**

SEMESTER 7

MATH 131	Numerical Analysis I	4
MATH 141	Linear Analysis I	4
BIO 182	Bioinformatics	4
	General Education Elective	4
Semester Units		**16**

SEMESTER 8

MATH 132	Numerical Analysis II	4
MATH 142	Linear Analysis II	4
	Upper division Science/Engineering Elective	4
	Free Elective	3
Semester Units		**15**

Total Program Units 124

* Freshman Seminar is an optional course; it is not required for Applied Math Majors.

The four-year plans presented in this catalog demonstrate the recommended sequencing and timing of the required and elective components within each major. In many cases, a student's academic background will require variations in the timing of the coursework listed in the plan. All students are expected to work with their academic advisor to find their best pathway through the degree requirements of their chosen program.

SAMPLE PLAN OF STUDY FOR APPLIED MATHEMATICAL SCIENCES DEGREE–ECONOMICS EMPHASIS TRACK

SEMESTER 1

MATH 21	Calculus 1	4
PHYS 8	Introductory Physics I	4
CORE 1	The World at Home	4
CSE 20	Introduction to Computing I	2
	Freshman Seminar*	1
Semester Units		**15**

SEMESTER 2

MATH 22	Calculus of a Single Variable II	4
PHYS 9	Introductory Physics II	4
CHEM 2	General Chemistry I	4
WRI 10	College Reading and Composition	4
Semester Units		**16**

SEMESTER 3

MATH 23	Multi-Variable Calculus	4
ECON 1	Introduction to Economics**	4
BIO 1	Contemporary Biology***	4
	General Education Elective (Humanities and Arts)	4
Semester Units		**16**

SEMESTER 4

MATH 24	Linear Algebra and Differential Equations	4
MATH 32	Probability and Statistics	4
ECON 11	History of Economic Thought	4
	General Education Elective (Social and Cognitive Sciences)	4
Semester Units		**16**

SEMESTER 5

MATH 121	Applied Mathematical Methods I	4
ECON 100	Intermediate Microeconomic Theory	4
	General Education (communication)	4
	Free Elective	3
Semester Units		**15**

SEMESTER 6

MATH 122	Applied Mathematical Methods II	4
ECON 101	Intermediate Macroeconomic Theory	4
CORE 100	The World at Home	4
	Free Elective	3
Semester Units		**15**

SEMESTER 7

MATH 131	Numerical Analysis I	4
MATH 141	Linear Analysis I	4
ECON 130	Econometrics	4
	General Education Elective	4
Semester Units		**16**

SEMESTER 8

MATH 132	Numerical Analysis II	4
MATH 142	Linear Analysis II	4
	Upper division Science/Engineering Elective	4
	Free Elective	3
Semester Units		**15**

Total Program Units 124

* Freshman Seminar is an optional course; it is not required for Applied Math Majors.

** Economics 1 can be used to satisfy a Social and Cognitive Science General Education Requirement.

*** or ESS 1 Introduction to Earth Systems Science or ESS 5 Introduction to Biological Earth Systems.

The four-year plans presented in this catalog demonstrate the recommended sequencing and timing of the required and elective components within each major. In many cases, a student's academic background will require variations in the timing of the coursework listed in the plan. All students are expected to work with their academic advisor to find their best pathway through the degree requirements of their chosen program.

SAMPLE PLAN OF STUDY FOR APPLIED MATHEMATICAL SCIENCES DEGREE–COMPUTER SCIENCE AND ENGINEERING EMPHASIS TRACK

SEMESTER 1

MATH 21	Calculus 1	4
PHYS 8	Introductory Physics I	4
CORE 1	The World at Home	4
CSE 20	Introduction to Computing I	2
	Freshman Seminar*	1
Semester Units		**15**

SEMESTER 2

MATH 22	Calculus of a Single Variable II	4
PHYS 9	Introductory Physics II	4
CHEM 2	General Chemistry I	4
WRI 10	College Reading and Composition	4
Semester Units		**16**

SEMESTER 3

MATH 23	Multi-Variable Calculus	4
CSE 30	Introduction to Computer Science And Engineering I	4
BIO 1	Contemporary Biology**	4
	General Education Elective (Arts/Humanities)	4
Semester Units		**16**

SEMESTER 4

MATH 24	Linear Algebra and Differential Equations	4
CSE 31	Introduction to Computer Science And Engineering II	4
MATH 32	Probability and Statistics	4
	General Education Elective (Social/Cognitive Sciences)	4
Semester Units		**16**

SEMESTER 5

MATH 121	Applied Mathematical Methods I	4
CSE 100	Algorithm Design and Analysis	4
	General Education (communication)	4
	Free Elective	3
Semester Units		**15**

SEMESTER 6

MATH 122	Applied Mathematical Methods II	4
CSE 111	Database Systems	4
CORE 100	The World at Home	4
	Free Elective	3
Semester Units		**15**

SEMESTER 7

MATH 131	Numerical Analysis I	4
CSE 160	Networking	4
MATH 141	Linear Analysis I	4
	General Education Elective	4
Semester Units		**16**

SEMESTER 8

MATH 132	Numerical Analysis II	4
MATH 142	Linear Analysis II	4
	Upper division Science/Engineering Elective	4
	Free Elective	3
Semester Units		**15**

Total Program Units 124

* Freshman Seminar is an optional course; it is not required for Applied Math Majors.

** or ESS 1 Introduction to Earth Systems Science or ESS 5 Introduction to Biological Earth Systems.

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SAMPLE PLAN OF STUDY FOR APPLIED MATHEMATICAL SCIENCES DEGREE–ENGINEERING MECHANICS EMPHASIS TRACK

SEMESTER 1

MATH 21	Calculus 1	4
PHYS 8	Introductory Physics I	4
CORE 1	The World at Home	4
CSE 20	Introduction to Computing I	2
	Freshman Seminar*	1
Semester Units		**15**

SEMESTER 2

MATH 22	Calculus of a Single Variable II	4
PHYS 9	Introductory Physics II	4
CHEM 2	General Chemistry I	4
WRI 10	College Reading and Composition	4
Semester Units		**16**

SEMESTER 3

MATH 23	Vector Calculus	4
ENGR 57	Dynamics	3
BIO 1	Contemporary Biology**	4
	General Education Elective (Arts/Humanities)	4
Semester Units		**15**

Professor Matthew Meyer.

SEMESTER 4

MATH 24	Linear Algebra and Differential Equations	4
MATH 32	Probability and Statistics	4
ENGR 120	Fluid Mechanics	4
	General Education Elective (Social/Cognitive Sciences)	4
Semester Units		**16**

SEMESTER 5

MATH 121	Applied Mathematical Methods I	4
ENGR 151	Strength of Materials	4
	General Education (communication)	4
	Free Elective	3
Semester Units		**15**

SEMESTER 6

MATH 122	Applied Mathematical Methods II	4
ME 140	Vibrations and Controls***	3
CORE 100	The World at Home	4
	Free Elective	3
Semester Units		**14**

SEMESTER 7

MATH 131	Numerical Analysis I	4
MATH 141	Linear Analysis I	4
ME 135	Finite Element Analysis	3
	General Education Elective	4
Semester Units		**15**

SEMESTER 8

MATH 132	Numerical Analysis II	4
MATH 142	Linear Analysis II	4
	Upper division Science/Engineering Elective	4
	Free Elective	3
Semester Units		**15**

Total Program Units 121

* Freshman Seminar is an optional course; it is not required for Applied Math Majors.

** or ESS 1 Introduction to Earth Systems Science or ESS 5 Introduction to Biological Earth Systems.

*** or PHYS 105 Analytic Mechanics

The four-year plans presented in this catalog demonstrate the recommended sequencing and timing of the required and elective components within each major. In many cases, a student's academic background will require variations in the timing of the coursework listed in the plan. All students are expected to work with their academic advisor to find their best pathway through the degree requirements of their chosen program.

■ Biological Sciences Major

The Biological Sciences address many of the most important and fundamental questions about our world: What is life? How does our brain produce our ideas and emotions? What are the limits to human life and physical capabilities? How do we feed the world's growing population? Could medical science ensure that our children won't have to worry about disease? Moreover, there has never been a more exciting and important time to study biology. From the mapping of the genome to understanding the molecular basis of human disease to predicting the effects of global climate change on ecosystems to understanding fundamental processes that produce and sustain life on Earth, the Biological Sciences are at the forefront of finding answers to some of society's most vexing problems.

The undergraduate major in Biological Sciences is an excellent first step towards exciting careers in biology and the health sciences. Graduates of this program will also be well prepared for positions in the biotechnology and pharmaceutical industries, health care, conservation, environmental law and policy, and natural resources management (including forest and park services), as well as careers such as journalism, public policy and business, which increasingly involve the biological sciences. In addition, the breadth and rigor of this program are an excellent preparation for graduates to teach science at the elementary or high school levels.

This program teaches biology as a multidisciplinary science, reflecting the increasing role of chemistry, physics, mathematics, computer science and advanced technologies in the life sciences. Students majoring in Biological Sciences can choose between five emphasis tracks providing background in different areas of biology: Molecular and Cell Biology, Ecology and Evolutionary Biology, Human Biology, Developmental Biology and Microbiology and Immunology. These emphasis tracks consist of a sequence of five or six upper division courses that are taken in the second, third and fourth years of the program.

Requirements for the Biological Sciences (BIO) Major

In addition to adhering to the UC Merced and School of Natural Sciences requirements, the requirements that must be met to receive the B.S. in Biological Sciences at UC Merced are:

BIOLOGICAL SCIENCES REQUIREMENTS (62–74 UNITS)

The Biological Sciences major consists of 16 courses (6 lower division and 9 or 10 upper division, depending on the emphasis track) designed to give all students a common foundation of core knowledge specific to the discipline

MAJOR REQUIREMENTS (28 UNITS)

Contemporary Biology (BIO 1) 4 units
The Cell (BIO 110) 4 units
Principles of Organic Chemistry (CHEM 8) 4 units
General Chemistry II (CHEM 10) 4 units
Mathematical Biology (MATH 30) or Calculus of a Single Variable II (MATH 22) 4 units
Probability and Statistics (MATH 32 or 18, ENVE 105, PSY 10) 4 units
Introductory Physics II or Introductory Physics II for Biological Sciences (PHYS 9 or PHYS 19) 4 units

Emphasis Track Courses (16–21 UNITS)

(Details on the Emphasis Tracks are given in next section)

- Molecular and Cell Biology: 4 courses
- Human Biology: 4 courses
- Ecology and Evolutionary Biology: 4 courses
- Developmental Biology: 5 courses
- Microbiology and Immunology: 5 courses

UPPER DIVISION ELECTIVE COURSES

Two to four thematically linked courses chosen from the emphasis track elective list in the next section 8-17 units

ADDITIONAL UPPER DIVISION COURSES (3– 4 UNITS)

One non-biology science or engineering course . . . . . 3-4 units

Undergraduate Major in Biological Sciences Research

As a capstone to the Biological Sciences Program, all Biological Sciences majors are encouraged to participate in a research experience. Students attend research lectures by UC Merced faculty, and students can elect to go on to participate in research projects during their senior year. The relevant course numbers are BIO 190 and BIO 195.

Transfer Students

Transfer students who wish to major in Biological Sciences should complete one year of calculus, one semester of calculus based physics, one year of general chemistry, a probability and statistics course and two to three semesters of general biology. Students should consult the online student-transfer information system at www.assist.org. Students should also consult the Information for Prospective Students link on the School of Natural Sciences web site naturalsciences.ucmerced.edu for more information.

BIOLOGICAL SCIENCES EMPHASIS TRACKS

I. Molecular and Cell Biology

The Molecular and Cell Biology (MCB) emphasis track provides students with the skills and knowledge to pursue studies in graduate programs and professional schools in preparation for careers in basic and applied biological research and medicine. MCB emphasizes the molecular and cellular principles that underlie all terrestrial life, as well as the genetic and evolutionary concepts explaining the diversity and unity of life. These topics form the foundation of modern health sciences and biomedical research.

MOLECULAR AND CELL BIOLOGY UPPER DIVISION CORE COURSES (16 UNITS)

Molecular Machinery of Life (BIO 100) . . . . . 4 units
Genetics (BIO 140) . . . . . 4 units
Evolution (BIO 141). . . . . 4 units
Computational Biology Elective (BIO 180, 181 or 182) . . . . . 4 units

At least four courses chosen from the Molecular and Cell Biology elective list below:

One course with Laboratory component . . . . . 5 units
Three additional courses . . . . . 12 units minimum

BIO 101 – Biochemistry

BIO 102 – Advanced Biochemistry and Molecular Biology

BIO 104 – Biophysics

BIO 104L – Biophysics Laboratory

BIO 105 – Enzymology

BIO 105L – Enzymology Laboratory

BIO 111 – Cells, Tissues and Organs

BIO 120 – General Microbiology

BIO 120L – General Microbiology Laboratory

BIO 122 – Pathogenesis

BIO 124 – Microbial Evolution

BIO 127 – Virology

BIO 130 – Plant Biology

BIO 134 – Marine Sciences Theory and Practice

BIO 142 – Genome Biology

BIO 143 – Biodiversity

BIO 144 – Phylogenetics

BIO 144L – Phylogenetics Laboratory

BIO 150 – Embryos, Genes and Development

BIO 151 – Molecular Immunology

BIO 151L – Molecular Immunology Laboratory

BIO 152 – Cancer Genetics and Tumor Biology

BIO 153 – Evolution and Development

BIO 160 – Comparative Physiology

BIO 160L – Comparative Physiology Laboratory

BIO 161 – Human Physiology

BIO 163 – Endocrinology

BIO 170 – Neurobiology

BIO 170L – Neurobiology Laboratory

BIO 175 – Biostatistics

BIO 180– Mathematical Modeling for Biology

BIO 181 – Introduction to Biomolecular Simulation

BIO 182 – Bioinformatics

BIO 183 – Population Genetics

II. Human Biology

The Human Biology (HB) emphasis track provides students with a rich education in the scientific principles that underlie modern health sciences. This major is an excellent preparation for entrance into health-related professional careers including medicine, dentistry, pharmacy, genetic counseling, health education, public health, clinical psychology, epidemiology, environmental health sciences and health administration, among others. The Human Biology emphasis track also provides a strong foundation for careers in biomedical research, and includes the courses most broadly required for advanced study in health sciences.

HUMAN BIOLOGY UPPER DIVISION CORE COURSES (17 UNITS)

Genetics (BIO 140) . . . . . 4 units
Biochemistry* (BIO 101) . . . . . 4 units
*requires CHEM 100, a 3 unit course
Evolution (BIO 141) . . . . . 4 units
Human Physiology (BIO 161). . . . . 5 units

At least four courses chosen from the Human Biology elective list below.

One upper division Cognitive Science Course (requires COGS 1) . 4 units
Three additional courses . . . . . 2 units minimum

ANTH 100 – History of Anthropological Thought and Practice

ANTH 114 – Social Memory

ANTH 130 – Archaeology of Colonialism

ANTH 155 – Paleodemography

ANTH 172 – Ethnohistory

BIO 104 – Biophysics

BIO 104L – Biophysics Laboratory

BIO 105 - Enzymology

BIO 111 – Cells, Tissues and Organs

BIO 122 – Microbial Pathogenesis

BIO 123 – Human Parasitology

BIO 125 – Emerging Public Health Threats

BIO 127 – Virology

BIO 142 – Genome Biology

BIO 150 – Embryos, Genes and Development

BIO 151 – Molecular Immunology

BIO 151L – Molecular Immunology Laboratory

BIO 152 – Cancer Genetics and Tumor Biology

BIO 170 – Neurobiology

BIO 170L – Neurobiology Laboratory

BIO 175 – Biostatistics

BIO 180– Mathematical Modeling for Biology

BIO 181 – Introduction to Biomolecular Simulation

BIO 182 – Bioinformatics

COGS 101 – Mind, Brain and Computation (requires COGS 1)

COGS 103 – Introduction to Neural Networks in Cognitive Science (requires COGS 1)

PSY 120 – Physiological Psychology

PSY 121 – Cognitive Psychology

PSY 130 – Developmental Psychology

PSY 132 – Personality

PSY 133 – Abnormal Psychology

PSY 140 – Clinical Psychology

PSY 145 – Human Sexuality

PSY 146 – Alcohol, Drugs and Behavior

III. Ecology and Evolutionary Biology

The Ecology and Evolutionary Biology (EEB) emphasis track prepares students for careers in areas of biology that lead to a more comprehensive understanding of biological processes that range across the mechanistic, organismal, population, community and ecosystem levels. Ecology and Evolutionary Biology incorporates multidisciplinary approaches to address biological questions in

an evolutionary framework. Areas of research in Ecology and Evolutionary Biology include behavioral ecology, biomechanics, comparative anatomy and physiology, conservation biology, developmental genetics, ecology, population genetics, plant biology, molecular evolution, organismal interactions (e.g., plant-animal), paleobiology, phylogenetics, quantitative genetics and systematics.

ECOLOGY AND EVOLUTIONARY BIOLOGY UPPER DIVISION CORE COURSES (16 UNITS)

Molecular Machinery of Life (BIO 100) . . . . . 4 units
Genetics (BIO 140) . . . . . 4 units
Evolution (BIO 141) . . . . . 4 units
Ecology (BIO 148) . . . . . 4 units

At least four courses chosen from the Ecology and Evolutionary Biology elective list below:

One course with Field component . . . . . 5 units
One course with Lab component . . . . . 5 units
Two additional courses . . . . . 8 units minimum

BIO 111– Cells, Tissues, Organs

BIO 124- Microbial Evolution

BIO 134– Marine Sciences (F)

BIO 142– Genome Biology (L)

BIO 143– Biodiversity

BIO 143F Biodiversity and the Tree of Life Field

BIO 144– Phylogenetics

BIO 144L – Phylogenetics Laboratory

BIO 146– Paleobiology

BIO 147– Astrobiology

BIO 149– Conservation Biology

BIO 149L – Conservation Biology Laboratory (satisfies Field component requirement)

BIO 153– Evolution & Development

BIO 160– Comparative Physiology (L)

BIO 162– Biomechanics

BIO 163– Endocrinology

BIO 163 L – Endocrinology Laboratory

BIO 170– Neurobiology

BIO 170L- Neurobiology Laboratory

BIO 180– Mathematical Modeling for Biology

BIO 181 – Introduction to Biomolecular Simulation

BIO 182 – Bioinformatics

BIO 183– Population Genetics

ESS 128– Theoretical Ecology

IV. Developmental Biology

Developmental Biology (DB) emphasis track provides students with an understanding of the mechanisms that govern the generation of unique cell types and the assembly of cells into complex organisms. In addition to a strong foundation in genetics, cell biology and molecular biology, students can choose specialized courses covering topics such as immune system development, nervous system development, and the evolution of developmental mechanisms. Training in DB prepares students for careers in all aspects of the health sciences and biological research, particularly in the fields of stem cell biology, cancer biology, evolutionary biology, and regenerative medicine.

DEVELOPMENTAL BIOLOGY UPPER DIVISION CORE COURSES (20 UNITS)

Molecular Machinery of Life (BIO 100) . . . . . 4 units
Genetics (BIO 140) . . . . . 4 units
Evolution (BIO 141) . . . . . 4 units
Embryos Genes and Development (BIO 150) . . . . . 4 units
Computational Biology Elective (BIO 180, 181 or 182) . . . . . 4 units

At least three courses chosen from the Developmental Biology elective list below:

One course with Laboratory component . . . . . 5 units
Two additional courses . . . . . 8 units minimum

BIO 101 – Biochemistry I

BIO 102 – Advanced Biochemistry and Molecular Biology

BIO 104 – Biophysics

BIO 104 – Biophysics Laboratory

BIO 111 – Cells, Tissues and Organs‡

BIO 120 – General Microbiology

BIO 120L – General Microbiology Laboratory

BIO 124 – Microbial Evolution

BIO 130 – Plant Biology

BIO 142 – Genome Biology

BIO 151 – Molecular Immunology

BIO 151L – Molecular Immunology Laboratory

BIO 152 – Cancer Genetics and Tumor Biology

BIO 153 – Evolution and Development‡

BIO 160 – Comparative Physiology

BIO 160L – Comparative Physiology Laboratory

BIO 161 – Human Physiology

BIO 163 – Endocrinology

BIO 164 – Human Anatomy

BIO 170 – Neurobiology

BIO 170L – Neurobiology Lab

BIO 180– Mathematical Modeling for Biology

BIO 181 – Introduction to Biomolecular Simulation

BIO 182 – Bioinformatics

BIOE 114 – Tissue Engineering Design

‡ Recommended Elective Courses: at least one of the DB Elective Courses must be from this group.

V. Microbiology and Immunology

Students in the Microbiology and Immunology (MBI) emphasis track study the diversity, structure, evolution, method of transmission, replication, epidemiology and mechanism of pathogenesis of microorganisms and their interplay with the host immune system. Related topics in bioterrorism, environmental

microbiology, drug resistance, development of immune system, applications in biotechnology and their political and socioeconomic ramifications are also explored. A student in the Microbiology and Immunology emphasis track will have many career options including work in research, education, the pharmaceutical industry, regulatory agencies or health-related professions.

MICROBIOLOGY AND IMMUNOLOGY UPPER DIVISION CORE COURSES (21 UNITS)

Molecular Machinery of Life (BIO 100) . . . . . 4 units
Biochemistry I* (BIO 101) . . . . . 4 units
*requires CHEM 100, a 3 unit course
General Microbiology (BIO 120) † . . . . . 4 units
General Virology (BIO 127) . . . . . 4 units
Molecular Immunology (BIO 151) †. . . . . 4 units
† One must be taken with the corresponding Laboratory component 1 unit

At least two courses chosen from the Microbiology and Immunology elective list below.

Two additional courses . . . . . 8 units minimum

BIO 102 – Advanced Molecular Biology and Biochemistry
BIO 105 – Enzymology
BIO 111 – Cells, Tissues and Organs
BIO 122 – Microbial Pathogenesis‡
BIO 123 – Human Parasitology‡
BIO 124 – Microbial Evolution
BIO 125 – Emerging Public Health Threats‡
BIO 140 – Genetics
BIO 141 - Evolution
BIO 142 – Genome Biology
BIO 150 – Embryos, Genes and Development
BIO 152 – Cancer Genetics and Tumor Biology‡
BIO 154 – Developmental Immunology‡
BIO 170 – Neurobiology
BIO 180– Mathematical Modeling for Biology
BIO 181 – Introduction to Biomolecular Simulation
BIO 182 – Bioinformatics

‡ Recommended Elective Courses: at least one of the MBI Elective Courses must be from this group.

AT UC MERCED I'VE LEARNED A LOT ABOUT MYSELF. WHAT I CAN CONTRIBUTE TO SOCIETY AND HOW I CAN START.

—Stacy Vang, Fresno, Biological Sciences Major

SAMPLE PLAN FOR THE MOLECULAR AND CELL BIOLOGY EMPHASIS TRACK

SEMESTER 1

BIO 1	Contemporary Biology	4
CORE 1	The World at Home	4
CHEM 2	General Chemistry I	4
Semester Units		**12**

SEMESTER 2

MATH 21	Calculus of a Single Variable I	4
CHEM 10	General Chemistry II	4
WRI 10	College Reading and Composition	4
	Freshman Seminar*	1
Semester Units		**13**

SEMESTER 3

BIO 100	Molecular Machinery of Life	4
MATH 30	Calculus of a Single Variable II for Biological Sciences	4
CHEM 8	Principles of Organic Chemistry	4
	General Education Elective (Arts/Humanities)	4
Semester Units		**16**

SEMESTER 4

BIO 110	The Cell	4
	Probability and Statistics	4
PHYS 18	Introductory Physics I for Biological Sciences	4
	Free Elective	4
MATH 15	Introduction to Scientific Data Analysis	2
Semester Units		**18**

SEMESTER 5

BIO 140	Genetics	4
	MCB Elective Course	4
PHYS 19	Introductory Physics II for Biological Sciences	4
	General Education Elective (communication)	4
Semester Units		**16**

SEMESTER 6

BIO 141	Evolution	4
	MCB Elective Course	4
CORE 100	The World at Home	4
	General Education Elective (social sciences)	4
Semester Units		**16**

SEMESTER 7

	MCB Elective Course (w/ Lab)	5
	Computational Biology Elective	4
BIO 195	Research Projects in Biological Sciences*	2
	General Education Elective	4
Semester Units		**15**

SEMESTER 8

	MCB Elective Course	4
	Science/Math/Engineering Elective	4
	Free Elective	4
BIO 195	Research Projects in Biological Sciences*	2
BIO 190	Research Seminar*	1
Semester Units		**15**

Total Program Units 121

* Optional courses for BIO major.

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SAMPLE PLAN FOR THE HUMAN BIOLOGY EMPHASIS TRACK

SEMESTER 1

BIO 1	Contemporary Biology	4
CORE 1	The World at Home	4
CHEM 2	General Chemistry I	4
Semester Units		**12**

SEMESTER 2

MATH 21	Calculus of a Single Variable I	4
CHEM 10	General Chemistry II	4
WRI 10	College Reading and Composition	4
	Freshman Seminar*	1
Semester Units		**13**

SEMESTER 3

BIO 140	Genetics	4
CHEM 8	Principles of Organic Chemistry	4
MATH 30	Calculus of a Single Variable II for Biological Sciences	4
	General Education Elective (Arts/Humanities)	4
Semester Units		**16**

SEMESTER 4

CHEM 100	Organic Synthesis and Mechanism	3
PHYS 18	Introductory Physics I for Biological Sciences	4
MATH 15	Introduction to Scientific Data Analysis	2
MATH 32	Probability and Statistics	4
COGS 1	Introduction to Cognitive Science**	4
Semester Units		**17**

SEMESTER 5

BIO 101	Biochemistry I	4
	HB Elective Course	4
PHYS 19	Introductory Physics II for Biological Sciences	4
	General Education Elective (communication)	4
Semester Units		**16**

SEMESTER 6

BIO 110	The Cell	4
BIO 141	Evolution	4
	UD Cognitive Science Course	4
CORE 100	The World at Home	4
Semester Units		**16**

SEMESTER 7

BIO 161	Human Physiology	5
	HB Elective Course	4
	General Education Elective	4
BIO 195	Research Projects in Biological Sciences*	2
Semester Units		**15**

SEMESTER 8

	HB Elective Course	4
	Math/Science/Engineering Elective	4
	Free Elective	4
BIO 195	Research Projects in Biological Sciences*	2
BIO 190	Research Seminar*	1
Semester Units		**15**

Total Program Units 120

* Optional courses for BIO major.

** Or PSY 1, Introduction to Psychology. COGS 1 is required to complete HB UD requirements.

The four-year plans presented in this catalog demonstrate the recommended sequencing and timing of the required and elective components within each major. In many cases, a student's academic background will require variations in the timing of the coursework listed in the plan. All students are expected to work with their academic advisor to find their best pathway through the degree requirements of their chosen program.

SAMPLE PLAN FOR THE ECOLOGY AND EVOLUTIONARY BIOLOGY EMPHASIS TRACK

SEMESTER 1

BIO 1	Contemporary Biology	4
CHEM 2	General Chemistry I	4
CORE 1	The World at Home	4
	Freshman Seminar*	1
Semester Units		**13**

SEMESTER 2

MATH 21	Calculus of a Single Variable I	4
CHEM 10	General Chemistry II	4
WRI 10	College Reading and Composition	4
	Computer Science Course**	2
Semester Units		**14**

SEMESTER 3

BIO 100	Molecular Machinery of Life	4
MATH 30	Calculus of a Single Variable II for Biological Sciences	4
CHEM 8	Principles of Organic Chemistry	4
	General Education Elective	4
Semester Units		**16**

SEMESTER 4

BIO 110	The Cell	4
	Probability and Statistics	4
PHYS 18	Introductory Physics I for Biological Sciences	4
	General Education Elective	4
Semester Units		**16**

SEMESTER 5

BIO 141	Evolution	4
	Elective EEB Course	4
PHYS 19	Introductory Physics II for Biological Sciences	4
	Free Elective	4
Semester Units		**16**

SEMESTER 6

BIO 148	Introduction to Ecology	4
	Elective EEB Course (w/ Lab)	4
CORE 100	The World at Home	4
	General Education Elective	4
Semester Units		**16**

SEMESTER 7

BIO 195	Research Projects in Biological Sciences*	1
	Elective EEB Course (w/ Field)	5
	Free Elective	4
	Free Elective	4
Semester Units		**14**

SEMESTER 8

	Elective EEB Course	5
	Science/Math/Engineering Elective	4
	Free Elective	4
BIO 195	Research Projects in Biological Sciences*	2
BIO 190	Research Seminar*	1
Semester Units		**16**

Total Program Units 121

* Optional courses for BIO major.

** Satisfied by Math 15 or CSE 5.

The four-year plans presented in this catalog demonstrate the recommended sequencing and timing of the required and elective components within each major. In many cases, a student's academic background will require variations in the timing of the coursework listed in the plan. All students are expected to work with their academic advisor to find their best pathway through the degree requirements of their chosen program.

SAMPLE PLAN FOR THE DEVELOPMENTAL BIOLOGY EMPHASIS TRACK

SEMESTER 1

BIO 1	Contemporary Biology	4
CORE 1	The World at Home	4
CHEM 2	General Chemistry I	4
CORE 090X	Freshman Seminar	1
Semester Units		**13**

SEMESTER 2

MATH 21	Calculus of a Single Variable I	4
CHEM 10	General Chemistry II	4
WRI 10	College Reading and Composition	4
MATH 15	Introduction to Scientific Data Analysis	2
Semester Units		**14**

SEMESTER 3

BIO 100	Molecular Machinery of Life	4
MATH 30	Calculus of a Single Variable II for Biological Sciences	4
CHEM 8	Principles of Organic Chemistry	4
	General Education Elective (Arts/Humanities)	4
Semester Units		**16**

SEMESTER 4

BIO 110	The Cell	4
	Probability and Statistics	4
PHYS 18	Introductory Physics I for Biological Sciences	4
	Free Elective	4
Semester Units		**16**

SEMESTER 5

BIO 140	Genetics	4
	DB Elective Course	4
PHYS 19	Introductory Physics II for Biological Sciences	4
	General Education Elective (communication)	4
Semester Units		**16**

SEMESTER 6

BIO 141	Evolution	4
BIO 150	Embryos, Genes and Development	4
CORE 100	The World at Home	4
	General Education Elective (social sciences)	4
Semester Units		**16**

SEMESTER 7

DB Elective Course (w/ Lab)		5
	Computational Biology Elective	4
BIO 195	Research Projects in Biological Sciences*	2
	General Education Elective	4
Semester Units		**15**

SEMESTER 8

	DB Elective Course	4
	Science/Math/Engineering Elective	4
	Free Elective	4
BIO 195	Research Projects in Biological Sciences*	2
BIO 190	Research Seminar*	1
Semester Units		**15**

Total Program Units 120

* Optional courses for BIO major.

The four-year plans presented in this catalog demonstrate the recommended sequencing and timing of the required and elective components within each major. In many cases, a student's academic background will require variations in the timing of the coursework listed in the plan. All students are expected to work with their academic advisor to find their best pathway through the degree requirements of their chosen program.

SAMPLE PLAN FOR THE MICROBIOLOGY AND IMMUNOLOGY EMPHASIS TRACK

SEMESTER 1

BIO 1	Contemporary Biology	4
CORE 1	The World at Home	4
CHEM 2	General Chemistry I	4
	Freshman Seminar*	1
Semester Units		**13**

SEMESTER 2

MATH 21	Calculus of a Single Variable I	4
CHEM 10	General Chemistry II	4
WRI 10	College Reading and Composition	4
MATH 15	Introduction to Scientific Data Analysis	2
Semester Units		**14**

SEMESTER 3

BIO 100	Molecular Machinery of Life	4
MATH 30	Calculus of a Single Variable II for Biological Sciences	4
CHEM 8	Principles of Organic Chemistry	4
	General Education Elective (Arts/Humanities)	4
Semester Units		**16**

SEMESTER 4

BIO 110	The Cell	4
Probability and Statistics		4
General Education Elective		4
CHEM 100	Organic Synthesis and Mechanism	3
Semester Units		**15**

SEMESTER 5

BIO 101	Biochemistry I	4
BIO 120	General Microbiology	4 (or 5)
PHYS 18	Introductory Physics I for Biological Sciences	4
	General Education Elective (communication)	4
Semester Units		**16 (or 17)**

SEMESTER 6

BIO 127	General Virology	4
PHYS 19	Introductory Physics II for Biological Sciences	4
	General Education Elective	4
CORE 100	The World at Home	4
Semester Units		**16**

SEMESTER 7

BIO 151	Molecular Immunology	4 (or 5)
	MBI Elective Course	4
BIO 195	Research Projects in Biological Sciences*	2
	General Education Elective (social sciences)	4
Semester Units		**14 (or 15)**

SEMESTER 8

	MBI Elective Course	4
	Science/Math/Engineering Elective	4
	General Education Elective	4
BIO 195	Research Projects in Biological Sciences*	2
BIO 190	Research Seminar*	1
Semester Units		**15**

Total Program Units 120

* Optional courses for BIO major.

The four-year plans presented in this catalog demonstrate the recommended sequencing and timing of the required and elective components within each major. In many cases, a student's academic background will require variations in the timing of the coursework listed in the plan. All students are expected to work with their academic advisor to find their best pathway through the degree requirements of their chosen program.

■ Chemical Sciences Major

Chemistry is often known as "the central science" because of the key position it occupies in modern science and engineering. Most phenomena in the biological and Earth sciences can be described in terms of the chemical and physical behavior of atoms and molecules, and chemical principles also underlie much progress in medicine and engineering. In addition, chemical systems are fascinating and often beautiful in their own right. Recent developments in the chemical sciences are increasingly directed toward the study of phenomena at the nanoscale, the size range intermediate between individual molecules and macroscopic matter. The ability to measure, understand and control the properties of matter on these size scales allows us to draw conceptual and practical connections between the submicroscopic world of atoms and molecules, and the macroscopic world with which we interact.

UC Merced offers an undergraduate major leading to a B.S. degree in the Chemical Sciences. All of our programs are planned to meet the requirements for approval by the American Chemical Society. The curriculum is designed to meet the needs of students who plan to end their formal education with a bachelor's degree as well as those who wish to go on for an advanced degree. We offer both a basic chemistry program and three emphasis tracks in biological chemistry, environmental chemistry and materials chemistry, which allow students to pursue interdisciplinary areas within a degree program that is still focused on chemistry. Chemical Sciences majors are strongly encouraged to undertake independent research projects under faculty supervision (CHEM 95 or CHEM 195) and all emphasis tracks require at least two units of research.

A degree in the chemical sciences opens the door to a wide variety of careers in industry or government service, forensic chemistry in crime laboratories, commercial fields such as patent law and scientific writing, and high school science teaching. Many chemistry majors go on to graduate study to prepare for careers in teaching and/or research at the college or university level, or research positions in the chemical, pharmaceutical, electronics or other high-tech industries. A major in chemistry is also an excellent foundation for medical school or other careers in the health sciences.

Requirements for the Chemical Sciences (CHEM) Major

In addition to adhering to the UC Merced and School of Natural Science requirements, the requirements that must be met to receive the B.S. in Chemical Sciences at UC Merced are:

CHEMICAL SCIENCES REQUIREMENTS (56-62 UNITS)

The Chemical Sciences major consists of 16-19 courses (7 lower division and 9-12 upper division, depending on emphasis track) designed to give all students a common foundation of core knowledge specific to the discipline.

LOWER DIVISION MAJOR REQUIREMENTS (28 UNITS)

BIO 1: Contemporary Biology . . . . . 4 units
CHEM 8: Principles of Organic Chemistry . . . . . 4 units
CHEM 10: General Chemistry II. . . . . 4 units
MATH 22: Calculus of a Single Variable II . . . . . 4 units
MATH 23: Multi-Variable Calculus . . . . . 4 units
MATH 24: Linear Algebra and Differential Equations . . . . . 4 units
PHYS 9: Introductory Physics II . . . . . 4 units

UPPER DIVISION MAJOR REQUIREMENTS (17 UNITS)

CHEM 100: Organic Synthesis and Mechanism . . . . . 3 units
CHEM 101L: Advanced Synthetic Laboratory. . . . . 2 units
CHEM 111/BIO 101: Biochemistry I . . . . . 4 units
CHEM 112: Quantum Chemistry and Spectroscopy. . . . . 3 units
CHEM 113: Chemical Thermodynamics and Kinetics . . . . . 3 units
CHEM 114L: Physical Chemistry and Instrumental Analysis Laboratory . . . . . 2 units

EMPHASIS TRACK REQUIREMENTS

Requirements for Chemistry Emphasis Track

CHEM 120: Inorganic Chemistry . . . . . 3 units
CHEM 115: Instrumental Analysis and Bioanalytical Chemistry . . 3 units
CHEM 95/195: Research . . . . . at least 5 units total

Requirements for Materials Chemistry Emphasis Track

CHEM 120: Inorganic Chemistry . . . . . 3 units
ENGR 45: Introduction to Materials . . . . . 4 units
CHEM 95/195: Research . . . . . at least 2 units total
CHEM 147: Materials Chemistry Laboratory . . . . . 3 units
PHYS 120: Physics of Materials . . . . . 4 units

Requirements for Biological Chemistry Emphasis Track

BIO 140: Genetics . . . . . 4 units
BIO 102/CHEM 122: Adv Biochemistry and Molecular Biology. . . 4 units

One other upper division biology course selected from the following:

BIO 110 Cell Biology . . . . . 4 units
(this is a pre-requisite for many other upper division BIO courses)
BIO 120 General Microbiology . . . . . 4 units
BIO 127 General Virology . . . . . 4 units
BIO 141 Evolution . . . . . 4 units
BIO 151 Molecular Immunology . . . . . 4 units
CHEM 120: Inorganic Chemistry . . . . . 3 units
CHEM 95/195: Research . . . . . at least 3 units total

Requirements for Environmental Chemistry Emphasis Track

ESS 20: Fundamentals of Earth Processes . . . . . 4 units
or ESS 70: Soil Foundations of Terrestrial Ecosystems. . . . . 4 units
or ENVE 20: Introduction to Environmental Science and Technology . . . . . 4 units
ESS 100: Environmental Chemistry . . . . . 4 units
ESS 102: Chemical Processes in the Soil Environment . . . . . 3 units
or ESS 109: Inorganic Chemistry of Earth's Materials . . . . . 3 units
ESS 106: Instrumental Methods in Environmental Systems . . . . . 3 units
CHEM 95/195: Research . . . . . at least 3 units total

Transfer Students

Transfer students who wish to major in Chemical Sciences should complete two semesters of general chemistry with laboratory, two semesters of organic chemistry with laboratory, one year of calculus-based physics with laboratory and mathematics through multivariable calculus.

Students should consult the online student-transfer information system at www.assist.org. Students should also consult the Information for Prospective Students link on the School of Natural Sciences web site naturalsciences.ucmerced.edu for more information.

SAMPLE PLAN OF STUDY FOR CHEMICAL SCIENCES DEGREE - CHEMISTRY EMPHASIS

SEMESTER 1

BIO 1	Contemporary Biology	4
CHEM 2	General Chemistry I	4
CORE 1	The World at Home	4
CSE 20	Introduction to Computing I	2
	Freshman Seminar*	1
Semester Units		**15**

SEMESTER 2

ICP 1	Integrated Calculus and Physics	8
CHEM 10	General Chemistry II	4
	Free elective	4
Semester Units		**16**

SEMESTER 3

MATH 22	Calculus II	4
CHEM 8	Principles of Organic Chemistry	4
PHYS 9	Introductory Physics II	4
WRI 10	College Reading and Composition	4
Semester Units		**16**

SEMESTER 4

CHEM 100	Organic Synthesis and Mechanism	3
MATH 32	Probability and Statistics	4
MATH 23	Multi-Variable Calculus	4
	General Education Elective	4
Semester Units		**15**

SEMESTER 5

MATH 24	Differential Equations and Linear Algebra	4
CHEM 112	Quantum Chemistry and Spectroscopy	3
	General Education Elective (communication)	4
CHEM 101L	Advanced Synthetic Lab	2
CHEM 195	Research	1
Semester Units		**14**

SEMESTER 6

CHEM 113	Chemical Thermodynamics and Kinetics	3
	General Education Elective	4
CORE 100	The World at Home	4
	Science/engineering Elective	3
CHEM 195	Research	1
Semester Units		**15**

SEMESTER 7

CHEM 111	Biochemistry I	4
CHEM 120	Inorganic Chemistry	3
	Free Elective	4
CHEM 115	Instrumental Analysis and Bioanalytical Chemistry	3
CHEM 195	Research	1
Semester Units		**15**

SEMESTER 8

CHEM 114L	Physical/Instrumental Lab	2
	Free Elective	4
	General Education Elective	4
	Science/engineering Elective	3
CHEM 195	Research	2
Semester Units		**15**

Total Program Units 121

* Freshman Seminar is an optional course; it is not required for Chemical Sciences Majors.

The four-year plans presented in this catalog demonstrate the recommended sequencing and timing of the required and elective components within each major. In many cases, a student's academic background will require variations in the timing of the coursework listed in the plan. All students are expected to work with their academic advisor to find their best pathway through the degree requirements of their chosen program.

SAMPLE PLAN OF STUDY FOR CHEMICAL SCIENCES DEGREE - MATERIALS EMPHASIS

SEMESTER 1

BIO 1	Contemporary Biology	4
CHEM 2	General Chemistry I	4
CORE 1	The World at Home	4
CSE 20	Introduction to Computing I	2
	Freshman Seminar*	1
Semester Units		**15**

SEMESTER 2

ICP 1	Integrated Calculus and Physics	8
CHEM 10	General Chemistry II	4
	Free elective	4
Semester Units		**16**

SEMESTER 3

MATH 22	Calculus II	4
CHEM 8	Principles of Organic Chemistry	4
PHYS 9	Introductory Physics II	4
WRI 10	College Reading and Composition	4
Semester Units		**16**

SEMESTER 4

CHEM 100	Organic Synthesis and Mechanism	3
MATH 32	Probability and Statistics	4
MATH 23	Multi-Variable Calculus	4
	General Education Elective	4
Semester Units		**15**

SEMESTER 5

MATH 24	Differential Equations and Linear Algebra	4
CHEM 112	Quantum Chemistry and Spectroscopy	3
	General Education Elective (communication)	4
CHEM 101L	Advanced Synthetic Lab	2
CHEM 195	Research	1
Semester Units		**14**

SEMESTER 6

CHEM 113	Chemical Thermodynamics and Kinetics	3
	General Education Elective	4
CORE 100	The World at Home	4
ENGR 45	Introduction to Materials	4
Semester Units		**15**

SEMESTER 7

CHEM 111	Biochemistry I	4
CHEM 120	Inorganic Chemistry	3
	Free Elective	4
PHYS 120	Physics of Materials	4
Semester Units		**15**

SEMESTER 8

CHEM 114L	Physical/Instrumental Lab	2
	Free Elective	4
	General Education Elective	4
CHEM 147	Materials Chemistry Lab	3
CHEM 195	Research	2
Semester Units		**15**

Total Program Units 121

* Freshman Seminar is an optional course; it is not required for Chemical Sciences Majors.

The four-year plans presented in this catalog demonstrate the recommended sequencing and timing of the required and elective components within each major. In many cases, a student's academic background will require variations in the timing of the coursework listed in the plan. All students are expected to work with their academic advisor to find their best pathway through the degree requirements of their chosen program.

SAMPLE PLAN OF STUDY FOR CHEMICAL SCIENCES DEGREE - BIOLOGICAL EMPHASIS

SEMESTER 1

BIO 1	Contemporary Biology	4
CHEM 2	General Chemistry I	4
CORE 1	The World at Home	4
CSE 20	Introduction to Computing I	2
	Freshman Seminar*	1
Semester Units		**15**

SEMESTER 2

ICP 1	Integrated Calculus and Physics	8
CHEM 10	General Chemistry II	4
	General Education elective	4
Semester Units		**16**

SEMESTER 3

MATH 22	Calculus II	4
CHEM 8	Principles of Organic Chemistry	4
BIO 140	Genetics	4
WRI 10	College Reading and Composition	4
Semester Units		**16**

SEMESTER 4

CHEM 100	Organic Synthesis and Mechanism	3
MATH 32	Probability and Statistics	4
MATH 23	Multi-Variable Calculus	4
PHYS 9	Introductory Physics II	4
Semester Units		**15**

SEMESTER 5

MATH 24	Differential Equations and Linear Algebra	4
CHEM 112	Quantum Chemistry and Spectroscopy	3
	General Education Elective (Communication)	4
CHEM 111	Biochemistry I	4
Semester Units		**15**

SEMESTER 6

CHEM 113	Chemical Thermodynamics and Kinetics	3
CHEM 122	Advanced Biochemistry and Molecular Biology	4
CORE 100	The World at Home	4
	General Education Elective (Social/Cognitive Sciences)	4
Semester Units		**15**

SEMESTER 7

CHEM 101L	Advanced Synthetic Lab	2
CHEM 120	Inorganic Chemistry	3
	Free Elective	4
	Biology Elective	4
CHEM 195	Research	2
Semester Units		**15**

SEMESTER 8

CHEM 114L	Physical/Instrumental Lab	2
	Free Elective	4
	General Education Elective	4
	Upper division biology course	4
CHEM 195	Research	1
Semester Units		**15**

Total Program Units 122

* Freshman Seminar is an optional course; it is not required for Chemical Sciences Majors.

The four-year plans presented in this catalog demonstrate the recommended sequencing and timing of the required and elective components within each major. In many cases, a student's academic background will require variations in the timing of the coursework listed in the plan. All students are expected to work with their academic advisor to find their best pathway through the degree requirements of their chosen program.

SAMPLE PLAN OF STUDY FOR CHEMICAL SCIENCES DEGREE - ENVIRONMENTAL EMPHASIS

SEMESTER 1

BIO 1	Contemporary Biology	4
CHEM 2	General Chemistry I	4
CORE 1	The World at Home	4
CSE 20	Introduction to Computing I	2
CHEM 90X	Freshman Seminar*	1
Semester Units		**15**

SEMESTER 2

ICP 1	Integrated Calculus and Physics	8
CHEM 10	General Chemistry II	4
ESS 20	Fundamentals of Earth Processes	4
Semester Units		**16**

SEMESTER 3

MATH 22	Calculus of a Single Variable II	4
CHEM 8	Principles of Organic Chemistry	4
PHYS 9	Introductory Physics II	4
WRI 10	College Reading and Composition	4
Semester Units		**16**

SEMESTER 4

CHEM 100	Organic Synthesis and Mechanism	3
MATH 32	Probability and Statistics	4
MATH 23	Multi-Variable Calculus	4
	General Education Elective (Arts/Humanities)	4
Semester Units		**15**

SEMESTER 5

MATH 24	Differential Equations and Linear Algebra	4
CHEM 112	Quantum Chemistry and Spectroscopy	3
	General Education Elective (communication)	4
CHEM 101L	Advanced Synthetic Lab	2
CHEM 195	Research	2
Semester Units		**15**

SEMESTER 6

CHEM 113	Chemical Thermodynamics and Kinetics	3
	Free Elective	4
ESS 100	Environmental Chemistry	4
CORE 100	The World at Home	4
Semester Units		**15**

SEMESTER 7

ESS 102	Chemical Processes in the Soil Environment	3
	Free Elective	4
	General Education Elective	4
CHEM 111	Biochemistry I	4
Semester Units		**15**

SEMESTER 8

ESS 106	Instrumental Methods in Environmental Systems	3
	General Education Elective	4
CHEM 114L	Physical/Instrumental Lab	2
CHEM 195	Research	1
	Free Elective	4
Semester Units		**14**

Total Program Units 121

* Freshman Seminar is an optional course; it is not required for Chemical Sciences Majors.

The four-year plans presented in this catalog demonstrate the recommended sequencing and timing of the required and elective components within each major. In many cases, a student's academic background will require variations in the timing of the coursework listed in the plan. All students are expected to work with their academic advisor to find their best pathway through the degree requirements of their chosen program.

■ Earth Systems Science Major

The undergraduate major in Earth Systems Science is designed to provide students with a quantitative understanding of the physical, chemical and biological principles that control the processes, reactions and evolution of the Earth as a support system for life. Emphasis is given to the interactions between biological systems and physical Earth processes. Core courses within the major provide students with a firm foundation in the fundamentals of chemistry, biology, hydrology, ecology and Earth sciences, while emphasis areas allow students the flexibility to pursue disciplinary areas in more depth. This major emphasizes a highly interdisciplinary approach to Earth Systems Science, incorporating field studies, laboratory experiments and computations. Complementary coursework in the social sciences exposes students to the political, economic and societal implications of human interactions with the environment.

Graduates of this major will have a strong background in the theory and application of Earth Systems Science. They will be well prepared for either graduate studies or jobs in the areas of environmental conservation, ecosystem and natural resource management and science, and many aspects of agricultural sciences. Additionally, Earth Systems Science is an excellent foundation for professional careers in law, policy and administration that increasingly involve the environmental sciences.

The location of UC Merced in the San Joaquin Valley near the Sierra Nevada offers an excellent and diverse real-world laboratory for studying the natural environment and the way it is affected by human activity. Additionally, the UC Merced Sierra Nevada Research Institute provides a rich milieu of faculty expertise, research seminars and other activities, and provides opportunities for undergraduate internships.

A hallmark of the Earth Systems Science major is its breadth and flexibility. Lower division coursework emphasizes foundation courses in physical, chemical and biological sciences, and mathematics, with a choice of a lower division elective science course. Upper division requirements consist of five core courses that provide students with a balance of key physical, chemical and biological concepts in Earth Systems Science, and exposure to environmental science and policy. In the upper division, students select three courses from within an emphasis area for more in-depth study and to tailor their program to their individual interests. An upper division seminar highlights the latest research in interdisciplinary Earth Systems Science topics. General education coursework in communications and economics prepares majors to apply their quantitative science skills in the job market or in further studies at the graduate level. Students are encouraged to participate in research, internship and service learning activities with faculty as part of their undergraduate studies.

MATH/SCIENCE PREPARATORY CURRICULA (18-20 UNITS)

MATH 21: Calculus of a Single Variable I* . . . . . 4 units
Probability and Statistics: MATH 18, MATH 32, or ENVE 105 . . . . 4 units
Introductory Physics I: PHYS 8* or PHYS 18 . . . . . 4 units
CHEM 2: General Chemistry I .4 units Computer Science: MATH 15 , CSE 5 , or CSE 20 . . . . . 2-4 units

*ICP: Integrated Calculus and Physics (8 units) may be taken in place of MATH 21 and PHYS 8.

Additional requirements that must be met to receive the B.S. in Earth Systems Science at UC Merced are:

EARTH SYSTEMS SCIENCE REQUIREMENTS (65-57 UNITS)

The Earth Systems Science program consists of a minimum of 14 courses (6 lower division and 8 upper division plus a seminar course) designed to give all students a common foundation of core knowledge specific to the discipline.

LOWER DIVISION MAJOR REQUIREMENTS (24 UNITS)

Introduction to Earth Systems Science (ESS 1), Introduction to Biological Earth Systems (ESS 5), or Contemporary Biology (BIO 1) . . . . . 4 units
Fundamentals of Earth Processes (ESS 20) or Soil Foundations of Terrestrial Ecosystems (ESS 70) . . . . . 4 units
General Chemistry II (CHEM 10) . . . . . 4 units
Calculus of a Single Variable II (MATH 22) . . . . . 4 units
Introductory Physics II (PHYS 9 or 19) . . . . . 4 units

One additional science or engineering course from the following list (other courses by approval):

Introduction to Ecosystem Science (ESS 25) . . . . . 4 units
Principles of Organic Chemistry (CHEM 8) . . . . . 4 units
Introduction to Environmental Science and Technology (ENVE 20) . . . . . 4 units

UPPER DIVISION MAJOR REQUIREMENTS (30-33 UNITS)

Environmental Chemistry (ESS 100) . . . . . 4 units
Hydrology and Climate (ESS 110) . . . . . 4 units
Geomicrobiology (ESS 120) or Introduction to Ecology (BIO148) . . . . . 4 units
Field Methods in Earth Systems (ESS 180) or Spatial Analysis and Modeling (ENGR 180) . . . . . 4 units
Environmental Science and Policy (ESS 141) or equivalent course (by approval) . . . . . 4 units
Undergraduate Seminar (ESS 190) . . . . . .1 unit

Emphasis Track

Three courses from emphasis track . . . . . 9-12 units

ADDITIONAL DEGREE REQUIREMENTS (11-13 UNITS)

Intermediate Microeconomic Theory (ECON 100) or Economics of the Environment (ECON 120) . . . . . 4 units

Two upper division electives in

Natural Sciences or Engineering . . . . . 6-8 units
Research (ESS 95 or ESS 195) and/or Service Learning (ENGR 97 or ENGR 197) . . . . . 1-3 units

Emphasis Track courses should be chosen from the following lists (other courses by approval):

Atmospheric Sciences Emphasis Track

Atmospheric Chemistry and Physics (ESS 131) . . . . . 4 units
Climatology (ESS 132) . . . . . 3 units
Air Pollution and Resources (ESS 134) . . . . . 3 units
Global Change (ENVE 118) . . . . . 4 units
Meteorology and Air Pollution (ENVE 130) . . . . . 4 units

Geochemistry and Biogeochemistry Emphasis Track

Chemical Processes in the Soil Environment (ESS 102) . . . . . 3 units
Geochemistry of Earth Systems (ESS 103) . . . . . 3 units
Environmental Organic Geochemistry (ENVE 171) . . . . . 4 units
Watershed Biogeochemistry (ESS 105) . . . . . 3 units
Microbial Ecology (ESS 125) . . . . . 4 units
Environmental Genomics (ESS 126) or Comparative Genomics (BIO 142) . . . . . 4 units
Air Pollution and Resources (ESS 134) . . . . . 3 units
Environmental Microbiology (ENVE 121) . . . . . 4 units

Hydrologic and Climate Sciences Emphasis Track

Watershed Biogeochemistry (ESS 105). . . . . 3 units
Terrestrial Ecosystem Ecology (ESS 124) . . . . . 4 units
Subsurface Hydrology (ENVE 112) . . . . . 4 units
Mountain Hydrology of the Western U.S. (ENVE 114) . . . . . 4 units
Global Change (ENVE 118) . . . . . 4 units
Meteorology and Air Pollution (ENVE 130) . . . . . 4 units
Contaminant Fate and Transport (ENVE 170). . . . . 3 units

Ecosystem Science Emphasis Track

Watershed Biogeochemistry (ESS 105). . . . . 3 units
Terrestrial Ecosystem Ecology (ESS 124) . . . . . 4 units
Microbial Ecology (ESS 125) . . . . . 4 units
Environmental Genomics (ESS 126) or
Comparative Genomics (BIO142) . . . . . 4 units
Theoretical Ecology (ESS 128) . . . . . 4 units
Environmental Microbiology (ENVE 121) . . . . . 4 units
Geomorphology and Surface Processes (ESS 150) . . . . . 4 units
Remote Sensing of the Environment (ENVE 152) . . . . . 3 units
Evolution (BIO 141). . . . . 4 units
Biodiversity and the Tree of Life (BIO 143) . . . . . 4 units

Transfer Students

Transfer students who wish to major in Earth Systems Science should complete one year of calculus, one year of physics, one year of general chemistry, and two to three semesters of general biology, organic chemistry, or Earth or environmental science courses. Students should consult the online student-transfer information system at www.assist.org. Students should also consult the Information for Prospective Students link on the School of Natural Sciences web site naturalsciences.ucmerced.edu for more information.

SAMPLE PLAN OF STUDY FOR EARTH SYSTEMS SCIENCE DEGREE

SEMESTER 1

ICP 1A*	Integrated Calculus and Physics	8
CORE 1	The World at Home	4
	Computer Science Course	2
	Freshman Seminar**	1
Semester Units		**15**

SEMESTER 2

	Lower Division Science Course (ESS 1 or BIO 1)	4
CHEM 2	General Chemistry I	4
MATH 22	Calculus of a Single Variable II	4
	Lower Division General Education (ECON 1)	4
Semester Units		**16**

SEMESTER 3

PHYS 9	Introductory Physics II	4
CHEM 10	General Chemistry II	4
MATH 32	Probability and Statistics	4
WRI 10	College Reading and Composition	4
Semester Units		**16**

SEMESTER 4

ESS 20	Fundamentals of Earth Processes	4
ECON 100	Intermediate Microeconomic Theory	4
	Lower Division Science Course	4
	Free Elective	4
Semester Units		**16**

SEMESTER 5

ESS 110	Hydrology and Climate	4
ESS 100	Environmental Chemistry	4
	General Education Elective (communication)	4
	Free Elective	3
Semester Units		**15**

SEMESTER 6

ESS 120	Geomicrobiology	4
ESS 180	Field Methods in Earth Systems	4
CORE 100	The World at Home	4
	General Education Elective (Arts/Humanities)	4
Semester Units		**16**

SEMESTER 7

	ESS Emphasis Track Course	4
	ESS Emphasis Track Course	3
ESS 141	Environmental Science and Policy	4
	Natural Sciences or Engineering Elective	4
ESS 190	Undergraduate Seminar	1
Semester Units		**16**

SEMESTER 8

	ESS Emphasis Track Course	4
	General Education Elective (Social/Cognitive Sciences)	4
	Natural Sciences or Engineering Elective	3
	Free Elective	4
	Research or Service Learning (ESS 195 or ENGR 197)	1
Semester Units		**16**

Total Program Units 126

* Can substitute MATH 21 Calculus of a Single Variable 1 (4 units) and PHYS 8 Introductory Physics 1 (4 units)

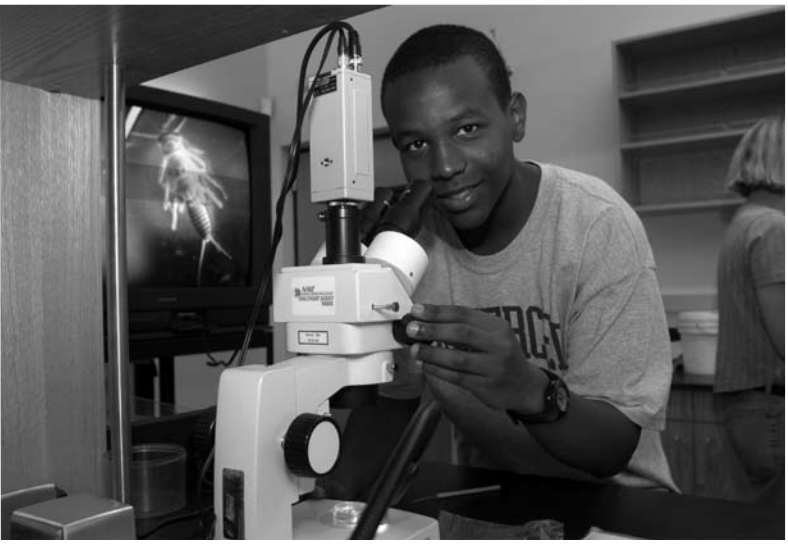
** Freshman Seminar is an optional course; it is not required for Earth Systems Science Majors

The four-year plans presented in this catalog demonstrate the recommended sequencing and timing of the required and elective components within each major. In many cases, a student's academic background will require variations in the timing of the coursework listed in the plan. All students are expected to work with their academic advisor to find their best pathway through the degree requirements of their chosen program.

■ Physics Major

Physics is the study of nature at its most fundamental. Its scope covers everything from the tiniest particles of matter—such as atoms, electrons, and quarks—to the structure of the entire universe, encompassing innumerable galaxies and stars.

Physicists seek to understand complex phenomena in terms of simple, unifying principles. Their queries have ranged from the seemingly innocuous, like "What causes an object to fall?", to the more elemental, like "What is the true nature of light?". Such



questions led to the discovery of the gravitational force, which governs the motion of planets and stars, as well as to the biggest breakthrough of the twentieth century—quantum mechanics—which governs the very small. Answers to physicists' questions have revolutionized society, not only altering our basic understanding of the universe, but also profoundly affecting our day-to-day lives, laying the foundation for numerous technological innovations such as the laser, computer, and cellular phone. And physics continues to evolve and excite us, with unanswered questions from a multitude of active and emerging fields of research, such as Quantum Computation, Superconductivity, Chaos, Biophysics, and String Theory, to name a few.

The Physics program at UC Merced provides a strong foundation in the fundamentals of theoretical and applied physics, while also emphasizing the increasingly interdisciplinary role played by physicists in the scientific and technological community. This is reflected in the "core plus emphasis track" model of the major. The core is a rigorous grounding in fundamental physical principles, including electricity and magnetism, quantum and classical mechanics, and thermodynamics. The emphasis tracks consist of flexible specialization options which students design with the assistance of their faculty advisor. Possible emphases include, but are not limited to, Atomic, Molecular, and Optical (AMO) Physics; Mathematical Physics; Biophysics; Earth and Environmental Physics; Materials Physics; and Engineering Physics.

Physics students develop excellent quantitative and analytical skills, enabling them to approach new and complex problems that arise in any field. These fundamental skills are essential preparation for a wide range of careers in such fields as aerospace, biotechnology, computers, engineering, medicine, education, law, finance, business, and consulting.

Students majoring in physics must meet the Math/Science general education requirement with the following courses.

MATH/SCIENCE PREPARATORY CURRICULA (18 UNITS)

MATH 21: Calculus of a Single Variable I* . . . . . 4 units
MATH 32: Probability and Statistics . . . . . 4 units
PHYS 8: Introductory Physics I* . . . . . 4 units
CHEM 2: General Chemistry I . . . . . 4 units
CSE 20: Introduction to Computing I . . . . . 2 units

*ICP: Integrated Calculus and Physics (8 units) may be taken in place of MATH 21 and PHYS 8.

In addition to adhering to the UC Merced and School of Natural Sciences requirements, the requirements that must be met to receive the B.S. in Physics at UC Merced are (57-60 units):

REQUIRED LOWER DIVISION MATH/SCIENCE COURSES (20 UNITS)

MATH 22: Calculus of a Single Variable II . . . . . 4 units
MATH 23: Vector Calculus . . . . . 4 units
MATH 24: Introduction to Linear Algebra and Differential Equations . . . . . 4 units
PHYS 9: Introductory Physics II . . . . . 4 units
PHYS 10: Introductory Physics III . . . . . 4 units

REQUIRED UPPER DIVISION CORE PHYSICS COURSES (24 UNITS)

PHYS 105: Analytic Mechanics Core 4 units
PHYS 110: Electrodynamics Core. . . . . 4 units
PHYS 112: Statistical Mechanics Core . . . . . 4 units
PHYS 137: Quantum Mechanics Core . . . . . 4 units
PHYS 160: Modern Physics Lab . . . . . 4 units
PHYS 122: Waves Minicourse . . . . . 2 units
One additional minicourse of student's choice. . . . . 2 units

ADDITIONAL REQUIRED COURSES (13-16 UNITS)

One breadth science or engineering elective (i.e. not physics or math). . . . . 3-4 units
Two physics electives (appropriate nonphysics courses may be substituted as part of an emphasis track) . . . . . 6-8 units
PHYS 195: Undergraduate Research—Senior Thesis (Research from other programs may be substituted as appropriate). . . . . at least 4 units

Minicourses

The minicourses are half-semester courses designed to round out a student's core training in physics. Possible minicourses are: Electromagnetic Radiation (PHYS 111), Waves (PHYS 122), Special Relativity (PHYS 126), and Rotational Mechanics (PHYS 124). Students are required to take two minicourses, one of which must be the Waves minicourse. For students planning to attend graduate school in physics, all four minicourses (PHYS 111, 122, 124 and 126) are recommended.

Senior Research

All students are required to complete a senior thesis (PHYS 195) consisting of independent research performed under the tutelage of a faculty advisor. Typically, this research is the culmination of a student's emphasis track (see below.) The thesis advisor may be a faculty member in either physics or another discipline, allowing for the possibility of cross-disciplinary research projects.

Emphasis Tracks

Students are encouraged to choose their electives to form an emphasis track in an area of physics or interdisciplinary study. Some examples of tracks are Atomic, Molecular, and Optical (AMO) Physics; Mathematical Physics; Biophysics; Earth and Environmental Physics; Materials Physics; or Engineering Physics. Students have considerable flexibility in proposing and designing their own emphasis tracks, with the assistance of their faculty advisor. A track must consist of at least 12 units. Typically, the track includes the two upper division physics electives and culminates with the student's senior thesis (PHYS 195). Other upper division courses may be substituted for the two physics electives if they are deemed appropriate to the track. All track programs must be approved by the student's faculty advisor. A student may also choose, in consultation with the faculty advisor, not to participate in the track program at all, although the senior thesis and physics electives are still degree requirements.

Examples of Emphasis Tracks

ATOMIC/MOLECULAR/OPTICAL (AMO) PHYSICS

PHYS 148: Optics 4
PHYS 144: Modern Atomic and Molecular Physics. 4
PHYS 195: Undergraduate Research 4

MATHEMATICAL PHYSICS

MATH 121: Applied Math Methods I. 4
MATH 122: Applied Math Methods II 4
MATH 198: Upper Division Directed Group Study (substituted for PHYS 195) 4

BIOPHYSICS

BIO 100: Molecular Machinery of Life 4
BIO 104/104L: Biophysics/Biophysics Laboratory 4/1
BIO 110: The Cell 4
PHYS 195: Undergraduate Research 4

Transfer Students

Transfer students who wish to major in Physics should complete four semesters of calculus, covering the topics of single variable calculus, multi-variable calculus, differential equations and preferably linear algebra. In addition, transfer students should complete one semester of general chemistry with laboratory and three semesters of calculus-based physics with laboratory. Students should consult the online student-transfer information system at www.assist.org. Students should also consult the Information for Prospective Students link on the School of Natural Sciences web site naturalsciences.ucmerced.edu for more information.

SAMPLE PLAN OF STUDY FOR PHYSICS DEGREE– ATOMIC, MOLECULAR AND OPTICAL EMPHASIS

SEMESTER 1

ICP	Integrated Calculus and Physics	8
CSE 20	Introduction to Computing I	2
CORE 1	The World at Home	4
	Freshmen Seminar*	1
Semester Units		**15**

SEMESTER 2

MATH 22	Calculus of a Single Variable II	4
PHYS 9	Introductory Physics II	4
WRI 10	Reading and Composition	4
CHEM 2	General Chemistry I	4
Semester Units		**16**

SEMESTER 3

MATH 23	Multi-Variable Calculus	4
BIO 1	Contemporary Biology	4
	General Education Elective (Arts/Humanities)	4
PHYS 10	Introductory Physics III	4
Semester Units		**16**

SEMESTER 4

MATH 24	Introduction to Linear Algebra and Differential Equations	4
PHYS 105	Analytic Mechanics	4
	Free Elective	4
	General Education Elective (Social/Cognitive Sciences)	4
Semester Units		**16**

SEMESTER 5

PHYS 137	Quantum Mechanics	4
PHYS 110	Electromagnetics I	4
MATH 32	Probability and Statistics	4
	General Education Elective (Communications)	4
Semester Units		**16**

SEMESTER 6

PHYS 160	Modern Physics Lab	4
PHYS 122	Waves	2
PHYS 124	Rotational Mechanics	2
CORE 100	The World at Home	4
	Free Elective	4
Semester Units		**16**

SEMESTER 7

PHYS 112	Statistical Mechanics	4
PHYS 148	Optics	4
	General Education Elective	4
PHYS 195	Undergraduate Research	3
Semester Units	**15**	

SEMESTER 8

PHYS 144	Modern Atomic Physics	4
	Free Elective	4
	Free Elective	4
PHYS 195	Undergraduate Research	3
Semester Units		**15**

Total Program Units 125

* Freshman Seminar is an optional course; it is not required for Physics Majors

The four-year plans presented in this catalog demonstrate the recommended sequencing and timing of the required and elective components within each major. In many cases, a student's academic background will require variations in the timing of the coursework listed in the plan. All students are expected to work with their academic advisor to find their best pathway through the degree requirements of their chosen program.

SAMPLE PLAN OF STUDY FOR PHYSICS DEGREE–MATHEMATICAL PHYSICS EMPHASIS

SEMESTER 1

ICP	Integrated Calculus and Physics	8
CSE 20	Introduction to Computing I	2
Core 1	The World at Home	4
	Freshmen Seminar*	1
Semester Units		**15**

SEMESTER 2

MATH 22	Calculus of a Single Variable II	4
PHYS 9	Introductory Physics II	4
WRI 10	Reading and Composition	4
CHEM 2	General Chemistry I	4
Semester Units		**16**

SEMESTER 3

MATH 23	Multi-Variable Calculus	4
BIO 1	Contemporary Biology	4
	General Education Elective (Arts/Humanities)	4
PHYS 10	Introductory Physics III	4
Semester Units		**16**

SEMESTER 4

MATH 24	Introduction to Linear Algebra and Differential Equations	4
PHYS 105	Analytic Mechanics	4
	Free Elective	4
	General Education Elective (Social/Cognitive Sciences)	4
Semester Units		**16**

SEMESTER 5

MATH 137	Quantum Mechanics	4
PHYS 110	Electromagnetics I	4
Math 32	Probability and Statistics	4
	General Education Elective communications)	4
Semester Units		**16**

SEMESTER 6

PHYS 122	Waves	2
PHYS 111	Electromagnetic Radiation	2
PHYS 160	Modern Physics Lab	4
CORE 100	The World at Home	4
	Free Elective	4
Semester Units		**16**

SEMESTER 7

PHYS 112	Statistical Mechanics	4
MATH 198	Directed Group Study	2
	General Education Elective	4
MATH 121	Applied Math Methods I	4
Semester Units		**14**

SEMESTER 8

MATH 198	Directed Group Study	2
	Free Elective	4
	Free Elective	4
MATH 122	Applied Math Methods II	4
Semester Units		**14**

Total Program Units 123

* Freshman Seminar is an optional course; it is not required for Physics Majors

The four-year plans presented in this catalog demonstrate the recommended sequencing and timing of the required and elective components within each major. In many cases, a student's academic background will require variations in the timing of the coursework listed in the plan. All students are expected to work with their academic advisor to find their best pathway through the degree requirements of their chosen program.

SAMPLE PLAN OF STUDY FOR PHYSICS DEGREE–BIOPHYSICS EMPHASIS

SEMESTER 1

ICP	Integrated Calculus and Physics	8
CSE 20	Introduction to Computing I	2
Core 1	The World at Home	4
	Freshman Seminar*	1
Semester Units		**15**

SEMESTER 2

MATH 22	Calculus of a Single Variable II	4
PHYS 9	Introductory Physics II	4
WRI 10	Reading and Composition	4
CHEM 2	General Chemistry I	4
Semester Units		**16**

SEMESTER 3

MATH 23	Multi-Variable Calculus	4
BIO 1	Contemporary Biology	4
CHEM 10	General Chemistry II	4
PHYS 10	Introductory Physics III	4
Semester Units		**16**

SEMESTER 4

MATH 24	Introduction to Linear Algebra and Differential Equations	4
	General Education Elective (Social/Cognitive Sci)	4
PHYS 105	Analytic Mechanics	4
CHEM 8	Principles of Organic Chemistry	4
Semester Units		**16**

SEMESTER 5

BIO 100	Molecular Machinery of Life	4
PHYS 137	Quantum Mechanics	4
PHYS 110	Electrodynamics	4
	General Education Elective (Communications)	4
Semester Units		**16**

SEMESTER 6

BIO 110	The Cell	4
MATH 32	Probability and Statistics	4
PHYS 160	Modern Physics Lab	4
CORE 100	The World at Home	4
Semester Units		**16**

SEMESTER 7

PHYS 112	Statistical Mechanics	4
PHYS 195	Undergraduate Research	3
BIO 104	Biophysics	4
BIO 104L	Biophysics Lab	1
	General Education Elective (Arts/Humanities)	4
Semester Units		**16**

SEMESTER 8

PHYS 122	Waves	2
PHYS 124	Rotational Mechanics	2
PHYS 195	Undergraduate Research	3
	General Education Elective	4
	Free Elective	4
Semester Units		**15**

Total Program Units **126**

* Freshman Seminar is an optional course; it is not required for Physics Majors

The four-year plans presented in this catalog demonstrate the recommended sequencing and timing of the required and elective components within each major. In many cases, a student's academic background will require variations in the timing of the coursework listed in the plan. All students are expected to work with their academic advisor to find their best pathway through the degree requirements of their chosen program.

WHAT I LIKE ABOUT UC MERCED IS THE EXPERIENCES THAT ONE GETS WITH FRIENDS. FROM THE THREE PAST YEARS I HAVE MANY GREAT MEMORIES, AND I FEEL THAT MAKES UC MERCED SPECIAL TO ME.

—Jorge Ruiz, Sacramento, Management Major

UC Merced has such a beautiful campus. I'm definitely in love with the gym because it's brand new and there's nothing like walking up to campus with a backdrop of the Sierra Nevada.

—Samuel Kim, Cerritos, Political Science Major

■ Natural Sciences Minors

To declare a minor, students must have an overall grade-point average of 2.0 (C) or better. Students should consult an advisor in the School of Natural Sciences to officially declare the minor and plan their courses.

The following guidelines must be adhered to:

- At least five courses, four of which must be upper division, must be taken for a letter grade.
- At least three of the required courses must be taken at UC Merced.
- Only one course may be used to satisfy two minor programs' requirements.
- Only one course may be used to satisfy both a minor and a major requirement.
- Work for the minor must be completed within the 150unit maximum limit for graduation.
- If the student's major and minor are in different schools, the higher unit maximum will apply.
- Students must consult the UC Merced General Catalog for prerequisites to required courses.
- The minor will appear on the student's transcript and diploma.

■ NATURAL SCIENCES EDUCATION MINOR

The Natural Sciences Education (NSED) minor is designed to prepare UC Merced students for admission to the teacher credential program or pursue graduate studies in education. Students who complete the coursework and the fieldwork associated with this program can be eligible for admission to the teacher credential programs at many local institutions. The NSED minor must be pursued in conjunction with a Natural Sciences or Engineering major. Additional support and resources for students interested in teaching careers are available through the Science and Mathematics Initiative (SMI) program with the School of Natural Sciences.

Minimum Requirements:

Two of the following CalTeach courses:

- NSED 23: Introduction to Teaching Science in Elementary School (1 unit)
- NSED 43: Introduction to Teaching Science in Middle School (1 unit)
- NSED 63: Introduction to Teaching Science in High School (1 unit)
- NSED 33: Introduction to Teaching Mathematics in Elementary School (1 unit)
- NSED 53: Introduction to Teaching Mathematics in Middle School (1 unit)
- NSED 73: Introduction to Teaching Mathematics in High School (1 unit)

Two CalTeach Fieldwork Courses—total 100 hours fieldwork:

- NSED 24: Fieldwork - Introduction to Teaching Science in Elementary School (1 unit)
- NSED 44: Fieldwork - Introduction to Teaching Science in Middle School (1 unit)
- NSED 64: Fieldwork - Introduction to Teaching Science in High School (1 unit)
- NSED 34: Fieldwork - Introduction to Teaching Mathematics in Elementary School (1 unit)
- NSED 54: Fieldwork - Introduction to Teaching Mathematics in Middle School (1 unit)
- NSED 74: Fieldwork - Introduction to Teaching Mathematics in High School (1 unit)

The additional required courses, all of which must be taken for a letter grade are:

- PSY 121: Cognitive Psychology (4 units) or PSY 130: Developmental Psychology (4 units) (Prerequisite: PSY 1 for both)
- NSED 100: Introduction to Instruction, Assessment, and Management for Beginning Teachers (4 units)
- NSED 120: Diversity in Education (4 units)
- WRI 115: Topics in Science Writing (4 units), or another approved upper division writing course (4 units)
- HIST 16: Forging of the US (4 units) or POLI 1: Introduction to Political Science (4 units)

■ PHYSICS MINOR

Physics is the study of nature at its most fundamental. It addresses the underlying principles that govern all phenomena in the universe, both within everyday life as well as within the most exotic situations. The physics minor equips students with a broad foundation to understand these diverse phenomena, including such topics as dynamics, planetary motion, quantum mechanics, atomic structure, special relativity, electricity, optics, and much more. The minor also provides an opportunity for a student to develop significant depth and explore modern topics in a few areas of his or her choosing. The physics minor may be useful for any student studying science or engineering who would like an enhanced foundation in his or her discipline. It may also appeal to any student who simply wishes to understand better the beauty and logic that governs the world around us and our place within it.

To receive a minor in physics, a student must complete the following requirements, all of which must be taken for a letter grade (32 units total):

1) REQUIRED LOWER-DIVISION PHYSICS/MATH COURSES (16 UNITS)

MATH 23: Vector Calculus (4)
MATH 24: Introduction to Linear Algebra and Differential Equations (4)
MATH 32: Probability and Statistics (4)
PHYS 10: Introductory Physics III (4)

Note that co- and prerequisites for these courses must also be completed (namely, PHYS 8, PHYS 9, MATH 21 and MATH 22, or their equivalents).

2) REQUIRED UPPER-DIVISION CORE PHYSICS COURSES (8 UNITS)

A student must take any two of the following four core physics courses:

PHYS 105: Analytic Mechanics Core (4)
PHYS 110: Electrodynamics Core (4)
PHYS 112: Statistical Mechanics Core (4)
PHYS 137: Quantum Mechanics Core (4)

3) REQUIRED ADDITIONAL UPPER-DIVISION PHYSICS COURSES (8 UNITS)

A student must take at least two additional upper division physics courses, of his/her choice, totaling at least 8 units.

■ APPLIED MATHEMATICS MINOR

Mathematics has been a central feature of humanity's intellectual achievements over the past several centuries. It is well established that mathematics provides the underlying framework to develop theory in the physical sciences and engineering. Moreover, mathematics is becoming increasingly important in the development of new knowledge in the social sciences and life sciences. These new application areas for applied mathematical sciences are undergoing remarkable growth. The Applied Mathematics minor gives students an opportunity to learn the fundamentals of modeling, analysis and scientific computing that make up the foundation of applied mathematics. The Applied Mathematics minor may be useful to students seeking to strengthen their educational experience in their major through building additional skills in quantitative reasoning and problem solving.

To receive a minor in Applied Mathematics, a student must complete the following requirements (20 units total), and follow the Natural Sciences guidelines on minors.

1) REQUIRED LOWER DIVISION MATH COURSES (4 units):

MATH 18 Statistics (4) or MATH 32: Probability and Statistics (4)

2) REQUIRED UPPER DIVISION CORE APPLIED MATHEMATICS COURSES (4 units):

MATH 121: Applied Mathematics Methods I (4)

Note that the following courses are prerequisites to the required course MATH 121:

MATH 21: Calculus of a Single Variable I (4)
MATH 22: Calculus of a Single Variable II (4)
MATH 23: Vector Calculus (4)
MATH 24: Introduction to Linear Algebra and Differential Equations (4)

3) REQUIRED ADDITIONAL UPPER DIVISION APPLIED MATHEMATICS COURSES (12 units):

A student must take at least three additional upper division Applied Mathematics courses, of his/her choice, totaling at least 12 units. Possible courses are:

MATH 122: Applied Mathematics methods II (4)
MATH 131: Numerical Analysis I (4)
MATH 132: Numerical Analysis II (4)
MATH 141: Linear Analysis I (4)
MATH 142: Linear Analysis II (4)
MATH 150: Mathematical Modeling (4)
MATH 198: Independent Study (4)

UC Merced is very diverse in students and faculty. Getting to know different backgrounds and cultures has given me an insight to understand them more.

—Judy Vang, Merced, Biological Sciences Major

School Of Social Sciences, Humanities And Arts

A WELCOME FROM THE OFFICE OF THE DEAN

Dear Students:

Welcome to the School of Social Sciences, Humanities and Arts! Our school embraces many disciplines, including economics, management, cognitive science, history, political science, literature, psychology, philosophy, anthropology, sociology, and the global arts. Our faculty are among the very best scholars in the world in their respective disciplines and they have joined UC Merced to create exciting new programs that appeal to our leaders of the future.

In our school, you will encounter many different approaches to our understanding of human nature, and become prepared for a lifetime of learning in an ever-changing world. The areas covered in our School will prepare you for future careers in many fields, including business, law, media, psychology, social work, and government. In a world of rapid changes, one of the primary goals of education is to learn how to learn. The tools of the social sciences, humanities and the arts are at your disposal.

Many opportunities for growth await you. Your academic classes and labs will challenge and stimulate you. You will broaden your horizons and share your ideas with fellow students from different disciplines. Our School offers undergraduate and graduate programs that allow flexible courses of study and opportunities for research at the intersections where the interesting questions lie. We encourage you to take classes outside of your chosen focus area and to get involved in activities outside of the classroom. Experience shows that students who are involved in such activities and balance their academic work with out-of-the-classroom experiences are happier, better-adjusted, enjoy life more, and are better prepared for life after the university.

At UC Merced you have a unique opportunity to get to know your professors and to work with them on research projects. Our School is still small and informal. It provides a rare opportunity to have the advantages of a world-class research university as well as the intimacy of a smaller institution.

It is my wish that many of you will fully realize the unique possibilities and near limitless opportunities offered to those who wish to join us in laying the foundations of the first research university of the twenty-first century, and I whole-heartedly welcome you to UC Merced.

Hans Björnsson

Interim Dean
School of Social Sciences, Humanities and Arts

The educational mission of our School is to create a rich learning environment by looking at people and society through the lenses of the many disciplines comprising the social sciences, humanities and arts.

Educational Philosophy

Our educational philosophy can be captured by the following principles which guide the way that the School of Social Sciences, Humanities and Arts constructs a learning foundation for our students:

Doing is the basis for learning. Students are encouraged to create the forms they are studying—whether they are plays, maps, persuasive essays or social surveys. We believe that developing writing skills leads to critical reading; being an articulate speaker leads to becoming a better listener; and developing models of decision-making from a holistic multidisciplinary perspective leads to a better appreciation of how policy is developed. We invite students to participate in the research programs of our faculty, to create student-led teams and to embark on individual, mentored research projects. Through their research, students learn to evaluate and use evidence and construct persuasive arguments based upon actual events and previous experience.

Learning is ubiquitous. Some of the best learning occurs outside of the classroom around peers and in communities. Diverse learning environments allow students to make connections between books and the world. Human beings are natural learners, and our job as educators is to provide an environment where students can engage these natural instincts. Courses are the anchors, but a lot of exciting learning depends upon students' own discovery of the links between formal academic programs and other endeavors such as foreign travel, artistic performance, political or business internship or community service.

Citizenship is founded in community. When we develop an informed and critical engagement with our own community, we can make better sense of what is happening there, and we can begin to see how our home is related to the globe. We live in a world where we are globally interdependent. Political borders, which change over time, determine citizenship and affect life opportunities. Ideas, diseases, languages, goods and individuals have always moved around the region and the world, but they do not reach all destinations with equal ease; they do not have equivalent effects when they alight in different places; and they are transformed by their new environments. We envision our community of students as developing a zone of comfort that allows them to act simultaneously as local and global citizens.

As a new campus, UC Merced has the singular opportunity to foster an integrative environment that draws from these disciplinary research traditions, but is not limited by their boundaries. The School of Social Sciences, Humanities and Arts offers a broad range of undergraduate and graduate programs dedicated to preparing students for varied roles as responsible and thoughtful citizens and leaders. We offer research and academic programs in anthropology, cognitive science, economics, global arts, history, literature, management, political science, psychology, public policy, and sociology that:

- prepare students for meaningful careers and professions;
- encourage intellectual and moral growth;
- promote sound decision-making;
- instill the values of lifelong learning; and
- encourage civic responsibility, public service, and understanding in a diverse, global society.

Students have the opportunity to follow personal paths of discovery in disciplinary or interdisciplinary curricula, while at the same time gaining depth and expertise in methodological domains such as social statistics, historiography, Geographic Information Systems, economics, cultural analysis and cognitive science.

Culture, society, and artistic expression differ widely on the basis of their historical era and geographical location. Individuals and their cultures are affected by diverse natural environments, the questions we ask about ourselves and the world, the changing ways in which the world has been measured and envisioned, and the legacies of contacts, migrations or isolation. As students learn to understand the ways that time and place have shaped lives, institutions and works of the imagination, they develop perspectives that enable them to better understand and shape our futures.

SCHOOL OF SOCIAL SCIENCES, HUMANITIES AND ARTS REQUIREMENTS

All students in the School of Social Sciences, Humanities and Arts, regardless of major, are expected to meet the minimum requirements for a degree. The School of Social Sciences, Humanities and Arts degree requirements are:

- At least 120 units to include the following:
  - At least 45 semester units of general education courses. Courses graded with a pass/no pass grading option are limited to one third of the total number of units required.
  - At least 60 semester units of upper division courses. Courses graded with a pass/no pass option are limited to one-third of the total number of units required.
- Students must complete all course prerequisites with a C- or better.
- Students must complete all major and minor requirements with a C- or better and maintain a 2.0 GPA in all major and minor course work. For a minor in Arts, a minimum GPA of 2.7 is required.
- Students must complete all major requirements with a letter grade option unless the course is only offered on a pass/no pass basis
- Students are not permitted to take more than one third of SSHA general education and major requirements at institutions other than UC Merced and approved University of California programs including Education Abroad, The University of California Center at Sacramento and The University of California at Washington Center.
- Students must obtain pre-approval through the SSHA Advising Office for all courses completed at institutions other than UC Merced.

GENERAL EDUCATION REQUIREMENTS (48 UNITS)

Students in the School of Social Sciences, Humanities and Arts are required to complete the following list of general education courses:

LOWER DIVISION UCM GENERAL EDUCATION REQUIREMENTS

College One Core Course sequence,
The World at Home (CORE 1) . . . . . 4 units
College Reading and Composition (WRI 10) . . . . . 4 units
Mathematical/Quantitative Reasoning Course . . . . . 4 units

LOWER DIVISION SSHA GENERAL EDUCATION REQUIREMENTS

Natural Sciences/Engineering Introductory Course
with laboratory, field or studio . . . . . 4 units
Second Natural Sciences or Engineering Course
with or without laboratory, field or studio . . . . . 4 units
Humanities, Arts, or Foreign Language Course
(outside of your major(s)) . . . . . 4 units
Social Sciences Course (outside of your major(s)). . . . . 4 units

UPPER DIVISION UCM GENERAL EDUCATION REQUIREMENTS

Core Course Sequence, The World at Home (CORE 100). . . . . 4 units

UPPER DIVISION SSHA GENERAL EDUCATION REQUIREMENTS

Four Upper Division General Education Courses Outside Area of
Emphasis or Major(s). . . . . 16 units

The first course of the Core Course sequence, CORE 1, The World at Home, is common for all UC Merced freshmen. This course lays the foundation in skills and ideals articulated in the UC Merced Guiding Principles for General Education (see General Education section of this catalog). These include decision-making, communication, ethics, responsibility, leadership, teamwork, aesthetic understanding, creativity and an appreciation of diverse perspectives in both the global and community contexts. All UC Merced students also take CORE 100, The World at Home, in their junior year.

Please review the "General Education for Transfer Students" section on the UC Merced General Education page. Transfer students are strongly encouraged to complete IGETC in order to prepare for work within the School of Social Sciences, Humanities and Arts. Students who do not complete IGETC before transferring are required to complete SSHA Foundations, an IGETC-like general education pattern. Please contact the SSHA Advising Office for more information at ssha.advising@ucmerced.edu. (Consult a SSHA advisor or the SSHA website for approved courses which meet SSHA GE Requirements).

Social Sciences, Humanities And Arts Majors

Major area upper division courses and emphasis track requirements are unique to each major. These are presented in the following section on majors.

In 2008-2009, the School of Social Sciences, Humanities and Arts offers fourteen minor programs (Anthropology, American Studies, Arts, Cognitive Science, Economics, History, Management, Philosophy, Political Science, Psychology, Services Science, Sociology, Spanish and Writing). Detailed descriptions of each minor, as well as minor requirements, are listed following the overview of major programs.

■ Anthropology Major

Anthropology is dedicated to understanding humankind's diversity as well as what makes us uniquely human. Through the specific perspectives and methods of socio cultural, archaeological, and biological anthropology, students learn how the human experience (past and present) is constituted through the interaction of social, cultural, political, material, historical, environmental, and biological factors. Anthropology strives for a holistic understanding of humankind and, depending on the questions asked and the means used to discover answers, anthropological knowledge can straddle the social sciences, humanities, and natural sciences.

The undergraduate major in Anthropology emphasizes how topics and issues central to the human experience such as migration, gender, power, health, kinship, race, and identity are examined and understood through diverse anthropological methodologies. In upper division courses, students explore particular socio cultural, archaeological, and biological perspectives on such issues in greater depth, and these courses may specifically engage perspectives from two or more sub fields. Other courses may consider a range of topics within a specific geographical area, while acknowledging certain limitations to the area studies configuration of knowledge.

Undergraduate majors in Anthropology develop critical skills in thought, written and oral expression, and the application of knowledge, as well as a valuable understanding of human cultural diversity. In an increasingly globalized world in which interaction with people of diverse cultures is becoming the norm, developing a cross cultural understanding about the complexities of human societies past and present is what makes Anthropology an ideal education for the 21st century. A bachelor's degree in Anthropology is valuable preparation for a career in law, medicine, education, business, government, museums, and various areas of non profit, public, and international service, including public policy and cultural resource management. The Anthropology program also provides a strong foundation for graduate study in any sub field of anthropology. By offering undergraduate majors opportunities to work with faculty research and apply knowledge and skills to local communities, agencies, and business through service learning and internships, students are further prepared for advanced study and successful careers.

Requirements For The Anthropology Major

In addition to adhering to the UC Merced and School of Social Science, Humanities and Arts requirements, the additional requirements that must be met to receive the B.A. in Anthropology at UC Merced are:

Requirements for the B.A. in Anthropology (ANTH)

Students in the Anthropology major must complete at least 48 units in Anthropology courses, as well as one additional 4 unit quantitative reasoning course and one additional 4-unit upper division interdisciplinary thematic articulation course that may simultaneously fulfill General Education Requirements. Courses in the major emphasis must be taken for a letter grade, and specifically may not be taken on a pass/no pass basis unless the course is only offered on a pass/no pass basis. Required courses are:

LOWER DIVISION MAJOR REQUIREMENTS [16 UNITS]:

ANTH 1: Introduction to Socio cultural Anthropology . . . . . 4 units
ANTH 3: Introduction to Anthropological Archaeology . . . . . 4 units
ANTH 5: Introduction to Biological Anthropology . . . . . .4 units

One lower division quantitative methods course from the following:

ECON 10/POLI 10: Statistical Inference . . . . . 4 units
MATH 18: Statistics for Scientific Data Analysis . . . . . 4 units
PSY 10: Analysis of Psychological Data . . . . . 4 units

UPPER DIVISION MAJOR REQUIREMENTS [40 UNITS]:

ANTH 100: History of Anthropological Thought and Practice. . . . 4 units

One upper division field methods course selected from the following:

ANTH 170: Ethnographic Methods . . . . . 4 units
ANTH 176: Archaeological Field Methods . . . . . 4 units

One upper division laboratory or archival methods course selected from the following:

ANTH 172: Ethnohistory . . . . . 4 units
ANTH 174: Lithic Analysis . . . . . 4 units
ANTH 178: Human Osteology . . . . . 4 units
ANTH 179: Bioarchaeology . . . . . 4 units

One upper division anthropology course from each of the following three fields:

Socio cultural anthropology (ANTH 110 129) . . . . . 4 units
Anthropological archaeology (ANTH 130 149). . . . . 4 units
Biological anthropology (ANTH 150 169) . . . . . 4 units

ADDITIONAL DEGREE REQUIREMENTS (16 UNITS)

At least three additional upper division courses in anthropology . . . . . 12 units
At least one upper division interdisciplinary thematic articulation course outside of anthropology . . . . . 4 units

(Please consult a SSHA advisor or the SSHA web site for approved courses.)

The upper division field methods requirement may be satisfied by taking an archaeological Field School from an approved institution.

Transfer Students

Transfer students who wish to major in Anthropology should complete the Intersegmental General Education Transfer Curriculum (IGETC) at their community college. In addition, students should complete at least two UC transferable introductory courses in anthropology, one of which must be introductory socio cultural anthropology, and one UC-transferable statistics course.

SAMPLE PLAN OF STUDY FOR B.A. DEGREE IN ANTHROPOLOGY

SEMESTER 1

CORE 1	The World at Home	4
ECON 1	Introduction to Economics	4
ANTH 1	Introduction to Socio-cultural Anthropology	4
Elective	Calculus of a Single Variable I	4
Semester Units		**16**

SEMESTER 2

ANTH 3	Introduction to Anthropological Archaeology	4
	Nat Sci/Engineering	4
	Introductory WCH or Arts course	4
	Introductory SCS course outside emphasis	4
Semester Units		**16**

SEMESTER 3

ANTH 5	Introduction to Biological Anthropology	4
	Upper Division ANTH socio-cultural anthropology course	4
	Natural Science/Engineering course w/Lab/Field/Studio	4
	Elective	4
Semester Units		**1**

SEMESTER 4

	Upper Division ANTH anthropological archaeology course	4
	Upper Division ANTH biological anthropology course	4
	Quantitative Methods course (e.g., MATH 18)	4
	Elective	4
Semester Units		**16**

SEMESTER 5

ANTH 100	History of Anthropological Thought and Practice	4
	Upper Division ANTH field methods course	4
	Upper Division General Education course outside Anthropology	4
	Elective	4
Semester Units		**16**

SEMESTER 6

CORE 100	The World at Home	4
	Upper Division ANTH lab/archival methods Course	4
	Upper Division ANTH elective	4
	Upper Division General Education Course outside Anthropology	4
Semester Units		**16**

I LIKE UC MERCED BECAUSE I HAVE GREAT FRIENDS HERE! WE STUDY TOGETHER AND COME UP WITH MANY RANDOM THINGS TO DO AND IT MAKES MY TIME MORE WORTHWHILE.

—Maira Alcala, Orosi, Psychology Major

SEMESTER 7

	Upper Division ANTH elective	4
	Upper Division General Education course outside Anthropology	4
	Upper Division Interdisciplinary Themes Course	4
	Elective	4
Semester Units		**16**

SEMESTER 8

	Upper Division ANTH elective	4
	Upper Division General Education course outside Anthropology	4
	Elective	4
	Elective	4
Semester Units		**16**

Total Program Units 128

The four-year plans presented in this catalog demonstrate the recommended sequencing and timing of the required and elective components within each major. In many cases, a student's academic background will require variations in the timing of the coursework listed in the plan. All students are expected to work with their academic advisor to find their best pathway through the degree requirements of their chosen program.

■ Cognitive Science Major

Cognitive Science is the interdisciplinary study of human thought and behavior. It combines methods, theories, and applications from many disciplines, including philosophy, psychology, linguistics, computer science, neuroscience, biology, and other related fields. The Cognitive Science majors, B.A. and B.S., provide a broad knowledge of cognitive science, including language and communication, reasoning, memory, categorization, cognitive modeling, perception and action, philosophical foundations, artificial intelligence, cognitive engineering, and cognitive science applications for the business setting. A degree in Cognitive Science provides in-depth training in research methods, data analysis, modeling, and lab-based research, and it provides excellent training for jobs in high-tech companies. It is ideal for students who want to pursue graduate work in cognitive science, neuroscience, psychology, computer science and engineering, information sciences and information management, communications, medicine, business, management, law, and education.

Requirements for the B.A. in Cognitive Science (COGS)

In addition to adhering to the UC Merced and School of Social Sciences, Humanities and Arts requirements, the Cognitive Science major, B.A., requires the following:

The Cognitive Science major, B.A., requires 46-48 units (some of which simultaneously meet general education requirements). Courses in the major must be taken for a letter grade, and may not be taken on a pass/no pass basis unless the course is only offered on a pass/no pass basis. All major course requirements must be completed with a grade of C- or better. Required courses include:

LOWER DIVISION MAJOR REQUIREMENTS (22-24 UNITS)

Introduction to Cognitive Science (COGS 1) . . . . . 4 units

Two additional introductory courses chosen from these four:

Introduction to Language and Linguistics (COGS 5). . . . . 4 units
Introduction to Economics (ECON 1) . . . . . 4 units
Introduction to Philosophy (PHIL 1) . . . . . 4 units
Introduction to Psychology (PSY 1) . . . . . 4 units
Analysis of Psychological Data (PSY 10)* . . . . . 4 units

*ECON10 or MATH 32 may also be considered by petition. (Meets the General Education Quantitative Reasoning Requirement)

Calculus of a Single Variable I (MATH 21) . . . . . 4 units
An introductory lower division computing course (e.g., CSE 5) . . . . . 2-4 units

UPPER DIVISION MAJOR REQUIREMENTS (24 UNITS)

Research Methods for Cognitive Scientists (COGS 105) . . . . . 4 units
Three additional upper division COGS courses. . . . . 12 units

One upper division course in Psychology or Philosophy chosen from:

PSY 120, 121, 130 or 131 and PHIL 103, 110, 111 or 150 . . . . . 4 units
One additional upper division course in Cognitive Science, Philosophy, Political Science, Psychology, Arts, Management, Economics, Biology or Computer Science and Engineering. . . . . 4 units

Transfer Students

Transfer students planning to major in Cognitive Science, B.A. should complete the Intersegmental General Education Transfer Curriculum (IGETC) at their community college. They must also complete at least three UC-transferable introductory social sciences courses, including one introductory psychology or philosophy course, two lower division natural sciences or engineering courses, including one with a lab, field, or studio component, one computer science course, one semester of calculus and one UC-transferable statistics course.

SAMPLE STUDY PLAN FOR COGNITIVE SCIENCE B.A.

SEMESTER 1

CORE 1	The World at Home	4
COGS 1	Introduction to Cognitive Science	4
WRI 10	College Reading & Composition	4
Elective		4
Semester Units		**16**

SEMESTER 2

COGS 5	Introduction to Language and Linguistics	
MATH 21	Calculus of a Single Variable I	4
	Nat Sci/ Engineering Intro course w/lab, Field or Studio	4
	Elective	4
Semester Units		**16**

SEMESTER 3

	Lower division Humanities or ARTS course	4
	Introductory Computing course	4
PSY 10	Analysis of Psychological Data	4
	Elective	4
Semester Units		**16**

SEMESTER 4

	Natural Sciences or Engineering course	4
COGS 5, ECON 1 or PHIL 1		4
	Elective	4
	Elective	4
Semester Units		**16**

SEMESTER 5

	COGS Upper Division Course I	4
	COGS 105 Research Methods for Cognitive Science	4
	Upper Division PSY or PHIL course from list	4
	Elective	4
Semester Units		**16**

SEMESTER 6

CORE 100	The World at Home	4
	COGS Upper Division Course II	4
	Upper Division GE Course outside COGS I	4
	Elective	4
Semester Units		**16**

SEMESTER 7

COGS Upper Division Course III	4
Upper Division Course from COGS, PSY, PHIL	4
ARTS, MGMT, ECON, BIO, or CSE Directed COGS Research	4
Upper Division General Education Course outside COGS II	4
Semester Units	**16**

SEMESTER 8

Directed COGS Research	4
Upper Division General Education Course outside COGS III	4
Upper Division General Education Course outside COGS IV	4
Elective	4
Semester Units	**16**

Total Program Units 128

The four-year plans presented in this catalog demonstrate the recommended sequencing and timing of the required and elective components within each major. In many cases, a student's academic background will require variations in the timing of the coursework listed in the plan. All students are expected to work with their academic advisor to find their best pathway through the degree requirements of their chosen program.

History Professors Gregg Herken and Sean Malloy listen to students' presentations.

Requirements for the B.S. In Cognitive Science (COGS)

In addition to adhering to the UC Merced and School of Social Science, Humanities and Arts requirements, the Cognitive Science major, B.S., requires the following:

The Cognitive Science major, B.S., requires 56-60 units (some of which simultaneously meet general education requirements). Compared to the B.A., the B.S. requires three additional lower division courses, one each in math, science and computing. In addition, B.S. students are encouraged to pursue upper division courses in Biology or Computer Science and Engineering. Courses in the major must be taken for a letter grade, and may not be taken on a pass/no pass basis unless the course is only offered on a pass/no pass basis. Required courses include:

LOWER DIVISION MAJOR REQUIREMENTS (28-32 UNITS)

Introduction to Cognitive Science (COGS 1) . . . . . 4 units

Two introductory courses chosen from these four:

Introduction to Language and Linguistics (COGS 5). . . . . 4 units

Introduction to Economics (ECON 1) . . . . . 4 units

Introduction to Philosophy (PHIL 1) . . . . . 4 units

Introduction to Psychology (PSY 1) . . . . . 4 units

Analysis of Psychological Data (PSY 10)* . . . . . 4 units

(Meets the General Education Quantitative Reasoning Requirement)

*ECON 10 or MATH 32 may also be considered by petition.

Calculus of a Single Variable I (MATH 21) and Calculus of a Single Variable II (MATH 22) . . . . . 8 units

Two lower division computing courses (e.g., CSE 20 and CSE 21; CSE 5 will not meet this requirement) . . . . . 8 units

Science Introductory Course with Laboratory, Field, or Studio Component (In addition to 8 units required for the General Education Science/Engineering Requirement.) Designated courses include BIO 1, BIO 3, CHEM 2, CHEM 8, PHYS 8, PHYS 9. Consult SSHA Advising for current list . . . . . 4 units

UPPER DIVISION MAJOR REQUIREMENTS (24 UNITS)

Research Methods for Cognitive Scientists (COGS 105). . . . . 4 units

Three additional upper division COGS courses. . . . . 12 units

One upper division course in Psychology or Philosophy chosen from: PSY 120, 121, 130 or 131 and PHIL 103, 110, 111 or 150 . . . . . 4 units

One additional upper division course in Cognitive Science, Philosophy, Psychology, Arts, Management, Economics, Biology or Computer Science and Engineering . . . . . 4 units

Transfer Students

Transfer students planning to major in Cognitive Science, B.S. should complete the Intersegmental General Education Transfer Curriculum (IGETC) at their community college. They must also complete at least three UC-transferable introductory social sciences courses, including one introductory psychology or philosophy course, three lower division natural science or engineering courses, including two with a lab, field, or studio component, two computer science courses, two semesters of calculus and one UC-transferable statistics course.

SAMPLE STUDY PLAN FOR COGNITIVE SCIENCE B.S.

SEMESTER 1

CORE 1	The World at Home	4
COGS 1	Introduction to Cognitive Science	4
WRI 10	College Reading & Composition	4
BIO 1		4
Semester Units		**16**

SEMESTER 2

COGS 5	Introduction to Language and Linguistics	4
MATH 21	Calculus of a Single Variable I	4
	Nat Sci/Engineering Intro course w/lab, Field or Studio	4
	Elective	4
Semester Units		**16**

Economics Professor Shawn Kantor talks to a student in class.

SEMESTER 3

	Lower division Humanities or ARTS course	4
PSY 10	Analysis of Psychological Data	4
CSE 20	Introduction to Computing I	4
MATH 22	Calculus of a Single Variable II	4
Semester Units		**16**

SEMESTER 4

	Natural Sciences or Engineering course	4
COGS 5, ECON 1 or PHIL 1		4
CSE 21	Introduction to Computing II	4
	Elective	4
Semester Units		**16**

SEMESTER 5

COGS	Upper Division Course I	4
COGS 105	Research Methods for Cognitive Science	4
	Upper Division PSY or PHIL course from list	4
	Elective	4
Semester Units		**16**

I like that it is close to home to go back when I want, but far enough to be on my own. We are one community, the school and the city, and it makes you feel at home.

—Dalila Zamora, San Jose, Management Major

SEMESTER 6

CORE 100	The World at Home	4
	COGS Upper Division Course II	4
COGS I	Upper Division GE Course outside	4
	Elective	4
Semester Units		**16**

SEMESTER 7

COGS	Upper Division Course III	4
	Upper Division Course from COGS, PSY, PHIL, POLI, ARTS, MGMT, ECON, BIO, or CSE	4
	Directed COGS Research	4
	Upper Division GE Course outside COGS II	4
Semester Units		**16**

SEMESTER 8

	Directed COGS Research	4
	Upper Division General Education Course outside COGS III	4
	Upper Division General Education Course outside COGS IV	4
	Elective	4
Semester Units		**16**

Total Program Units 128

The four-year plans presented in this catalog demonstrate the recommended sequencing and timing of the required and elective components within each major. In many cases, a student's academic background will require variations in the timing of the coursework listed in the plan. All students are expected to work with their academic advisor to find their best pathway through the degree requirements of their chosen program.

■ Economics Major

Economists study how scarce resources are allocated so that the well-being of individuals is maximized. Whether the resource that is being allocated is income, time, or a precious commodity, there is always some tradeoff associated with allocating the resource for one use and not another. Individuals, businesses, and governments face these tradeoffs in countless ways everyday. The most important thing students learn from studying economics is how to identify, measure, and understand the essential elements of this tradeoff.

The Economics major is built on a foundation of strong theoretical and statistical training. The major provides students solid grounding in microeconomic and macroeconomic theory, statistical and econometric methodology, as well as applied economic analysis. The Economics major emphasizes the role of incentives and institutions in shaping economic outcomes and how public policies influence economic performance and individual outcomes. Special emphases in the program include labor economics, public economics, political economy, law and economics, environmental economics, empirical methods, and U.S. economic history.

In addition to having a solid understanding of economic theory, our program has a special emphasis on empirical research methods in economics. All students engage in research (with faculty, in teams, and independently) that involves analyzing data and answering well-formulated questions related to public policies. With these research experiences, our students are competitive for research internships, fellowships, and pre-graduate summer programs while still in school.

Because students with a degree in economics develop strong analytical and quantitative skills and the ability to solve complex problems effectively, studying economics is excellent preparation for many careers in business, law, management consulting, education, or public service. Businesses of all types and sizes, financial institutions, consulting firms, government agencies, non-governmental organizations, as well as graduate business and law schools actively seek graduates with bachelor's degrees in economics. In addition, many of our students go on to do graduate study in economics, law, public policy, or business.

Graduates with a degree in Economics will be able to:

- Clearly formulate important questions related to public policies or economic performance.
- Use economic models to understand and predict the outcomes of changes in the economic, political, or legal environment.
- Understand how institutions, governments, and individuals interact in a market setting and how this determines economic outcomes.
- Be able to analyze data using sophisticated econometric models to test theories and predict outcomes.
- Effectively communicate questions, tradeoffs, and empirical findings in both academic and non-academic settings, orally and in formal written work.

Requirements for the B.A. in Economics (ECON)

In addition to adhering to the UC Merced and School of Social Sciences, Humanities and Arts requirements, the Economics major requires 48 units (some of which simultaneously fulfill general education requirements). Courses in the major must be taken for a letter grade and may not be taken on a pass/no pass basis unless the course is only offered on a pass/no pass basis. Students must complete all major course prerequisites with a C-or better. Students in the Economics major must maintain a 2.0 grade point average in all major coursework.

LOWER DIVISION MAJOR REQUIREMENTS (16 UNITS)

Introductory Courses in the Social and Cognitive Science . . . . . s8 units
Introduction to Economics (ECON 1)
One course chosen from:

- Introduction to Cognitive Science (COGS 1)
- Introduction to Psychology (PSY 1)
- Introduction to Political Science (POL 1)
- Introduction to Sociology (SOC 1)

Quantitative Methods . . . . . 8 units
Statistical Inference (ECON 10) . . . . . 4 units
Calculus of a Single Variable I (MATH 21) . . . . . 4 units
(Either course counts toward the general education mathematical/quantitative reasoning requirement.)

UPPER DIVISION MAJOR REQUIREMENTS (32 UNITS)

Intermediate Microeconomic Theory (ECON 100) . . . . . 4 units
Intermediate Macroeconomic Theory (ECON 101) . . . . . 4 units
Econometrics (ECON 130). . . . . 4 units
Five additional upper division Economics courses. . . . . 20 units

Transfer Students

Transfer students planning to major in Economics should complete the Intersegmental General Education Transfer Curriculum (IGETC) at their community college. They must also complete at least two UC-transferable introductory social sciences courses, including introductory macroeconomics and microeconomics courses and one semester of a UC-transferable calculus course. Please consult www.assist.org for suggested course equivalencies.

SAMPLE PLAN OF STUDY FOR B.A. DEGREE IN ECONOMICS

SEMESTER 1

CORE 1	The World at Home	4
ECON 1	Introduction to Economics	4
WRI 10	College Reading & Composition	4
MATH 21	Calculus of a Single Variable I	4
Semester Units		**16**

SEMESTER 2

	Nat Sci/Engineering Intro course w/ Lab, Field Work, or Studio	4
	Lower Division Humanities or Arts course	4
	Elective	4
	Lower Division Social or Cognitive Science course outside ECON	4
	Freshman Seminar	1
Semester Units		**17**

SEMESTER 3		
ECON 100	Intermediate Microeconomic Theory	4
ECON 10	Statistical Inference	4
	Natural Science/Engineering course	4
	Elective	4
Semester Units		**16**

SEMESTER 4		
	Upper Division GE course outside ECON I	4
ECON 130	Econometrics	4
	General Education Elective	4
	Elective	4
Semester Units		**16**

SEMESTER 5		
	Upper Division ECON course I	4
	Upper Division General Education course outside ECON II	4
	Elective	4
	Elective	4
Semester Units		**16**

SEMESTER 6		
	Upper Division ECON course II	4
ECON 101	Intermediate Macroeconomic Theory	4
	Elective	4
CORE 100	The World at Home	4
Semester Units		**16**

SEMESTER 7		
	Upper Division ECON course III	4
	Upper Division ECON course IV	4
	Upper Division General Education course outside ECON III	4
	Elective	4
Semester Units		**16**

SEMESTER 8		
	Upper Division ECON course V	4
	Upper Division General Education course outside ECON IV	4
	Elective	4
	Elective	4
Semester Units		**16**

Total Program Units	**129**

The four-year plans presented in this catalog demonstrate the recommended sequencing and timing of the required and elective components within each major. In many cases, a student's academic background will require variations in the timing of the coursework listed in the plan. All students are expected to work with their academic advisor to find their best pathway through the degree requirements of their chosen program.

■ History Major

The Greek historian Thucydides wrote many centuries ago that the study of history is of value to any "who desire an exact knowledge of the past as an aid to the interpretation of the future." In a diverse and interdependent world, the study of History provides students with the tools to make sense of both the past and present, and to prepare for the future. We cannot hope to address America's contemporary racial dilemmas without understanding the history of slavery and Manifest Destiny. Nor can we grasp today's global patterns of poverty and prosperity without grappling with the history of empire and the spread of capitalism. The long history of immigration that has made California's Central Valley such a diverse region is intertwined with both global and national histories of war, revolution, commerce, culture, and politics.

Though rooted in the study of the past, the tools employed by historians are useful in a broad array of modern careers and professions. History, with its focus on research, writing, and argumentation, is well known as an excellent preparation for graduate school, law school, and other professions. History majors may also find employment related to their degrees in schools, museums, editing and publishing, archives, historic preservation, federal, state and local agencies, and as consultants and contractors.

History majors at UC Merced choose a field of concentration in either United States History or World History. They apply their classroom learning to research problems outside the classroom, where they can contribute to expanding public knowledge and awareness of cultural issues. Students may explore thematic topics such as environmental history, the history of science and technology, the history of migration and cultural intersections, as well as issues of world, national, state and local history.

Current UC Merced faculty members' areas of expertise include archives and museums, the study of global conflict and diplomacy, American history, world history, political geography, and the digital mapping of historical and cultural phenomena.

Requirements for the B.A. in History (HIST)

In addition to adhering to the UC Merced and School of Social Sciences, Humanities and Arts requirements, the History major requires 64 units. Courses in the major must be taken for a letter grade and may not be taken on a pass/no pass basis unless the course is only offered on a pass/no pass basis. Students must complete all major course prerequisites with a C-or better. All major course requirements must be completed with a grade of C-or better. Students in the History major must maintain a 2.0 grade point average in all major coursework.

LOWER DIVISION MAJOR REQUIREMENTS (16 UNITS)

A two-semester lower division introductory sequence in area of concentration (8 units)

(Please choose one of the following combinations):

Concentration in World History:

Introduction to World History to 1500 (HIST 10) and Introduction to World History since 1500 (HIST 11)

Concentration in United States History:

The Forging of the United States, 1607-1877 (HIST 16) and The Modern United States, 1877-Present (HIST 17)

(Additional introductory region/nation sequence courses in History may be taken to meet this requirement as those courses are developed in future years. Please consult a SSHA advisor and/or visit SSHA's web site to check for approved new course sequence additions.)

Two lower division History electives
outside area of concentration . . . . . 8 units

One Year of College-level Courses in a Language
other than English. . . . . 8 units

(Students must take one year of the same language. This requirement may be satisfied through alternative means, such as proficiency testing and/or prior college-level course work.)

UPPER DIVISION MAJOR REQUIREMENTS (32 UNITS)

The Historian's Craft (HIST 100) (must be taken in junior year). . . 4 units

Applied Research (HIST 190) . . . . . 4 units

Senior Thesis (HIST 191) . . . . . 4 units

Five additional Upper Division History electives, including (20 units)

- At least two upper division History courses in area of concentration
- At least two upper division History courses outside area of concentration

BREADTH REQUIREMENT (8 UNITS)

Two non-History courses (lower or upper division) from within the chosen concentration (Consult a SSHA advisor or the SSHA web site for approved courses.)

Transfer Students

Transfer students who wish to major in History should complete the Intersegmental General Education Transfer Curriculum (IGETC) at their community college. In addition, students should complete at least one full-year, of a UC-transferable introductory course sequence selected from their intended concentration, either United States or world history, two additional introductory history courses in topics outside their concentration as well as introductory courses in anthropology, art history, economics, literature, political science and/or sociology. Students should complete the equivalent of one year of college-level courses in one language other than English. Please consult www.assist.org for suggested course equivalencies.

■ CONCENTRATIONS

Currently, two concentrations are available within the History major.

Students choosing to concentrate in U.S. History take courses exploring the development of America and its peoples from the centuries before European colonization through the present day. Courses within the U.S. History concentration range from African American history to the history of the Cold War and American foreign policy. Students in this concentration also take two courses in other disciplines that will broaden their understanding of U.S. history. Thus students might take a course in contemporary U.S. literature or Asian American music as a way of broadening their understanding of the diverse cultures that have historically shaped the development of the United States.

Students choosing to concentrate in World History take a one-year introductory sequence exploring themes of human cultural and social development and the connections among peoples from the emergence of the human species until the present day. Following this course, students will have the opportunity to take upper division courses of global scope on topics such as trade, mapping, or the environment; and also courses focusing on some aspect of the history of a particular part of the world. Students in this concentration also take two courses in other disciplines that broaden their understanding of World History. Thus students might take an Anthropology course in Transnationalism, or an advanced course in a language other than English.

SAMPLE STUDY PLAN: CONCENTRATION IN WORLD HISTORY

SEMESTER 1

CORE 1	The World at Home	4
WRI 10	College Reading & Composition	4
HIST 10	The World to 1450	4
	Foreign Language	4
Semester Units		**16**

SEMESTER 2

	Elective	4
	Nat Sci/Eng Intro Course w/lab/Field/Studio I	4
HIST 11	The World Since 1450	4
	Foreign Language	4
Semester Units		**16**

SEMESTER 3

	Lower Division HIST Course outside concentration	4
	Quantitative Reasoning Course	4
	Lower Division Humanities or Arts Course outside HIST	4
	Elective	4
Semester Units		**16**

SEMESTER 4

	Lower Division HIST Course outside concentration	4
	Nat Sci/Eng Course	4
	Lower Division Social or Cognitive Science Course	4
	Elective	4
Semester Units		**16**

SEMESTER 5

HIST 100	The Historian's Craft	4
	UD HIST Elective I	4
	Breadth Requirement	4
	Upper Division General Education Course outside of HIST I	4
Semester Units		**16**

SEMESTER 6

HIST 190	Applied Research	4
	UD HIST Elective II	4
CORE 100	The World at Home	4
	Upper Division General Education Course outside of HIST II	4
Semester Units		**16**

SEMESTER 7

	Upper Division HIST Elective III	4
	Upper Division HIST Elective IV	4
	Breadth Requirement	4
	Upper Division General Education Course outside of HIST II	4
Semester Units		**16**

SEMESTER 8

HIST 191	Senior Thesis	4
	Upper Division HIST Course in or out of concentration	4
	Upper Division General Education Course outside of HIST IV	4
	Elective	4
Semester Units		**16**

Total Program Units 128

The four-year plans presented in this catalog demonstrate the recommended sequencing and timing of the required and elective components within each major. In many cases, a student's academic background will require variations in the timing of the coursework listed in the plan. All students are expected to work with their academic advisor to find their best pathway through the degree requirements of their chosen program.

SAMPLE STUDY PLAN: CONCENTRATION IN U.S. HISTORY

SEMESTER 1

CORE 1	The World at Home	4
WRI 10	College Reading & Composition	4
HIST 16	Forging of the U.S.	4
	Foreign Language	4
Semester Units		**16**

SEMESTER 2

	Elective	4
	Nat Sci/Eng w/lab/Field/Studio I	4
HIST 17	The Modern U.S.	4
	Foreign Language	4
Semester Units		**16**

SEMESTER 3

	Lower Division HIST Course outside concentration	4
	Quantitative Reasoning Course	4
	Lower Division Humanities or Arts Course outside HIST	4
	Elective	4
Semester Units		**16**

SEMESTER 4

	Lower Division HIST Course outside concentration	4
	Nat Sci/Eng Course	4
	Lower Division Social or Cognitive Science Course	4
	Elective	4
Semester Units		**16**

SEMESTER 5

HIST 100	The Historian's Craft	4
	UD HIST Elective I	4
	Breadth Requirement	4
	Upper Division General Education Course outside of HIST I	4
Semester Units		**16**

SEMESTER 6

HIST 190	Applied Research	4
	Upper Division HIST Elective	4
CORE 100	The World at Home	4
	Upper Division General Education Course outside of HIST II	4
Semester Units		**16**

SEMESTER 7

	Upper Division HIST Course in or out of concentration	4
	UD HIST Elective III	4
	Breadth Requirement	4
	Upper Division General Education Course outside of HIST III	4
Semester Units		**16**

SEMESTER 8

HIST 191	Senior Thesis	4
	Upper Division HIST Elective IV	4
	Upper Division General Education Course outside of HIST IV	4
	Elective	4
Semester Units		**16**

Total Program Units 128

The four-year plans presented in this catalog demonstrate the recommended sequencing and timing of the required and elective components within each major. In many cases, a student's academic background will require variations in the timing of the coursework listed in the plan. All students are expected to work with their academic advisor to find their best pathway through the degree requirements of their chosen program.

■ Literatures And Cultures Major

The major in Literatures and Cultures at the University of California, Merced asks students to recognize the complex interactions of history, culture, and literature, and in doing so, to ask questions of gender and minority thought and discourse, and of intersections with other fields such as cognitive science, social sciences, and information science. Literatures and Cultures offers a program of study that develops in students the critical skills most necessary to understand how culture shapes and is shaped by the production, dispersal, and consumption of literary and cultural texts; it seeks to ensure that students understand the basic notion of cultural production, and that they are, through a variety of courses, familiarized with the inherent relationship between society and literature, between reading and thinking, and between individual and societal forms of expression. In keeping with the campus' primary directive of interdisciplinary, the Literatures and Cultures major situates itself at a disciplinary crossroads, both inviting collaboration with the other schools and disciplines within the School of Social Sciences, Humanities and Arts and across the campus, and illustrating, within its own precepts, a wide ranging set of disciplinary approaches and interests.

Currently, the major asks students to select one of two concentrations, consisting of three overlapping interdisciplinary areas, each of which can be understood as a distinct geographic, intellectual, linguistic, and aesthetic territory, and which can also be studied in relation to the others. They are as follows: Literatures of the Spanish Speaking World, focusing on Mexico and the U.S., South and Central American countries and European countries such as Spain and Portugal; and Literatures of the English Speaking World, emphasizing literatures, both oral and written, produced within the United States and England, but also encompassing geographic terrains such as Australia and South Africa. The Literatures of the Spanish Speaking World concentration has a global reach and interest, which includes Peninsular, American, African, and Asian literatures in Spanish, as well as a Portuguese component. Courses in this area are taught in Spanish (with some eventually in Portuguese), and are available to students interested in cultural and linguistic proficiency in Spanish. The Literatures of the English Speaking World concentration also has global reach and interest, and includes colonial and postcolonial literatures, and indigenous literatures, including a focus on American regional literature and environmental literatures, including literature of the Great Central Valley, California literatures, and the literature of Yosemite. Additionally, a third area is encompassed by an overlap both geographical and cultural, and comprises courses students take within both concentrations. This area of study, Literatures and Cultures of the Americas, will enable a bold hemispheric approach, exploring commonalities and differences between native and postcolonial cultures in North America, Central America, South America and the Caribbean.

Overall, UC Merced's highly comparative approach to literature enables the interdisciplinary training of students in literature, cultural studies, theory and comparative studies. Upon graduation, students will find themselves prepared for a number of career possibilities, including education, graduate and professional programs, including the fields of law, medicine and business, as well as advertising, editing and publishing, journalism, communications and mass media.

Requirements for the B.A. in Literatures and Cultures (LITC)

In addition to adhering to the UC Merced and School of Social Sciences, Humanities and Arts requirements, the Literatures and Cultures major requires 52-60 units (some of which simultaneously fulfill general education requirements). Courses in the major must be taken for a letter grade and may not be taken on a pass/no pass basis unless the course is only offered on a pass/no pass basis. Students must complete all major course prerequisites with a C- or better. All major course requirements must be completed with a grade of C- or better. Students in the Literatures and Cultures major must maintain a 2.0 grade point average in all major coursework.

LOWER DIVISION LITERATURES AND CULTURES MAJOR REQUIREMENTS (16 UNITS)

Two lower division introduction courses in area of concentration
(preferably within a sequence)

Concentration in Literatures of the English Speaking World (8 units)

- Introduction to World Literature I (LIT 20)
- Introduction to World Literature II (LIT 21)
- Introduction to American Literature I (LIT 30)
- Introduction to American Literature II (LIT 31)
- Introduction to British Literature I (LIT 40)
- Introduction to British Literature II (LIT 41)

Concentration in Literatures of the Spanish Speaking World (8 units)

- Introduction to Hispanic Literature I (LIT 50)
- Introduction to Hispanic Literature II (LIT 51)

Two additional lower division LIT electives . . . . . 8 units

Upper Division Literatures and Cultures Major Requirements (20 units)

Engaging Texts: Introduction to Critical Practice (LIT 100) . . . . . 4 units

Senior Project (LIT 190) . . . . . 4 units

At least 3 Concentration-specific upper division courses. . . . . 12 units

(For a list of appropriate courses, please consult the web site or check with a SSHA advisor.)

Foreign Language Requirement. . . . . 8–16 units

- Literatures of the English Speaking World (at least 2 semesters of college-level foreign language)
- Literatures of the Spanish Speaking World (at least 4 semesters of college-level Spanish)

Breadth Requirement . . . . . 8 units

- Two non-literature courses from within the student's chosen concentration. These may be either upper- or lower-division courses.

(Please consult a SSHA advisor or the SSHA web site for approved courses.)

Students interested in a concentration other than those listed above (for example, a thematic concentration in gender or race or a geographical location in US literature or Literature of the Americas) may submit a petition with a proposed list of courses that would constitute their concentration. Over time, additional approved concentrations may be added to the list above.

Our major in Literatures and Cultures really embraces my research, which looks at non traditional literatures and even non textual forms of literature. I love being able to bring this approach into my classes, and I've enjoyed the research opportunities it has created with undergraduates. My work crosses a lot of disciplinary boundaries, and I feel that Merced is the perfect place to do that.

—Professor Jan Goggans, Literature

Transfer Students

Transfer students who wish to major in Literatures and Cultures should complete the Intersegmental General Education Transfer Curriculum (IGETC) at their community college. In addition, students should complete at least one full-year UC-transferable introductory course sequence selected from their intended concentration, two additional introductory literature courses as well as introductory courses in anthropology, art history, economics, history, political science and/or sociology. Students should complete the equivalent of one year of a college-level courses in one language other than English, students with a Literatures of the Spanish speaking world concentration should complete two years of courses in Spanish language. Please consult www.assist.org for suggested course equivalencies.

SAMPLE STUDY PLAN: CONCENTRATION IN LITERATURES OF THE ENGLISH SPEAKING WORLD

SEMESTER 1

LIT 30/ LIT 40/LIT 20	Introduction to American Literature I or Introduction to British Literature or Introduction to World Literature	4
WRI 10	Reading & Composition	4
CORE 1	The World at Home	4
	Elective	4
Semester Units		**16**

SEMESTER 2

LIT 31/LIT 41/21	Introduction to American Literature II or Introduction to British Literature II or Introduction to World Literature II	4
	Natural Science/Engineering intro Course w/ lab, Field work, or Studio	4
	Foreign Language	4
	Elective	4
Semester Units		**16**

SEMESTER 3

	Lower Division LIT Course	4
	Foreign Language	4
	Quantitative Reasoning Course	4
	Lower Division Humanities or ARTS course outside of LIT	4
Semester Units		**16**

UC Merced's award winning Martial Arts Club performs at Bobcat Day, Asian Fest and other campus events.

SEMESTER 4

	Lower Division LIT Course	4
	Lower Division Social or Cognitive Sciences Course	4
	Natural Sciences/Engineering Course	4
	Elective	4
Semester Units		**16**

SEMESTER 5

LIT 100	Engaging Texts	4
	Upper Division LIT Course	4
	Breadth Requirement	4
	Elective	4
Semester Units		**16**

SEMESTER 6

	Upper Division LIT Course	4
	Upper Division General Education Course outside of LIT	4
CORE 100	The World at Home	4
	Elective	4
Semester Units		**16**

SEMESTER 7

	Upper Division LIT Course	4
	Upper Division General Education Course outside of LIT	4
	Breadth Requirement	4
	Elective	4
Semester Units		**16**

SEMESTER 8

LIT 190	Senior Project	4
	Upper Division General Education Course outside of LIT	4
	Upper Division General Education Course outside of LIT	4
	Elective	4
Semester Units		**16**

Total Program Units 128

The four-year plans presented in this catalog demonstrate the recommended sequencing and timing of the required and elective components within each major. In many cases, a student's academic background will require variations in the timing of the coursework listed in the plan. All students are expected to work with their academic advisor to find their best pathway through the degree requirements of their chosen program.

SAMPLE STUDY PLAN: CONCENTRATION IN LITERATURES OF THE SPANISH SPEAKING WORLD

SEMESTER 1

CORE 1	The World at Home	4
	Quantitative Reasoning Course	4
WRI 10	Reading & Composition	4
LIT 50	Introduction to Hispanic Literature I	4
Semester Units		**16**

SEMESTER 2

	Natural Science/Engineering intro course w/ lab, Field work, or Studio	4
	Foreign Language	4
	Elective	4
LIT 51	Introduction to Hispanic Literature II	4
Semester Units		**16**

SEMESTER 3

	Natural Sciences/Engineering Course	4
	Foreign Language	4
	Lower Division LIT Course	4
	Lower Division Humanities or ARTS course outside of LIT	4
Semester Units		**16**

SEMESTER 4

	Lower Division Social or Cognitive Sciences Course	4
	Foreign Language	4
	Lower Division LIT Course	4
	Elective	4
Semester Units		**16**

SEMESTER 5

	Foreign Language	4
LIT 100	Engaging Texts	4
	Breadth Requirement	4
	Upper Division LIT Course	4
Semester Units		**16**

SEMESTER 6

CORE 100	The World at Home	4
	Upper Division LIT Course	4
	Upper Division Course outside of LIT	4
	Elective	4
Semester Units		**16**

SEMESTER 7

	Upper Division LIT Course	4
	Breadth Requirement	4
	Upper Division Course outside of LIT	4
	Elective	4
Semester Units		**16**

SEMESTER 8

LITC 190	Senior Project	4
	Upper Division Course outside of LIT	4
	Upper Division Course outside of LIT	4
	Elective	4
Semester Units		**16**

Total Program Units 128

The four-year plans presented in this catalog demonstrate the recommended sequencing and timing of the required and elective components within each major. In many cases, a student's academic background will require variations in the timing of the coursework listed in the plan. All students are expected to work with their academic advisor to find their best pathway through the degree requirements of their chosen program.

Being at UC Merced gives you the opportunity to do what you can, should, would, could and WILL do.

At UC Merced, it's the close-knit community and the ability to change the school with just one step of courage and belief in oneself.

As a UCM student, the best thing is being able to do anything you want and at the same time have the whole UC system behind you every way.

Being a UCM student, you get to see a camel on Bellevue, a white horse on North Lake, two flamingos at a ranch and a plethora of bunnies on campus. What more do you want?

UC Merced defines "opportunity"!

—Julia Zhou, Undergraduate

■ Management Major

The Management major responds to the growing needs of California's business environment. UC Merced's Management major provides rigorous analytical and quantitative training from a blend of fields including economics, management theory and other social sciences. Real-life management problems do not fit neatly into subject areas. Today's managers tackle issues that involve a number of management functions—so solutions need to draw on expertise from a variety of different areas. The UC Merced approach is to step away from thinking of management as a set of separate functions drawing from single disciplines. Instead, students learn to integrate key ideas from across subject areas to understand all the dimensions of a given issue. Creativity, innovation and entrepreneurship are emphasized.

The Management major at UC Merced offers a unique hands-on approach to business decision-making, positioning students to explore the leading edge of dynamic business ideas. The practical and project-based approach is based on the principle that learning is more rewarding when put into practice. Expertise can be taught, yet developing skills demands live employment in the real world of work. The major is based on the premise that organizations of different kinds– for-profit, non-profit, technological and governmental– require employees who are trained in analytical and quantitative decision-making, who work effectively in teams and on projects, who are comfortable in various cultures, who are "well rounded" in sciences and humanities, and who have learned the art of self-directed learning.

The Management major prepares students for a broad range of management-related careers in the New Economy. The curriculum provides a strong foundation in economics, organization, business, finance, accounting and quantitative methods. It focuses on analysis and problem solving across a wide spectrum of management activities. The theoretical underpinning for the undergraduate program comes from economics and management science disciplines that use tools and techniques based on applied mathematics and statistics to solve problems in virtually all areas of business and government. The typical undergraduate student develops skills to build quantitative models of complex operations and competitive markets and be able to use those models to facilitate decision-making.

The Management degree provides students with the analytical tools that are needed to succeed in a modern, volatile business environment. The core management courses provide a rigorous foundation in economics, organizations, finance, accounting and statistical methods.

Students who graduate with a B.S. degree in Management will be able to:

- Analyze information, solve problems, and make decisions from a multidisciplinary perspective;
- Apply theories and concepts from management and related fields (for example, economics, accounting, statistics and finance) to various management situations;
- Use effective written and oral communication consistent with the management and professional environment;
- Apply appropriate information technology to analyze problems, develop business research, report key data and recommend management strategies and actions; and
- Evaluate ethical, social, cultural and political issues as they relate to the organization, operations, human resources and business ventures.

Great minds think alike, that's why they're at UC Merced.

—Julia Zhou, San Jose, Cognitive Science Major

Requirements for the B.S. in Management (MGMT)

In addition to adhering to the UC Merced and School of Social Sciences, Humanities and Arts requirements, the requirements that must be met to receive the B.S. in Management at UC Merced are:

Management Course Requirements

The Management major requires 56 units (some of which simultaneously fulfill general education requirements). Courses in the major emphasis must be taken for a letter grade and may not be taken on a pass/no pass basis unless the course is only offered on a pass/no pass basis. For limits on pass/no pass grading, please contact the SSHA advising office. Students must complete all major course prerequisites with a C- or better. All major course requirements must be completed with a grade of C- or better. Students in the Management major must maintain a 2.0 grade point average in all major coursework.

LOWER DIVISION MAJOR REQUIREMENTS (24 UNITS)

Introduction to Economics (ECON 1) . . . . . 4 units
Introduction to Finance (MGMT 25) . . . . . 4 units
Introduction to Accounting (MGMT 26) . . . . . 4 units
Statistical Inference (ECON 10)* . . . . . 4 units
Calculus of a Single Variable I (MATH 21)* . . . . . 4 units
Introduction to Computer Applications (CSE 5) . . . . . 4 units

UPPER DIVISION MAJOR REQUIREMENTS (32 UNITS)

Intermediate Microeconomic Theory (MGMT 100) . . . . . 4 units
Intermediate Macroeconomic Theory (MGMT 101) . . . . . 4 units
Econometrics (MGMT 130) . . . . . 4 units
Marketing (MGMT 140) . . . . . 4 units
Intermediate Finance (MGMT 165) . . . . . 4 units
One additional upper division course chosen from the following:
Organizational Strategy (MGMT 116) . . . . . 4 units
Industrial and Organizational Psychology (PSY 141) . . . . 4 units
Two additional MGMT Courses** . . . . . 8 units

* Can satisfy general education requirement.

** Students may substitute a Management-related course for one of these courses. Students should contact SSHA Advising for an updated list of appropriate course substitutions.

Transfer Students

Transfer students who wish to major in Management should complete the Intersegmental General Education Transfer Curriculum (IGETC) at their community college. In addition, students should complete at least two UC-transferable introductory courses, one each selected from the humanities/arts and the social sciences; two lower division natural sciences or engineering courses, at least one of which has a lab, field or studio component; principles of economics; a course in financial accounting; a course in introductory finance (if available); and one UC transferable course in calculus. Please consult www.assist.org for suggested course equivalencies.

SAMPLE PLAN OF STUDY FOR MANAGEMENT DEGREE

SEMESTER 1

CORE 1	The World at Home	4
ECON I	Introduction to Economics	4
WRI 10	College Reading & Composition	4
MATH 21	Calculus of a Single Variable I	4
Semester Units		**16**

SEMESTER 2

	Lower division Social or Cognitive Sciences course	4
	Lower division Humanities or Arts course	4
	Nat Sci/Engineering Intro course w/ Lab, Field Work or Studio	4
CSE 5	Introduction to Computer Applications	4
Semester Units		**16**

SEMESTER 3

MGMT 100	Intermediate Microeconomic Theory	4
	Natural Sciences/Engineering course	4
MGMT 25	Introduction to Finance	4
ECON 10	Statistical Inference*	4
Semester Units		**16**

SEMESTER 4

MGMT 26	Introduction to Accounting	4
MGMT 130	Econometrics	4
	Elective	4
	Elective	4
Semester Units		**16**

SEMESTER 5

	Upper division General Education course outside MGMT I	4
	Upper division MGMT course 4	
	Elective	4
	Elective	4
Semester Units		**16**

SEMESTER 6

	Upper division MGMT course	4
MGMT 162	Corporate Finance	4
MGMT 101	Macroeconomic Theory	4
CORE 100	The World at Home	4
Semester Units		**16**

SEMESTER 7

Upper division MGMT course	4
Upper division General Education course outside MGMT	4
Upper division General Education course outside MGMT	4
Elective	4
Semester Units	**16**

SEMESTER 8

Upper division General Education course outside MGMT	4
Upper division MGMT course	4
Elective	4
Elective	4
Semester Units	**16**

Total Program Units	**129**

*Counts toward GE mathematical/quantitative reasoning requirement.

The four-year plans presented in this catalog demonstrate the recommended sequencing and timing of the required and elective components within each major. In many cases, a student's academic background will require variations in the timing of the coursework listed in the plan. All students are expected to work with their academic advisor to find their best pathway through the degree requirements of their chosen program.

■ Political Science Major

Political Science is the social scientific study of political institutions and political behavior. The study of political institutions includes topics such as the effect of the design of electoral systems on the quality of representation in government, the formal and informal elements of the legislative process and their implications for the making of law, and the impact of domestic political institutions on the incidence of international conflict. Under the rubric of political behavior, political scientists study how and why people choose to participate in politics, the determinants of vote choice, and the nature and origins of public opinion. Students studying political science at UC Merced develop a strong substantive understanding of both political institutions and behavior. Students also learn the theories that help us better understand the political world and the methods by which these theories are tested and refined.

Political Science majors choose courses from three subfields of the discipline: American Politics, Comparative Politics, and International Relations. The study of institutions and behavior is central to all three of these subfields, although the substantive emphasis differs. Courses in American Politics focus on domestic politics in the U.S., while courses in Comparative Politics examine government and politics in other nations. International Relations classes address issues in foreign policy, international conflict, and the institutions intended to govern the interactions between nations. Students focus on one of these three subfields, although they also are able to take courses in the two subfields outside of their focus. Due to both the broad intellectual roots of political science as a scholarly field and the interdisciplinary nature of UC Merced's School of Social Sciences, Humanities and Arts, Political Science majors also take at least two upper division classes in Cognitive Science, Economics, History, Psychology or Sociology.

I enjoy coming to UC Merced because the Writing Professors helped me become a better writer. Before college, I hated writing essays, but now they're not so bad.

—Evelyn Damate, Los Angeles, Biological Sciences Major

The knowledge and skills acquired with the Political Science Major should provide a strong foundation for graduate training in law, political science or other social sciences. Students graduating with a degree in political science can also pursue a wide variety of other careers, such as public administration, campaign management or consultation, grassroots political organization, corporate governmental affairs, Foreign Service, journalism, lobbying or teaching.

Requirements for the B.A. in Political Science (POLI)

In addition to adhering to the UC Merced and School of Social Sciences, Humanities and Arts requirements, the requirements that must be met to receive a B.A. in political science at UC Merced are:

The Political Science major requires 48 units, some of which may simultaneously meet general education requirements. Courses in the major must be taken for a letter grade, and may not be taken on a pass/no pass basis unless the course is only offered on a pass/no pass basis. All major course requirements must be completed with a grade of C- or better. Students in the Political Science major must maintain a 2.0 GPA or better in all major coursework. Required courses include:

LOWER DIVISION MAJOR REQUIREMENTS (16 UNITS)

Introduction to American Politics (POLI 1) . . . . . 4 units

Two courses chosen from . . . . . 8 units

- Contemporary Problems in American Politics (POLI 2)
- Introduction to Comparative Politics (POLI 3)
- Introduction to International Relations (POLI 5)
- Global Issues (POLI 6)
- Community Mobilization and Politics (POLI 9)

Statistical Inference (POLI 10) . . . . . 4 units

UPPER DIVISION MAJOR REQUIREMENTS (32 UNITS)

Three upper division Political Science courses from one of the following three subfields. . . . . 12 units

- American Politics (POLI 100-127)
- Comparative Politics (POLI 130-140)
- International Relations (POLI 150-160)

Any three additional upper division courses in Political Science. . . . . 12 units

Two courses selected from the following. . . . . 8 units

- Cognitive Psychology (COGS 121/PSY 121)
- Cognitive Neuroscience (COGS 130)
- Judgment and Decision Making (COGS 153)
- Intermediate Microeconomic Theory (ECON 100)

- Intermediate Macroeconomic Theory (ECON 101)
- American Economic History (ECON 111)
- Econometrics (ECON 130)
- Public Economics (ECON 151)
- Law and Economics (ECON 152)
- Political Economics (ECON 155)
- Essence of Decision (HIST 136)
- The Cold War, 1941-1991 (HIST 150)
- Social Psychology (PSY 131)
- Social Movements, Protest, and Collective Action (SOC 110)
- Advanced Issues in Race and Ethnicity (SOC 180)

Transfer Students

Transfer students planning to major in Political Science must complete the Intersegmental General Education Transfer Curriculum (IGETC) at their community college. In addition, students must complete at least two UC-transferable introductory political science courses, including one introductory course in American politics and one introductory course in either comparative politics or international relations.

SAMPLE PLAN OF STUDY FOR POLITICAL SCIENCE DEGREE

SEMESTER 1

CORE 1	The World at Home	4
POLI 1	Introduction to American Politics	4
WRI 10	College Reading & Composition	4
	Elective	4
Semester Units		**16**

SEMESTER 2

	Lower division POLI course	4
	Nat Sci/Engineering Intro course w/ Lab, Field or Studio	4
	Lower division Humanities or ARTS course	4
	MATH 5 Preparatory Calculus	4
Semester Units		**16**

SEMESTER 3

POLI 10	Statistical Inference	4
	Lower division POLI course	4
	Lower division Social or Cognitive Science Course outside of Political Science	4
	Elective	4
Semester Units		**16**

SEMESTER 4

	1st of 3 upper division POLI courses from single subfield	4
	Any upper division POLI course	4
	Natural Sciences or Engineering course	4
	Elective	4
Semester Units		**16**

SEMESTER 5

	Any upper division POLI course	4
	Upper division ECON, COGS, HIST, PSY, or PUBP course from list above	4
	Upper division General Education course outside POLI Major	4
	Elective	4
Semester Units		**16**

SEMESTER 6

CORE 100	The World at Home	4
	2nd of 3 upper division POLI courses from single subfield	4
	Upper division General Education course outside POLI Major	4
	Elective	4
Semester Units		**16**

SEMESTER 7

	3rd of 3 upper division POLI courses from single subfield	4
	Upper division ECON, COGS, HIST, PSY, or PUBP course from list above	4
	Upper division General Education course outside POLI Major	4
	Elective	4
Semester Units		**16**

SEMESTER 8

	Any upper division POLI course	4
	Upper division General Education course outside POLI Major	4
	Elective	4
	Elective	4
Semester Units		**16**

Total Program Units 128

The four-year plans presented in this catalog demonstrate the recommended sequencing and timing of the required and elective components within each major. In many cases, a student's academic background will require variations in the timing of the coursework listed in the plan. All students are expected to work with their academic advisor to find their best pathway through the degree requirements of their chosen program.

■ Psychology Major

The undergraduate major in Psychology provides students with an understanding of the major questions and methodologies across Psychology, including a common core of statistical and experimental methods courses. Upper division courses and projects allow students to explore the various substantive specialties in psychology, and to identify the areas of psychology that they might wish to pursue further. Many students with an undergraduate degree in psychology go on to graduate study in psychology or closely related fields such as cognitive science or organizational behavior. The psychology program strongly encourages further graduate study, and supports its undergraduate majors in reaching this goal by providing opportunities to work with faculty on research.

The Psychology major also prepares undergraduates for many other careers even without further graduate training. The American Psychological Association reports that only about 5% of 1997 and 1998 bachelor's degree psychology major graduates had taken a job that is actually in psychology. Most psychology major graduates—about two thirds—took employment in private sector business settings. Graduates with an undergraduate psychology major are highly marketable because they are trained to have good research and writing skills, to be effective problem solvers in both team and individual settings, and to use critical thinking skills to analyze, synthesize, and evaluate information. Specific examples of employment include administrative support, public affairs, education, business, sales, service industries, health, the biological sciences, computer programming, employment counselors, correction counselor trainees, interviewers, personnel analysts, probation officers, and writers. The same APA report finds that two thirds of psychology major graduates believe their job is closely or somewhat related to their psychology background and that their jobs hold career potential.

> I enjoy UC Merced because it has helped me develop into a leader and a pioneer. It has helped me become a competitive applicant for graduate school.
>
> —Lucelia Rivera, San Fernando, Biological Sciences Major

Requirements for the B.A. in Psychology (PSY)

In addition to adhering to the UC Merced and School of Social Sciences, Humanities and Arts requirements, the requirements that must be met to receive the B.A. in Psychology at UC Merced are:

The Psychology major requires 48 units (some of which simultaneously fill General Education Requirements as indicated below). Courses in the major emphasis must be taken for a letter grade, and may not be taken on a pass/no pass basis unless the course is only offered on a pass/no pass basis. Required courses include:

LOWER DIVISION MAJOR REQUIREMENTS (16 UNITS)

Introduction to Psychology (PSY 1) . . . . . 4 units

Introductory course chosen from: . . . . . 4 units

- Introduction to Cognitive Science (COGS 1)
- Introduction to Economics (ECON 1)
- Introduction to Political Science (POL 1)
- Introduction to Public Policy (PUBP 1)
- Introduction to Sociology (SOC 1)
- Cultural Anthropology (ANTH 1)

Analysis of Psychological Data (PSY 10) . . . . . 4 units

(Meets the General Education Quantitative Requirement)

Research Methods (PSY 15). . . . . 4 units

UPPER DIVISION MAJOR REQUIREMENTS (32 UNITS)

Writing in the Disciplines: Psychology (WRI 101) . . . . . 4 units

One upper division psychology course from each of the following three groups:. . . . . 12 units

- Group A (Cognition, Brain and Behavior): Any PSY course in the 160s or 180s, or any upper division COGS course
- Group B (Social-Personality, Development): Any PSY course in the 130s or 150s
- Group C (Applied Psychology): Any PSY course in the 120s, 140s, or 170s

At least four additional upper division courses in Psychology . . . 16 units

Transfer Students

Transfer students who wish to major in Psychology should complete the IGETC at their community college. In addition, students should complete at least two UC-transferable introductory social sciences courses, one of which must be introductory psychology, a UC-transferable statistics course as well as a UC-transferable psychological research methods course and two lower division natural science or engineering courses, at least one of which has a lab, field, or studio component.

SAMPLE PLAN FOR B.A. IN PSYCHOLOGY

Semester 1

CORE 1	The World at Home 4	
PSY 1	Introductory Psychology	4
WRI 10	College Reading & Composition	4
Elective	4	
Semester Units		**16**

Semester 2

PSY 10	Analysis of Psychological Data	4
	Nat Sci/Engin w/Lab/Field Work/Studio	4
	Elective	4
	Elective	4
Semester Units		**16**

Semester 3

PSY 15	Methods	4
	Natural Sciences/Engineering Course	4
WRI 101	Writing in the Disciplines: Psychology	4
	Elective	4
Semester Units		**16**

Semester 4

	Lower Division Social or Cognitive Sciences Course outside Psychology	4
	Lower Division Humanities or Arts course	4
	Elective	4
	Elective	4
Semester Units		**16**

Semester 5

	PSY Group A course	4
	Upper-division course in PSY	4
	Upper-division General Education course outside PSY	4
	Elective	4
Semester Units		**16**

Semester 6

CORE 100	The World at Home	4
	PSY Group B course	4
	Upper-division course in PSY	4
	Upper-division General Education course outside PSY	4
Semester Units		**16**

Semester 7

	PSY Group C course	4
	Upper-division course in PSY	4
	Upper-division General Education course outside PSY	4
	Elective	4
Semester Units		**16**

Semester 8

	Upper division course in PSY	4
	Upper division General Education course outside PSY	4
	Elective	4
	Elective	4
Semester Units		**16**

Total Program Units: 128

The four-year plans presented in this catalog demonstrate the recommended sequencing and timing of the required and elective components within each major. In many cases, a student's academic background will require variations in the timing of the coursework listed in the plan. All students are expected to work with their academic advisor to find their best pathway through the degree requirements of their chosen program.

■ SSHA Programs

The following programs represent loci of research and instructional excellence within the School of Social Sciences, Humanities and Arts. While these programs do not have specific curricula, and are not degree-granting disciplinary areas, we encourage students to broaden their horizons by considering courses from these areas during their undergraduate studies at UC Merced.

The Global Arts Studies Program

The Global Arts Studies Program (GASP) defines the arts broadly in order to promote an interdisciplinary study of the arts. GASP offers a unique curriculum by integrating subjects conventionally housed in disparate departments, including art history, music and ethnomusicology, media studies, and cultural and ethnic studies. GASP students gain a broad multicultural understanding of the arts by investigating the effects of industrialization, colonialism, commercialism and globalization on art practices in a balanced, inclusive range of critical perspectives. GASP students can seek a variety of graduate studies and employment opportunities in teaching, arts and music management, museums and galleries, the recording industry, publishing, broadcasting, and public relations.

The focus in GASP on research and scholarly work recognizes the important role in which culture participates in the larger social world inside and outside of academe. Students will develop a set of critical skills and specialized knowledge through an interdisciplinary yet rigorous curriculum. While concentrating on a particular area of study such as visual culture or music studies, GASP students are required to take courses outside of their focus, which broadens their perspectives. For example, a student on the music studies track, whose main interest is jazz history will have the opportunity to take classes on Latin American or Asian Pacific visual art. Additionally, students are required to take courses outside of GASP, becoming the flexible yet critical thinkers prepared to participate in the opportunities, as well as meet the challenges, of the future.

Foreign Languages

To be able to communicate in a foreign language is a fundamental asset in any profession, from careers in education, translating, and interpreting, to those in international studies, health, business or law. The knowledge of a foreign language is also useful for traveling and research in many parts of the world. The School of Social Sciences, Humanities and Arts offers four foreign languages for UC Merced students: Chinese, French, Japanese and Spanish.

All lower division courses in Chinese, French, Japanese and Spanish are content-based, learner-oriented and follow the communicative learning approach. In addition to helping students develop skills to communicate at an introductory and intermediate level in the target language, these courses attempt to promote a cultural awareness of the countries and communities where the languages are spoken.

The Spanish language program at UC Merced offers courses at the lower and upper division level as well as a minor in Spanish. Lower division course offerings include introductory and intermediate courses, as well as courses for Spanish heritage speakers who would like to improve their oral, writing and reading skills. At the upper division level, the Spanish program offers a wide variety of courses that provide students with the opportunity to broaden their knowledge of the language and of Hispanic cultures, as well as to learn the vocabulary and expressions commonly used in specific professions. Consult the Minors section of this catalog for information on the minor in Spanish.

To ensure appropriate placement in our foreign language courses, students with previous academic instruction in the language that they would like to study are encouraged to take the placement exam for that language. Spanish heritage speakers who wish to improve their oral, writing and reading skills should not take the Spanish placement exam, but register in SPAN 10-11. Students should have fulfilled the requirements (SPAN 4 or SPAN 11) or equivalent to register in an upper division Spanish course. For information about placement exams please go to orientation.ucmerced.edu or speak to a UC Merced academic advisor. You can also contact the Spanish Language Program coordinator, Dr. Virginia Adán-Lifante, for questions related to the placement exam or any other foreign language issues.

Media Arts Technique Program

Art has the potential to illuminate all aspects of life. As a form of creativity, art is distinguished by its metaphoric attributes. Art has an immense capability to transform and transcend. Dedication to diversity, cross cultural exploration, interdisciplinary collaboration, as well as belief in the value of freedom to explore characterizes Media Arts Technique Program curriculum.

The goal of Media Arts Technique Program is to offer students the opportunity to sample multiple art techniques, from traditional to experimental, and to allow them to find their own individual ways of integrating art into their lives. Courses are designed to provide students with tools that will enhance their ability to grow, to adjust to new environments and to new ideas throughout their lives. Access to multiple art techniques aims to give students the opportunity to develop holistic understanding of art media as well as respect for the diverse ways in which art is manifested in different cultures. Media Arts Technique Program is designed to develop capacity to create new forms of expression and communication.

Media Arts Technique Program curriculum strives to help students integrate specialized art techniques into their chosen fields of study. Students are encouraged to enroll in courses that suit their personal interests. Students are able to choose courses according to applicability to their majors, or in order to gain perspective on their own disciplines. In addition, students may choose courses in order to strengthen their cognitive abilities, to learn to understand art and creativity better, to develop heuristic methods of learning, to access intuitive holistic thinking, to sharpen their powers of inquiry, to enhance their cultural literacy, or to develop empathy.

Courses in the following art media are offered: architecture, digital arts, fine arts, music, performing arts, and photography. The Artist in Residence Program, which is part of Media Arts Technique Program, provides students with opportunity to study the practice of art with professional artists. Past Artists in Residence included Latina theater director and actress, African American choreographer specializing in West African dance, and sculptor recognized for pioneering work in feminist art.

Enrollment in Media Arts Technique Program courses is open to all students, regardless of major or prior art experience.

The UC Merced Writing Program

The UC Merced Writing Program is charged with carrying out the university's mission "to convey information to and communicate and interact effectively with multiple audiences, using advanced skills in written and other modes of communication" (Guiding Principles for General Education at UC Merced).

The Writing Program offers an array of courses in which students explore the art of critical thinking, craft their written expression, and address a variety of issues and audiences. Students learn to use language actively, inventively, and responsibly by exchanging their work at all stages of their writing process while building cumulative portfolios. The faculty's interdisciplinary approach to writing offers students the opportunity to reflect broadly on their college education as well as to consider a range of pre-professional and academic opportunities.

Writing Program classes generally feature about twenty students per section; teacher-student conferences; frequent written and verbal feedback on writing and ideas; interdisciplinary teaching, ranging from scientific literacy to aesthetic appreciation; conversational and collaborative in-class projects; portfolio projects that emphasize process and product in writing; and detailed assessment of student learning and teaching effectiveness.

For more details, please visit writingprogram.ucmerced.edu.

Sociology Program

Sociology, as a discipline, is wide ranging with a diversity of methodological approaches, theoretical perspectives, and areas of substantive interest. Sociological research studies range from examining the interaction of two individuals, to how we work in groups, to how our post-modern society is structured. This can include examining how we form group identities (i.e. national, racial, and ethnic), how institutions are built, maintained and die, demographic shifts, upward and downward mobility, processes of stratification as well as social dimensions of education, family life, law, military, political behavior, science and religion. The methodological tools used in sociology are as diverse as its topics of study. They range from historical and archival research, mathematical and statistical modeling, computer simulations, individual interviews, participant observation, and experimentation.

Sociology at UC Merced will focus on two axes. The first axis is an emphasis on studying the traditional sociological issues: power, structure, agency and inequality, with a particular emphasis on race, class, and gender. The second axis is using analytically based methodologies, both quantitative and qualitative, with a stress on where the discipline is headed—including spatial analyses, multi-level modeling, and innovative ethnographic methods. Given UC Merced's unique location in the San Joaquin Valley and the socioeconomic and demographic changes gripping the Central Valley in particular, and the State of California as a whole, students interested in Sociology will focus on such issues as:

- The complex issues of race/ethnicity that will emerge as the minority populations in California grow.
- How minority and majority politics adapt to those changes.
- How collective action and social movements rise and fall in concert with the aforementioned demographic and political changes.
- How the dynamics of neighborhood/community change given increasing economic inequalities and increasing racial diversity.
- Shifting residential segregation.

In learning about, and developing an understanding of, human relations and social organization, sociology is attractive to students considering careers in business, education, law, marketing,

medicine, journalism, social work, politics, public administration and urban planning. It provides a springboard not only for an advanced degree in any of the social sciences, but also to perform social science-based research in federal, state and local agencies as well as private foundations and research institutes and think-tanks.

World Heritage Program

World Heritage is an emerging interdisciplinary and cross-disciplinary area that includes architecture, history, archaeology, art history, geography, anthropology, management, law, environmental sciences and other disciplines. Thus, faculty in this field brings together the humanities, social sciences, policy, and management, consistent with the interdisciplinary intent of the World Cultures program within SSHA.

The key feature of the program, a strong technology orientation, will permit us to create a new discipline and innovative profiles for new jobs in the field of the humanities, cultural resource management, economics, computer science, educational purposes and many others.

The challenge for our contemporary classroom work is to construct a curriculum that blends humanistic interests and technology. Students will learn that the codes, metadata, and interfaces of today are in constant change and thus the fundamental task will be to determine how to set up a sustainable management system for digital media and global heritage study.

The learning outcome from such teaching should be the acquisition of a methodology aimed at understanding and communicating information about tangible and intangible heritage, cultural and natural sites. Each student in the World Heritage Program should learn to apply this methodology to the specialization of their field or to specific case studies within their field.

■ SSHA Minors

The School of Social Sciences, Humanities and Arts offers fourteen minors: American Studies, Anthropology, Arts, Cognitive Science, Economics, History, Management, Philosophy, Political Science, Psychology, Services Science, Sociology, Spanish and Writing.

The following guidelines pertain to all SSHA minors:

- To complete any SSHA minor, students must complete a minimum of five courses, at least four of which must be upper division.
- All courses must be taken for a letter grade.
- A minimum overall grade point average of 2.0 (C) in upper division courses is required. The only exception is a minor in Arts, for which the minimum GPA in upper division courses is 2.7 (B-).
- At least three of the five required courses must be taken at UC Merced.
- Only one course may be used simultaneously to satisfy requirements for two minors.
- Only one course may be used to satisfy both a minor and a major requirement.
- Students must consult the UC Merced General Catalog for prerequisites to required courses.

■ MINOR IN AMERICAN STUDIES

The American Studies minor builds on the tradition of an interdisciplinary field of study that promotes a broad humanistic understanding of American culture, past and present. By incorporating economics, history, literature, sociology, art history, anthropology, ethnic studies and public policy (among other areas), this minor encourages students and faculty within those fields to exchange ideas on scholarship as it relates to the American experience. In addition, the American Studies minor seeks to move beyond traditional limitations of American Studies, by allowing students to take relevant courses in engineering or the natural sciences. Inclusion of these courses is based on the rationale that cultural practices often stem from our understanding of and research in those sciences.

Minimum Requirements

One of the following courses:

- HIST 16 (The Forging of the United States, 1607-1877)
- HIST 17 (The Modern United States, 1877-Present)
- LIT 30 (Introduction to American Literature I)
- LIT 31 (Introduction to American Literature II)

One upper division American history course

One upper division American literature course

One upper division non-HIST/LIT course on American topics (Please choose from the following or check with the SSHA Advising Office for other appropriate courses):

- ARTS 120: American Music of the 20th Century
- POLI 110: Government Power and the Constitution
- POLI 160: U.S. Foreign Policy
- SOC 110: Social Movement, Protest and Collective Action
- SOC 131: Urban Inequality
- ANTH 135: Archaeology of Native California
- ANTH 130: Archaeology of Colonialism

One of the following upper division courses in American ethnicity, race or gender, either from HIST, LIT or another area:

- ANTH 110 (Anthropology of Transnationalism)
- HIST 124: African American History from Slavery to Civil Rights
- HIST 133 (Topics in the History of Migration and Immigration)
- LIT 120 (Topics in the Literature of Difference)
- LIT 135: American Protest Literature
- LIT 169 (U.S. Latino Literature)
- SCS 145 (Second Language Learning and Bilingualism)

■ MINOR IN ANTHROPOLOGY

Students taking the Anthropology minor learn how the human experience in both the past and present involves the interaction of many factors including social, cultural, political, economic, historical, environmental, and biological factors. Thus, the holistic understanding provided by anthropology draws on knowledge that encompasses the social sciences, humanities, and natural sciences. Through coursework, students learn basic anthropological concepts and methods of study, while also exploring various topics in depth from sociocultural, archaeological and biological anthropology.

Minimum Requirements

ANTH 1 (Introduction to Sociocultural Anthropology)

One additional lower division course from the following:

- ANTH 3 (Introduction to Anthropological Archaeology)
- ANTH 5 (Introduction to Biological Anthropology)

One upper division methods course within ANTH 170 through ANTH 179 series

Three additional upper-division courses in at least two of the following subfields:

- Sociocultural anthropology (within ANTH 110 through ANTH 129 series)
- Anthropological archaeology (within ANTH 130 through ANTH 149 series)
- Biological anthropology (within ANTH 150 through ANTH 169 series)

■ MINOR IN ARTS

A minor is by definition a form of study that can truly be referred to as enrichment. The minor in Arts provides students the opportunity to explore courses from the three parallel tracks in the Arts curriculum: history (interpreting works of art from all media within their context and purpose), theory (concentrating on research) and practice (artists in residence, performance and cognitive skills courses). ArtScore (ARTS 7) is a survey course of arts around the globe, with an integrated and comparative approach to studying the history and ideas of arts from antiquity to the twentieth century.

This course serves as the foundation for all students pursuing the Arts minor.

Minimum Requirements

ARTS 7 (ArtScore)

One additional lower division ARTS course

A minimum of four upper division ARTS courses

■ MINOR IN COGNITIVE SCIENCE

Cognitive Science is the study of human thought and its relation to human activities, including the study of language, perception, memory and reasoning. The Cognitive Science minor increases students' knowledge of the mind and how it is studied from various perspectives, and helps them to acquire critical skills in scientific research and formal areas such as computer science and mathematics. Students are encouraged to become involved with faculty research.

Minimum Requirements

COGS 1 (Introduction to Cognitive Science)

COGS 101 (Mind, Brain and Computation) or PSY 121 (Cognitive Psychology)

A minimum of three additional upper division COGS courses (one PSY course may be substituted)

A semester of lab-based research (e.g. COGS 95, COGS 98, COGS 99, COGS 195, COGS 198, COGS 199) is encouraged, but not required.

■ MINOR IN ECONOMICS

Students with an interest in developing a solid grounding in economic theory are encouraged to consider the minor in Economics. The minor provides students with an understanding of how incentives and institutions shape society. Students in the Economics minor have opportunities for strong theoretical and statistical training in areas of labor economics, public economics, environmental economics, political economy and economic data analysis.

Minimum Requirements

ECON 1 (Introduction to Economics)

ECON 10 (Statistical Inference)

A minimum of four upper division ECON courses.

■ MINOR IN HISTORY

Students find that a minor in History makes an invaluable contribution to their studies. A knowledge of history provides an appreciation of the context within which important developments in politics, art, literature, philosophy and science or technology take place, and is necessary to an understanding both of their origins and their implications.

Minimum Requirements:

Two lower division HIST survey courses (courses can be in combination, but a completion of a full sequence is encouraged):

- HIST 10 (Introduction to World History to 1500)
- HIST 11 (Introduction to World History Since 1500)
- HIST 16 (The Forging of the United States, 1607-1877)
- HIST 17 (The Modern United States, 1877-Present)
- HIST 30 (Early European History)
- HIST 31 (Modern European History)

A minimum of four upper division HIST courses.

■ MINOR IN LITERATURES AND CULTURES

The Literatures and Cultures minor enables students who are majoring in other disciplines to nonetheless develop strong skills in literary and cultural analysis, critical reading, and effective writing. Literary study asks questions of history and culture, of gender and minority thought and discourse, of intersections with other fields such as cognitive science, social science, and information science. The UC Merced Minor in Literatures and Cultures seeks to ensure both that students understand the basic notion of cultural production and reception, and that they are, through a variety of courses, familiarized with the relationships between society and literature, between reading and thinking, and between self and societal forms of expression.

Minimum Requirements:

Students must complete a minimum of five Literature courses, including at least one lower division LIT course and at least four must be upper division. While the major requires a field of concentration, the minor may be drawn from all Literatures and Cultures offerings. Students are encouraged to develop a focus in consultations with faculty and with SSHA advising staff.

All courses must be taken for a letter grade. An exception can be made for one course with written permission from LIT faculty.

■ MINOR IN MANAGEMENT

The Management minor at UC Merced provides an opportunity for students who are majoring in another field, such as the sciences or engineering, to learn the fundamental analytical and quantitative tools necessary for management decision-making. Students receive training in economic theory, statistics, accounting, and fields including human resources, strategy, finance, and organizational theory.

Since we're a fairly small campus, connecting with the students here on campus is easy and has probably been one of the most life changing experiences.

—Kristin Tran, Fremont, Management Major

Minimum Requirements:

MGMT 25 (Introduction to Accounting)

ECON 10 (Statistical Inference)

A minimum of four upper division Management courses.

■ MINOR IN PHILOSOPHY

The minor in Philosophy provides students with an understanding of the principles, methods and areas of application of contemporary philosophy. Philosophers study conceptual questions within and between the humanities, arts and sciences: What is art? What is justice? What is the relation between mind and brain? Philosophy at UC Merced focuses on both applied and interdisciplinary philosophy, and students able to use their training in philosophy to complement their other coursework and identify connections between their various areas of study.

Minimum Requirements

PHIL 1 (Introduction to Philosophy)

PHIL 5 (Logic and Critical Reasoning)

A minimum of four additional upper-division PHIL courses.*

*Pre-approved courses from other areas may be substituted. (LIT 100 has been identified as a pre-approved course). Pre-approval should be sought from Philosophy faculty.

■ MINOR IN POLITICAL SCIENCE

The Political Science minor offers broad coverage of the study of politics. Political science is the social scientific study of political processes involving political institutions and political behavior. The study of political institutions includes topics such as the effect of the design of electoral systems on the quality of representation in government, the formal and informal elements of the legislative process and their implications for the making of law, and the impact of domestic political institutions on the incidence of international conflict. Under the rubric of political behavior, political scientists study how and why people choose to participate in politics, the determinants of vote choice, and the nature and origins of public opinion. Students studying political science at UC Merced develop a strong substantive understanding of both political institutions and behavior. Students also learn the theories that help us better understand the political world and the methods by which these theories are tested and refined.

Minimum Requirements

One of the following courses:

- POLI 1 (Introduction to American Politics), and
- POLI 3 (Introduction to Comparative) or
- POLI 5 (Introduction to International Relations)

A minimum of four upper-division POLI courses.

■ MINOR IN PSYCHOLOGY

Psychology is a social science that helps students better understand and interpret scientific information and ways to apply quantitative tools such as statistics. Psychology is often of inherent interest to students. Taking a psychology minor provides an interesting exposure to novel and exciting ideas that students would not otherwise encounter and can be of great use to students who are majoring in other fields. For example, students taking a pre-med curriculum find a psychology minor useful for understanding the social and psychological aspects of medical care or as preparation for a career in psychiatry. Students in management and economics find coursework in social psychology, decision-making and organizational and industrial psychology to be of particular use to their careers.

Minimum Requirements

PSY 1 (Introduction to Psychology)

PSY 10 (Analysis of Psychological Data)

A minimum of four upper-division PSY area courses, at least one course each from Group A, Group B and Group C

Group A (Cognition, Brain and Behavior): Any PSY course in the 160s or 180s

Group B (Social-Personality, Development): Any PSY course in the 130s or 150s

Group C (Applied Psychology): Any PSY course in the 120s, 140s, or 170s.

(More course options may be added to this list over time. Please check with the SSHA Advising Office for updates).

■ MINOR IN SERVICES SCIENCE

The economies of most developed countries are dominated by services; even traditional manufacturing companies such as General Electric and IBM are adding high-value services to grow their businesses. Improving productivity in services often requires combining technical, social and business innovations. Effective combinations of these innovations often develop naturally together. Cross-disciplinary knowledge and skills relevant to services are becoming necessary for most college graduates. The minor in Services Science aims to provide these skills by drawing together cross-disciplinary courses to understand services from management, economics, engineering and/or cognitive science perspectives.

Minimum Requirements

MGMT 150 (Services Science and Management)

One upper-division MGMT-project course.

Three additional courses, one from each of the following areas (at least two must be upper-division):

- Cognitive Sciences
- Computer Sciences and Engineering
- Economics

■ MINOR IN SOCIOLOGY

The minor in Sociology gives students the ability to understand the complexities of today's society by examining human behavior and social actions. In examining how social structures (such as work, the family, religion, etc.) help shape social rules, processes, and agency, students gain a better understanding of the entirety of today's world—from poverty, to gender, to race, to organizational behavior,

to politics. In studying these issues, students learn to use analytical reasoning and apply sociological theories to explain a wide range of social phenomena. Students engage in the one semester Sociology minor capstone, which has them create a sociological question and examine the existing literature for explanations to the social phenomena in question.

Minimum Requirements

SOC 1 (Introduction to Sociology)
One additional lower-division Sociology course
Three upper-division Sociology courses
SOC 190 (Capstone Research Course)

■ MINOR IN SPANISH

To be able to communicate in a foreign language is a fundamental asset in any profession, from careers in education, translating and interpreting, to those in international studies, health, business or law. A minor in Spanish addresses the needs of students who seek the ability to communicate in more than one language in order to be competitive in their chosen profession. The study of Spanish language and culture is of special importance in the United States, the country with the second largest Spanish-speaking population in the world. The Spanish minor offers students the linguistic confidence needed for studying in another country and the benefits of being exposed to other cultures.

Minimum Requirements*

SPAN 103 (Spanish Composition and Conversation)
Four additional courses from the following list (at least three must be upper division):

- LIT 50 (Introduction to Hispanic Literature I)
- LIT 51 (Introduction to Hispanic Literature II)
- LIT 61 (Hispanic/Latino Children's Literature and Film)
- LIT 63 (Hispanic Film and Popular Culture)
- LIT 151 (Golden Age Spanish Literature)
- LIT 152 (The Transatlantic Baroque)
- LIT 153 (Spanish Literature from the Generation of '98 to the Present)
- LIT 155 (Latin American Colonial Literature)
- LIT 156 (Latin America Literature Since the Independence)
- LIT 157 (Caribbean Literatures and Cultures)
- LIT 158 (Transatlantic Modernismo)
- LIT 159 (Diasporas and Exiles in the Hispanic World)
- LIT 169 (US Latino Literature)
- SPAN 105 (Hispanic Cultures I)
- SPAN 106 (Hispanic Cultures II)
- SPAN 110 (Spanish Linguistics)
- SPAN 141 (Spanish for Health Professionals)
- SPAN 142 (Spanish for Business and Management)
- SPAN 180 (Topics on Hispanic Languages and Cultures)

(More course options may be added to this list over time. Please check with the SSHA Advising Office for updates).

* Substitutions and waivers are subject to approval by the Spanish language coordinator.

■ MINOR IN WRITING

The Writing minor provides students with extensive opportunities for creative and professional development within and across the disciplines as well as preparation in academic discourse. Each course emphasizes writing as a process and iterates the importance of gaining sophistication in criticism and analysis. In Writing minor courses, students demonstrate responsibility for the production of written work through engagement with professional values and recognition of intellectual property conventions. This sense of responsibility enriches students' writing and enhances the work they produce in other courses. By engaging in a continuous process of writing, students discover the potency of their ideas and learn that writing is influential, whether in the pursuit of research, through the creation of policy or by the nuances of creative writing.

Minimum Requirements*

One lower-division course from the following list:

- WRI 25 (Introduction to Creative Writing)
- WRI 30 (Introduction to Professional Writing)

Four additional upper-division courses from the following list:

- WRI 100 (Advanced Writing)
- WRI 105 (Language and Style)
- WRI 110 (Tutor Training)
- WRI 115 (Science Writing)
- WRI 116 (Science Writing in Natural Sciences)
- WRI 117 (Writing for Social Sciences and Humanities)
- WRI 118 (Management Communication)
- WRI 119 (Writing for Engineering)
- WRI 125 (Topics in Creative Writing)
- WRI 130 (Topics in Professional Writing)
- WRI 131 (Journal Production)
- SPAN 103 (Spanish Composition and Conversation)

(With an instructor's permission, students may repeat WRI 125 and WRI 130 as their specific topics change).

* With the approval of the Director of Writing, one writing-intensive course may be substituted for any of the required minor program courses. The Director may also allow applying one lower division writing course completed elsewhere towards fulfillment of this minor program.

Graduate Studies

WELCOME FROM THE DEAN

Dear Students:

Graduate education is an experience in learning the process of discovery. Be it in the laboratory, the field, a museum or library, students will learn how to identify, investigate and analyze major problems of importance to society. As a natural laboratory for research of international significance, California's San Joaquin Valley is defined by the diversity of its people and the proximity of the Sierra Nevada mountains. These elements offer a critical venue for a broad palette of studies that span the gamut from the humanities and social sciences to the natural and engineering sciences.

The University of California, Merced is building a world-class faculty. These individuals provide abundant opportunities for graduate students to interact with a broad range of internationally acclaimed scientists and policy makers while also providing access to some of the world's most powerful research instrumentation.

I hope you will explore UC Merced for your graduate education. As the tenth and newest campus of the University of California, we offer our founding graduate students the matchless experience of being here at the beginning. You will have a profound impact on the campus spirit, culture and traditions that will become the hallmarks of the San Joaquin Valley's first UC campus.

Graduate education is about adventure and exploration; so too is the development of a new campus. The entrepreneurial spirit that drives the best graduate students is identical to that needed for the creation of a new campus. The faculty and the Graduate Division look forward to providing our students an educational experience that will be the stepping stone to a truly exceptional career.

Samuel J. Traina
Acting Dean, Graduate Division

SOLVING SOCIETY'S CHALLENGES

Society's most intractable problems are broad based and multifaceted. UC Merced is committed to offering graduate students an opportunity to work on many of society's most pressing and important problems. The research interests of our faculty reach across the spectrum of modern research and scholarship. Research interests among UC Merced's faculty include:

- History of the Cold War and nuclear armament
- Ethnic diversity and political participation
- Spatial language, metaphor and gesture
- Economics of women's employment and decisions regarding fertility and child care
- Experimental and quasi-experimental design, meta-analytic methods, program evaluation and effects of psychotherapy
- U.S. economic history and political economy
- Digital cultural atlases for history and heritage preservation
- Space, mapping and power in pre-industrial Eurasia
- Spanish language literature of the Americas and Spain
- Transport of organic and inorganic contaminants in natural systems
- Structural and functional characteristics of biomaterials
- Design of environmental sensors for contaminant transport
- Computational biology, genomics and proteomics
- Biology of stem cells
- Philosophical issues in neuroscience and cognitive science
- Nanotechnology and solar energy

Given UC Merced's plans for substantial growth during its early years, this list will expand rapidly. The current list of UC Merced faculty can be found online at www.ucmerced.edu/faculty/facultylist.asp.

While the scope of graduate education at UC Merced is national and international, the campus location also offers unique research avenues. From the cultural diversity of the San Joaquin Valley to the ecological diversity of the Sierra and the coastal mountains, the interior of California offers an abundance of unique living, learning and research opportunities. The interdependence of the Valley and the surrounding mountains provides a natural laboratory for creating environmental sustainability in the presence of an expanding and diverse population base.

Our programs are designed to prepare students for careers in academia, industry, government or private research organizations.

UC Merced offers individually tailored graduate programs in the following emphasis areas:

- Applied Mathematics
- Biological Engineering and Small-Scale Technologies
- Electrical Engineering and Computer Science
- Environmental Systems
- Mechanical Engineering and Applied Mechanics
- Physics and Chemistry
- Quantitative and Systems Biology
- Social and Cognitive Sciences
- World Cultures

Graduate students excel in a uniquely supportive setting where world-renowned professors and promising students strive together to research human nature, society and the natural world. The graduate group structure for overseeing each of these emphases is composed of faculty from multiple Schools. Each program is highly interdisciplinary in approach and intended to facilitate interactions between faculty and students from a broad scope of traditional academic disciplines. This is intended to offer graduate students the flexibility to address major societal problems using the tools of a wide variety of disciplines.

PREPARING FOR AN ADVANCED DEGREE

Admission to a graduate program at UC Merced requires a bachelor's degree, or its equivalent, that is comparable to a degree from the University of California both in the level of scholarly achievement and in the distribution of academic subject matter. Although applications for graduate study will be evaluated primarily on scholarly achievement, UC Merced will utilize the totality of a prospective student's qualifications, including research, work experience, recommendations and other creative accomplishments, to render a decision. To be eligible for admission to the UC Merced Graduate Division, you must have a minimum B average in your undergraduate coursework. In addition to your undergraduate transcripts and an application, applicants must submit Graduate Record Examination (GRE) scores, letters of recommendation and, for certain programs, examples of your own written work that can be evaluated by the graduate admissions committee.

APPLYING FOR ADMISSION

An applicant can be considered for only one emphasis area during a term. Applications to UC Merced can be accessed electronically at gradstudies.ucmerced.edu. Applications are accepted for the fall semester only. Prospective students are encouraged to begin the admissions process as early as possible in the prior academic year. International applicants should consult the UC Merced Graduate Division web site listed above for details regarding application and admission. Residents of the United States must have all application materials submitted to UC Merced by January 15. In order for an application to be fully considered, a non- refundable application fee of $60 must be paid. You may pay online with a credit card (minimal surcharge added): https://epay.ucmerced.edu/gradapp. Alternatively, checks should be made payable to UC Regents, accompanied by the Graduate Application Fee Form for Admission, and mailed to the Graduate Division Office. Fee exemptions for UC-approved programs are available. The Graduate Division site, gradstudies.ucmerced.edu provides further information about admission requirements, financial assistance, deadlines and important contacts.

International Students

Students with credentials from universities outside the United States should begin the application process well in advance of the deadline date. Official copies or certified copies of all transcripts in English and in the original language are required.

Applicants whose native language or language of instruction is not English must show evidence of having recently taken the Test of English as a Foreign Language (TOEFL) or the International English Language Testing Service (IELTS) examination. UC Merced requires a minimum score of 550 on the paper test or 213 on the computer-based TOEFL test or a score of at least 7 on the IELTS. Some programs require higher scores. Information on the TOEFL is available online at www.toefl.org and IELTS information at www.ielets.org. These requirements are waived for applicants who have received an advanced degree from a U.S. institution or from a country where English is the language of instruction. Please check our web site for the latest information on minimum score requirements for TOEFL-IBT (Internet-based test).

International applicants must certify that they have sufficient funds to cover fees, tuition and living expenses for the first year of their study at UC Merced. A Foreign Applicant Questionnaire for the purpose of verifying the amount and source of funds available for graduate study will be forwarded upon acceptance into graduate study. Financial verification must be provided before visa forms can be issued.

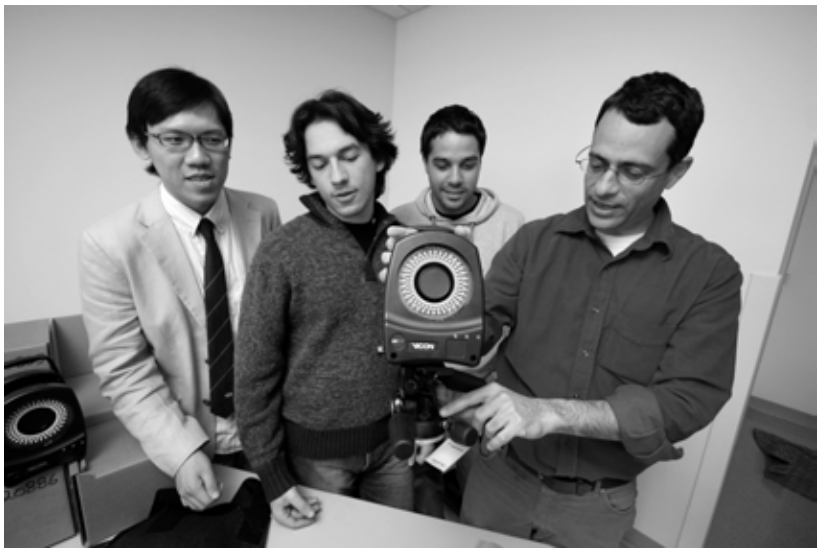
ADMISSIONS AND REGISTRATION

A formal notice from the dean of the Graduate Division is the official proof of admission to graduate study at UC Merced. Successful applicants will be notified as soon as possible after the program faculty has made its recommendations to the dean of the Graduate Division. Accepted students will be asked to verify their intention to register by filling out and returning a Statement of Intent to Register by April 15. Return of this form reserves your slot in the program. Should you choose not to accept the offer of admission, we ask that you also notify us by completing the Declination of Admission section so that we can offer the placement to another applicant.

Individuals must be enrolled in 12 units each semester to retain graduate student standing. Registration provides the necessary access to courses, facilities and faculty. Students holding nonimmigrant visas must register for each semester covered by their visa.

> The thing I enjoy most at UC Merced is working with students. Everyone here has the pioneering spirit which makes teaching classes fun and exciting.
>
> —Professor Arnold Kim, Mathematics

Programs Of Study



Professor Marcello Kallmann (right) and students with an infrared-emitting camera.

UC Merced offers the Master of Science (M.S.), Master of Arts (M.A.) and Doctor of Philosophy (Ph.D.) degrees. New students are assigned a faculty advisor and committee that assist them in developing a curriculum to meet the requirements. Although considerable flexibility to meet individual needs exists, requirements usually include a core of required material that a student must master.

The M.S. and M.A. degrees are either Plan I or Plan II programs. Plan I requires a minimum of 20 semester units of upper division and graduate courses plus completion of a thesis. Plan II requires at least 24 semester units of upper division and graduate courses, followed by a comprehensive examination administered by the faculty.

Students pursuing M.S. or M.A. Plan I degrees will begin their thesis research at the end of the first year. Although they may continue to take additional graduate seminars or independent study, the majority of the second year involves thesis research and writing. The thesis committee must approve the scope of the thesis and provide guidance during the process of developing the thesis. Approval of the thesis must be unanimous for the award of the master's degree.

The Ph.D. degree is designed to prepare students for creative activity and original research. A doctoral degree is awarded in recognition of a student's knowledge of a broad field of learning and for distinguished accomplishment in that field through an original contribution of significant knowledge. The dissertation must demonstrate a high level of critical ability, imagination and synthesis. In contrast to the master's degrees, there are no University unit requirements for the doctorate, although individual programs may set specific course requirements. However, students must complete at least four semesters of academic residence at UC Merced and successfully complete the course requirements before they are allowed to take the Qualifying Examination.

All students pursuing the Ph.D. degree must pass a Qualifying Examination before admission to candidacy. Students are expected to pass the Qualifying Examination before the beginning of their third year of graduate study unless they successfully petition the Graduate and Research Council to take it at a specified later date.

The intent of this examination is to ascertain the breadth of a student's comprehension of fundamental facts and principles that apply in the major field of study. It will also determine the student's ability to think critically about the theoretical and practical aspects of the field.

Students are advanced to candidacy when they fulfill the following requirements:

- Successfully completed the Qualifying Exam;
- Maintained a minimum grade point average of 3.0;
- Received incomplete grades in no more than two courses; and
- Fulfilled any language requirement associated with their program. Once a student is advanced to candidacy, it is imperative that he/she begin his/her dissertation studies promptly.

Graduate programs are built around an interdisciplinary, graduate group model that melds faculty expertise and scholarly approaches, transcending normal disciplinary boundaries. We offer the following nine graduate studies emphases:

■ APPLIED MATHEMATICS (AM)

http://appliedmath.ucmerced.edu/
Contact: Michael Sprague, Assistant Professor of Natural Sciences
msprague@ucmerced.edu

Applied Mathematics involves the use of analytical and computational mathematics to solve real-world problems. Its core is based on modeling, analysis and scientific computing. The Applied Mathematics graduate emphasis offers opportunities for students interested in multidisciplinary mathematics projects at the interface with life sciences, physical sciences, engineering and social sciences. Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) degrees are offered. The coursework provides training in the fundamental tools of applied mathematics, including ordinary and partial differential equations, asymptotic and perturbation methods, numerical analysis and scientific computing. An explicit goal of applied mathematical sciences is to contribute significantly to another discipline. Hence, the objective of applied mathematics is to foster multidisciplinary research and education.

During a student's first year, he or she will take Applied Mathematics Core courses, take the preliminary exams in the spring semester, and become familiar with the various active research areas in the group. In the second year, a student will complete the Core courses, take Special Topics courses, and begin working on a M.S. or Ph.D. research project. M.S. students typically complete their degrees in two years. Ph.D. students take their qualifying exam in the second or third year of studies, and are expected to complete their degrees in four to six years total.

M.S. and Ph.D. graduates in Applied Mathematics will find a wide variety of careers and ongoing study opportunities. Employers value the analytical and computational skills acquired through the training provided in Applied Mathematics. Potential employers include government and industrial research labs in a broad array

of fields including engineering, energy, telecommunications, transportation and pharmaceutical sciences, as well as consulting firms, financial institutions, schools, etc. The unique combination of solid mathematical background, computational expertise and advanced knowledge of an application area places our graduates ahead of the curve on a job market that increasingly values interdisciplinary research. Graduates seeking a career in academia as post-doctoral researchers or college professors will be in a distinctly favorable position through their teaching and research training, and through the breadth of their mathematical, computational, and scientific qualifications.

All Applied Mathematics graduate students are required to pass preliminary exams offered in the first year of studies, and to complete the five core courses covering partial-differential equations, asymptotic and perturbation methods, numerical methods and scientific computing. Details regarding specific degree requirements may be found at http://appliedmath.ucmerced.edu/grad-requirements.html

PARTICIPATING FACULTY AND RESEARCH AREAS

François Blanchette, Assistant Professor of Natural Sciences: computational and theoretical multiphase fluid dynamics with applications to sedimenting systems and surface tension dominated flows

Boaz Ilan, Assistant Professor of Natural Sciences: nonlinear analysis applied to control of intense laser beams and high-precision measurements of frequency and time

Arnold D. Kim, Associate Professor of Natural Sciences, wave propagation in random media applied to biomedical optical imaging and wireless communications

Kevin Mitchell, Assistant Professor of Natural Sciences: dynamical systems applied to atomic, molecular and optical physics

Michael Sprague, Assistant Professor of Natural Sciences: computational mathematics of structural mechanics and fluid mechanics with applications in geophysical fluid dynamics.

Mayya Tokman, Assistant Professor of Natural Sciences: computational science, numerical analysis, mathematical modeling applied to plasma physics

AFFILIATE FACULTY

Alberto Cerpa, Assistant Professor of Engineering: computer networking and distributed systems areas

Raymond Chiao, Professor of Engineering and Natural Sciences: interface of quantum mechanics and general relativity, partial differential equations and differential geometry

Ajay Gopinathan, Assistant Professor of Natural Sciences: Analytical treatment and computational modeling of biomembrane dynamics, cell motility, cytoskeletal dynamics, polymer translocation, anomalous diffusion in polymer systems, chemotaxis

Thomas C. Harmon, Professor of Engineering: contaminant transport in aquatic systems, soil and groundwater remediation, development and use of environmental sensors

Marcello Kallman, Assistant Professor of Engineering: geometric modeling, computer graphics, computer animation, autonomous agents, robotics and artificial intelligence

Shawn Newsam, Assistant Professor of Engineering: image processing, computer vision, pattern recognition, machine learning, content-based information retrieval, digital libraries, data mining, and knowledge discovery in spatio-temporal, multimedia and scientific datasets

Katie L. Winder, Assistant Professor of Social Sciences, Humanities and Arts: labor economics, applied econometrics, economics of gender, poverty

Jeffrey Yoshimi, Assistant Professor of Social Sciences, Humanities and Arts: philosophy of mind, philosophy of cognitive science, phenomenology (especially Husserl) and neural networks

■ BIOLOGICAL ENGINEERING AND SMALL-SCALE TECHNOLOGIES (BEST)

https://best.ucmerced.edu/
Program Chair: Kara McCloskey, Assistant Professor of Engineering
kmccloskey@ucmerced.edu

The engineering sciences are undergoing a vast and fundamental metamorphosis from isolated disciplines to more integrative and multidisciplinary topics. The BEST Graduate Program offers graduate degrees (M.S. and Ph.D.) in synergistic areas of Biological Engineering and Materials Engineering with specializations in diverse tracks. Research projects are available on topics ranging from fundamental characterization of materials to tissue engineering, and coursework will provide a background in the tools of biologics and integration of modern materials.

Our faculty and staff take pride in combining exceptional teaching with state-of-the-art research to advance the education and research of this rapidly maturing discipline. Our researchers are actively participating both within and beyond the university community to apply biotechnology principles to the solutions of essential medical, technological, and societal challenges.

The Doctor of Philosophy degree is granted to students who demonstrate a thorough knowledge of a broad field of learning and have given evidence of distinguished accomplishment in that field. The degree also signifies that the recipient has critical ability and powers of imaginative synthesis as demonstrated by a doctoral dissertation containing an original contribution to knowledge in his or her chosen field of study. The doctoral student will complete a variety of coursework tailored to his specific area of study. Research and publication efforts will also be a primary focus of the individual doctoral training program. Funding is usually provided for doctoral students in the form of fellowships, training grants, teaching assistantships, or research assistantships.

BEST Research Themes Include:

Biological Materials/Tissue Engineering

The area of tissue engineering is, by nature, cross disciplinary in that it employs cell culture methods combined with identification and development of appropriate materials, scaffolding architecture, technologies for cell delivery and nutrient transport strategies while also synergizing with nanobioengineering and bio-inspired materials.

Christopher Viney, Professor of Engineering

Jennifer Lu, Assistant Professor of Engineering

Kara McCloskey, Assistant Professor of Engineering

Valerie Leppert, Associate Professor of Engineering

Wei-Chun Chin, Assistant Professor of Natural Sciences

Biological Modeling and Control

Biological Modeling and Control is an interdisciplinary research area combining the fields of engineering, cell biology, and chemistry. Examples include the design of components for biomedical devices

and tissue engineering and chemical optimization of molecules with biological properties.

David Ojcius, Professor of Natural Sciences

Matthew Meyer, Assistant Professor of Natural Sciences

Kara McCloskey, Assistant Professor of Engineering

Carlos Coimbra, Associate Professor of Engineering

Ajay Gopinathan, Assistant Professor of Natural Sciences

Biosensor Design and Fabrication

Sensors and "bots" that can replace defective physiological counterparts in humans and animals; implants and prosthetics constructed from nanocomposites that closely resemble natural tissue; and biosensors, which can be designed to nanodimensions, mounted on a single chip and used in remote diagnoses.

Michelle Khine, Assistant Professor of Natural Sciences

Wei-Chun Chin, Assistant Professor of Natural Sciences

Jay Sharping, Assistant Professor of Natural Sciences

Jennifer Lu, Assistant Professor of Engineering

Valerie Leppert. Associate Professor of Engineering

Jian-Qiao Sun, Professor of Engineering

Steve Kang, Chancellor and Professor of Engineering

Tao Ye, Assistant Professor of Natural Sciences

Micro/Nano Fabrication

Microfabrication for development of micro-array platforms for cell signaling and analysis is a cutting edge area of research for single cell analyses. Convergence between engineering and biology are also at the nanoscale level – the level of biological molecules, molecular aggregates and cellular processes – has begun to offer new, rich areas of study and commercialization. Examples of the devices, processes, interactions and materials that are of interest include self-assembly of materials, structures and devices, interactions between nanoparticles and biological tissue.

David Ojcius, Professor of Natural Sciences

Michelle Khine, Assistant Professor of Natural Sciences

Valerie Leppert, Associate Professor of Engineering

Jennifer Lu. Assistant Professor of Engineering

Tao Ye, Assistant Professor of Natural Sciences

Sayantani Ghosh, Assistant Professor of Natural Sciences

■ ELECTRICAL ENGINEERING AND COMPUTER SCIENCE (EECS)

http://eecs.ucmerced.edu/

Graduate studies in Electrical Engineering and Computer Science offers individualized, strongly research-oriented courses of study leading to the M.S. and Ph.D. degrees. The EECS graduate group is organized to allow students to pursue cutting edge research in modern fields of electrical engineering and computer science, emphasizing research and preparing students for leadership positions in industrial labs, government, or academia.

The EECS graduate group is highly cross-disciplinary with connections to faculty from all three Schools at UC Merced. In particular, strong collaborations with the graduate programs in environmental engineering and cognitive sciences are possible. Research projects with applications across the full spectrum of science and engineering are encouraged. Opportunities for collaborative projects with scientists at the Lawrence Livermore National Laboratory and with the Center for Information Technology Research in the Interest of Society (CITRIS) are available, particularly with respect to the use of specialized computational equipment.

Prospective applicants must hold a B.S. degree in one of the accredited engineering curricula or who have satisfied the equivalent of a B.S. degree as determined by the university. The principal requirements for the Ph.D. are (1) coursework, (2) preliminary examination, (3) the qualifying exam, and (4) the dissertation. There is no foreign language requirement. The expected time of completion for the Ph.D. is five years. To apply for the graduate studies in EECS, applicants must follow the application procedure of the UC Merced Graduate Division.

PARTICIPATING FACULTY AND RESEARCH AREAS

Stefano Carpin, Assistant Professor of Engineering: robotics, artificial intelligence; Robotics Lab (https://robotics.ucmerced.edu/robotics)

Miguel Carreira-Perpinan, Assistant Professor of Engineering: machine learning with applications to computer vision and speech; computational neuroscience

Alberto Cerpa, Assistant Professor of Engineering: embedded networked systems of sensors, computer networks, distributed systems, operating systems

Marcelo Kallmann, Assistant Professor of Engineering: computer graphics, animation, robotics; Computer Graphics Lab (http://graphics.ucmerced.edu/)

Steve Kang, Chancellor and Professor of Engineering: semiconductor devices and circuits, high-speed optoelectronic circuits and optical network systems, and nanoelectronics

Shawn Newsam, Assistant Professor of Engineering: image processing, computer vision, pattern recognition, content-based image retrieval, geoinformatics, data mining

David Noelle, Assistant Professor of Engineering and Social Sciences, Humanities and Arts: computational cognitive neuroscience, artificial neural networks, machine learning, artificial intelligence

Songhwai Oh, Assistant Professor of Engineering: intelligent systems, wireless sensor networks, robotics; Intelligent Systems Laboratory (http://isl.ucmerced.edu/)

■ ENVIRONMENTAL SYSTEMS (ES)

The Environmental Systems graduate group engages in individualized, research-based courses of study leading to the M.S. and Ph.D. This program strives to equip students with the knowledge and skills to improve the scientific understanding of Earth as an integrated system of atmosphere, hydrosphere, lithosphere and biosphere. Courses are designed to provide the scientific principles underlying the function and sustainability of natural and engineered ecosystems, and the policies affecting them. Participating faculty are affiliated with the Schools of Engineering, Natural Sciences, and Social Sciences, Humanities and Arts.

UC Merced's unique geographical location, its relationship with neighboring institutions and its seamless integration of science and engineering render the ES program distinct from similar programs in California and elsewhere. In particular, a substantial part of UC Merced's initial development as a research institution has been the

structuring of meaningful relationships with the National Park Service and the Lawrence Livermore National Laboratory, with a particular emphasis on joining scientific inquiry with engineering analysis.

The ES faculty research strengths include Earth systems science, ecology and evolutionary biology, spatial analysis, environmental engineering, air quality, geochemistry, solar energy, climatology, hydrology, policy, and economics.

PARTICIPATING FACULTY:

Andres Aguilar, Assistant Professor of Natural Sciences

Roger Bales, Professor of Engineering

Martha Conklin, Professor of Engineering

Yihsu Chen, Assistant Professor of Engineering and Social Sciences, Humanities and Arts

Wei-Chun Chin, Assistant Professor of Engineering

Carlos Coimbra, Associate Professor of Engineering

Michael Dawson, Assistant Professor of Natural Sciences

Benoit Dayrat, Assistant Professor of Natural Sciences

Gerardo Diaz, Assistant Professor of Engineering

Phillip Duffy (LLNL), Adjunct Professor of Natural Sciences

Qinghua Guo, Assistant Professor of Engineering

Thomas Harmon, Professor of Engineering and Chair of the Environmental Systems Graduate Program

Lara Kueppers , Assistant Professor of Natural Sciences

Valerie Leppert, Associate Professor of Engineering

Monica Medina, Assistant Professor of Natural Sciences

Peggy O'Day, Professor of Natural Sciences

Niguel Quinn, Adjunct Research Engineer, School of Engineering

Samuel Traina, Professor of Natural Sciences and Engineering; Acting Vice Chancellor for Research and Dean, Graduate Division

Anthony Westerling, Assistant Professor of Engineering and Social Sciences, Humanities and Arts

Roland Winston, Professor of Natural Sciences and Engineering

Jeff Wright, Professor and Dean of Engineering

■ MECHANICAL ENGINEERING AND APPLIED MECHANICS (MEAM)

http://meam.ucmerced.edu/
Program Chair: Carlos F. M. Coimbra, ccoimbra@ucmerced.edu
Admissions Chair: Jian Q. Sun, jsun3@ucmerced.edu

The Mechanical Engineering and Applied Mechanics (MEAM) graduate emphasis engages in individualized, research-based programs of study leading to the M.S. and Ph.D. degrees. The MEAM faculty members strive to provide students with a comprehensive research experience based on the latest developments of the analytical, numerical and experimental tools available in the field. Mechanical Engineering and Applied Mechanics includes a broad spectrum of research activities that are based on well-defined scientific principles. Judicious application of the fundamentals principles of Mechanics allows specialized Mechanical Engineers and Applied Mechanicists to impact virtually all fields of science and technology. The goal of the MEAM emphasis at UC Merced is to provide its graduate students with a very solid foundation in Mechanical Sciences and a strong and comprehensive exposure to modern research techniques.

Courses are designed to provide the mathematical and scientific principles underlying the foundations of Applied Mechanics, with emphasis on applications and novel research developments in diverse topics such as Advanced Dynamics, Modern Control Systems, Continuum Mechanics, Viscous Flows, Rheology, Convective Mass Transfer, etc. The MEAM graduate program provides a seamless transition for undergraduate students interested in pursuing graduate studies in the area.

The current MEAM faculty research strengths include:

- Continuum Mechanics
- Thermodynamics (Optimal Design, Low-Entropy Generating Systems)
- Heat Transfer (Multiphase Flow, Evolutionary Design of Thermal Systems)
- Fluid Mechanics (CFD, Sedimentation, Unsteady Viscous Flows)
- Solid Mechanics and Mechanical Design (Motion Planning, Geometric Modeling)
- Robotics, Mechanisms and Artificial Intelligence
- Hydroelasticity and Aeroelasticity
- Rheology
- Vibrations and Control
- Solar Energy and Particle Physics

PARTICIPATING FACULTY:

Francois Blanchette, Assistant Professor of Natural Sciences

Stefano Carpin, Assistant Professor of Engineering

Carlos Coimbra, Associate Professor of Engineering, Chair

Gerardo Diaz, Assistant Professor of Engineering

Marcelo Kallman, Assistant Professor of Engineering

Michael Sprague, Assistant Professor of Natural Sciences

Jian Qiao Sun, Professor of Engineering

Roland Winston, Professor of Engineering and Natural Sciences

■ PHYSICS AND CHEMISTRY

http://physics-chemistry.ucmerced.edu/
Contact: Professor Anne Myers Kelley
amkelley@ucmerced.edu

Research in the Physics and Chemistry graduate emphasis area spans the traditional disciplines of chemistry and physics and related interdisciplinary fields. Graduate education within the group is currently divided into three tracks—Physics, Physical Chemistry, and Organic Chemistry—which have different preliminary exams and course work. Thus, students are educated and must demonstrate proficiency in a particular discipline, but have the opportunity to pursue research that is highly interdisciplinary if they so desire. This approach provides our students with both the rigorous training and

the broad perspectives needed to address present-day scientific and technological challenges, most of which are not confined to single disciplines. Most students are admitted to the Physics and Chemistry program to work toward a Ph.D. degree, but applications from students whose goal is a terminal M.S. degree will also be considered.

The deadline for receipt of applications is January 15. Late applications are considered as space permits. Normally applications are accepted for Fall semester only. The minimum requirement admission to the Physics and Chemistry program is a bachelor's degree in physics, chemistry, or a related field of science or engineering with a grade point average of at least 3.0. The GRE general test is required and the subject test in physics, chemistry, or mathematics is recommended. Admission decisions are based on undergraduate grades, performance on the GRE, accomplishments in undergraduate research, and letters of recommendation. Students from non-English speaking countries must take the TOEFL exam and are normally interviewed by telephone in order to evaluate English proficiency.

During the first year in residence, students typically take courses and serve as TAs for undergraduate science courses. The heart of the Physics and Chemistry Ph.D. program is the completion of a piece of original scientific research leading to the preparation and defense of a Ph.D. thesis. Students are encouraged to discuss research interests and possible Ph.D. projects with all of the faculty in the group as early as possible, and select a faculty research advisor (major professor) early during the second semester of study. Research normally occupies a majority of the student's time after the first year of residence.

The Physics and Chemistry group has established the following requirements for the Ph.D. degree:

- Complete at least four semesters of full-time academic residence (12 units minimum) at UC Merced.
- Complete the required courses for one of the three emphasis tracks (physics, physical chemistry, or organic chemistry), with a letter grade of at least "B" in each course ("S" in seminar courses graded S/U).
- Serve as a teaching assistant for at least one semester.
- Pass a preliminary examination testing undergraduate-level knowledge of physics, physical chemistry, or organic chemistry.
- Pass an oral Ph.D. qualifying examination, normally taken during the second year in residence.
- Present an open technical seminar at least once each calendar year in residence.
- Present and successfully defend a doctoral dissertation containing an original contribution to knowledge in the field.

PARTICIPATING FACULTY AND RESEARCH AREAS

Raymond Chiao, Professor of Engineering and Natural Sciences: Nonlinear and quantum optics, experiment and theory; detection of gravitational radiation

Sayantani Ghosh, Assistant Professor of Natural Sciences: Experimental condensed matter physics including magnetism, strongly correlated systems, spintronics and quantum information processing

Ajay Gopinathan, Assistant Professor of Natural Sciences: Theoretical biophysics and soft condensed matter physics

Anne Kelley, Professor of Natural Science:. Linear and nonlinear laser Raman scattering, experiment and theory; organic nonlinear optical materials; nanoplasmonics and surface enhanced spectroscopies

David Kelley, Professor of Natural Sciences: Ultrafast dynamics and spectroscopy of semiconductor nanoparticles and solar energy conversion.

Valerie Leppert, Associate Professor of Engineering: Electron microscopy of technological and environmental nanomaterials

Jennifer Lu, Assistant Professor of Engineering: Synthesis of novel functional nanomaterials employing self-assembled macromolecules as templates; applications in biosensing and renewable energy

Matthew Meyer, Assistant Professor of Natural Sciences: Mechanistic enzymology and applications to drug design. The study, development, and improvement of stereoselective organic reactions

Kevin Mitchell, Assistant Professor of Natural Sciences: Nonlinear dynamics and classical/quantum chaos, with applications to atomic and molecular physics.

Jay E. Sharping, Assistant Professor of Natural Sciences: Ultrafast laser technology and applications in physics, chemistry, and biology

Meng-Lin Tsao, Assistant Professor of Natural Sciences: Bioorganic chemistry, chemical biology, protein chemistry and vaccine technology

Christopher Viney, Professor of Engineering: Biomolecular materials; physical science and engineering of polymers and liquid crystals

Roland Winston, Professor of Engineering and Natural Sciences: Solar power and renewable energy; elementary particle physics; nonimaging optics

Tao Ye, Assistant Professor of Natural Sciences: Scanning probe microscopy study of interfaces; nanoscale machines on surfaces; single molecule analysis of biopolymers.

■ QUANTITATIVE AND SYSTEMS BIOLOGY (QSB)

qsb.ucmerced.edu
Contact: Associate Professor Andy LiWang
aliwang@ucmerced.edu

Advances in techniques and theory that bridge molecular and ecosystems scales, have greatly enabled the potential for integration across the life sciences. Biologists' ability to gather and process large amounts of quantitative data in field and laboratory settings, is advancing hand-in-hand with theory and modeling that better explain the diversity of life on Earth. The Quantitative and Systems Biology graduate emphasis at UC Merced provides individualized, research-based courses of study leading to M.S. and Ph.D. degrees. Research projects are available on diverse topics including: 1) biomolecular interactions, 2) genomics and proteomics, 3) cellular interactions and signal transduction, 4) organ systems and whole animals (both vertebrate and invertebrate), 5) comparative ecology, evolution, and organismal biology, and 6) computational biology. Because of the interdisciplinary nature of the program and faculty, research projects often span multiple topics to address more complex questions and linkages across levels of biological scale (e.g. molecules, cells, organisms, communities) typical of systems biology and quantitative biology (e.g. measuring individuals to describe populations). Course work in this graduate emphasis provides a background in the tools of modern biology, including computational biology, genomics and advanced instrumentation. The Quantitative and Systems Biology emphasis offers particular opportunities for students interested in multidisciplinary projects at the interface of biology, computer science and bioengineering. Career opportunities

for graduates include exciting research positions in government and industry, as well as academic positions at colleges and universities.

The minimum requirement for graduate admission to UCM is a bachelor's degree with an undergraduate grade point average no lower than 3.0 on a 4.0 scale. This minimum will be waived only under circumstances where the applicant has demonstrated strong academic skills subsequent to their undergraduate studies. Performance on the GRE, accomplishments in undergraduate research, and letters of recommendation are also important determinants of an applicant's potential for success in graduate education and will be evaluated by the admissions committee. Foreign students from non-English speaking countries are required to attain a minimum score of 580 on the TOEFL exam (paper version) or 230 (computer-based version), as well as a score of at least 45 on the TSE. Each academically qualified student will also have a telephone or in-person interview with one or more QSB faculty members. Finally, the match of the candidate's skills and interests to QSB research programs will be considered. For this reason applicants are encouraged to contact QSB faculty before applying.

Graduate students in the Ph.D. program typically spend the first year taking courses, fulfilling their teaching requirement, and working on their graduate research project. The subsequent years will be primarily devoted to the student's graduate research project. Typically, a graduate student spends five years to complete their research project. Students are supported by Teaching Assistantships during the first year, and by Graduate Student Research Positions in subsequent years.

The Quantitative and Systems Biology graduate group has established the following requirements for the Ph.D. degree. Students must:

- Complete at least four semesters of full-time academic residence (12 units minimum) at UC Merced
- Earn a passing grade in at least four graduate courses of at least three units (exclusive of research)
- Complete all graduate courses with a letter grade of at least "B"
- Serve as a Graduate Student Instructor (GSI) for at least one semester
- Pass a qualifying oral exam
- Present an open technical seminar at least twice while in residence
- Publish at least one scientific paper in the peer-reviewed literature
- Present and successfully defend a doctoral dissertation containing an original contribution to knowledge in the field

PARTICIPATING FACULTY AND RESEARCH AREAS

Andres Aguilar, Assistant Professor of Natural Sciences: Population genetics and molecular evolution

Keith Alley, Professor of Natural Sciences: Developmental neuroscience

David Ardell, Assistant Professor of Natural Sciences: Computational biology of gene expression systems

Miriam Barlow, Assistant Professor of Natural Sciences: Evolution of bacteria

Wei-Chei Chun, Assistant Professor of Engineering: Applying engineering principles to biological systems

Jinah Choi, Assistant Professor of Natural Sciences: Molecular biology of hepatitis C virus

Michael Cleary, Assistant Professor of Natural Sciences: Determinants of stem cell fate

Michael Colvin, Professor of Natural Sciences: Biomolecular simulations

Michael Dawson, Assistant Professor of Natural Sciences: Ecology and evolution, marine biodiversity and biogeography

Benoit Dayrat, Assistant Professor of Natural Sciences: Evolution of mollusks

Henry J. Forman, Professor of Natural Sciences: Biochemistry of reactive oxygen species

Crolin Frank, Assistant Professor of Natural Sciences: Microbial genome evolution

Marcos Garcia-Ojeda, Assistant Professor of Natural Sciences: Stem cell development

Ajay Gopinathan, Assistant Professor of Natural Sciences: Modeling of cell motility and biopolymers

Michelle Khine, Assistant Professor of Engineering: Engineering therapeutically useful cells

Valerie Leppert, Associate Professor of Engineering: Nanomaterials

Andy LiWang, Associate Professor of Natural Sciences: Nuclear magnetic resonance spectroscopy

Patricia LiPang, Professor of Natural Sciences: Chemokine structure and function

Jennifer Manilay, Assistant Professor of Natural Sciences: Mechanisms of lymphocyte development

Kara McCloskey, Assistant Professor of Engineering: Tissue engineering

Monica Medina, Assistant Professor of Natural Sciences: Evolution of marine invertebrate animals

Matthew Meyer, Assistant Professor of Natural Sciences: Kinetic isotope effects

David Ojcius, Professor of Natural Sciences: Intracellular pathogens of epithelial cells

Rudy Ortiz, Assistant Professor of Natural Sciences: Physiology & endocrinology of cardiovascular and renal function and disease, and nutrition

Maria Pallavicini, Professor and Dean of Natural Sciences: Stem cell behavior

Jason Raymond, Assistant Professor of Natural Sciences: Systems biology and the diversity of life

Meng-Lin Tsao, Assistant Professor of Natural Sciences: Organic synthesis, protein engineering, bioconjugation

Christopher Viney, Professor of Engineering: Biomolecular materials

Tao Ye, Assistant Professor of Natural Sciences: Single molecule analysis of biopolymers

■ SOCIAL AND COGNITIVE SCIENCES (SCS)

http://scsgrad.ucmerced.edu
Contact: Mitch Ylarregui, Graduate Program Coordinator
mylarregui@ucmerced.edu

The graduate emphasis in Social and Cognitive Sciences offers students individualized training and the opportunity to help build a unique, interdisciplinary research community. Graduate study is currently organized in five tracks: anthropology, cognitive science, economics, political science, and psychology. In addition, there are individual faculty members with interests in policy and sociology. There are future plans for additional areas, but applications are only considered in areas of current faculty research. Graduate study at UC Merced will involve working closely with one or more professors, so prospective applicants should carefully consult the faculty list for current research topics.

Anthropology

This track explores contemporary and historical cultures and societies by studying the practices and processes that entwine the individual in social structures, social relations, and power dynamics. Areas of focus include health and nutritional status, migration, demography, identity, culture and citizenship, and globalization, with attention to the Americas.

Faculty: DeLugan, Hull, Wedel.

Cognitive Science

This track provides interdisciplinary training in computational modeling, high-level cognition, including reasoning, categorization and decision-making, psycholinguistics, cognitive linguistics, visual perception, cognitive engineering, artificial intelligence, computer vision, philosophy of mind, and cognitive neuroscience.

Faculty: Dunham, Heit, Kallmann, Kello, Maglio, Matlock, Newsam, Noelle, Spivey, Yoshimi.

Economics

This track provides training in such applied microeconomic fields as labor economics, public economics, law and economics, industrial organization and political economy.

Faculty: Kantor, Neumann, Whalley, Winder.

Political Science

This track provides training in quantitative approaches to American Political Behavior and Institutions.

Faculty: Hansford, Monroe, Nicholson.

Psychology

This track provides training in developmental psychology, health psychology and quantitative psychology. Areas of particular strength include experimental design, meta-analysis, health in children, adolescents and young adults, development of social stereotypes and prejudices, and language and cognitive development.

Faculty: Chouinard, Dunham, Shadish, Vevea, Wallander.

PARTICIPATING FACULTY AND RESEARCH AREAS:

Yihsu Chen: Assistant Professor of Engineering and Social Sciences, Humanities and Arts: Energy and environmental modeling, statistics, operations research, decision analysis, policy and health effect analysis

Michelle Chouinard: Assistant Professor of Social Sciences, Humanities and Arts: Language acquisition, conceptual development, folk biology

Robin Maria DeLugan, Assistant Professor of Social Sciences, Humanities and Arts: Collective identity, the nation-state, social memory, hemispheric perspectives on the Americas, Indigenous peoples' issues

Yarrow Dunham: Assistant Professor of Social Sciences, Humanities and Arts: Social cognitive development, stereotyping and prejudice, linguistic influences on conceptual development

Tom Hansford, Associate Professor of Social Sciences, Humanities and Arts: Political institutions, judicial politics, campaigns and elections, statistical modeling

Kathleen Hull, Assistant Professor of Social Sciences, Humanities and Arts: Anthropological archaeology, colonialism, demographic anthropology, identity and ethnogenesis, Indigenous people

Evan Heit, Professor of Social Sciences, Humanities and Arts: Psychology and cognitive science, focusing on reasoning, memory, categorization, computational modeling

Marcelo Kallmann: Assistant Professor of Engineering: Computer animation, agents, robotics, artificial intelligence

Shawn Kantor, Professor of Social Sciences, Humanities and Arts: Political economy, law and economics, public economics

Christopher Kello, Associate Professor of Social Sciences, Humanities and Arts: Psycholinguistics, speech production, and word reading. Computational modeling using neural networks and dynamical systems.

Paul Maglio: Associate Adjunct Professor of Social Sciences, Humanities and Arts: Distributed cognition, Human-Computer Interaction, Service Science

Teenie Matlock, Assistant Professor of Social Sciences, Humanities and Arts: Psycholinguistics, cognitive linguistics, semantics, spatial cognition, metaphor, human-computer interaction

Nathan Monroe, Assistant Professor of Social Sciences, Humanities and Arts: American politics, political institutions, legislative politics, legislative elections, research design, positive political theory

Todd Neumann, Assistant Professor of Social Sciences, Humanities and Arts: Applied microeconomics, industrial organization, program evaluation, and economic history with a focus on the history of the American retail industry

Shawn Newsam, Assistant Professor of Engineering: Computer vision, pattern recognition, machine learning, data mining

Stephen Nicholson, Associate Professor of Social Sciences, Humanities and Arts: Political behavior, public opinion, voting and elections, political psychology, and direct democracy

David Noelle, Assistant Professor of Engineering and Social Sciences, Humanities and Arts: Computational cognitive neuroscience, concept formation, working memory, cognitive psychology, machine learning, artificial intelligence

William Shadish, Professor of Social Sciences, Humanities and Arts: Experimental and quasi-experimental design, meta-analysis, program evaluation, psychology of science

Michael Spivey, Professor of Social Sciences, Humanities and Arts: Psycholinguistics, visuolinguistic processing, visual memory and attention, studied via eye movements and artificial neural networks

Jack Vevea, Associate Professor of Social Sciences, Humanities and Arts: Quantitative Psychology, Meta-Analysis, Mathematical Models of Cognition

Jan Wallander, Professor of Social Sciences, Humanities and Arts: Health and developmental psychology, behavioral influences on health, quality of life, with a focus on children and adolescents

Vicki Wedel, Assistant Professor of Social Sciences, Humanities and Arts: Bioarchaeology, human skeletal analysis, and the biological effects of American emancipation

Simon Weffer-Elizondo, Assistant Professor of Social Sciences, Humanities and Arts: Social stratification, social movements, racial/ethnic relations, political sociology, immigration

Anthony Westerling, Assistant Professor of Engineering and Social Sciences, Humanities and Arts: Applied climatology; climate-wildfire interactions; statistical modeling for seasonal forecasts, paleofire reconstructions, and climate change impact assessments; resource management and policy

Alex Whalley, Assistant Professor of Social Sciences, Humanities and Arts: Economics of labor markets, impact of education and job training

Katie Winder, Assistant Professor of Social Sciences, Humanities and Arts: Labor economics, applied econometrics, economics of gender, poverty

Jeffrey Yoshimi, Assistant Professor of Social Sciences, Humanities and Arts: Philosophy of mind, philosophy of cognitive science, phenomenology (especially Husserl), and neural networks

■ WORLD CULTURES (WC)

http://wcgrad.ucmerced.edu
Contact: Mitch Ylarregui, Graduate Program Coordinator
mylarregui@ucmerced.edu

The graduate emphasis in World Cultures offers individualized, research-based courses of study that explore cultures in both their local manifestations—by focusing on the rich cultural and historical heritage of California, the San Joaquin Valley, and the Sierra Nevada—and in a global context. The program pays particular attention to world cultures in their historical, political, material, and literary manifestations, and to the effects of immigration and migration on society and cultural change. Students explore and apply the methods by which historians, literary scholars, anthropologists, artists, philosophers, scholars of cultural studies, and other humanists and social scientists examine societies and cultures. The emphasis offers concentrations in History, Literatures and Cultures of the Spanish-speaking World, Literatures and Cultures of the English-speaking World, and World Heritage.

Concentrations include multidisciplinary and interdisciplinary courses, and the concentrations are conceived as mutually complementary. Since proximity to the Sierra and the other splendid natural features of California has significantly influenced the cultural and historical development of the state, students will also benefit from the intersections of interests between the World Cultures Institute (WCI) and the Sierra Nevada Research Institute (SNRI), particularly with respect to cultural understanding of wilderness, landscape, and the environment.

PARTICIPATING FACULTY:

Virginia Adan-Lifante, Lecturer, Social Sciences, Humanities and Arts

Gregg Camfield, Professor of Social Sciences, Humanities and Arts

Robin Maria Delugan, Assistant Professor of Social Sciences, Humanities and Arts

Kevin Fellez, Assistant Professor of Social Sciences, Humanities and Arts

Maurizio Forte, Professor of Social Sciences, Humanities and Arts

Jan E. Goggans, Assistant Professor of Social Sciences, Humanities and Arts

Gregg Herken, Professor of Social Sciences, Humanities and Arts

Kathleen L. Hull, Assistant Professor of Social Sciences, Humanities and Arts

Ilgnacio Lopez-Calvo, Professor of Social Sciences, Humanities and Arts

Sean Malloy, Assistant Professor of Social Sciences, Humanities and Arts

Manuel M. Martin-Rodriquez of Professor, Social Sciences, Humanities and Arts

Ruth Mostern, Assistant Professor of Social Sciences, Humanities and Arts

Cristian Ricci, Assistant Professor of Social Sciences, Humanities and Arts

Vicki Wedel, Assistant Professor of Social Sciences, Humanities and Arts

Jeffrey Yoshimi, Assistant Professor of Social Sciences, Humanities and Arts

GRADUATE STUDENT RESEARCH POSITIONS AND TEACHING ASSISTANTSHIPS

For information on graduate student research positions or teaching assistantships, please see the Graduate Student Financial Support section of this catalog.

GOVERNANCE OF GRADUATE EDUCATION

Graduate study is administered by the Dean of the Graduate Division, and by the Graduate and Research Council, a committee of the Academic Senate. The Coordinating Committee on Graduate Affairs is a system-wide body that assures coordination between the campuses and develops general policies that govern graduate education throughout the University of California.

FINANCIAL SUPPORT

The Graduate Division and the Office of Financial Aid and Scholarships coordinates all forms of financial support and administers need-based financial aid programs for graduate students. We are here to help students understand the financial aid opportunities as well as the criteria utilized in determining eligibility for the various financial aid programs available at UC Merced.

Several forms of financial support will be available to facilitate the pursuit of a graduate education at UC Merced. Most forms of support are granted for merit, while others are granted for financial need or for a combination of merit and need. In large part, the Graduate Division provides financial support for graduate students, and we work closely with that office to coordinate all forms of student support.

TYPES OF AID

Financial support is available at UC Merced in the form of graduate student research positions, teaching assistantships, fellowships and loans. All students, regardless of income, are encouraged to apply.

Graduate Student Research (GSR) Positions

Research positions afford excellent opportunities to gain invaluable experience in areas of importance to your graduate education and to receive financial support at the same time. Information and application materials for GSR positions are available from the Graduate Division.

Teaching Assistantships (TA)

Graduate students working toward advanced degrees are given duties in undergraduate courses that may include conducting discussion or laboratory sections, grading students' work and providing students with individual help in the subject. Teaching assistants are chosen for excellent scholarship and promise as teachers. They serve apprenticeships under active tutelage and supervision of regular faculty members. Teaching assistants engage in learning how to teach and they work closely with faculty mentors. A limited number of teaching assistantships are available each year. On the recommendation of the academic deans, the Graduate Division makes appointments to teaching assistantships.

Fellowships

Fellowships are awarded primarily on the basis of scholarship and the promise of outstanding academic and professional achievement. Consideration is given to the extent and quality of previous undergraduate and graduate work, evidence of ability in research or other creative accomplishment, evidence of intellectual capacity and promise of productive scholarship.

Financial need or the availability of other sources of support in your graduate program is not relevant to the evaluation of academic merit, but may be an additional criterion for some fellowships. Students must establish eligibility for need-based fellowships by filing a Free Application for Federal Student Aid (FAFSA). For faster and more accurate filing, students can fill out the FAFSA online at www.fafsa.ed.gov.

Loans

Financial aid awards that require repayment, loans, offer the opportunity to defer the cost of your educational expenses by borrowing now and repaying later. Some loan programs are based on financial need, but there are loan programs available to all students regardless of income. Loan programs available through UC Merced are federally funded, providing long-term, low-interest loans.

Federal Subsidized Stafford Loans: These loans are awarded to students with financial need. This loan is "subsidized" in that the federal government pays the interest while the student is in school and during the grace period (first six months after leaving school or dropping to less than half-time enrollment status).

Federal Unsubsidized Stafford Loans: Not based on financial need, these loans are available to all eligible students, regardless of income. This loan is "unsubsidized" in that the student is responsible for paying all interest due. There is no federal interest subsidy for the loan. Interest accrues immediately upon disbursement. Borrowers may elect to pay accrued interest on a monthly or quarterly basis or have it added back to the principal balance in a process called capitalization.

HOW TO APPLY

Graduate applicants who are US citizens, permanent residents or immigrants are required to file a "Free Application for Federal Student Aid" (FAFSA). Although the FAFSA can be filed at any time, it is strongly suggested that you file by the priority processing date of March 2. However, if the March 2 deadline has passed, you may still submit this form. We process some forms of financial aid throughout the year. For faster and more accurate processing, you may fill out this form online at www.fafsa.ed.gov. This form is used to determine financial need only. Financial need is a component of the eligibility criteria for many forms of financial support. If you need assistance with your application, please contact the Office of Financial Aid and Scholarships.

To be considered for graduate student research or teaching assistant (TA) positions: Graduate students who are interested in obtaining a graduate student research position or a teaching assistant position must submit an application online. From the UC Merced home page, select job/opportunities and follow the links to academic student positions. TA positions are listed there.

FOR ADDITIONAL INFORMATION: Please refer to the Financing Your Education section on the web site at gradstudies.ucmerced.edu for additional information and assistance.

H. RAJENDER REDDY HEALTH CENTER

Student health and wellness services are provided at the H. Rajender Reddy Health Center on the 2nd floor of the Joseph Edward Gallo Recreation and Wellness Center. The H. Rajender Reddy Health Center provides quality health care and wellness education focused on the needs of graduate students.

All registered graduate students are eligible to use the services at the H. Rajender Reddy Health Center. These include injury and illness visits with medical providers, appointments with a health educator or nutritionist, laboratory testing, medications, immunizations and injections, optometry services and health and wellness education. Most of our core services are covered by registration and health fees and are provided at no additional cost, with the exception of labs, radiology, pharmaceuticals and some immunizations. Hours are posted on the health web site at health.ucmerced.edu.

Our mission is to assist you to achieve and maintain maximum wellness to allow you to pursue your academic and personal goals. The campus health center provides basic treatment and prevention services that enhance and maintain your physical, emotional and social well-being. These services are provided by board-certified physicians, certified nurse practitioners and health educators. Our staff and peer counselors also provide information on issues such as alcohol and drug abuse, safety, sexual health, stress management, nutrition and body image and smoking cessation. Through our programs and services, we encourage you to become active participants in your health and wellness.

Health Insurance Plan

All students attending a UC campus are required to have major medical health insurance as a nonacademic condition of enrollment. Graduate students are automatically enrolled in UC Merced's Graduate Student Health Insurance Plan (GSHIP) and billed through their student account. This comprehensive and affordable health insurance plan supplements the campus services available at the H. Rajender Reddy Health Center and provides extended medical care services, including emergency services, when you need them. Graduate students with a TA/GSR appointment greater than twenty-five percent (25%) may have their medical insurance cost paid by their UC Merced Department.

If you are covered by other health insurance, the GSHIP requirement may be waived if you can demonstrate, by the specified deadline, that your coverage is comparable to that available under the University's plan. If GSHIP is waived, you are still eligible to utilize the campus health center. For further information on insurance, including the Waiver Application, refer to the health services web page at health.ucmerced.edu or contact insurance@ucmerced.edu.

Research At UC Merced

Research is the pioneering work of the intellect, an adventure at the frontiers of knowledge in which faculty engage both their undergraduate and graduate students. It reflects mankind's indomitable spirit of optimism that we can and must do better. Every human pursuit benefits from the ongoing process of evaluation and discovery. As the first research university to be built in the 21st century, UC Merced is positioned for new approaches to research in support of the university's educational mission. As the tenth campus of the University of California, UC Merced joins in the University's unparalleled history of accomplishment. That history also sets the high standards that UC Merced must live up to.

As an undergraduate student at UC Merced, you will find faculty research enriching your education and your ability to analyze and critique information objectively. Exposure to research approaches will help you to begin to define solutions to the weighty problems with which humankind will wrestle during your lifetime. Your courses will be continually enriched and invigorated by faculty discoveries, which reflect an ever-evolving curriculum. You will also have formal opportunities to participate in ongoing faculty projects, joining graduate students and postdoctoral fellows in labs, field work and other research settings. These opportunities will extend your classroom experiences and highlight the process of discovery that is critical to each discipline.

As a graduate student you will plumb the depths of some of the world's most challenging problems through your research and scholarly work. Graduate students work with faculty as apprentice scholars, building the skills needed to create and communicate discoveries in their field. The distinguishing feature of UC Merced's graduate programs is their interdisciplinary nature, which provides a breadth of knowledge that helps put studies into a wider context. You will join a community of scholars and set your course for a career. Part of your research experience will include working closely with your faculty mentor and advisory committee as you build professional expertise and prepare for the future.

To foster discovery that brings faculty insights from many disciplines together, UC Merced is structuring many of its research and graduate educational activities around research institutes composed of faculty from multiple schools. The first four such organizations are described below.

■ The Sierra Nevada Research Institute (SNRI)

The mission of the Sierra Nevada Research Institute is to discover and disseminate new knowledge that contributes to sustaining natural resources and promoting social well being in the San Joaquin Valley and Sierra Nevada regions of California, and related regions worldwide, through integrated research in the natural, social and engineering sciences.

The mission of the Sierra Nevada Research Institute is accomplished through:

- Collaborative, multidisciplinary, fundamental research conducted by faculty, students, staff and affiliated scientists in natural sciences, engineering and social sciences.
- Strong interactions with related research units within the UC system and close collaborative relations with scientists and managers at national laboratories, and local, state and federal agencies, including the National Park Service.
- Connecting objective, science-based data and information with public and private stakeholders.

The Sierra Nevada Research Institute is organized around an Environmental Systems model. A particular emphasis is on the physical and biological connections that exist between the Central Valley and Sierra ecosystems. Through these balanced research efforts, the Sierra Nevada Research Institute serves as a source of objective scientific information for public policy makers as California faces the growing challenge of sustaining the integrity and quality of its resources into the future.

Through the Sierra Nevada Research Institute our students and faculty have access to a variety of biological field stations in Yosemite, Sequoia and Kings Canyon National Parks. In May 2004, Yosemite National Park and the Sierra Nevada Research Institute dedicated the first of these stations, located in Wawona. The Wawona station gives logistical support for academic field research and outreach activities in Yosemite National Park.

In addition, the Virginia Smith Trust Reserve adjacent to the UC Merced campus provides additional sites for research.

UC Merced faculty currently affiliated with the Sierra Nevada Research Institute are working on climate change and ecosystem health, contaminant transformations in soils and aquatic systems, development of environmental sensors, hydrologic processes in the Sierra Nevada, nutrient transport in agricultural and natural systems, water and air quality in the Valley basin and Sierra Nevada Range, and computational ecology and biodiversity.

■ World Cultures Institute (WCI)

The World Cultures Institute aims to support and sustain an environment for collaborative, innovative and interdisciplinary research about culture, benefiting the scholarly community at the University of California, Merced, as well as other academic establishments and the public at large.

■ Biomedical and Systems Biology Research Institute (BSBR)

Systems Biology brings a new multi-disciplinary approach to life sciences that uses advanced technology to elucidate the function of complex biological phenomena, then creates practical applications of this knowledge. Examples include developing better treatments for human disease and better strategies to understand health-environment interactions.

The Biomedical and Systems Biology Research Institute forms the academic foundation for health science programs. The goal of the Biomedical and Systems Biology Research Institute is to establish programs of excellence at UC Merced by highlighting UC Merced's interest and commitment to the new biology and facilitating intercampus interactions in a dynamic new field. The Institute also provides a collaborative forum for community partners interested in biomedical and health sciences.

The Institute addresses a critical need in the San Joaquin Valley: human health and well-being. San Joaquin Valley communities are medically underserved and have a higher incidence of health problems than do other regions of California. A central lesson in the history of health care is that improving the well-being of a community requires a systemic approach, including facilities, healthcare providers, outreach, and educational and research institutions.

The Biomedical and Systems Biology Research Institute is home to biologists, mathematicians, engineers, biophysicists, computer scientists, chemists and physicians who work at the interface of life sciences, engineering and computer science. Faculty, students and researchers from these disciplines will develop new technologies to identify and measure the fundamental molecular components of biological processes, elucidate the relations between these components and ultimately develop models to simulate the behavior of the system as a whole.

UC Merced has prepared me as a leader and scholar more than any other university could.

—Christian Ayeni, Dallas, TX, Bioengineering Major

■ Center For Nonimaging Optics

UC Merced's Center for Nonimaging Optics conducts research in areas of new and sustainable energy technologies. UC Merced faculty researchers are engaged in developing close linkages throughout the solar technologies community, and with nonimaging optics professionals to expand into other areas of renewable and sustainable energy futures.

Nonimaging optics has been successfully applied to the design of solar concentrators and shows great promise of revolutionizing solar energy technology used for commercial, industrial and domestic heating, cooling and lighting. A key dimension to this energy program will be the strong research and education integration between energy, and environmental and water resources engineering. The Center's goal is to produce societal-scale improvements in efficiencies in the management and stewardship of precious energy and water resources, through the design, development, implementation and testing of new and practical space heating, cooling and day lighting technologies. A major emphasis throughout this work will be to promote and develop strong international collaborations and entrepreneurial partnerships.

ANTHROPOLOGY

ANTH 001: Introduction to Sociocultural Anthropology [4]

Introduction to human culture and cultural diversity, including the methods by which anthropology—via the study of social institutions, shared practices, and collective meanings—seeks to understand how people adapt to, make sense of, and transform their worlds.

ANTH 003: Introduction to Anthropological Archaeology [4]

Survey of theory, field and analysis methods, and objectives of anthropological archaeology. Examines how intellectual perspectives guide the ways in which archaeologists undertake their work and the types of materials they collect and analyze to study issues such as technology, exchange, subsistence, settlement, social organization, and ideology.

ANTH 005: Introduction to Biological Anthropology [4]

Introduction to evolution and how natural selection has shaped modern human variation. Examination of non-human primate behavior and how analogous it might be to that of early humans. Discussion of culture, the fossil evidence, genetics, and inheritance.

ANTH 090X: Freshman Seminar [1]

Examination of a topic in anthropology.

May be repeated for credit.

ANTH 095: Lower Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

ANTH 098: Lower Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ANTH 099: Lower Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ANTH 100: History of Anthropological Thought and Practice [4]

Historical overview of key individuals and central ideas influencing the practice of anthropology and the production of anthropological knowledge. Topics may include the disciplining of anthropology into related subfields; social evolutionism, historical particularism, British structural-functionalism; French structuralism; cultural ecology; sociobiology; symbolic and interpretive anthropology; feminist and other critiques of anthropology.

Prerequisite: ANTH 001 and (ANTH 003 or ANTH 005) or consent of instructor.

UNDERGRADUATE COURSES

Lower Division Courses

Courses numbered 1–99 are designed primarily for freshmen and sophomores but are open to all students for lower division credit. (Graduate students petitioning to enroll in lower-division undergraduate courses will not receive unit credit nor will the course fulfill degree requirements.)

Upper Division Courses

Courses numbered 100–199 are open to all students who have met the necessary prerequisites as indicated in the catalog course description. Preparation should generally include completion of one lower division course in the given subject or completion of two years of college work.

GRADUATE COURSES

Courses numbered 200–299 are open to graduate students. (Undergraduate students must obtain the signature of the instructor, School Dean, and the Dean of Graduate Studies. Graduate level units will count towards the required 120 units for graduation; however students are urged to meet with their academic advisor in order to determine if graduate course units may be used to fulfill a graduation requirement.)

PREREQUISITES

Prerequisites for courses should be followed carefully; the responsibility for meeting these requirements rests on the student. If you can demonstrate that your preparation is equivalent to that specified by the prerequisites, the instructor may waive these requirements for you. The instructor also may request that a student who has not completed the prerequisites be dropped from the course. Note: For all courses a "C-" or better grade is required for a course to be used as a prerequisite for another course. If a course was taken for a "P/NP" grade then a "P" grade is required. If the prerequisite for a course is not satisfied, students must obtain the approval of the instructor (or school designee) of the course they wish to take.

COURSE SUBSTITUTIONS

Students may petition the appropriate dean to substitute a suitable course in place of a required course (for a general education course: petition the Dean of College One; for a major course: petition the dean of the School in which the major resides). Petition forms are available on the following web sites: Office of the Registrar, the Student Advising & Learning Center, College One and Schools.

GRADING OPTIONS

Unless otherwise stated in the course description, each course is letter graded with a P/NP or S/U option (unless required for your major or graduate program).

ANTH 110: Transnationalism [4]

Exploration of modern, global movements of people with a focus on the conditions, processes, and practices of contemporary national and transnational belonging. Topics include globalization, migration, immigration, Diaspora, the nation-state, national identities and cultural citizenship.

Prerequisite: ANTH 001 and junior standing, or consent of instructor.

ANTH 112: Political Anthropology [4]

Political anthropology involves the study of formal political institutions as well as the manifestations of power in everyday life. Topics may include anthropological perspectives on: the state and other forms of political authority; social inequality; conflict; indigenous responses to colonialism and the nation-state; social movements; citizenship; governmentality; and globalization.

Prerequisite: ANTH 001 and junior standing, or consent of instructor.

ANTH 114: Social Memory [4]

Introduction to the practices, spaces, artifacts and media through which social memory is formed, maintained and reproduced. Topics may include: how societies remember; how the past and its representation is bound up with national and other collective identities; commemoration; heritage; and the link between history, memory, and social justice.

Prerequisite: ANTH 001 and junior standing, or consent of instructor.

ANTH 116: Indigenous Activism in the Americas [4]

Focusing on the contemporary struggles of Indigenous peoples for rights; self-determination; social, political, and environmental justice and/or increased nation-state participation. Examines how the mobilization of indigenous peoples is strengthened through regional, hemispheric and global solidarities; and how international law, media, and technology support indigenous actions for change.

Prerequisite: ANTH 001 and junior standing, or consent of instructor.

ANTH 130: Material Culture [4]

Examines the role that material objects play in human social relations, identity, and economy, including archaeological application of such knowledge to past societies. We explore the range of production and use of material objects, including theories of material culture, technology, style, meaning, memory, and agency.

Prerequisite: ANTH 003 and junior standing. Permission of instructor required.

ANTH 134: Dynamics of Small-scale Societies [4]

Examines ethnographic and archaeological literature on small-scale hunter-gatherer-fisher and horticultural societies, and explores how these data contribute to study of subsistence and settlement strategies, technology, exchange, demography, and social relations in the past and present.

Prerequisite: ANTH 003 and junior standing, or consent of instructor.

ANTH 140: Cultural Heritage Policy and Practice [4]

Critical examination of the legal, practical, and ethical aspects of cultural heritage management in the United States and abroad. Topics include cultural resource management in public and private contexts, participation of stakeholders, the application of anthropological knowledge, and public outreach.

Prerequisite: Junior standing and (ANTH 003 or WH 001) or consent of instructor.

ANTH 142: Archaeology of Colonialism [4]

Examines theoretical perspectives, issues, and interpretations in archaeological study of the interaction between indigenous peoples, European colonists, and enslaved Africans. Topics include disease, power, resistance, colonial institutions, multi-ethnic communities, and gender relations in diverse native engagements with colonists and others from a variety of homelands.

Prerequisite: ANTH 003 and junior standing, or consent of instructor.

ANTH 146: Archaeology of Native California [4]

Research issues and regional interpretations in the archaeological study of California native cultures from earliest settlement to contact with Europeans.

Prerequisite: ANTH 003 and junior standing, or consent of instructor.

ANTH 150: Race and Human Variation [4]

Investigation of how human biological variation is studied and how the definition of such variation differs between the scientific community and the public. Topics include historical perspectives on race and eugenics, how scientific racism has shaped national policy, and how genetic diversity and the Human Genome Project have informed such issues.

Prerequisite: ANTH 005 and junior standing, or consent of instructor.

ANTH 151: Human Adaptability [4]

Examination of how humans live in marginal environments, such as extremely hot, extremely cold, or high altitude areas. Evolutionary, genetic ecological, demographic, and cultural explanations for human biological adaptability are explored. Students consider case studies from the high Andes, Siberia, equatorial South America, and the International Space Station.

Prerequisite: ANTH 005 and junior standing, or consent of instructor.

ANTH 152: Dying, Death, and Dead Persons [4]

Examination of the multiple cultural meanings of death and the dead person, including hospice, reactions to death, memorial gestures, rights to and constructions of the dead body in the U.S. legal system, cadavers in education and research, dead persons in mass disasters and human rights cases, archaeological examples, and repatriation issues.

Prerequisite: ANTH 005 and junior standing, or consent of instructor.

ANTH 155: Paleodemography [4]

Exploration of human population growth and decline, fertility and mortality, and population age and sex structure in the past without benefit of written records. Topics include the interplay of demography and hominid evolution, migration, environmental stress, the transition to agriculture, and the rise and fall of complex societies.

Prerequisite: ANTH 003, ANTH 005 and junior standing, or consent of instructor.

ANTH 170: Ethnographic Methods [4]

Examination of the critical use of historical documents, journals, and visual images; archives; oral history to understanding past cultures and culture change. Analysis of case studies and original archival research demonstrate how these sources complement data collected through ethnographic, archaeological, or biological methods.

Prerequisite: ANTH 001 and junior standing, or consent of instructor.

ANTH 172: Ethnohistory [4]

This course examines the critical use of historical documents, journals, and visual images; archives; and oral history to understanding past cultures and culture change. Analysis of case studies and original archival research demonstrate how these sources complement data collected through ethnographic, archaeological, or biological methods.

Prerequisite: Junior standing and (ANTH 001 or ANTH 003) or consent of instructor.

ANTH 174: Lithic Analysis [4]

Systematic consideration and practical application of analytical laboratory and data recording techniques used to study stone tools and manufacturing debris. Topics include procurement; production and reuse; style and function; the organization of technology with respect to settlement and gender; and craft specialization.

Prerequisite: ANTH 003 or consent of instructor.

ANTH 176: Archaeological Field Methods [4]

Introduction to the goals and methods of archaeological surface survey, excavation, and various forms of field documentation. The integration of research issues and methods is addressed through both classroom and field activities.

Prerequisite: ANTH 003 and junior standing, or consent of instructor.

ANTH 178: Human Osteology [4]

Students develop a basic familiarity with human skeletal remains, including the identification of the bones of the skull, dentition, and axial and appendicular skeletons. Identification of side (i.e., left, right) and element of both intact and fragmentary remains are be considered.

Prerequisite: ANTH 005 or consent of instructor.

ANTH 179: Bioarchaeology [4]

In-depth consideration of methods used to identify sex, age at death, stature, and ancestry from human skeletal remains. Anthropometrics, disease, trauma, and basic demographic techniques are also considered, preparing students for anthropological study of both individual remains and skeletal populations.

Prerequisite: ANTH 005 and ANTH 178, or consent of instructor.

ANTH 190: Topics in Anthropology [4]

Exploration of a special topic or problem within or between fields in anthropology. Topics vary and course may be repeated for credit if topics differ.

Prerequisite: ANTH 001 and junior standing. May be repeated for credit three times with different topics.

ANTH 195: Upper Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

ANTH 198: Upper Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ANTH 199: Upper Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ARTS

ARTS 001A: Learning to See: Beginner Drawing [4]

Develops cognitive skill of drawing by teaching the ability to see accurately. Material covered is not limited to skills required for becoming an artist. Anyone interested in sharpening one's perceptions and creative abilities finds this course useful.

ARTS 002A: Learning to Vocalize: Beginning Vocal Instruction [4]

Vocal instruction for students with a beginning level of music proficiency.

ARTS 002B: Introduction to Chorale [4]

Students form a choral group focusing in the study and performance of choral literature chosen from all major eras and genres. Emphasis on part-singing, intonation, ensemble blend, diction, and vocal development. Includes written assignments requiring research and analysis of the music, composers, style, and music fundamentals.

Prerequisite: ARTS 002A or consent of instructor.

ARTS 002C: Introduction to Vocal Jazz Repertoire [4]

The study and performance of Jazz vocal repertoire with continued instruction in correct singing techniques, posture and breathing, diction, and anatomy of the singing instrument. In addition to vocal instruction, includes written assignments requiring research and analysis of the music, composers, style, and music fundamentals.

Prerequisite: ARTS 002A or consent of instructor.

ARTS 002D: Introduction to Musical Theater Vocal [4]

The study and performance of Musical Theater/ Broadway repertoire. Instruction in correct singing techniques, posture and breathing, diction, correct use of the chest and "theater" voice. Special attention to character development and stage movement. Includes written assignments requiring research and analysis of music, composers, style, and music fundamentals.

Prerequisite: ARTS 002A or consent of instructor.

ARTS 003: Learning to See: Painting [4]

Development of cognitive skill of painting by teaching the ability to see accurately. Material covered is not limited to skills required for becoming an artist. Anyone interested in sharpening one's perceptions and creative capabilities finds this course useful. This studio class includes painting from nature.

ARTS 003B: Learning to See: Intermediate Painting [4]

Course teaches intermediate level techniques in acrylic, watercolor or oil painting, concentrating on enhancing the technique necessary to develop mastery of individual expression.

Prerequisite: ARTS 003.

ARTS 004A: Learning to See in Three Dimensions [4]

Development of cognitive skill of seeing in three dimensions. Material covered is not limited to skills required for becoming an artist. Anyone interested in sharpening his or her perceptions and creative capabilities finds this course useful.

ARTS 004B: Introduction to Sculpture [4]

Introduces students to the traditional additive and subtractive sculptural methods along with contemporary sculptural processes. Students are taught to explore conventional media, such as clay, soft stone, wood, wax, plaster and paper pulp as well as unconventional materials. Emphasis is placed on successful union of technique and personal expression.

ARTS 005A: Learning to Listen: Beginner Music [4]

Cognitive skill of listening to music to enhance perceptive powers. The use of this skill is not limited to those planning to be artists.

ARTS 007: ArtScore: Introduction to Global Arts Studies Program [4]

Survey of arts around the globe, with an integrated and comparative approach to studying the history and ideas of arts from antiquity to the twentieth century. This is the foundation course for all students pursuing an arts major.

Prerequisite: WRI 001 or passing score on the entry level analytical writing placement exam or equivalent. Letter grade only.

ARTS 008A: Learning to Perform: Beginner Acting [4]

Develops cognitive skill of physical and vocal performance by teaching the ability to act on stage. Material covered is not limited to skills required for becoming an artist. Anyone interested in sharpening one's abilities to perform finds this course useful.

ARTS 009: Introduction to Contemporary Practices in Photography [4]

Beginning level course stressing technical and critical photographic skills. The class aims to develop the student's capacity to produce well-wrought, effectively structured photographs utilizing in camera exposure, depth-of-field, and composition with either a digital or film camera.

ARTS 010: Substances of Arts [4]

Introduces students to substantive characteristics of the arts, with emphasis on cultural and social significance. Each student learns to develop his/her own understanding of what is art, what makes individual works of art significant and how art enriches human existence. Course work includes research, writing and art event attendance.

Prerequisite: WRI 001 or passing score on the entry level analytical writing placement exam or equivalent.

ARTS 011: Substances of Music [4]

Introduces students to substantive characteristics of the art of music, with emphasis on cultural and social significance. Each student learns to develop his/her own understanding of what the art of music entails, what makes individual works of music art significant and how music enriches human experience.

Prerequisite: WRI 001 or passing score on the entry level analytical writing placement exam or equivalent.

ARTS 012: Substances of Architecture [4]

Introduces students to substantive characteristics of architecture, with emphasis on cultural and social significance. Each student learns to develop his/her own understanding of what is architecture and why individual works of architecture become significant. Emphasizes the interrelatedness of architecture and socio-economic history.

ARTS 013: Substances of Visual Arts [4]

Introduces students to substantive characteristics of visual arts, with an emphasis on developing students' own critical skills in studying our contemporary and historical visual culture. Topics include artworks from the Renaissance to Neoclassicism to Pop, as well as issues in television, video, fashion, magazine, pop culture, computer art.

Prerequisite: WRI 001 or passing score on the entry level analytical writing placement exam or equivalent.

ARTS 070: Techniques of Contemporary Artists [4]

Students have opportunity to study with a contemporary artist. Open to any student interested in learning how acquisition of technique supports creative processes. Emphasis is put on process instead of result. Techniques taught vary depending on the instructor artist's medium of expression.

Permission of instructor required. May be repeated for credit.

ARTS 071: Techniques of Interdisciplinary Research in Arts [4]

Explores differences between research conducted by artists and by academics, and examines how artists process information, as well as how various forms of artistic expression influence content and meaning. The role of cliche and stereotypical representation in the creation of works of art is also explored.

May be repeated for credit.

ARTS 090X: Freshman Seminar [1]

Examination of a topic in the arts.

ARTS 095: Lower Division Undergraduate Research [1-6]

Supervised research.

Permission of instructor required. May be repeated for credit.

ARTS 098: Lower Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ARTS 099: Lower Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ARTS 100: History of World Art [4]

Introduces students to significant examples of world art through analysis of selected works from a number or different geographical regions of the world. Emphasis is placed upon the influence of religious, economic, political and aesthetic factors. Course work includes research and writing.

Prerequisite: ARTS 010.

ARTS 101: History of Clothing, Costume and Fashion: Euro-centric Pre-History to 1800 [4]

Survey of history of Euro-centric clothing, costumes and fashion from pre-history to 1800. Emphasizes the intrinsic connection between clothing and all aspects of human existence from politics, economics, sociology, cultural history, to climate, psychology and art. Each student is encouraged to pick research topics connected to his or her major.

ARTS 102: History of Clothing, Costume and Fashion: Euro-centric 1800 to 1980 [4]

Survey of history of Euro-centric clothing, costumes and fashion from 1800 to 1980. Emphasizes the intrinsic connection between clothing and all aspects of human existence from politics, economics, sociology, cultural history, to climate, psychology and art. Each student is encouraged to pick research topics connected to his or her major.

ARTS 103: History of Ethnic Costume [4]

Survey of ethnic costume across the globe. Covers indigenous clothing, emphasizing the intrinsic connection between clothing and cultural history. Each student is encouraged to pick research topics connected to his or her major.

Prerequisite: junior standing or consent of instructor.

ARTS 104: History of Costume Design [4]

Survey of history of costume design with emphasis on costumes for the stage. Examines the practice of costume design across world cultures as well as the relationship between costumes and prevailing cultural values. Course work concentrates on research but may include a creative component.

Prerequisite: junior standing or consent of instructor.

ARTS 115: Twentieth Century Drama: Theatre and Social Responsibility [4]

Examination of ways in which the works of selected 20th century playwrights contribute to awareness of social responsibility. Explores correlation between dramaturgy and political activism. Includes staged readings of plays, research and writing.

ARTS 120: Critical Popular Music Studies [4]

Major forms of American music of the twentieth century: classical music, opera, musical theatre, African American music, folk music and others are presented. Emphasizes connection between musical forms and cultural and social trends. Course work includes research, writing, and may include creative work.

Prerequisite: ARTS 011 and junior standing, or consent of instructor.

ARTS 121: Music of the Twentieth Century [3]

A critical investigation of various music trends in the 20th century with an emphasis on the musicians who have bridged or blurred the distinctions between art music and popular music.

Prerequisite: ARTS 007 and junior standing.

ARTS 125: African American Music of the 20th Century [4]

Focuses on a central question: how do we locate African American music, i.e., how can we define African American music? In attempting to answer this question, we think through concepts such as authenticity, representation, recognition, cultural ownership, appropriation, origin(s).

Prerequisite: Junior standing or consent of instructor.

ARTS 130: History of World Architecture [4]

Introduces students to significant examples of world architecture, concentrating on characteristics of structure, materials, and use. Course work includes research and writing.

Prerequisite: ARTS 012 and junior standing.

ARTS 141: History & Practice of Photography [4]

In this course students examine critical texts on the history and theory of photography, study the work of photographers from diverse backgrounds, and investigate cultural and socio-political issues in photographic practice and production. Students will also learn some basic techniques of taking photographs through various in-class exercises and assignments.

Prerequisite: Sophomore standing and any lower-division GASP or ARTS course. Letter grade only.

ARTS 170: Techniques of Contemporary Artists [4]

Students have opportunity to study with a contemporary artist. Open to any student interested in learning how acquisition of technique supports creative processes. Emphasis is put on process instead of result. Technique taught varies depending on instructor artist's medium of expression.

May be repeated for credit.

ARTS 171: Techniques of Interdisciplinary Research in Arts [4]

Explores differences between research conducted by artists and by academics. Examines how artists process information, as well as how various forms of artistic expression influence content and meaning. The role of cliche and stereotypical representation in the creation of works of art is also explored.

May be repeated for credit.

ARTS 195: Upper Division Undergraduate Research [1-6]

Group or individual research projects.

Permission of instructor required. May be repeated for credit.

ARTS 196: Individual Internship [2-4]

Internship in the arts management, production or preservation under the supervision of arts faculty. Requires minimum of 6 hours a week of in the field internship and 1 hour a week meeting with faculty supervisor. Students enrolled for more than 2 units are required to write an original research paper based on the internship. Internship may also be completed during the summer between junior and senior year at an arts production, management and preservation organization.

Prerequisite: Junior standing or consent of instructor. Letter grade only. May be repeated for credit.

ARTS 198: Upper Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ARTS 199: Upper Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

BIOLOGICAL ENGINEERING AND SMALL-SCALE TECHNOLOGIES

BEST 200: Special Topics in Bioengineering [3]

Special Topics in Bioengineering cover background principles of cutting-edge research directions in the field of Biological Engineering. Includes 3 hours of lecture and discussion per week and significant out-of-class reading and study. The course format also emphasizes student-led presentation, analysis and discussion of reading assignments from the current and recent scientific literature.

Prerequisite: (ICP 001A or MATH 021), (ICP 001B or PHYS 008) and BIO 100. Letter grade only.

BEST 201: Special Topics in Materials [3]

Special Topics in Materials covers background principles of cutting-edge research directions in the field of material science. Includes 3 hours of lecture and discussion per week and significant out-of-class reading and study. The course format also emphasizes student-led presentation, analysis and discussion of reading assignments from the current and recent scientific literature.

Prerequisite: ICP 001A, ICP 001B and BIO 100 or equivalent. Letter grade only.

BEST 214: Tissue Engineering [3]

Fundamental topics include: issues related to the cell source (including stem cells, plasticity, transdifferentiation, therapeutic cloning vs. reproductive cloning, bone marrow transplants, and cell differentiation and purification), cell culture and tissue organization, gene therapy delivery methods, cell adhesion and migration, issues in construct design, tissue preservation, and immunoisolation and/or modulation. We also cover current case studies and issues for FDA approval of tissue engineered products.

Letter grade only.

BEST 217: Lab on a Chip: Developing 3rd World Diagnostics for Global Health [3]

This is the first-ever four campus course between UC San Francisco, UC Berkeley, UC Santa Cruz, and UC Merced which aims to 1) raise awareness and knowledge about global health issues 2) teach students critical engineering skills such as nano/micro-fabrication 3) enable students to design, build, and test their own diagnostics and 4) develop entrepreneurial skills. Students learn about tuberculosis from leading experts at UCSF and then address the dearth of sensitive diagnostics by designing and testing their own nano/micro-systems. Taught at UC Merced with teleconferencing to the other campuses and two field trips.

Letter grade only.

BEST 291: Research Seminar [1]

Seminar series covering various topics in quantitative and systems biology, bioengineering, biomaterials and nanotechnology hosted by combined BEST and QSB Graduate Group.

May be repeated for credit.

BEST 292: Group Meeting [1]

Meetings to describe current research progress and future research plans lead by BEST faculty.

May be repeated for credit.

BEST 293: Journal Club [1]

Student-led presentation, analysis and discussion of reading assignments from the scientific literature.

May be repeated for credit.

BEST 294: Responsible Conduct in Research [1]

Seminar covering responsibilities and expectations for researchers as well as advice for success in graduate school and science careers, required for NIH-funded graduate students.

BEST 295: Graduate Research [1-12]

Supervised research with BEST faculty.

Permission of instructor required. May be repeated for credit.

BEST 299: Directed Independent Study [1-6]

Supervised course study with BEST faculty.

Permission of instructor required. Letter grade only. May be repeated for credit.

BIOLOGICAL SCIENCES

Course subject BIO replaced BIS beginning Spring 2009

BIO 001: Contemporary Biology [4]

Introduction to the major concepts in biology including origin of life, evolution, DNA, genes and genomes, principles and patterns of inheritance, genotype to phenotype, gene, environment and disease relationships, biotechnology, ecosystem structure and function, nutrient cycles and pollution, biodiversity, earth systems.

BIO 002: Introduction to Molecular Biology: Science and Applications in Biotechnology [4]

Introduction to the molecules and molecular processes underlying life. Overview of molecular biology, its applications in biotechnology, and impact on society, industry, modern medicine, and environment.

BIO 003: To Know Ourselves: Molecular Basis of Health and Disease [4]

Introduction to the molecular basis of a number of human diseases and molecular-based therapies for disease treatment.

BIO 005: Concepts and Issues in Biology Today [4]

Fundamental biological concepts in the areas of genetics, evolution and ecology are explored in the context of current issues enabling students to understand the relevance of biology to their lives both as individuals and as voting citizens.

Course cannot be taken after obtaining credit for BIO 001. Not recommended for BIO majors.

BIO 010: Genetics, Stem Cells and Development [4]

Issues associated with genes, stem cells and embryonic development increasingly impact our lives. Integrates an overview of biologic topics such as genetic testing, stem cells and the use of animal models with their bioethical considerations. It places science in the context of personal decisions and ethics.

BIO 034: Introduction to Marine Science [4]

An introduction to biological, chemical, and physical oceanography, marine geomorphology, and their synthesis in the study of marine life; also including relationships with atmospheric, freshwater, and terrestrial systems. Areas of emphasis include ecosystems (from the deep sea to saltwater ponds), the integrated coastal zone, resource management, and global change.

Letter grade only.

BIO 043: Biodiversity and Conservation [4]

Introduction to the study of biodiversity and conservation. Patterns, origin, and importance of biodiversity are discussed. An introduction to the major biological groups and the conservation efforts used to preserve contemporary biodiversity.

BIO 046: Age of Dinosaurs [4]

Dinosaurs are used to explore the development of science and fundamental concepts of geology, evolution, and biodiversity. Students are also introduced to basic anatomy and the underlying unity of animal form. Current controversies such as mass extinctions are explored, and students weigh evidence in coming to their own interpretations.

BIO 050: Human Development [4]

Male and female reproductive systems, hormonal control of egg-sperm interactions, fertilization, venereal disease, embryonic development, fetal physiology.

BIO 051: Cancer and Aging [4]

Introduction to the biology of cancer and aging, including discussions of the biological and molecular basis of aging and cancer, novel and conventional cancer treatments, cancer prevention, and prospects for new approaches to increase longevity and health.

BIO 060: Nutrition [4]

Introduction to nutrition science that integrates basic concepts of nutrients, human physiology, microbiology, biochemistry, and the psychology of wellness.

BIO 090X: Freshman Seminar [1]

Examination of a topic in the biological sciences.

May be repeated for credit.

BIO 095: Lower Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

BIO 098: Lower Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

BIO 099: Lower Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

BIO 100: Molecular Machinery of Life [4]

Introduction to the chemical processes underlying life, covering the structure and properties of biological macromolecules, metabolism, regulation, and energy transduction.

Prerequisite: BIO 001. Letter grade only.

BIO 101: Biochemistry I [4]

Advanced study of proteins, enzymes, enzyme kinetics, and carbohydrates metabolism in living organisms.

Prerequisite: CHEM 100. Letter grade only.

BIO 102: Advanced Biochemistry and Molecular Biology [4]

Mechanisms of amino acid, nucleic acid, and lipid metabolism plus advanced mechanisms of gene expression, signal transduction, and regulation of gene expression.

Prerequisite: BIO 101. Letter grade only.

BIO 104: Biophysics [4]

An introduction to the physical processes underlying biological phenomena. Topics to be covered include transport and diffusion, biochemical reaction kinetics and thermodynamics, molecular motors, cell motion, and cellular electrophysiology. BIO 104L must be taken concurrently.

Prerequisite: (BIO 100 or BIO 101) and (CHEM 010 or ENGR 130) or consent of instructor.

BIO 104L: Biophysics Laboratory [1]

Laboratory experiments demonstrating and reinforcing topics covered in BIO 104. BIO 104 must be taken concurrently.

Prerequisite: (BIO 100 or BIO 101) and (CHEM 010 or ENGR 130) or consent of instructor. Letter grade only.

BIO 105: Enzymology [4]

Advanced study of enzyme mechanisms and regulation. BIO 105L must be taken concurrently.

Prerequisite: BIO 100 and CHEM 010.

BIO 105L: Enzymology Laboratory [1]

Laboratory experiments demonstrating and reinforcing topics covered in BIO 105. BIO 105 must be taken concurrently.

Prerequisite: BIO 100 and CHEM 010

BIO 106: Introduction to Molecular and Cell Biology [4]

Advanced study of the mechanisms of nucleic acid replication, transcription and translation as well as gene regulation and expression.

Prerequisite: BIO 001. Letter grade only.

BIO 110: The Cell [4]

Introduction to the structure and function of bacterial, plant and animal cells, with an emphasis on universal cellular systems, including regulation of subcellular organization, control of cellular processes by internal and external signaling, energy capture, storage and usage, and cell cycle.

Prerequisite: BIO 100 or BIO 101. BIO 101 may be taken concurrently.

BIO 111: Cells, Tissues, and Organs [4]

Introduction to principles of cell structure and the organization of cells into tissues, organs, and organ systems. Both the cellular and extracellular components of the primary tissues and their compilation into the major organic systems are covered. Emphasis on understanding the link between cellular architectures and organ function.

Prerequisite: BIO 110.

BIO 120: General Microbiology [4]

Molecular basis for diversity in bacteria and archae. Students explore the significance of molecular diversity in microbial biology and gain an understanding of the genetic, physiologic, and structure-function relationships that underlie the remarkable ability of these organisms to adapt to the environment.

Prerequisite: BIO 110.

BIO 120L: General Microbiology Laboratory [2]

Laboratory experiments demonstrating and reinforcing topics covered in BIO 120.

Prerequisite: BIO 110 and BIO 120. BIO 120 may be taken concurrently.

BIO 122: Microbial Pathogenesis [4]

Genetic and biochemical features of infectious agents including identification and characterization of pathogens and the epidemiology of infectious diseases.

Prerequisite: BIO 120.

BIO 123: Human Parasitology [4]

Introduction to protozoan, worm, and insect parasitism in animals and humans and resultant diseases. Emphasis on epidemiology, diagnosis, and immunology of parasitic infections.

Prerequisite: BIO 120.

BIO 124: Microbial Evolution [4]

Evolution of microbes. Concepts covered include horizontal exchange, genome evolution, dispersal of microbes, population size, cryptic genes, mutagenesis and mutagenic pathways, phylogenetics, experimental evolution, metabolic evolution and antimicrobial resistance evolution.

Prerequisite: BIO 120 and BIO 144. BIO 144 may be taken concurrently. Letter grade only.

BIO 125: Emerging Public Health Threats [4]

Multidisciplinary study of the historical, sociological, medical, and biological issues underlying new public health threats and the scientific and policy-based approaches to responding to these new threats.

Prerequisite: BIO 120.

BIO 127: General Virology [4]

Introduction to biology of bacterial and animal viruses, focusing on structure, infective cycle, interactions with host, transmission, and methods of detection and control. Discusses scientific literature and current topics in virology.

Prerequisite: BIO 110. May be repeated for credit once.

BIO 130: Plant Biology [4]

An introduction to the biology of plant life, including plant cell physiology, plant growth and development, and plant evolution and adaptation.

Prerequisite: BIO 110.

BIO 134: Marine Sciences Theory and Practice [4]

Integrative studies of ocean and coastal ecosystems, including current issues. Also referencing relationships with atmospheric, freshwater, and terrestrial systems. Areas of emphasis include practical field study in the coastal zone in any area of marine science.

Prerequisite: Junior standing, BIO 034 and (BIO 141 or BIO 148). Letter grade only.

BIO 140: Genetics [4]

Includes concepts of inheritance, structure and function of genes and genomes, recombination, genetic mapping, gene regulation, mutations, and recombinant DNA technology including labs and discussions.

Prerequisite: BIO 001. Letter grade only.

BIO 141: Evolution [4]

Natural Selection and Darwinian evolution, includes concepts of population and quantitative genetics, speciation, neutral theory and molecular evolution, phylogenetics, comparative genomics, and macroevolution including labs and discussion.

Prerequisite: BIO 100. Letter grade only.

BIO 142: Genome Biology [5]

Introduction to the concepts behind genome biology and a detailed overview of the many tools used in comparative genomics. Specific topics include genome assembly, gene modeling and comparative genomics, transcriptomics, and proteomics of prokaryotic and eukaryotic organisms. Students carry out real scientific projects in collaboration with course faculty and produce new genomic data of publishable quality. Includes mandatory weekly three hour lab.

Prerequisite: BIO 110. Letter grade only.

BIO 143: Biodiversity and the Tree of Life [4]

Introduction to the biological diversity in the three domains of the Tree of Life (Archaebacteria,

Eubacteria, and Eukaryotes): overview of species diversity as well as diversity in the deep characteristics (e.g., reproduction, metabolism, structure) of plants, animals, fungi, and microbes. Illustrated by complementary field trips and labs (part of BIO 143F).

Prerequisite: BIO 001. Letter grade only.

BIO 143F: Biodiversity and the Tree of Life [1]

Field trips and labs reinforcing topics covered in BIO 143. Five field trips illustrate the biodiversity of different regions of California (seashore, Central Valley, foothills, and Sierra Nevada). Wet labs serve to examine the organisms collected during field trips, and participate in a long-term DNA Barcoding project of the field sites visited.

Prerequisite: BIO 001 and BIO 143. BIO 143 may be taken concurrently. Letter grade only.

BIO 144: Phylogenetics [4]

Theory behind phylogenetic reconstruction and an introduction to the diverse methods for phylogenetic inference. How to deal with morphological and molecular characters is discussed as well as the comparative method.

BIO 144L must be taken concurrently. Prerequisite: BIO 140 and (MATH 032 or MATH 018).

BIO 144L: Phylogenetics Laboratory [1]

Laboratory experiments demonstrating and reinforcing topics covered in BIO 144.

BIO 144 must be taken concurrently. Letter grade only.

BIO 145: Introduction to Population and Community Ecology [4]

Comprehensive introduction to the ecology of populations, communities and ecosystems. Examines the dynamics of single-species populations, and then moves to species interactions including competition, predation, parasitism, and mutualism. Structure and dynamics of entire communities and food webs also are examined. Discusses conservation biology applications throughout.

Prerequisite: BIO 001 and (MATH 021 or ICP 001A).

BIO 146: Paleobiology [4]

An introduction to the major geological factors that have affected the evolution and the diversity of organisms. We also present how the fossil record can help us understand evolution of Life through time, with an emphasis on macro-evolutionary events (e.g., mass extinctions, transitions between habitats, radiations).

Prerequisite: BIO 140.

BIO 147: Astrobiology [4]

Astrobiology refers to the study of the origin and evolution of life in the cosmos. It is an integrative, multidisciplinary field that includes areas of biology, astronomy, geology, chemistry and physics. Students in the class face some of the most fundamental topics addressed by science today such as who we are, where we came from, and where we might go. We cover three main themes: How did life begin and evolve? Does life exist elsewhere in the universe? What is life's future on Earth and beyond?

Prerequisite: CORE 001 and (BIO 001, BIO 005, PHYS 006, PHYS 008, CHEM 002 or ESS 001) or consent of instructor. Letter grade only.

BIO 148: Introduction to Ecology [4]

Introduction to principles of Ecology ranging from the ecosystem to the population level.

Prerequisite: BIO 001 or BIO 005. Permission of instructor required. Letter grade only.

BIO 149: Conservation Biology [4]

Detailed examination of the evolutionary, ecological, management, and policy issues related to the conservation of ecosystems, species, and genetic diversity. Theory and practical aspects of biological conservation are also presented, with special reference to case studies from California.

Prerequisite: BIO 001 and (MATH 018 or MATH 032). BIO 148 recommended. Permission of instructor required. Letter grade only.

BIO 149F: Conservation Biology Lab [1]

Field and laboratory exercises reinforcing material presented in BIO 149/ESS 149.

Prerequisite: BIO 149 or ESS 149. Either of which may be taken concurrently. Letter grade only.

BIO 150: Embryos, Genes, and Development [4]

Principles of developmental biology as revealed through analysis of invertebrate and vertebrate systems. Animal models are used to examine the molecular and cellular mechanisms that influence cell fate. Cell signaling is studied in the context of embryonic pattern formation and the development of body plans and organ systems.

Prerequisite: BIO 110.

BIO 151: Molecular Immunology [4]

Emphasis on development and function of hematopoietic and immune systems and their roles in responding to environmental change, maintenance of health, and disease pathogenesis.

Prerequisite: BIO 110.

BIO 151L: Molecular Immunology Laboratory [1]

Laboratory experiments demonstrating and reinforcing topics covered in BIO 151.

Prerequisite: BIO 110 and BIO 151. BIO 151 may be taken concurrently. Pass/No Pass grading only.

BIO 152: Cancer Genetics and Tumor Biology [4]

Topics include viral and hormonal carcinogenesis, molecular aberrations in cancer, tumor development, epigenetics and cancer, tumor immunology, oncogenes.

Prerequisite: BIO 101 or BIO 110.

BIO 153: Evolution and Development [4]

Comparison and contrast of the development and developmental cues of a variety of animals and emphasizes how conserved developmental pathways have been manipulated through evolutionary processes to produce different physical features. The effects of regulatory region mutations, gene duplication, and genetic co-opting are investigated.

Prerequisite: BIO 110. Letter grade only.

BIO 154: Developmental Immunology [4]

An in-depth exploration of the development of the immune system. Topics include the biology of primary lymphoid organs (particularly the thymus and bone marrow) and early development of lymphoid and myeloid cells. Emphasis is on the temporal, microenvironmental, genetic and molecular control of immune cell development.

Prerequisite: BIO 151 and junior standing. Letter grade only.

BIO 160: Comparative Physiology [4]

Covers the function of the major organ systems by studying species-specific adaptations across the vertebrate subphylum, emphasizing physiological adaptations to environmental challenges. Locomotion, reproduction, cardiovascular, renal, and pulmonary function serve as the models for assessing the cellular basis for physiologic adaptation across the spectrum of vertebrates. BIO 160L must be taken concurrently.

Prerequisite: BIO 100 or BIO 101.

BIO 160L: Comparative Physiology Laboratory [1]

Laboratory experiments demonstrating and reinforcing topics covered in BIO 160. BIO 160 must be taken concurrently.

Prerequisite: BIO 110. Pass/No Pass grading only.

BIO 161: Human Physiology [4]

Understanding the mechanisms underlying function of major human organs. Emphasis includes neural transmission and action potential, cardiovascular, renal and gastrointestinal physiology, metabolism, and endocrinology. Laboratory experiments demonstrating and reinforcing topics covered in lecture with an emphasis on scientific method.

Prerequisite: Senior standing, BIO 101 and (PHYS 009 or PHYS 019). Letter grade only.

BIO 162: Evolutionary Constraints of Physiology [4]

An introduction to the materials upon which evolution acts. We study the structure of animals, the materials from which living organisms are made and the limitations that those materials impose upon evolution.

Prerequisite: BIO 160.

BIO 163: Endocrinology [4]

Basic principles of endocrinology; structure and functions of endocrine glands primarily in mammals with reference to other vertebrates

for comparison; hormonal control of kidney function, metabolism, neural transmission, and reproduction; mechanisms of hormone actions.

Prerequisite: BIO 110, BIO 160, BIO 163L and CHEM 008 or consent of instructor. BIO 163L may be taken concurrently. Letter grade only. May be repeated for credit once.

BIO 163L: Endocrinology Laboratory [1]

Laboratory experiments demonstrating and reinforcing topics covered in BIO 163 with an emphasis on analytical techniques in endocrinology.

Prerequisite: BIO 163, which may be taken concurrently. Letter grade only. May be repeated for credit once.

BIO 164: Human Anatomy [5]

Introduction to the basic concepts of human anatomy at the cell, tissue, and organ levels, through a system-based approach (e.g., skeletal, muscular, nervous, cardiovascular, respiratory, digestive, urinary, reproductive). Laboratories include dissection of mammal organs (cat, sheep, cow), observation of human models and histological slides of human tissues, and interactive computer based exercises.

Prerequisite: BIO 110 and junior standing. Letter grade only.

BIO 170: Neurobiology [4]

Examination of the general operations of the central and peripheral nervous system. Covers cellular neuroscience, including the molecular basis of excitability, synaptic transmission, and neuronal signal transduction, as well as the organization and operations of the major neural systems associated with sensation, locomotion, and higher brain function.

Prerequisite: BIO 110.

BIO 170L: Neurobiology Laboratory [1]

Laboratory experiments demonstrating and reinforcing topics covered in BIO 170.

Prerequisite: BIO 110 and BIO 170. BIO 170 may be taken concurrently. Pass/No Pass grading only.

BIO 175: Biostatistics [4]

Advances in statistical techniques to investigate experimental data generated in molecular, cellular, and evolutionary biology, and health sciences research.

Prerequisite: (MATH 018 or MATH 032) and (ICP 001B, PHYS 008, MATH 022 or MATH 030).

BIO 180: Mathematical Modeling for Biology [4]

Statistical analysis and mathematical modeling skills for life scientists. Topics include modern statistical tools for complex data sets, population models, mathematical analysis of genetics and DNA sequence comparisons and disease models. Extensive computer laboratories using the "R" statistical language.

Prerequisite: BIO 001 and (MATH 018 or MATH 032), or consent of instructor.

BIO 181: Introduction to Biomolecular Simulation [4]

Lectures and laboratory exercises teach the principles and practice of molecular modeling with a focus on simulations of biological macromolecules. Topics covered include classical molecular dynamics, molecular mechanics, docking, and visualization. The computational laboratories involve simulations of systems including water, micelles, DNA, and proteins.

Prerequisite: BIO 100, CHEM 008 and (MATH 021 or ICP 001A) and (PHYS 008, PHYS 018 or ICP 001B) and (MATH 015 or BIO 180), or consent of instructor.

BIO 182: Bioinformatics [4]

Detailed introduction to the tools, algorithms, statistics and databases used in bioinformatics. Topics include sequence alignment, database searching, gene finding and classification, motif analysis, phylogenetics, genome analysis, gene expression and proteomics, functional ontologies, and RNA and protein structure analysis. Includes a mandatory computer laboratory, no prior programming experience assumed.

Prerequisite: BIO 001 and (MATH 018 or MATH 032).

BIO 183: Population Genetics [4]

A study of the various factors that affect gene flow and frequency within a population. Theories of selection, neutrality, drift, hitchhiking, recombination, mutation, isolation, in-breeding, and selfish genetic elements are taught along with statistical tests and experimental methods for detecting these forces.

Prerequisite: BIO 140 and (MATH 021 or ICP 001A).

BIO 185: Biomedical Ethics [3]

Ethical issues associated with contemporary biology and the complex relationships among medicine, science, and society. Topics include genetic engineering, cloning, and stem cell research.

Prerequisite: BIO 001 or BIO 003.

BIO 190: Research Seminar [1]

Student-led presentations of current topics in biological sciences, including independent research presentations.

Prerequisite: Junior standing. Permission of instructor required.

BIO 192: Communication Science [1-2]

Development of skills to effectively communicate scientific topics to broad audiences.

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

BIO 195: Upper Division Undergraduate Research [1-5]

Group or individual research projects in the biological sciences under the direction of a BIO faculty member.

Permission of instructor required. May be repeated for credit.

BIO 198: Upper Division Directed Group Study [1-5]

Group directed study in the biological sciences under the guidance of a BIO faculty member.

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

BIO 199: Upper Division Individual Study [1-6]

Independent study in the biological sciences under the direction of a BIO faculty member.

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

BIOENGINEERING

BIOE 030: Introduction to Bioengineering [4]

Presents students with an overview of the creative synergies between engineering and life sciences that define the scope of Bioengineering. Examples of successful Bioengineering endeavors (devices, materials, processes, models) are provided. Discussion of current frontiers and future direction of Bioengineering, with an emphasis on information technology and nanotechnology.

Prerequisite: (ICP 001A or MATH 021) and (ICP 001B or PHYS 008) and BIO 001 and CHEM 002. CHEM 002 may be taken concurrently. Letter grade only.

BIOE 095: Lower Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

BIOE 098: Lower Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

BIOE 099: Lower Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

BIOE 100: Physiology for Engineers [4]

Using the conceptual, analytical, modeling and design tools of engineering to achieve quantitative insights into physiological systems. Transport mechanisms, energy transduction, feedback and feed forward control, optimization, and materials selection principles in the context of cells, tissues, and organs. How muscles, nerves and biological fluids interact to allow you to read this course description.

Prerequisite: BIO 100, CHEM 008 and (ICP 001A or MATH 021) and (ICP 001B or PHYS 008). Letter grade only.

BIOE 101: Modeling of Nanoscale Process in Biology [3]

Advanced mathematical modeling, simulation and data analysis applied to biological problems at the molecular level; probabilistic models. Scope and limitations of these techniques. Molecular conformations and folding, protein structure, molecular interactions, binding sites, formation of aggregates and complexes, phase changes, membrane transport, physiological control systems in cells.

Prerequisite: (ICP 001A or MATH 021) and (ICP 001B or PHYS 008) and MATH 023 and BIO 001. MATH 024 recommended. Letter grade only.

BIOE 102: Biosensors [4]

Design of natural and artificial devices for characterizing the physical and chemical environment inside and outside living cells. Detection of metabolites, toxins, pathogens and cancers. Molecular and nanoparticle probes. Immunosensors. Nucleic acid sensors and DNA chips. Enzyme-based biosensors. Organism and whole cell-based biosensors. Natural and synthetic receptors for biosensors. Remote diagnosis.

Prerequisite: BIO 001 and (ICP 001A or MATH 021) and (ICP 001B or PHYS 008). Course cannot be taken after obtaining credit for BIOE 103. Letter grade only.

BIOE 103: Biosensors and Bioinstrumentation [4]

Intended for the last-year engineering student to facilitate the student's development into bioengineering investigation. Designed to introduce fundamental principles of circuit theory, analog and digital electronics and biological instrumentation techniques commonly used in biomedical research.

Prerequisite: (ICP 001A or MATH 021) and (ICP 001B or PHYS 008) and BIO 001. Letter grade only.

BIOE 104: Biotransport [4]

Biological Transport Phenomena is the quantitative description of momentum transport (viscous flow) and mass transport (convection and diffusion) in living systems. We explore the similarities between the fundamental principles of momentum, heat, and mass transfer, develop analogies between the fundamentals that apply at microscopic and macroscopic scales, and use the fundamentals in conjunction with conservation laws to develop mathematical descriptions of physiological and engineering systems.

Prerequisite: Junior standing, BIO 100, CHEM 002 and (ICP 001A or MATH 021) and (ICP 001B or PHYS 008). Letter grade only.

BIOE 110: Self-Assembling Molecular Systems [3]

Preparation, characterization, and applications of supramolecular structures. Factors that promote controlled molecular assembly at interfaces and in 3-D. Hydrophobic bonding and the role of water. Liquid crystalline phases. In vivo and in vitro examples of self-assembly. Biomimetic materials: the quest for adaptive responses to changes in environment, and self-healing. "Green" processing routes via biotechnology. Limitations of biomimetic materials.

Prerequisite: (ICP 001A or MATH 021) and (ICP 001B or PHYS 008) and BIO 100. Letter grade only.

BIOE 111: Biomembranes [3]

The molecular and physical chemistry of membranes formed from natural and synthetic amphiphiles. Relationships between surfactant molecular structures, chemical and physical environment, and membrane assembly. Solubility of proteins in biomembranes. Pore formation and structure. Transport through biomembranes. Biomembranes as catalysts and reaction vessels. Characterization of membrane structure and properties.

Prerequisite: (ICP 001A or MATH 021) and (ICP 001B or PHYS 008) and BIO 100. Letter grade only.

BIOE 112: Biomolecule-Substrate Interactions [3]

Cell receptor biology in the context of cell interactions with materials. Biomolecule adsorption to solid materials. Relevance to catalysis, adhesion, and responses to implanted biomaterials. Interactions between nanoparticles and biological tissue. Coagulation and thrombosis, infection, acute inflammation, chronic inflammation and the foreign body response, immune and tumorgenic mechanisms. Surface and interface characterization methods.

Prerequisite: (ICP 001A or MATH 021) and (ICP 001B or PHYS 008) and BIO 100 and ENGR 045. Letter grade only.

BIOE 113: Bioinstrumentation [4]

Signals and interactions that are useful in characterizing biomolecules and small-scale biological structures. Principles of 2-D and 3-D image formation. Resolution limits of imaging and non-imaging characterization techniques. Integration of mechanical, sensor and control technologies into devices that can perform diagnoses and repairs at cellular and subcellular length scales.

Prerequisite: (ICP 001A or MATH 021) and (ICP 001B or PHYS 008) and BIO 001. Course cannot be taken after obtaining credit for BIOE 103. Letter grade only.

BIOE 114: Tissue Engineering Design [3]

Fundamental topics include: issues related to the cell source (including stem cells, plasticity, transdifferentiation, therapeutic cloning vs. reproductive cloning, bone marrow transplants, and cell differentiation and purification), cell culture and tissue organization, gene therapy delivery methods, cell adhesion and migration, issues in construct design, tissue preservation, and immunoisolation and/or modulation. We also cover current case studies and issues for FDA approval of tissue engineered products.

Prerequisite: (ICP 001A or MATH 021) and (ICP 001B or PHYS 008) and BIO 100. Letter grade only.

BIOE 117: Lab on a Chip: Developing 3rd World Diagnostics for Global Health [3]

Innovative campus course between UC San Francisco, UC Berkeley, UC Santa Cruz, and UC Merced which aims to 1) raise awareness and knowledge about global health issues 2) teach students critical engineering skills such as nano/micro-fabrication 3) enable students to design, build, and test their own diagnostics and 4) develop entrepreneurial skills. Students learn about tuberculosis from leading experts at UCSF and then address the death of sensitive diagnostics by designing and testing their own nano/micro-systems. Taught at UC Merced with teleconferencing to the other campuses. Two field trips also are required.

Prerequisite: Junior standing, BIO 001, CHEM 002 and (ICP 001A or MATH 021) and (ICP 001B or PHYS 008). Letter grade only.

BIOE 120: Physiology for Engineers: Lab Only [1]

Human physiological functions in organ systems. Labs emphasize functional aspects of organs systems through experimentation. This lab should help you gain practical lab skills, scientific reasoning, understanding of physiology subject matter, and teamwork skills. Physiology laboratory is intended for transfer students that have completed the lecture portion of Physiology at another institution.

Prerequisite: BIO 100 and (ICP 001A or MATH 021) and (ICP 001B or PHYS 008). Letter grade only.

BIOE 126: Nanodevice Fabrication: Bridging Research and Education [3]

Blending lectures with labs, we challenge students to solve problems both individually and in groups and bridges education and research. It begins with an introduction to sensing principles and then an overview of nanomaterial-enabled sensing devices and systems. The electronic detection schemes using CNT-based sensors are presented in detail. Up-to-date breakthroughs as well as the gap between research and commercially successful products are discussed. At the lab sessions, students gain hands-on experience in making CNT-based electronic devices, characterizing their sensing performance, and more importantly conducting their own experiments in the six week self-designed project.

Prerequisite: CHEM 002, PHYS 009, ENGR 165 and junior standing. Letter grade only.

BIOE 150: Bioengineering Design [3]

Students work in teams on bioengineering problems requiring design solutions. Students define the problem, propose a viable solution, acquire approval for the design, and build and test the designed device.

Prerequisite: BIO 100, CHEM 008, ENGR 045, ENGR 120, ENGR 130 and (ICP 001A or MATH 021) and (ICP 001B or PHYS 008). Letter grade only.

BIOE 195: Upper Division Undergraduate Research [1-5]

Research credit is designed to give credit to students that elect to conduct research in a laboratory on campus. Credits are proportional to the hours spent in the laboratory (1-5 credits).

Permission of instructor required. May be repeated for credit.

BIOE 198: Upper Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

BIOE 199: Upper Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

CHEMISTRY

CHEM 001: Preparatory Chemistry [3]

Preparation for general chemistry. Units of measurement, dimensional analysis, significant figures; elementary concepts of volume, mass, force, pressure, energy, density, temperature, heat, work; fundamentals of atomic and molecular structure; the mole concept; acids and bases; stoichiometry; properties of the states of matter; gas laws; solutions, concentrations. NOTE: Chemistry 1 satisfies no requirements other than contribution to the 120 units required for graduation. Designed for students who need additional help prior to enrollment in General Chemistry.

Course cannot be taken after obtaining credit for CHEM 002.

CHEM 002: General Chemistry I [4]

Atoms, molecules, and stoichiometry; periodic properties; chemical equations; concepts of chemical bonding; Lewis structures; bond energies; atomic and molecular orbitals; solutions and measures of concentration; acid-base and solubility equilibria; thermochemistry; main group descriptive chemistry. Laboratories emphasize "green chemistry" concepts, using environmentally benign reagents and minimizing waste.

Prerequisite: CHEM 001 or passing score on the Chemistry Placement Exam or score of 3 or better on AP Chemistry Exam.

CHEM 008: Principles of Organic Chemistry [4]

Molecular shapes and charge distributions; resonance; electron delocalization; organic structures, nomenclature and isomerism, stereochemistry; optical activity; organic reactions; IR spectroscopy; intermolecular forces. Rational approaches to organic mechanism are emphasized.

Prerequisite: CHEM 002 (with a grade of A- or better) or CHEM 010.

CHEM 010: General Chemistry II [4]

Gas properties; entropy; free energy; chemical kinetics: rate laws, temperature dependence, catalysis, enzymes; diffusion and transport; nuclear chemistry; quantum mechanics; molecule-radiation interactions; electronic and vibrational spectroscopy; coordination compounds; solids and liquids; salts, metals, and semiconductors; mass spectrometry; diffraction. Laboratories emphasize "green chemistry" concepts, using environmentally benign reagents and minimizing waste.

Prerequisite: CHEM 002.

CHEM 090X: Freshman Seminar in Chemistry [1]

Examination of a topic in chemistry.

Pass/No Pass grading only.

CHEM 095: Lower Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

CHEM 098: Lower Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

CHEM 099: Lower Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

CHEM 100: Organic Synthesis and Mechanism [3]

Reactions, syntheses, purification and characterization of all of the major classes of organic compounds. Includes standard organic reaction mechanisms and bioorganic mechanism. A retrosynthetic approach to synthetic design is emphasized.

Prerequisite: CHEM 008 and CHEM 010.

CHEM 100L: Organic Chemistry Laboratory [1]

Laboratory experiments in synthetic methods and chemical and spectroscopic characterization of organic compounds. Emphasis is on microscale techniques.

Prerequisite: CHEM 100, which may be taken concurrently.

CHEM 101L: Advanced Synthetic Laboratory [2]

Laboratory experiments in synthetic methods and chemical and spectroscopic characterization of organic and inorganic compounds. Emphasis is on microscale techniques.

Prerequisite: CHEM 100, which may be taken concurrently.

CHEM 111: Biochemistry I [4]

Advanced study of proteins, enzymes, enzyme kinetics, and carbohydrates metabolism in living organisms.

Prerequisite: CHEM 100. Letter grade only.

CHEM 112: Quantum Chemistry and Spectroscopy [3]

Theory and practical application of molecular quantum mechanics. Schrodinger equation and matrix representations of quantum mechanics; simple exactly solvable model problems; calculation of observable properties; vibrational and electronic wave functions; approximation methods; quantum mechanics of spectroscopy.

Prerequisite: CHEM 010, MATH 024 and PHYS 009. Letter grade only.

CHEM 113: Chemical Thermodynamics and Kinetics [3]

Statistical mechanics, thermodynamics, and chemical kinetics, taught from a perspective that develops the behavior of bulk matter from molecular properties.

Prerequisite: CHEM 112. Letter grade only.

CHEM 114L: Physical Chemistry and Instrumental Analysis Laboratory [2]

Laboratory experiments in spectroscopy, electrochemistry, separations, and kinetics, including biochemical and biophysical applications.

Prerequisite: CHEM 112, which may be taken concurrently.

CHEM 115: Instrumental Analysis and Bioanalytical Chemistry [3]

Spectroscopic, electrochemical, and separation methods of chemical analysis including bioanalytical techniques.

Prerequisite: CHEM 112, which may be taken concurrently.

CHEM 120: Inorganic Chemistry [3]

Descriptive inorganic chemistry, reactivity, inorganic spectroscopy, group theory, and crystallography.

Prerequisite: CHEM 008 and CHEM 010. Letter grade only.

CHEM 122: Advanced Biochemistry and Molecular Biology [4]

Mechanisms of amino acid, nucleic acid, and lipid metabolism plus advanced mechanisms of gene expression, signal transduction, and regulation of gene expression.

Prerequisite: BIO 101 and BIO 140. Letter grade only.

CHEM 130: Organic Spectroscopy and Computation [3]

Modern methods and tools employed for the determination of organic molecular structure including NMR [1D and 2D FT], IR, and UV spectroscopy. Applications of quantum

mechanical concepts and methods to understand and predict organic structures and reactivities. Computational modeling methods, including force field and quantum mechanical computer calculations.

Prerequisite: CHEM 100 and CHEM 112.

CHEM 131: Molecular Spectroscopy [3]

Time-dependent quantum mechanics; interaction of radiation with matter; electronic spectra of atoms and molecules; vibrational, rotational, and Raman spectra; magnetic resonance spectroscopy; X-ray, neutron, and electron diffraction.

Prerequisite: CHEM 112. Letter grade only.

CHEM 133: Biophysical Chemistry [3]

Biochemical kinetics, solution thermodynamics of biochemical systems, multiple equilibria, hydrodynamics, energy levels, spectroscopy, and bonding. Three-dimensional structure of proteins, forces that stabilize protein structures, protein folding, prediction of protein structure from sequence. Three-dimensional structure of DNA and RNA, sequence-specific recognition of DNA and RNA, RNA-catalyzed processes.

Prerequisite: (CHEM 111 or BIO 101) and CHEM 113. Letter grade only.

CHEM 140: Nanoscale Materials Chemistry [3]

An introduction to the properties of matter on size scales intermediate between atoms or molecules and bulk matter, with emphasis on metallic and semiconductor nanoparticles. Synthesis, characterization, physical and chemical properties, and applications of these materials.

Prerequisite: CHEM 100, CHEM 113 and CHEM 120. All of which may be taken concurrently. Letter grade only.

CHEM 147: Materials Chemistry Laboratory [3]

Laboratory examination of materials synthesis and physical properties of complex materials. Combines synthetic skills with fundamental physical understanding and characterization in approximately equal proportions to relate materials synthesis to materials function.

Prerequisite: CHEM 101L and CHEM 113. CHEM 113 may be taken concurrently.

CHEM 190: Advanced Topics in Chemistry [3]

In-depth treatment of a timely advanced topic in chemistry as selected by the faculty. More than one section covering different topics may be offered.

Permission of instructor required. Letter grade only. May be repeated for credit with different topics.

CHEM 195: Upper Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

CHEM 198: Upper Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

CHEM 199: Upper Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

CHEM 200: Advanced Organic Synthesis [3]

Logical approaches to designing syntheses of target organic compounds. Introduction to retrosynthetic analyses and background on the reactions needed to achieve common syntheses; protecting groups and stereoselective methodologies. Classic syntheses are discussed in the context of modern methods. Introduction to literature search tools, a practical estimate of the reliability of published protocols, and references on chemical purification.

Letter grade only.

CHEM 201: Organic and Organometallic Reaction Mechanisms [3]

Thermodynamics, statistical mechanics, and molecular orbital theory are used to explain reactivity, product distributions, the stability of intermediates, and transition state structure. Elements of computational chemistry, kinetic methods of interrogation, linear free energy relationships, kinetic isotope effects, and other methods for empirically constructing plausible reaction mechanisms.

Letter grade only.

CHEM 202: Bioorganic Chemistry [3]

The molecular basis of biological processes. Methods by which enzymes catalyze organic reactions; experimental methods by which the mechanisms of enzyme-catalyzed reactions are elucidated; chemistry of disease states and drug action.

Letter grade only.

CHEM 212: Molecular and Solid State Quantum Chemistry [3]

Theory and practical application of molecular quantum mechanics. Schrodinger equation and matrix representations of quantum mechanics; simple exactly solvable model problems; calculation of observable properties; vibrational and electronic wave functions; approximation methods; quantum mechanics of spectroscopy. Graduate requirements include computer laboratory and a computational project.

Letter grade only.

CHEM 213: Chemical Thermodynamics and Kinetics [4]

Statistical mechanics, thermodynamics, and chemical kinetics, taught from a perspective that develops the behavior of bulk matter from molecular properties; modern experimental and theoretical methods in kinetics.

Prerequisite: CHEM 212. Letter grade only.

CHEM 231: Molecular Spectroscopy [3]

Time-dependent quantum mechanics; interaction of radiation with matter; electronic spectra of atoms and molecules; vibrational, rotational, and Raman spectra; magnetic resonance spectroscopy; X-ray, neutron, and electron diffraction. Modern experimental and theoretical methods in spectroscopy. Graduate requirements include a term paper critically evaluating a recent technique in spectroscopy.

Prerequisite: CHEM 212.

CHEM 251: Microstructures Processing and Properties of Materials [3]

Relationships between material properties and their molecular and higher-level organization; control of these properties by the environment to which the material is subjected during processing.

CHEM 290: Current Topics in Physics and Chemistry [3]

Exploration of current research directions, problems, and techniques in molecular and materials chemistry, physics, and engineering. Course format emphasizes student-led presentation, analysis, and discussion of reading assignments from the current and recent scientific literature. Topics are determined by the instructor and change each semester.

May be repeated for credit.

CHEM 291: Physics and Chemistry Seminar [1]

Graduate seminar in physics and chemistry.

Satisfactory/Unsatisfactory grading only. May be repeated for credit.

CHEM 295: Graduate Research [1-6]

Supervised research.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

CHEM 298: Directed Group Study [1-6]

Group project under faculty supervision.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

CHEM 299: Directed Independent Study [1-6]

Independent project under faculty supervision.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

CHINESE

CHN 001: Elementary Chinese I [4]

An introduction to modern standard Chinese (Mandarin) pronunciation and grammar as well as pinyin and simplified characters. Emphasis is on the basic language skills: speaking, listening, reading and writing.

CHN 002: Elementary Chinese II [4]

An introduction to modern standard Chinese (Mandarin) pronunciation and grammar as well as pinyin and simplified characters. Emphasis is on the basic language skills: speaking, listening, reading and writing.

Prerequisite: CHN 001.

CHN 003: Intermediate Chinese I [4]

Review of modern standard Chinese (Mandarin) pronunciation and grammar as well as pinyin and simplified characters. Emphasizes speaking and writing skills. Readings are utilized to build cultural understanding.

Prerequisite: CHN 002.

CHN 004: Intermediate Chinese II [4]

Review of modern standard Chinese (Mandarin) pronunciation and grammar as well as pinyin and simplified characters. Emphasizes speaking and writing skills. Readings are utilized to build cultural understanding.

Prerequisite: CHN 003.

COGNITIVE SCIENCES

COGS 001: Introduction to Cognitive Science [4]

An introduction to the interdisciplinary field of cognitive science. Basic issues related to cognition, including perception, memory, language, learning, problem solving, spatial cognition, attention, mental imagery, consciousness, brain damage, development, and artificial intelligence, are considered from the perspectives of psychology, philosophy, computer science, and neuroscience.

COGS 005: Introduction to Language and Linguistics [4]

An introduction to the scientific study of language. Topics include phonology, phonetics, syntax, semantics, pragmatics, sociolinguistics, psycholinguistics, historical linguistics, language acquisition, and natural discourse.

COGS 090X: Freshman Seminar [1]

Examination of a topic in the cognitive sciences.

May be repeated for credit.

COGS 095: Lower Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

COGS 098: Lower Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

COGS 099: Lower Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

COGS 101: Mind, Brain and Computation [4]

Further explores the issues covered in COGS 1, but with greater emphasis on computation, brain structure, neurological deficits, and the connection between mind and brain.

Prerequisite: COGS 001 or consent of instructor.

COGS 102: Introduction to Cognitive Modeling [4]

An introduction to the use of computer programs in modeling and cognitive phenomena. Some proficiency in a high level programming language [C, Java, Lisp, etc.] is assumed. Topics include symbolic artificial intelligence, neural networks, genetic algorithms, and computer graphics.

Prerequisite: (COGS 001 or PSY 001) and (CSE 001, CSE 002 or CSE 020), or consent of instructor.

COGS 103: Introduction to Neural Networks in Cognitive Science [4]

Introduction to the use of neural networks in the study of cognitive phenomena. Topics include perception, attention, language, memory, and biologically realistic model neurons.

Prerequisite: COGS 001 or PSY 001, or consent of instructor.

COGS 105: Research Methods for Cognitive Scientists [4]

Methods used for conducting interdisciplinary research in cognitive science. Topics range from identifying interesting problems, applying methods and theory to everyday cognitive tasks, designing projects, collecting data, analyzing and interpreting data, modeling data, and writing up results. Lab work and group projects are included.

Prerequisite: (COGS 001 or PSY 001) and PSY 010.

COGS 110: Philosophy of Cognitive Science [4]

Consideration of philosophical and foundational issues in cognitive science, including the Turing Test, the Chinese Room argument, the nature of cognitive architecture, animal cognition, connectionism vs. symbolic artificial intelligence, and the possibility of thinking machines.

Prerequisite: PHIL 001 and (COGS 001 or PSY 001) or consent of instructor.

COGS 121: Cognitive Psychology [4]

Introduction to human information processing, mental representation and transformation, imagery, attention, memory, language processing, concept formation, problem solving and computer simulation.

Prerequisite: PSY 001 or COGS 001.

COGS 123: Computational Cognitive Neuroscience [4]

Design and analysis of computational simulations of human behavior and brain function. Techniques for modeling active membranes, individual neurons, the dynamics produced by recurrent excitation and lateral inhibition, synaptic plasticity, and the computational role of neurotransmitters. Formal models of perception, attention, learning, memory, language, categorization, and cognitive control.

Prerequisite: (COGS 001 or PSY 001) and one additional upper division COGS course, or consent of instructor.

COGS 125: Introduction to Artificial Intelligence [4]

Provides an overview of the main concepts and algorithms underlying the understanding and construction of intelligent systems: agents, problem solving, search, representation, reasoning, planning, communication, perception, robotics, neural networks. Includes practical experimentation of algorithms in computer labs.

Prerequisite: CSE 020 and CSE 021 or appropriate sequence of introductory programming courses or consent of instructor. COGS 001 recommended.

COGS 128: Cognitive Engineering [4]

This survey provides an introduction to cognitive engineering, with an emphasis on cognitive science. Topics include human computer interaction, human robot interaction, speech recognition systems, animated characters, virtual reality systems, ubiquitous computing, computer supported cooperative work, and the implications of cognitive science research on the design and use of electronic devices and user interfaces in the 21st Century.

Prerequisite: COGS 001 or PSY 001, or consent of instructor.

COGS 130: Cognitive Neuroscience [4]

Brain systems involved in mental processes including perception, attention, language, reasoning, spatial cognition, memory, and decision-making. Neurobiological evidence for functional subsystems within these processes and the evolution of specialized systems are considered through examining findings from animal studies, human behavior and development research, and brain imaging studies.

Prerequisite: COGS 001, BIO 001 or PSY 001.

COGS 140: Perception [4]

An introduction to key theoretical constructs and experimental procedures in visual and auditory perception. Topics include psychophysics; perception of color, space, shape and motion; pattern recognition; perceptual attention; and brain areas engaged in perception.

Prerequisite: COGS 001 or PSY 001.

COGS 144: Animal Cognition [4]

Focuses on how different species of animal animals process, organize, and retain information. Topics such as learning and memory, sensation

and perception, navigation and migration, and communication, are discussed from ethological, experimental, behavioral, and neuroscientific perspectives. Contemporary issues in the comparative study of the evolution of human cognition are also addressed.

Prerequisite: Junior standing and (PSY 001 or COGS 001), or consent of instructor.

COGS 150: Language, Cognition, and Interaction [4]

Examines the interactive nature of language. Discussion focuses on the extent to which perception, memory, and other non-linguistic processes interact with language and the way people use language to interact in everyday situations. Topics include conversational language, gesture, speech disfluencies, figurative language, spatial language, child-parent interaction, speech recognition, and human-computer processing. Integrates research from psychology, linguistics, sociolinguistics, and human-computer interaction. Research project required.

Prerequisite: (COGS 001 or PSY 001) and COGS 005, or consent of instructor.

COGS 152: Services Science and Management [4]

Services, e.g., restaurants, hotels, lawyers, information technology operations, business consulting -- account for more than 70% of the US economy. Through case studies of businesses and scientific studies of people in real service settings, we focus on how to align people and technology effectively to generate value.

Prerequisite: ECON 001. Letter grade only.

COGS 153: Judgment and Decision Making [4]

An introduction to the study of human judgment and decision making. Topics include decision making under uncertainty, financial choices, health decision making, group decisions, rational theories of choice behavior, and improving decision making. The material is related to cognitive science, psychology, economics, and other social sciences.

Prerequisite: COGS 001 or PSY 001.

COGS 154: Cognitive Science Applications for Management [4]

Covers thought, behavior, and interaction in modern businesses, where knowledge workers interact with one another and with technology. Topics include business decision making, risk behavior, attitudes toward risk, planning, communication, information management, information systems, human-computer interaction, neuroeconomics, and organizational behavior.

Prerequisite: COGS 001 or PSY 001, or consent of instructor.

COGS 155: Language Acquisition [4]

A comprehensive survey of the theories, methods and findings on first and second language acquisition.

Prerequisite: COGS 001 and COGS 005.

COGS 171: Memory and Cognition [4]

Advanced study of recent research on human memory such as systems of memory, memory disorders, the neural basis of memory, memory and consciousness, memory and emotion, representation of knowledge, computer models of memory.

Prerequisite: COGS 121 or PSY 121, or consent of instructor. Letter grade only.

COGS 172: Thinking and Reasoning [4]

Advanced study of recent research on thinking and reasoning such as inductive and deductive reasoning, concepts and categorization, problem solving, creative thinking, expertise, cognition in groups, relations to philosophy of science.

Prerequisite: COGS 121 or PSY 121, or consent of instructor. Letter grade only.

COGS 175: Spatial Cognition [4]

Topics include navigation, perception of space and motion, spatial attention, spatial language, neurological deficits related to spatial cognition, spatial mental models, motion path planning in humans and computers, and visual representation in the arts and new media.

Prerequisite: COGS 001 or PSY 001.

COGS 180: Topics in Cognitive Science [4]

A variety of topics in cognitive science are offered.

Prerequisite: COGS 001 or PSY 001, or consent of instructor. May be repeated for credit twice with different topics

COGS 190: Advanced Seminar in Cognitive Science [4]

Intensive treatment of a special topic or problem within cognitive science.

Prerequisite: Junior standing. Permission of instructor required. May be repeated for credit once.

COGS 195: Upper Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

COGS 198: Upper Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

COGS 199: Upper Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

COGS 201: Cognitive Science Foundations I [4]

Solidification and expansion of students' existing knowledge of the fundamental theoretical frameworks and methodological tools of cognitive science. Connections among Philosophy of Mind, Cognitive Neuroscience, Theoretical Linguistics, Artificial Intelligence, and Cognitive Psychology, are emphasized. Required of all first-year Cognitive Science graduate students.

COGS 202: Cognitive Science Foundations II [4]

Continuation of COGS 201, with more emphasis placed on recent developments and applications in Cognitive Science, and tools needed to conduct cognitive science research in a variety of domains. Also includes practical career information, such as tutorials in grant-writing, effective presentation, writing techniques, and professional development. Required of all first-year Cognitive Science graduate students.

COGS 203: Introduction to Neural Networks in Cognitive Science [4]

Introduction to the use of neural networks in the study of cognitive phenomena. Topics include perception, attention, language, memory and biologically realistic model neurons. This graduate level version of the course includes a sizeable final project that simulates data from cognitive research.

COGS 223: Computational Cognitive Neuroscience [4]

Design and analysis of computational simulations of human behavior and brain function. Techniques for modeling active membranes, individual neurons, the dynamics produced by recurrent excitation and lateral inhibition, synaptic plasticity, and the computational role of neurotransmitters. Formal models of perception, attention, learning, memory, language, categorization, and cognitive control.

Permission of instructor required.

COGS 250: Cognitive Science Graduate Seminar [4]

Broad issues in cognitive science, with an emphasis on computation, and the connections among mind, technology, and society. Each semester features guest speakers and topics such as artificial intelligence, design, human-computer interaction, perception, language, high-level cognition, reasoning, neuroscience, and the role of technology in society.

Satisfactory/Unsatisfactory grading only. May be repeated for credit.

COGS 285: Topics in Philosophy of Cognitive Science [4]

Detailed study of special topics in the philosophy of cognitive science, including (but not limited to): Animal Cognition, Cognitive Architecture, Consciousness, Mental Representation, Modularity, Nativism vs. Empircisim, and Self.

May be repeated for credit three times with different topics.

COGS 295: Graduate Research [1-12]

Supervised research.

Permission of instructor required. May be repeated for credit.

COGS 298: Directed Group Study [1-6]

Group project under faculty supervision.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

COGS 299: Directed Independent Study [1-6]

Independent project under faculty supervision.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

CORE

CORE 001: The World at Home: Planning for the Future in a Complex World I [4]

A foundation for UC Merced's general education program with a strong emphasis on writing, quantitative literacy, critical thinking, and understanding events in their historical and cultural contexts. The inaugural theme is a study of how individuals and societies can make the best choices in preparing for an uncertain future. The unifying theme in these modules is contemporary California which acts as a common reference point highlighting the regional implications of global events or the global consequences of seemingly local choices. A wide range of interdisciplinary perspectives from the arts, humanities, social sciences, life and physical sciences, and engineering are brought to bear on the course topics.

Prerequisite: WRI 001 or passing score on the entry level analytical writing placement exam or equivalent. Letter grade only.

CORE 090X: Freshman Seminar [1]

Examination of a topic.

Pass/No Pass grading only. May be repeated for credit.

CORE 100: The World at Home: Planning for the Future in a Complex World II [4]

Second half of the Core course sequence, building on the foundation of UC Merced's general education program and has a strong emphasis on writing, quantitative literacy, critical thinking, and understanding events in their historical and cultural contexts. The inaugural theme is a study of how individuals and societies can make the best choices in preparing for an uncertain future. The unifying theme in these modules is contemporary California which acts as a common reference point highlighting the regional implications of global events or the global consequences of seemingly local choices. A wide range of interdisciplinary perspectives from the arts, humanities, social sciences, life and physical sciences, and engineering are brought to bear on the course topics. Upper-division-level quantitative literacy skills and writing ability is expected.

Prerequisite: CORE 001 and junior standing. Letter grade only.

COMPUTER SCIENCE AND ENGINEERING

CSE 001: Programming I [3]

Fundamentals of computer programming, including basic algorithms, programming styles, program validation, and debugging. Covers the major compound data types including arrays, queues, tuples, stacks, binary trees, and linked lists.

CSE 002: Programming II [3]

Intermediate computer programming, including concepts of recursion, functional and object-oriented programming. Includes concepts of classes and objects, abstraction, inheritance, operator overloading, and data localization.

Prerequisite: CSE 001.

CSE 005: Introduction to Computer Applications [4]

This project-based experience presents the use of computers to control information flow: data collection, management, analysis, and presentation. Basic programming skills, selection of appropriate computer-based tools and languages, and data security are covered. Emphasis is placed on computer knowledge necessary for non-CSE majors to successfully use and manage data and information.

Offered in Fall and spring. Letter grade only.

CSE 020: Introduction to Computing I [2]

Designed to give students comprehensive introduction to computing using quantitative examples. Fundamentals of computer programming, including basic algorithms, programming styles, program validation, debugging, and Methods Objects. Major compound data types including arrays, queues, tuples, stacks, binary.

Offered fall and spring.

CSE 021: Introduction to Computing II [2]

Designed to give students comprehensive introduction to computing using quantitative examples. Fundamentals of computer programming, including basic algorithms, programming styles, program validation, debugging, and Methods Objects. Major compound data types including arrays, queues, tuples, stacks, binary.

Prerequisite: CSE 020. Offered in fall and spring.

CSE 030: Introduction to Computer Science and Engineering I [4]

Provides students with an overview of the diverse field of computer science and engineering. Provides an in-depth analysis of several key inventions in the field that have been instrumental in advancing CSE and driving worldwide technical growth.

Prerequisite: CSE 021. Offered fall and spring.

CSE 031: Introduction to Computer Science and Engineering II [4]

Provides students with an overview of the diverse field of computer science and engineering. Also provides an in-depth analysis of several key inventions in the field that have been instrumental in advancing CSE and driving worldwide technical growth.

Prerequisite: CSE 030. Offered in fall and spring.

CSE 095: Lower Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

CSE 098: Lower Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

CSE 099: Lower Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

CSE 100: Algorithm Design and Analysis [4]

Introduction to the design and analysis of computer algorithms. Topics include theoretical models of computation, concepts of algorithm complexity, computability, and NP-completeness. Also covers major algorithms and data structures for searching, sorting, parsing, and memory management.

Prerequisite: CSE 031. Offered in fall only.

CSE 106: Exploratory Computing [4]

Our ability to manipulate data depends on and is limited by our familiarity with computing technologies. We study tools for exploratory computing, emphasizing programming and scripting languages over point-and-click interfaces. We cover the Unix basics and common utilities, regular expressions, Perl and R languages. Development of a problem solving ability to learn languages independently and cull online documentation.

Letter grade only.

CSE 111: Database Systems [4]

Principles of database design and operation. Major types of databases, including flat-file, hierarchical, relational, and object-oriented. Other topics include database querying languages, database security, and special issues related to the www-based database systems.

Prerequisite: CSE 100. Offered in fall only.

CSE 120: Software Engineering [4]

Modern engineering techniques for developing reliable, efficient, re-usable, and maintainable computer software. Primary software design models, including functional, structured, and object-oriented programming. Other topics

include software validation, revision control, project management, and documentation.

Prerequisite: CSE 111, CSE 150, CSE 160 or CSE 170. Offered in spring only.

CSE 140: Computer Architecture [4]

Fundamental concepts of digital computer design, including instruction sets, memory systems and registers, logic and mathematics units, and off-cpu communication and control. Also surveys the diversity of contemporary computer designs.

Prerequisite: CSE 031. Offered in spring only.

CSE 150: Operating Systems [4]

Concepts of computer operating systems including memory management, file systems, multitasking, performance analysis, and security.

Prerequisite: CSE 031. Offered in spring only.

CSE 160: Computer Networks [4]

Design concepts and implementation features of computer networks. Concepts of network robustness, scalability, addressing, routing, and security. Several contemporary networking protocols are analyzed.

Prerequisite: CSE 031. Offered in fall only.

CSE 170: Computer Graphics [4]

Basic algorithms in computer graphics enabling students to understand and experience the process of implementing modern computer graphics applications. The topics covered are: rasterization, clipping, hidden surface removal, transformations, rendering pipeline, scene graphs, graphics libraries, interpolation, curves and surfaces, constructive solid geometry, boundary representation, spatial partition methods, texture mapping, color models, illumination and shading.

Prerequisite: CSE 031. Offered in spring only. Letter grade only.

CSE 171: Programming Interactive 3D Graphics and Games [4]

The main algorithms and techniques used in the implementation of interactive 3D Graphics applications, such as in Computer Games, Robotics Simulators and Virtual Reality, with a focus on implementing large projects. The topics covered are: keyframe animation, articulated figures, direct and inverse kinematics, motion capture, physically-based simulation, path planning, behavior-based animation, scripting behaviors, finite state machines and other AI topics.

Prerequisite: CSE 170. Letter grade only.

CSE 173: Computational Cognitive Neuroscience [4]

Design and analysis of computational simulations of human behavior and brain function. Techniques for modeling active membranes, individual neurons, the dynamics produced by recurrent excitation and lateral inhibition, synaptic plasticity, and the computational role of neurotransmitters. Formal models of perception, attention, learning, memory, language, categorization, and cognitive control.

Prerequisite: (COGS 001 or PSY 001) and one additional upper division COGS course, or consent of instructor. Offered in alternate years, spring only.

CSE 175: Introduction to Artificial Intelligence [4]

An overview of the main concepts and algorithms underlying the understanding and construction of intelligent systems: agents, problem solving, search, representation, reasoning, planning, communication, perception, robotics, neural networks. Includes practical experimentation of algorithms in computer labs.

Prerequisite: CSE 020 and CSE 021, or consent of instructor. COGS 001 recommended. Offered in fall only. Letter grade only.

CSE 176: Machine Learning [4]

Survey of techniques for the development and analysis of software that learns from experience. An introduction to computational learning theory. Bayesian approaches to learning. Instance-based methods and case-based learning. Decision tree learning. Inductive logic. Artificial neural networks. Kernel methods. Reinforcement learning. Learning from demonstrations and explicit instruction.

Prerequisite: MATH 032 and CSE 175, or consent of instructor. Offered in alternate years, spring only.

CSE 180: Mobile Robotics [4]

Basics of mobile robotics, focusing on the algorithmic side, rather than technology. Students are introduced to basic techniques including navigation, exploration, mapping, localization, planning and cooperation. Strong hands-on component. Implementation of different techniques in simulation complement the theoretical lectures.

Prerequisite: CSE 100. Letter grade only.

CSE 185: Introduction to Computer Vision [4]

Overview of fundamental image processing and pattern recognition techniques including image formation, edge detection, image segmentation, optical flow, recovery of three-dimensional structure from shading or stereo information, shape representations, and issues in object recognition.

Prerequisite: CSE 031and junior standing, or equivalent programming skills. Mathematical background commensurate with upper division engineering students. Offered in fall only. Letter grade only.

CSE 195: Upper Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

CSE 198: Upper Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

CSE 199: Upper Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

CSE 205: Probability and Stochastic Processes [4]

Introduction of probability theory and stochastic processes. Topics: discrete-tim Markov chains, conditional expectation and martingales, limiting behavior of sequences of random variables, Poisson process and continuous-time Markov chains, renewal processes and queuing theory, detection and estimation, wide-sense stationary processes and spectral density, Kalman filter and Wiener filter, and Brownian motion.

Prerequisite: MATH 032 and MATH 141, or consent of instructor. Offered in fall only.

CSE 250: Advanced Topics Computer Systems [4]

Computer systems research, including operating systems, database systems, internet infrastructure systems and sensor networks systems. The goal of the course is to cover a broad array of research topics in computer systems, and to engage you in top-flight systems research. The first part is devoted to basic thematic issues and underlying techniques in computer systems, while the second part goes deeper into topics related to scalable, parallel and distributed systems. The class is based on a discussion of important research papers, and a research project.

Letter grade only. May be repeated for credit with different topics.

CSE 252: Embedded Computer Systems [4]

Concentration on methodologies and technologies for design of embedded systems. Topics include hardware and software platforms for embedded systems, techniques for modeling and specification of system behavior, software organization, real-time operating system scheduling, real-time communication and packet scheduling, low-power battery and energy-aware system design, timing synchronization, fault tolerance and debugging, and techniques for hardware and software architecture optimization. We cover theoretical foundations as well as practical design methods.

Offered in Fall only. Letter grade only. May be repeated for credit.

CSE 260: Optimization [4]

Introduction of theory and numerical methods for continuous multivariate optimization (unconstrained and constrained), including: line-search and trust-region strategies; conjugate-gradient, Newton, quasi-Newton and large-scale methods; linear programming; quadratic programming; penalty and augmented Lagrangian methods; sequential quadratic programming; and interior-point methods.

Prerequisite: MATH 023, MATH 024, MATH 141 or consent of instructor. Offered in spring only. Letter grade only.

CSE 262: Networking of Embedded Sensor Systems [4]

Wireless and sensor systems have achieved significant maturity in the past five years. Experimental systems research in this area has developed a wide range of innovative solutions to practical problems. There is also a fairly large literature on practical experience with these systems. In this class, we sample a wide range of current research on experimental networked wireless and sensor systems. Our exploration ranges from low-level systems and components (self-configuration, localization, time-synchronization), to networking (medium access, routing, transport), and higher-level systems issues (programming, deployment, and management).

Offered in Fall only. Permission of instructor required. Letter grade only. May be repeated for credit.

CSE 270: Robot Algorithms [4]

In depth study of algorithmic techniques to solve fundamental robotic problems, with a particular emphasis on probabilistic aspects. Sensor fusion, mission planning, and other selected topics are covered as well. Theory is complemented by a personal semester long project assigned to every student.

Permission of instructor required. Offered in fall only. Permission of instructor required. Letter grade only.

CSE 273: Computational Cognitive Neuroscience [4]

Design and analysis of computational simulations of human behavior and brain function. Techniques for modeling active membranes, individual neurons, the dynamics produced by recurrent excitation and lateral inhibition, synaptic plasticity, and the computational role of neurotransmitters. Formal models of perception, attention, learning, memory, language, categorization, and cognitive control.

Offered in alternate years, spring only. Permission of instructor required.

CSE 276: Machine Learning [4]

Survey of techniques for the development and analysis of software that learns from experience. An introduction to computational learning theory. Bayesian approaches to learning. Instance-based methods and case-based learning. Decision tree learning. Inductive logic. Artificial neural networks. Kernel methods. Reinforcement learning. Learning from demonstrations and explicit instruction.

Offered in alternate years, spring only. Permission of instructor required.

CSE 280: Advanced Topics in Computer Networks and Distributed Systems [4]

Overview of Internet development history and fundamental principles underlying TCP/IP protocol design. Discussion of current networking and distributed systems research topics, including latest research results in routing protocols, transport protocols, network measurements, network security protocols, and clean-slate approach to network architecture design. Fundamental issues in network protocol design and implementations applied to a variety of different applications and environments.

Offered in fall only. Permission of instructor required. Letter grade only. May be repeated for credit.

CSE 281: Advanced Topics in Robotics [4]

Contemporary issues in mobile robotics, Topics include but are not limited to: cooperative mobile robotics, mathematical models for complex tasks (e.g. manipulation), humanoid robotics, human-robot interfaces, robot hardware and middleware.

Prerequisite: CSE 270, or consent of instructor. Offered in fall only. Letter grade only. May be repeated for credit.

CSE 285: Advanced Topics in Motion Planning [2-4]

Advanced algorithms in the motion planning research domain and reviews selected topics in applications to robotics, computer animation, cognitive science and bioinformatics. Includes development of a sizeable programming project and student-lead seminars.

Prerequisite: Consolidated programming skills, notions of computer graphics and robotics. Offered in fall only. Permission of instructor required. Letter grade only.

CSE 286: Advanced Topics in Computer Vision [2-4]

Current and advanced topics in computer vision. Students develop verbal and written presentation skills through critical evaluation of seminal works.

Prerequisite: CSE 185 or consent of instructor. Offered in spring only. Letter grade only. May be repeated for credit with different topics.

CSE 287: Advanced Topics in Computer Animation [2-4]

A review of advanced topics in computer animation, including: character animation, motion capture techniques, physics-based animation, deformable surfaces, collision detection and motion planning. Includes development of a sizeable programming project and student-lead seminars.

Offered in fall only. Permission of instructor required. Letter grade only.

CSE 290: Electrical Engineering and Computer Science Seminar [1]

The topics include the entire range of body knowledge within the electrical engineering and computer science domain areas. It is primarily intended to give electrical engineering and computer science graduate students breadth exposure to all the areas in the field, not just their specific individual areas of research. Students are required to attend eighty percent (80%) of the seminars scheduled in the semester unless they are excepted by written authorization of the student advisor. Attendance is registered by the faculty delivering the seminar, hosting the distinguished guest, or advising the Ph.D. graduate student presenting an advance topic.

Satisfactory/Unsatisfactory grading only. May be repeated for credit twice.

CSE 295: Graduate Research [1-12]

Supervised research in computer science.

Permission of instructor required. May be repeated for credit.

CSE 298: Directed Group Study [1-6]

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

CSE 299: Directed Independent Study [1-6]

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

ECONOMICS

ECON 001: Introduction to Economics [4]

Introduction to economics principles and methods, including microeconomics (operation of the economy at the individual and firm level) and macroeconomics (nature and functions of the national economy in a global context).

ECON 010: Statistical Inference [4]

Introduction to observation, estimation, and hypothesis testing in economics; use of linear regression models.

Prerequisite: MATH 005 or equivalent score on Math Placement Exam.

ECON 011: History of Economic Thought [4]

A survey of the theories of major economists from Adam Smith to Keynes.

Prerequisite: ECON 001.

ECON 090X: Freshman Seminar [1]

Examination of a topic in economics.

May be repeated for credit.

ECON 095: Lower Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

ECON 098: Lower Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ECON 099: Lower Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ECON 100: Intermediate Microeconomic Theory [4]

Exploration of the foundations of microeconomic theory, focusing on the behavior of individuals and firms, and the interaction of these agents in the market. Price determination and resource distribution theory under conditions of perfect and imperfect competition. General equilibrium and welfare economics.

Prerequisite: ECON 001 and (MATH 021 or ICP 001A), or consent of instructor.

ECON 101: Intermediate Macroeconomic Theory [4]

Analysis of output, employment, interest rates, and the price level. The effects of these on changes in monetary and fiscal variables.

Prerequisite: ECON 001 and (MATH 021 or ICP 001A), or consent of instructor.

ECON 111: American Economic History [4]

Analysis of output, employment, interest rates, and the price level. A survey of trends in the American economy; emphasis on factors explaining economic growth and on the changing distribution of the gains and losses associated with growth.

Prerequisite: ECON 100 or MGMT 100.

ECON 115: Economics of Industrial Organization [4]

The organization and structure of industrial production in the United States economy.

Prerequisite: ECON 100 or MGMT 100.

ECON 116: Organizational Strategy [4]

Discussion of critical issues in the design and functioning of effective organizations. Topics covered include: the boundary of the firm, firm structure, arrangements within the firm, alliances and contracts between firms, and trust and culture in the firm. Combines case studies with relevant economic theory to provide insight into the functioning of organizations.

Prerequisite: ECON 100 or MGMT 100. Letter grade only.

ECON 120: Economics of the Environment [4]

Analysis of public policy measures that pertain to human environments.

Prerequisite: ECON 100 or MGMT 100.

ECON 130: Econometrics [4]

Introduction of problems of observation, estimation, and hypotheses testing in economics through the study of the theory and application of linear regression models, critical evaluation of selected examples of empirical research, and exercises in applied economics.

Prerequisite: (ECON 010 or POLI 010) and (MATH 021 or ICP 001A).

ECON 140: Labor Economics [4]

Analysis of the economic forces that shape labor markets, institutions, and performance in the United States and other countries, with special attention to trade unions, legal regulations, and social conventions.

Prerequisite: ECON 100 or MGMT 100.

ECON 141: Human Resource Economics [4]

Examination of how firms make decisions involving human resources. Topics covered include employee hiring and recruitment, compensation and use of incentives, and employee motivation and teamwork. Builds on both economic theory and practical examples to illuminate key concepts.

Prerequisite: ECON 100 or MGMT 100. Letter grade only.

ECON 142: The Economics of Gender and Poverty [4]

Analysis of the economic issues pertaining to gender with an emphasis on studying and evaluating U.S. policy. Topics include work-life balance, occupational choice, the gender earnings/wage gap, housework, and changing social norms. The intersection between gender and poverty is also discussed, particularly as it pertains to U.S. welfare policy.

Prerequisite: ECON 001.

ECON 145: Health Economics [4]

An economic analysis of policies and institutions in the U.S. health care sector: supply and demand for health services, conceptual and policy issues relating to health insurance, and economic analysis of efficient regulatory policies toward the health care sector.

Prerequisite: ECON 100 or MGMT 100.

ECON 150: Economic Development [4]

Problems of underdevelopment and poverty, policy issues, and development strategy.

Prerequisite: ECON 100 or MGMT 100.

ECON 151: Public Economics [4]

The influence of governmental revenue and expenditure decisions on economic performance. Examines such issues as public goods and externalities, as well as specific expenditure and taxation programs.

Prerequisite: ECON 100 or MGMT 100.

ECON 152: Law and Economics [4]

The economic analysis of legal rules and institutions, including property, contract, and tort law. We also consider issues surrounding crime and punishment.

Prerequisite: ECON 100 or MGMT 100.

ECON 155: Political Economics [4]

Tools of political economics: preferences and institutions, electoral competition, agency, partisan politics. Redistributive politics: general interest politics, special interest politics. Comparative politics: electoral rules, separation of powers, political regimes. Dynamic politics: fiscal policy, growth.

Prerequisite: ECON 100 or MGMT 100.

ECON 160: International Microeconomics [4]

International trade theory: impact of trade on the domestic and world economies; public policy toward external trade.

Prerequisite: ECON 100 or MGMT 100.

ECON 161: International Macroeconomics [4]

Macroeconomic theory of an open economy. Balance of payments adjustment mechanism, international monetary economics issues, international financial institutions and their policies.

Prerequisite: ECON 101 or MGMT 101.

ECON 162: Corporate Finance [4]

Exploration of the valuation of assets including stocks, bonds, options, and futures contracts using modern financial theoretical models, including CAPM and APT. Optimal portfolio selection and risk management issues are also explored.

Prerequisite: ECON 100 or MGMT 100.

ECON 190: Topics in Economics [4]

Intensive treatment of a special topic or problem in economics. May be repeated for credit in different subject area.

Prerequisite: Junior standing and (ECON 100 or MGMT 100), or consent of instructor. May be repeated for credit three times with different topics.

ECON 191: Fieldwork in Economics [1-4]

Supervised field studies in economics.

Prerequisite: ECON 001 and junior standing, or consent of instructor. Letter grade only.

ECON 195: Upper Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

ECON 196: Senior Thesis in Economics I [4]

First part in a year-long capstone seminar that culminates in the presentation of a senior thesis in economics. In this semester, students study research methods in economics, formulate a theoretical or empirical question for their thesis, and conduct a literature review.

Prerequisite: (ECON 100 or MGMT 100) and (ECON 130 or MGMT 130) and senior standing. Letter grade only.

ECON 197: Senior Thesis in Economics II [4]

Second part in a year-long capstone seminar that culminates in the presentation of a senior thesis in economics. In this semester, students develop

and conduct the research proposed in the first semester, write the thesis, and present their work to faculty and peers.

Prerequisite: ECON 196 and senior standing. Letter grade only.

ECON 198: Upper Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ECON 199: Upper Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ECON 240: Advanced Labor Economics I [4]

Covers recent developments in research on labor economics and provide a basis for students to develop a research program in this area. We discuss human capital investment, the wage structure and inequality, labor demand, labor market institutions, internal and local labor markets.

Permission of instructor required. Letter grade only. May be repeated for credit twice.

ECON 290: Quantitative labor Studies Seminar [3]

Research presentations by visiting scholars in the area of quantitative labor studies.

Satisfactory/Unsatisfactory grading only.

ECON 295: Graduate Research [1-12]

Supervised research.

Permission of instructor required. May be repeated for credit.

ECON 298: Directed Group Study [1-6]

Group project under faculty supervision.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

ECON 299: Directed Independent Study [1-12]

Independent project under faculty supervision.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

EDUCATION

EDUC 010: The Essentials of Educational Practice and Policy [4]

Introduction to key elements in education: teaching and learning, school organization, education policy, politics, and philosophical goals of education. Topics include: educational reform, testing and accountability, school finance, student diversity, and bilingual education. Focus is on California's education system, with comparative perspectives from other states and countries.

EDUC 090X: Freshman Seminar [1]

Examination of a topic in education.

ENGINEERING

ENGR 045: Introduction to Materials [4]

Relationship between the structure, processing, properties, and performance of materials. The application of physical and chemical principles in the context of engineering materials: atomic bonding, crystal structure, defects, thermodynamics, and kinetics.

Prerequisite: CHEM 002 and (ICP 001A or MATH 021) and (ICP 001B or PHYS 008) or consent of instructor. Offered in spring only. Letter grade only.

ENGR 050: Statics [2]

Fundamental concepts of mechanics, including statics, dynamics, and kinetics of particles and rigid bodies.

Prerequisite: (ICP 001A or MATH 021) and (ICP 001B or PHYS 008). Offered in fall only. Letter grade only.

ENGR 052: Computer Modeling and Analysis [3]

Basic tools needed for the design and analysis of engineering systems, including data collection, basic algorithm design, implementation and testing, and systems simulation.

ENGR 053: Materials and the Environment [3]

Impact of materials mining, processing, synthesis, use, and disposal on the environment, including cost-benefit analyses of environmentally "friendly" vs. "unfriendly" materials. Energy properties, cost, durability, disposal, and other considerations in materials selection. Materials challenges in fuel cell, battery, solar, and water filtration applications. Environmental costs and benefits of emerging nanotechnologies.

Prerequisite: (ICP 001A or MATH 021) and (ICP 001B or PHYS 008) and CHEM 002, or consent of instructor. Letter grade only.

ENGR 057: Dynamics [3]

Kinematics and equations of motion of a particle for rectilinear and curvilinear motion. Planar kinematics of rigid bodies. Kinetics for planar motion of rigid bodies, including equations of motion and principles of energy and momentum.

Prerequisite: ENGR 050. Offered in spring only. Letter grade only.

ENGR 095: Lower Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

ENGR 097: Service Learning: Engineering Projects in Community Service [1-3]

Multi-disciplinary teams of freshman through senior students work with community organizations to design, build, and implement engineering-based solutions for real-world problems. Students gain insight into the design and development process. Students are encouraged to participate for two or more semesters at the lower division [ENGR 97] and upper division [ENGR 197] level.

Permission of instructor required. May be repeated for credit.

ENGR 098: Lower Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ENGR 099: Lower Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ENGR 108: BioEntrepreneurship [3]

Introduces upper division undergraduate and graduate students to entrepreneurship. We start with a history of biotechnology and medical devices which hopefully inspires them to integrate entrepreneurship with engineering and/or life sciences. We work through case studies of start-up companies (including Genetech) brainstorm ideas about new inventions, and walk them through the requisite steps to start a new business venture (IP issues, team formation, raising capital).

Letter grade only.

ENGR 120: Fluid Mechanics [4]

Introduction to and application of principles of mechanics to flow of compressible and incompressible fluids.

Prerequisite: ENGR 057, ENGR 130 and ENGR 151. ENGR 130 and 151 may be taken concurrently. Offered in spring only. Letter grade only.

ENGR 130: Thermodynamics [3]

Fundamentals of equilibrium, temperature, energy, and entropy. Equations of state and thermodynamic properties, with engineering applications.

Prerequisite: CHEM 002, MATH 023, MATH 024 and (PHYS 009 or PHYS 019). Offered in fall only. Letter grade only.

ENGR 135: Heat Transfer [4]

Study of conduction, convection, and radiation heat transfer, with applications to engineering problems.

Prerequisite: ENGR 120. Offered in fall only. Letter grade only.

ENGR 140: Introduction to Object Oriented Programming [4]

Object and database principles, including data models, access control, database systems architecture, functional data manipulation, database organizational design, indexing, and performance analysis.

Prerequisite: CSE 001. Letter grade only.

ENGR 151: Strength of Materials [4]

Stresses and strain in solids with symmetric and asymmetric loads. Stresses in pressure vessels and rotating shafts. Strength and failure, plastic deformation, fatigue and elastic instability.

Prerequisite: ENGR 057. Offered in fall only. Letter grade only.

ENGR 155: Engineering Economics Analysis [3]

Microeconomic principles and methods. Time value of money, interest and equivalences, analysis of economic alternatives, depreciation, inflation and taxes, estimates of demand, cost and risk, decision theory.

Prerequisite: Junior standing. Offered in fall and spring.

ENGR 160: Discrete Math and Computer Modeling [3]

Combinatorics, graph theory, cryptography, discrete optimization, mathematical programming, coding theory, information theory, game theory, principles of computer science, including algorithms, complexity, and performance modeling.

Prerequisite: CSE 001.

ENGR 165: Circuits [3]

Basic concepts such as voltage, current, resistance, impedance, Ohm's and Kirchoff's law; Basic electric circuit analysis techniques, resistive circuits, transient and steady-state responses of RLC circuits; circuits with DC and sinusoidal sources, steady-state power and three-phase balanced systems.

Prerequisite: MATH 024. Letter grade only.

ENGR 170: Introduction to Electron Microscopy [3]

Principles and techniques of electron microscopy used in the study of materials. Emphasis upon practical applications.

Offered in spring only. Letter grade only.

ENGR 170L: Introduction to Electron Microscopy Laboratory [1]

Laboratory for principles and techniques of electron microscopy used in the study of materials.

Prerequisite: ENGR 170, which may be taken concurrently. Offered in spring only. Letter grade only.

ENGR 180: Spatial Analysis and Modeling [4]

Principles of geographic information systems [GIS]; applications of GIS to environmental, water, and resource management issues; problem solving with GIS. Other topics include spatial analysis interpolation techniques and model integration.

Prerequisite: MATH 021 or ICP 001A. Offered in fall only. Letter grade only.

ENGR 191: Professional Seminar [1]

Presentation and discussion of professional engineering practices. Professional ethics and the roles and responsibilities of public institutions and private organizations pertaining to engineering.

Prerequisite: Senior standing. Permission of instructor required.

ENGR 195: Upper Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

ENGR 197: Service Learning: Engineering Projects in Community Service [1-3]

Multi-disciplinary teams of freshman through senior students work with community organizations to design, build, and implement engineering-based solutions for real-world problems. Students gain insight into the design and development process. Students are encouraged to participate for two or more semesters at the lower division [ENGR 97] and upper division [ENGR 197] level.

Prerequisite: Sophomore standing. Permission of instructor required. May be repeated for credit.

ENGR 198: Upper Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ENGR 199: Upper Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ENGR 208: BioEntrepreneurship [3]

Introduction for upper division undergraduate and graduate students to entrepreneurship. We start with a history of biotechnology and medical devices which inspires them to integrate entrepreneurship with engineering and/or life sciences. Case studies of start-up companies (including Genetech) brainstorm ideas about new inventions, and the requisite steps to start a new business venture (IP issues, team formation, raising capital).

Letter grade only.

ENGR 270: Introduction to Electron Microscopy [3]

Principles and techniques of electron microscopy used in the study of materials. Emphasis upon practical applications. Graduate requirements include additional assignments, quiz problems, and a project. Offered in spring only.

Letter grade only.

ENGR 270L: Introduction to Electron Microscopy Laboratory [1]

Laboratory for principles and techniques of electron microscopy used in the study of materials. Graduate requirements include additional laboratory reports and a research project.

Prerequisite: ENGR 270, which may be taken concurrently. Offered in spring only. Letter grade only.

ENGR 295: Graduate Research [1-6]

Supervised research in engineering.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

ENGR 298: Directed Group Study [1-6]

Group project under faculty supervision.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

ENGR 299: Directed Independent Study [1-6]

Independent project under faculty supervision.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

ENVIRONMENTAL ENGINEERING

ENVE 010: Environment in Crisis [4]

Human effects on Earth's ecosystems, air, and waters. Social and technological solutions to interacting pressures from environmental pollution, biodiversity loss, water pollution, climate warming, and feeding Earth's population. Science and policy topics appropriate for students majoring in fields other than science or engineering.

Not open to majors for credit. Offered in fall only. Letter grade only.

ENVE 020: Introduction to Environmental Science and Technology [4]

Introduction to historical and current issues in the diverse field of environmental engineering. Principles of mass and energy balance. In-depth analysis of several key innovations from the field that have been instrumental in advancing the field. Design project.

Prerequisite: CSE 021, CHEM 002 and MATH 032. Offered in spring only. Letter grade only.

ENVE 095: Lower Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

ENVE 098: Lower Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ENVE 099: Lower Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ENVE 100: Environmental Chemistry [4]

Chemical principles of Earth and environmental systems focusing on environmental processes in water, soil, and air. Emphasis on acid-base chemistry, aqueous speciation, mineral and gas solubility, oxidation and reduction, and isotopes.

Prerequisite: CHEM 010 and (MATH 022, ICP 001B or PHYS 008). Offered in fall only.

ENVE 105: Environmental Data Analysis [3]

The objective of this class is to provide students with probabilistic and statistical methods to analyze environmental data. This class emphasizes both theoretical and applied aspects of data analysis methods. Weekly lab exercises are from environmental applications. Topics include: distribution, hypothesis test, linear regression, multiple regression, uncertainty analysis, outlier detection, sample design, and spatial and temporal data analysis.

Prerequisite: (ICP 001A or MATH 021) and (ICP 001B or PHYS 008). Offered in spring only. Letter grade only.

ENVE 110: Hydrology and Climate [4]

Basics of the hydrological cycle and the global climate system. Fundamentals of surface water hydrology, hydrometeorology, evaporation, precipitation, statistical and probabilistic methods, unit hydrograph, and flood routing.

Prerequisite: ENVE 020 or ESS 020. Letter grade only.

ENVE 112: Subsurface Hydrology [4]

Hydrologic and geologic factors controlling the occurrence and use of groundwater on regional and local scales. Physical, mathematical, geologic, and engineering concepts fundamental to subsurface hydrologic processes. Introduction to ground-water flow and transport modeling, with emphasis on model construction and simulation.

Prerequisite: ENVE 110 or ESS 110. Offered in spring only. Letter grade only.

ENVE 114: Mountain Hydrology of the Western United States [3]

Principles of snow formation, occurrence, and measurement; components of evapotranspiration; runoff generation; groundwater recharge processes; water resource assessments; and resource management. Focus on California and the southwestern US. Design project.

Prerequisite: ENVE 110 or ESS 110. Offered in spring only. Letter grade only.

ENVE 116: Applied Climatology [3]

Spatial and temporal patterns in climate and their association with land surface characteristics and processes. Methods for exploiting these for hypothesis testing, modeling, and forecasting. Applications include seasonal forecasting, ecological modeling, and analysis of processes such as flooding and wildfire.

Prerequisite: ENVE 110 or ESS 110, or consent of instructor.

ENVE 118: Global Change [4]

Detection of, adaptation to, and mitigation of global climate change. Climate-change science, sources, sinks, and atmospheric cycling of greenhouse gases. Societal context for implementing engineered responses. Assessment of options for responding to the threat of climate change.

Prerequisite: CHEM 002.

ENVE 121: Environmental Microbiology [4]

Fundamentals of environmental microbiology: physiology, biochemistry, metabolism, growth energetics and kinetics, ecology, pathogenicity, and genetics, with application to both engineered and natural environmental systems. Specific applications to water, wastewater, and the environmental fate of pollutants.

Prerequisite: BIO 001 and ENVE 020. Letter grade only.

ENVE 130: Meteorology and Air Pollution [4]

Basic physics and thermodynamics of the atmosphere; fundamentals of atmospheric sciences important to environmental problems; chemistry and physics of atmospheric pollutants; visibility; air quality modeling; emissions; and air pollution control strategies.

Prerequisite: ENVE 020 or ESS 020. Offered in spring only. Letter grade only.

ENVE 132: Air Pollution Control [3]

Topics include government regulations, design and economics of air pollution control for point and spatial sources, strategies for regional air pollution control and engineering solutions. Air pollution control for both point and mobile sources is addressed in the context of case studies.

Prerequisite: ENVE 130. Offered in spring only. Letter grade only.

ENVE 140: Water Resources Planning and Management [3]

Quantitative analytical methods in water resources planning and management; introduction to systems analysis, multi-objective planning and risk assessment. Design Project.

Prerequisite: ENVE 020 and ENGR 155. Letter grade only.

ENVE 152: Remote Sensing of the Environment [4]

Fundamentals of electromagnetic remote sensing, concepts of information extraction and applications pertinent to environmental engineering and earth systems science. Topics include remote sensing principles, aerial photography, photogrammetry, image interpretation, image processing, and applications of remote sensing in a range of environmental applications (e..g. water resource, terrestrial ecosystems, climate change and other environmental topics).

Prerequisite: (ICP 001A or MATH 021) and (ICP 001B or PHYS 008). Letter grade only.

ENVE 155: Decision Analysis in Management [4]

Presents the tools of decision science using a quantitative approach with a focus on investment, finance, management, technology and policy decisions. These tools include decision tree analysis, risk and uncertainty analysis, stochastic dominance, the value of information, probability bias, and subjective probability.

Prerequisite: (ECON 100 or MGMT 100) and (ECON 010 or POLI 010), or consent of instructor.

ENVE 160: Sustainable Energy [4]

Current systems for energy supply and use. Renewable energy resources, transport, storage, and transformation technologies. Technological opportunities for improving end-use energy efficiency. Recovery, sequestration, and disposal of greenhouse gases from fossil-fuel combustion.

Prerequisite: ENVE 020 or ESS 020. Offered in fall only. Letter grade only.

ENVE 162: Modeling and Design of Energy Systems [3]

Concepts and applications of solar thermal processes; applications of solar collectors for water heating; active and passive building heating and cooling; fundamentals and design of wind energy systems; economics of solar energy.

Prerequisite: ENGR 135, ENGR 160 and ENVE 160. Offered in spring only. Letter grade only.

ENVE 170: Contaminant Fate and Transport [3]

Properties and behavior of organic and metal contaminants, in soils, groundwater, surface waters, and air. Emphasis on phase transfer and transport for organic compounds; complexation and surface processes for metals. Topics include modeling of environmentally important compounds, photochemical reactions, natural organic matter, sorption phenomena.

Prerequisite: ENVE 100 or ESS 100. Offered in alternate years, fall only. Letter grade only.

ENVE 171: Environmental Organic Chemistry [3]

Processes governing the distribution and transformation of anthropogenic organic chemicals in the environment. Topics include chemical-physical properties of organic chemicals, sorption processes, bioaccumulation, chemical transformations, photochemical transformations, modeling concepts.

Prerequisite: ENVE 100 or ESS 100, or consent of instructor. Offered in fall only.

ENVE 176: Water and Wastewater Treatment [3]

Water treatment, use, reclamation, and reuse. Introduction to modeling and designing treatment systems; both conventional and

advanced technology. Use of mass balances for system evaluation and design. Design project.

Prerequisite: (ENVE 020 or ESS 020) and (ENVE 100 or ESS 100) and ENGR 120. Letter grade only.

ENVE 181: Field Methods in Snow Hydrology [1-3]

Properties and measurement of snow. Principles of snow metamorphism and melting. Field workshops.

Prerequisite: ENVE 110 or ESS 110. Offered in spring only. Pass/No Pass grading only.

ENVE 182: Field Methods in Surface Hydrology [1-3]

Measurement and interpretation of data; stream gauging, hydrography, and limnology exercises; evaporation studies; micrometeorological instruments and methods; discharge measurement; flood plain mapping; preparation of hydrologic reports. Field workshops.

Prerequisite: ENVE 110 or ESS 110.

ENVE 183: Field Methods in Subsurface Hydrology [1-3]

Introduction to fundamental field instruments used for vadose zone and subsurface field investigations. Analysis of groundwater wells and of a (hypothetical) contaminated site. Field workshops.

Prerequisite: ENVE 112. Offered in fall only.

ENVE 184: Field Methods in Environmental Chemistry [1-3]

Introduction to the fundamental field instruments used for environmental chemistry field investigations. Air, water, and soil sample collection and preservation procedures. Particle separation and analysis, ion selective electrodes, colorimetric assays for nutrients and metallic species, extraction of organic species. Experimental design, measurements, and interpretation of data.

Prerequisite: ENVE 100.

ENVE 191: Professional Seminar [1]

Presentation and discussion of professional environmental and water resources engineering practices. Professional ethics and the roles and responsibilities of public institutions and private organizations pertaining to environmental engineering.

ENVE 192: Topics in Environmental Systems [1-6]

Examination of a topic in environmental engineering.

May be repeated for credit.

ENVE 195: Upper Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

ENVE 198: Upper Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ENVE 199: Upper Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ENVIRONMENTAL SYSTEMS

ES 200: Environmental Systems [3]

Exploration of linkages in environmental systems and tools to evaluate important features of those systems. This is done by examining the characteristics of different Earth compartments (pedosphere, lithosphere, biosphere, atmosphere and hydrosphere) in terms of mass and energy balance, residence times and interactions. To provide a context, the we examine how each of these compartments interacts with the global water cycle.

Offered in spring only. Letter grade only.

ES 202: Chemistry and Mineralogy of Soils [3]

Thermodynamics and kinetics of chemical process in soil systems. Topics include the formation and identification of common minerals, adsorption/desorption, precipitation/dissolution, and electrochemical reactions in soils. Graduate requirements include individual additional exercises and preparation of a research paper.

ES 203: Geochemistry of Earth Systems [3]

Quantitative analysis of Earth systems using principles of thermodynamics, kinetics, and isotope geochemistry; solution-mineral equilibrium and phase relations; equilibrium and reactive transport approaches to modeling geochemical processes at ambient and elevated temperatures. Graduate requirements include individual student projects.

ES 204: Organic Geochemistry [3]

Focus on organic chemical reactions in soils and sedimentary environments. Topics include the formation and weathering of natural organic matter and reactions of natural organic matter with pollutants. Graduate requirements include individual additional exercises and preparation of a research paper.

ES 205: Watershed Biogeochemistry [3]

Movement, storage, and transformations involving water, nutrients, and solutes in natural and human impacted watersheds; biological and chemical processes; modeling of biogeochemical processes. Interactions of watersheds with lakes and streams. Graduate requirements include more in-depth investigation of one or more topics and preparation of paper.

ES 206: Instructional Methods in Environmental Systems [3]

Instrumental analytical methods and quantitative analysis applied to the study of environmental materials, including inorganic, organic, and biological substances. Completion of an individual research project and preparation of a project report is required for graduate credit.

ES 207: Environmental Data Analysis [3]

The objective of this class is to provide students with probabilistic and statistical methods to analyze environmental data. This class emphasizes both theoretical and applied aspects of data analysis methods. Weekly lab exercises are from environmental applications. Topics include: distribution, hypothesis test, linear regression, multiple regression, uncertainty analysis, outlier detection, sample design, and spatial and temporal data analysis.

Letter grade only.

ES 208: Surface and Colloid Chemistry of Earth Materials [3]

Surface, colloid, and interfacial chemistry related to soil, environmental, and microbial applications; properties, energetics, and reactivity of surfaces and interfaces of Earth materials; the role of mineral surfaces in promoting and catalyzing chemical phenomena at phase boundaries. Graduate requirements include individual additional exercises and preparation of a research paper.

ES 209: Chemistry and Mineralogy of Earth Materials [3]

Chemical principles, structure, and bonding of minerals and Earth materials, including crystallography (symmetry, space groups, group theory), coordination chemistry, bonding models (valence bond, crystal field, and MO theories), and electronic and magnetic properties.

Prerequisite: ESS 100, CHEM 010 or consent of instructor. May be repeated for credit.

ES 212: Subsurface Hydrology [4]

Hydrologic and geologic factors controlling the occurrence and use of groundwater on regional and local scales. Physical, mathematical, geologic, and engineering concepts fundamental to subsurface hydrologic processes. Introduction to ground-water flow and transport modeling, with emphasis on model construction and simulation. Graduate requirements include completion of advanced analysis in problem sets, completion of a term paper or project, and development of project management skills in the course design project.

ES 214: Mountain Hydrology of the Western United States [3]

Principles of snow formation, occurrence, and measurement; components of evapotranspiration; runoff generation; groundwater recharge processes; water resource assessments; and resource management. Focus on California and the southwestern US. Design project. Graduate requirements include more in-depth investigation of one or more topics and preparation of paper.

ES 218: Global Change [4]

Detection of, adaptation to, and mitigation of global climate change. Climate-change science, sources, sinks, and atmospheric cycling of greenhouse gases. Societal context for implementing engineered responses. Assessment of options for responding to the threat of climate change. Graduate requirements include preparation of a detailed case analysis.

ES 221: Environmental Microbiology [4]

Fundamentals of environmental microbiology: physiology, biochemistry, metabolism, growth energetics and kinetics, ecology, pathogenicity, and genetics, with application to both engineered and natural environmental systems. Specific applications to water, wastewater, and the environmental fate of pollutants. Graduate requirements include additional projects.

ES 224: Terrestrial Ecosystem Ecology [3]

Ecosystem ecology is the study of interactions between organisms and their environment. Focus on energy, water and nutrient flows through the living (plants, animals, microbes) and nonliving (soils, atmosphere) components of ecosystems. We examine both natural and human-modified terrestrial ecosystems. Graduate requirements include preparation and peer review of a research proposal.

ES 225: Microbial Ecology [4]

Advanced study of microbiological systems and techniques. Graduate requirements include additional exercises and preparation of a research paper.

ES 226: Environmental Genomics [4]

Introduction to the principles and methods of genomics as applied to the understanding of ecosystems. Topics include population genetics, adaptation to environmental change, and genomic analysis of environmental microbial communities; experimental and computational methods relevant to environmental genomics. Graduate requirements include additional exercises and preparation of a research paper.

ES 228: Ecological Modeling [3]

An advanced study of modeling population dynamics and the flow of energy and matter in ecosystems. Graduate requirements include additional exercises and preparation of a research paper.

ES 232: Applied Climatology [3]

Spatial and temporal patterns in climate and their association with land surface characteristics and processes. Methods for exploiting these for hypothesis testing, modeling, and forecasting. Applications include seasonal forecasting, ecological modeling, and analysis of processes such as flooding and wildfire.

ES 234: Air Pollution and Resources [3]

Chemistry and physics of atmospheric pollutants, urban air pollution, visibility, mitigation, and resource economics.

Prerequisite: ESS 100 or consent of instructor. May be repeated for credit once.

ES 235: Heat Transfer [4]

Study of conduction, convection, and radiation heat transfer, with applications to engineering problems. Graduate requirements include in-depth investigation of one or more topics and preparation of paper.

ES 236: Advanced Mass Transfer [4]

Steady and unsteady mass diffusion; mass convection, simultaneous heat and mass transfer; Fick's law in a moving medium; similarity and integral methods in mass transfer; high mass transfer theory; research project in mass transport.

Prerequisite: ES 235 or ENGR 135. Offered in spring only. Letter grade only. May be repeated for credit once.

ES 237: Viscous Flows [4]

Study of the Navier-Stokes equations; Stokes' problems; creeping flows; internal and external flows; similarity and integral methods in boundary layer flows; stability and transition to turbulence.

Prerequisite: ES 235 or ENGR 135. Offered in fall only. Letter grade only. May be repeated for credit once.

ES 238: Air Pollution Control [3]

Physical and chemical principles for the capturing of air pollutants. Design of air pollution controls devices for particulate and gaseous pollutants emitted from stationary and mobile sources. State and Federal Regulations for point, mobile and area sources. Economics aspects of air pollution control to meet ambient air quality standards. In case studies, particular issues are addressed as they relate to the San Joaquin Valley.

ES 240: Water Resources Planning and Management [3]

Basic concepts of and issues in water resources management, water resources planning, institutional and policy processes. Quantitative analytical methods in water resources planning and management; introduction to systems analysis, multi-objective planning, and risk assessment. Design project. Graduate requirements include preparation of a detailed case analysis.

ES 252: Remote Sensing of the Environment [3]

Fundamentals of electromagnetic remote sensing, concepts of information extraction, and applications pertinent to environmental engineering and Earth systems science. Emphasis on water and other resource management topics. Graduate requirements include in-depth investigation of one or more remote sensing applications and preparation of a paper.

ES 260: Sustainable Energy [4]

Current systems for energy supply and use. Renewable energy resources, transport, storage, and transformation technologies. Technological opportunities for improving end-use energy efficiency. Recovery, sequestration, and disposal of greenhouse gases from fossil-fuel combustion. Graduate requirements include preparation of a detailed case analysis.

ES 262: Modeling and Design of Energy Systems [3]

Concepts and applications of solar thermal processes; applications of solar collectors for water heating; active and passive building heating and cooling; fundamentals and design of wind energy systems; economics of solar energy. Graduate-level requirements include preparation of a detailed case analysis.

ES 270: Contaminant Fate and Transport [3]

Properties and behavior of organic and metal contaminants, in soils, groundwater, surface waters, and air. Emphasis on phase transfer and transport for organic compounds; complexation and surface processes for metals. Topics include modeling of environmentally important compounds, photochemical reactions, natural organic matter, sorption phenomena. Graduate-level requirements include preparation of a detailed case analysis.

ES 291: Environmental Systems Seminar [1-3]

Seminar on advanced engineering and science topics, environmental systems research, and relevant case studies.

Offered in fall and spring. Satisfactory/Unsatisfactory grading only. May be repeated for credit once.

ES 292: Topics in Environmental Systems [1-6]

Treatment of a special topic or theme in environmental systems.

May be repeated for credit in a different subject area.

ES 295: Graduate Research [1-12]

Supervised research.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

ES 298: Directed Group Study [1-12]

Group project under faculty supervision.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

ES 299: Directed Independent Study [1-12]

Independent project under faculty supervision.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

EARTH SYSTEMS SCIENCE

ESS 001: Introduction to Earth Systems Science [4]

An introduction to basic principles of earth systems for non-science majors and prospective

majors. A multidisciplinary approach that draws from geology, chemistry, physics, and biology to understand how the Earth functions as a complex system, and the role and impact of human beings on earth systems.

ESS 005: Introduction to Biological Earth Systems [4]

An introduction to basic principles of coupled biological and earth systems for non-science majors and prospective majors. An interdisciplinary approach that combines concepts from biology and earth science to understand how the Earth functions as a biological incubator, the origin and evolution of molecular life, the rise of complex biological and ecological earth systems, human impacts, and the sustainable Earth.

ESS 010: Earth and Society [4]

We are users and changers of our planet. We discuss the materials and resources our planet supplies to human society, the impact of natural disasters on human history and sociological development, and anthropogenic influences on climate, land use, and sustainable resources.

ESS 012: Geology of California [4]

Introduction to the geology of California for non-science majors. A tour of the major geologic features of our state, its geologic hazards, and its natural earth resources in the context of basic plate tectonics and earth science principles.

ESS 020: Fundamentals of Earth Processes [4]

Introduction to Earth science with emphasis on physical and chemical processes that have shaped our planet through time; topics include plate tectonics, mountain building, mineral and rock formation, weathering, and landscape and soil formation. Weekly laboratories focus on the practical study of earth processes, materials, and history.

Prerequisite: (ESS 001, ESS 005, BIO 001 or CHEM 002) and (MATH 021 or ICP 001A).

ESS 025: Introduction to Ecosystem Science [4]

Fundamentals of ecosystem science; organization, function and development of ecological systems; energy and mass flow; biogeochemical cycling; biodiversity, population dynamics, and sustainability.

Prerequisite: (ESS 001, ESS 005, BIO 001) and (ICP 001A or MATH 021) and (ICP 001B or PHYS 008).

ESS 040: Air Quality, Air Resources and Environmental Health [4]

A survey of principles and issues related to air quality and resources from global to regional scales, including evolution of the earth's atmosphere, urban smog formation, visibility, acid rain, stratospheric and tropospheric ozone, effects of meteorology on air pollution, air pollution transport across political boundaries, and health effects of exposure to air pollution.

ESS 050: Ecosystems of California [4]

An introduction to ecological principles and processes through the examination of California's varied ecosystems; discussion of native and invasive species, land use, human impacts, and biodiversity; two Saturday field trips to a variety of California habitats.

ESS 060: Global Environmental Change [4]

History, causes, and consequences of anthropogenic and natural changes in the atmosphere, oceans, and terrestrial ecosystems; geologic evidence for glacial cycles and climate changes, modern marine and atmosphere circulation, greenhouse gases, deforestation and species extinctions, and human population growth and impacts on climate and resources.

ESS 070: Soil Foundations of Terrestrial Ecosystems [4]

Examines the physical, chemical and biological properties of soils that influence terrestrial and freshwater ecosystems. Topics include processes that control soil formation, evolution, development, and chemical properties. Particular emphasis is placed on the quantitative descriptions of energy nutrient and contaminant fluxes into, out of and through soils.

Prerequisite: (ESS 001 or BIO 001) and CHEM 002.

ESS 090X: Freshman Seminar [1]

Examination of a topic in earth systems science.

Pass/No Pass grading only.

ESS 095: Lower Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

ESS 098: Lower Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ESS 099: Lower Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ESS 100: Environmental Chemistry [4]

Chemical principles of Earth and environmental systems focusing on environmental processes in water, soil, and air. Emphasis on acid-base chemistry, aqueous speciation, mineral and gas solubility, oxidation and reduction, and isotopes.

Prerequisite: CHEM 010 and (MATH 022, ICP 001B or PHYS 008).

ESS 102: Chemical Processes in the Soil Environment [3]

Thermodynamics and kinetics of chemical process in soil systems. Topics include the formation and identification of common minerals, adsorption/desorption, precipitation/dissolution, and electrochemical reactions in soils.

Prerequisite: ENVE 100 or ESS 100. Letter grade only.

ESS 103: Geochemistry of Earth Systems [3]

Quantitative analysis of earth systems using principles of thermodynamics, kinetics, and isotope geochemistry; solution-mineral equilibrium and phase relations; equilibrium and reactive transport approaches to modeling geochemical processes at ambient and elevated temperatures.

Prerequisite: ENVE 100 or ESS 100. Letter grade only.

ESS 104: Organic Geochemistry [3]

Focus on organic chemical reactions in soils and sedimentary environments. Topics include the formation and weathering of natural organic matter and reactions of natural organic matter with pollutants.

Prerequisite: ENVE 100 or ESS 100. Letter grade only.

ESS 105: Watershed Biogeochemistry [3]

Movement, storage, and transformations involving water, nutrients, and solutes in natural and human impacted watersheds; biological and chemical processes; modeling of biogeochemical processes. Interactions of watersheds with lakes and streams.

Prerequisite: (ENVE 100 or ESS 100) and (ENVE 110 or ESS 110). Letter grade only.

ESS 106: Instrumental Methods in Environmental Systems [3]

Instrumental analytical methods and quantitative analysis applied to the study of environmental materials, including inorganic, organic, and biological substances.

Prerequisite: ENVE 100, ESS 100 or CHEM 010.

ESS 108: Surface and Colloid Chemistry of Earth Materials [3]

Surface, colloid, and interfacial chemistry related to soil, environmental, and microbial applications; properties, energetics, and reactivity of surfaces and interfaces of Earth materials; the role of mineral surfaces in promoting and catalyzing chemical phenomena at phase boundaries.

Prerequisite: ENVE 100 or ESS 100. Letter grade only.

ESS 109: Inorganic Chemistry of Earth's Materials [3]

Chemical principles, structure, and bonding of minerals and Earth materials, including crystallography (symmetry, space groups, group theory), coordination chemistry, bonding models (valence bond, crystal field, and MO theories), and electronic and magnetic properties.

Prerequisite: ESS 100, ENVE 100 or CHEM 010.

ESS 110: Hydrology and Climate [4]

Basics of the hydrological cycle and the global climate system. Fundamentals of surface water

hydrology, hydrometeorology, evaporation, precipitation, statistical and probabilistic methods, unit hydrograph, and flood routing.

Prerequisite: ENVE 020 or ESS 020. May be repeated for credit once.

ESS 120: Geomicrobiology [4]

Fundamentals of microbiology related to earth systems, including biogeochemical cycling, microbial metabolism and biodiversity, soil food webs, and genomics.

Prerequisite: CHEM 010 and (MATH 022, ICP 001B or PHYS 008).

ESS 124: Terrestrial Ecosystem Ecology [4]

Ecosystem ecology is the study of interactions between organisms and their environment. Focus on energy, water and nutrient flows through the living (plants, animals, microbes) and nonliving (soils, atmosphere) components of ecosystems. Examines both natural and human-modified terrestrial ecosystems.

Prerequisite: Junior standing and (BIO 148 or ESS 025). Letter grade only.

ESS 125: Microbial Ecology [4]

Advanced study of microbiological systems and techniques.

Prerequisite: ESS 120. Letter grade only.

ESS 126: Environmental Genomics [4]

Introduction to the principles and methods of genomics as applied to the understanding of ecosystems. Topics include population genetics, adaptation to environmental change, and genomic analysis of environmental microbial communities; experimental and computational methods relevant to environmental genomics.

Prerequisite: BIO 141 or ESS 120. Letter grade only.

ESS 128: Theoretical Ecology [4]

Advanced study of the application of theoretical and quantitative methods for the analysis and interpretation of populations, communities and ecosystems.

Prerequisite: MATH 022 and BIO 145. Letter grade only.

ESS 131: Atmospheric Chemistry and Physics [4]

Chemistry and physics of the troposphere and stratosphere, including atmospheric aerosols.

Prerequisite: CHEM 008, PHYS 009 and (ESS 020 or ENVE 020).

ESS 132: Applied Climatology [3]

Spatial and temporal patterns in climate and their association with land surface characteristics and processes. Methods for exploiting these for hypothesis testing, modeling, and forecasting. Applications include seasonal forecasting, ecological modeling, and analysis of processes such as flooding and wildfire.

Prerequisite: ENVE 110 or ESS 110, or consent of instructor.

ESS 134: Air Pollution and Resources [3]

Chemistry and physics of atmospheric pollutants, urban air pollution, visibility, mitigation, and resource economics.

Prerequisite: ESS 100 or ENVE 100.

ESS 141: Environmental Science Policy [4]

In depth-analysis of environmental case studies. Focus on science critical to policy development and implementation, the policy-making process, and policy outcomes. Special emphasis on interaction between scientific information and policy-making. Example topics include Western water resources, biodiversity conservation, and global warming. Emphasis on written and oral communication and critical analysis.

Prerequisite: WRI 010 and (any course in BIO, ESS, ENVE, POLI or ECON).

ESS 147: Astrobiology [4]

Astrobiology refers to the study of the origin and evolution of life in the cosmos. It is an integrative, multidisciplinary field that includes areas of biology, astronomy, geology, chemistry and physics. Students in the class face some of the most fundamental topics addressed by science today such as who we are, where we came from, and where we might go. We cover three main themes: How did life begin and evolve? Does life exist elsewhere in the universe? What is life's future on Earth and beyond?

Prerequisite: CORE 001 and (BIO 001, BIO 005, PHYS 006, CHEM 002 or ESS 001), or consent of instructor. Letter grade only.

ESS 149: Conservation Biology [4]

Detailed examination of the evolutionary, ecological, management, and policy issues related to the conservation of ecosystems, species, and genetic diversity. Theory and practical aspects of biological conservation are presented, with special reference to case studies from California.

Prerequisite: BIO 001 and (MATH 018 or MATH 032). BIO 148 recommended. Letter grade only.

ESS 150: Geomorphology and Surface Processes [4]

Observation and analysis of earth surface processes and the development of landforms and landscape. The interaction between surficial processes and tectonic, biologic, hydrologic, climatic, and atmospheric processes. Evaluation of environmental hazards and engineering solutions.

Prerequisite: ESS 020 or ENVE 020.

ESS 180: Field Methods in Earth Systems [4]

Field techniques in chemistry, hydrology, geology, ecology, and microbiology, emphasizing principles of measurement, observation, and interpretation; integration of diverse data sets.

Prerequisite: CHEM 010 and (MATH 022, ICP 001B or PHYS 008).

ESS 190: Undergraduate Seminar [1]

Weekly seminar of current topics in earth and environmental systems.

Prerequisite: Junior standing. Pass/No Pass grading only.

ESS 192: Topics in Environmental Systems [1-6]

Treatment of a special topic or theme in Environmental Systems. May be repeated for credit in a different subject area.

Prerequisite: Junior standing or consent of instructor. May be repeated for credit with different topics.

ESS 195: Upper Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

ESS 198: Upper Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ESS 199: Upper Division Individual Study [1-5]

Prerequisite: Junior standing. Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

FRENCH

FRE 001: Elementary French I [4]

Introduction to speaking, reading, writing and understanding French. Classes conducted in French.

Letter grade only.

FRE 002: Elementary French II [4]

Introduction to speaking, reading, writing and understanding French. Classes conducted in French.

Prerequisite: FRE 001. Letter grade only.

FRE 003: Intermediate French I [4]

A review of French grammar with emphasis on building speaking and writing skills and on reading to build cultural understanding. Classes conducted in French.

Prerequisite: FRE 002. Letter grade only.

FRE 004: Intermediate French II [4]

A review of French grammar with emphasis on building speaking and writing skills and on reading to build cultural understanding. Classes conducted in French.

Prerequisite: FRE 003. Letter grade only.

FRE 095: Lower Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

FRE 098: Lower Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

FRE 099: Lower Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

GLOBAL ARTS STUDIES PROGRAM

GASP 001: Introduction to Global Arts Studies [4]

Study of global arts with an integrated approach that examines visual arts, music, and a variety of other subjects offered by the Global Arts Studies Program.

Letter grade only.

GASP 002: Introduction to Music Studies [4]

Explores the fundamentals of music through various idioms, genres and traditions.

Letter grade only.

GASP 003: Introduction to Visual Culture [4]

An introduction to visual material in art and mass media from cultures throughout the world. Emphasizes the development of students' own critical skills in analyzing and understanding visual culture. Topics include artworks from the antiquity to postmodernism, as well as issues in mass media, pop culture, and cyberspace.

Letter grade only.

GASP 004: Introduction to Arts and Cultural Studies [4]

Introduction to a range of debates in cultural studies concerned with the impact race, gender, sexuality and class, for example, exert on cultural production, cultural identity and representation and/or aesthetics.

Letter grade only.

GASP 005: Introduction to Arts and Technology [4]

Familiarizes students with academic debates regarding the relationship between technology writ large and artistic production, distribution and consumption - as well as creation, critique and pleasure.

Letter grade only.

GASP 012: Asia Pacific Art [4]

Introduces students to the artistic traditions of cultures within Asia and/or the Pacific Ocean region.

Letter grade only.

GASP 013: Latin American Art [4]

Introduces students to the artistic traditions of Latin American cultures.

Letter grade only.

GASP 021: Ethnomusicology [4]

Introduces and familiarizes students with the theoretical and methodological issues and concerns in the field of ethnomusicology.

Letter grade only.

GASP 023: Music of Asia Pacific [4]

Introduces and familiarizes students with a musical tradition from Asia and/or the Pacific Ocean.

Letter grade only.

GASP 025: Music of the Middle East [4]

Introduces and familiarizes students with a musical tradition from the Middle East.

Letter grade only.

GASP 031: Critical Popular Music Studies [4]

Introduces students to current concerns in critical popular music studies, including issues of identity (e.g., race, gender) and representation. Students learn a variety of theories used in critical analyses of popular music. They also learn various methodological approaches used to research popular music.

Letter grade only.

GASP 034: The American Musical [4]

Explores the relationship between the American musical and American-ness. Ideas about what it means to be an American have been expressed on the musical stage and have both reflected and helped form those ideas. Readings help link ideas about America and Americans as well as the historical contexts for the songs and narratives of the musicals.

Letter grade only.

GASP 095: Lower Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

GASP 098: Lower Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

GASP 099: Lower Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

GASP 101: Visual Arts of the Twentieth Century [4]

Surveys major artists and ideas in the twentieth century with a global perspective. Students read pertinent critical theories and examine artworks from around the world in their cultural, social and political contexts.

Letter grade only.

GASP 102: Asian American Art [4]

Examines the artistic production of American artists of Asian descent (both foreign and U.S. born). This class provides an overview of these artists' works in relation to issues of diaspora, immigration policies, social and civic engineering, racial relations, as well as formal and stylistic developments.

Prerequisite: Junior standing. Letter grade only.

GASP 135: African American Music [4]

Focuses on a central question: how do we locate African American music, i.e., how can we define African American music? In attempting to answer this question, we think through concepts such as authenticity, representation, recognition, cultural ownership, appropriation, origin(s).

Prerequisite: Junior standing. Letter grade only.

GASP 141: History & Practice of Photography [4]

In this course students examine critical texts on the history and theory of photography, study the work of photographers from diverse backgrounds, and investigate cultural and socio-political issues in photographic practice and production. Students will also learn some basic techniques of taking photographs through various in-class exercises and assignments.

Prerequisite: Sophomore standing and any lower-division GASP or ARTS course. Letter grade only.

GASP 151: Topics in Visual Culture [4]

Special topics in the study of visual culture in a global context.

Prerequisite: Junior standing. Letter grade only.

GASP 152: Topics in Music Studies [4]

Focuses on a combination of individual and group research projects in music studies.

Prerequisite: Junior standing. Letter grade only.

GASP 175: Race and Nationalism in American Art [4]

Addresses issues concerning pictorial representations of racial and national identities in twentieth-century American art through readings of historical, cultural, and sociopolitical documents and theories. Special emphasis is placed on artists who are considered outside the

canon and on debates relating to assimilation and nationalism.

Prerequisite: GASP 001 and junior standing, or consent of instructor. Letter grade only.

GASP 195: Upper Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

GASP 198: Upper Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

GASP 199: Upper Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

GEOGRAPHY

GEOG 010: Introduction to Spatial Analysis [4]

Teaches the value of geography as a basis for organizing and discovering information; the nature and meaning of maps, and the concepts and tools for spatial analysis: the description, organization, linkage, manipulation and communication of geographical information.

GEOG 141: Environmental Science and Policy [4]

In depth-analysis of environmental case studies. Focus on science critical to policy development and implementation, the policy-making process and policy outcomes. Special emphasis on interaction between scientific information and policy-making. Example topics include Western water resources, biodiversity conservation and global warming. Emphasis on written and oral communication and critical analysis.

Prerequisite: Any course in BIO, ESS, ENVE, POLI or ECON, or consent of instructor.

GEOG 142: Geography of Resource Management [4]

Climate and biogeography of Western US relevant to Forestry, Fire, and Water Resources management introduced via the writings of 19th Century explorers and surveyors of the West and recent scientific literature. Analyze role of climate and biogeographic information in public resource management policy debates of 1870s-1910s versus present day. Geographic perspective on long term repercussions of early 20th Century resource management policy choices.

Prerequisite: Any course in HIST, LIT, PUBP, BIO, ENVE or ESS, or consent of instructor.

HUMAN BIOLOGY

HBIO 190: Research Seminar [1]

Student-led presentations of current topics in human biology, including independent research presentations.

Prerequisite: Junior standing. Permission of instructor required.

HBIO 195: Research Project in Human Biology [1-5]

Group or individual research projects in human biology under the direction of a BIO faculty member and a faculty member from the School of Social Sciences, Humanities and the Arts.

Prerequisite: Junior standing. Permission of instructor required. May be repeated for credit.

HBIO 198: Directed Group Study in Human Biology [1-5]

Group directed study in human biology under the direction of a BIO faculty member and a faculty member from the School of Social Sciences, Humanities and the Arts.

Prerequisite: Junior standing. Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

HBIO 199: Directed Independent Study in Human Biology [1-5]

Independent study in human biology under the direction of a BIO faculty member and a faculty member from the School of Social Sciences, Humanities, and the Arts.

Prerequisite: Junior standing. Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

HISTORY

HIST 005: History of Cartography [4]

Interpretation of historical maps from East Asia, the Islamic world, Europe, and indigenous societies, and the relationship of map making traditions to state power, science, religion, and other areas of thought and practice. The final unit of the course addresses GIS and mapping in the computer age.

HIST 010: Introduction to World History to 1500 [4]

World History from the origins of civilization to the European encounter with the Americas. Major topics include the growth of human populations, the rise of empires and states, routes of trade and migration, the spread of ideas and religions, and the impact of human settlement upon the natural world.

Letter grade only.

HIST 011: Introduction to World History Since 1500 [4]

World history from the European encounter with the Americans to the present century. Major topics include colonization and decolonization, the rise of modern imperialism, capitalism and its opponents, urbanization and mass communication, technologies for war and peace, and the impact of human settlement upon the natural world.

Prerequisite: HIST 010 or consent of instructor.

HIST 016: Forging of the United States, 1607-1877 [4]

The history of the U.S. from colonial roots through the Civil War and Reconstruction. Major topics include the coming of the Revolution, the impact of slavery on the development of the United States, westward expansion, and the creation of a distinctively American culture.

HIST 017: The Modern United States, 1877-Present [4]

The history of the United States from the Gilded Age through the early 21st century. Major topics include the impact of the Industrial Revolution on American life, the rise of the U.S. to a world power, the changing role of the federal government, and the ongoing struggle for civil rights.

HIST 020: History of the American West 1500-1849 [4]

Focuses upon the age of discovery, the idea of the frontier, and the impact of westward expansion upon the indigenous people of the West.

HIST 021: History of the American West, 1850-2000 [4]

The history of the idea of the west in the United States from the aftermath of the California Gold Rush to the rise of the Silicon Valley. Emphasis is upon the various roles that technology and the modern notion of the frontier played in the settlement and exploitation of the west before and after the Civil War.

Prerequisite: HIST 020.

HIST 030: Early European History [4]

A survey of the economic, social/cultural, and political history of Europe from the emergence of early societies to the advent of modern Europe.

HIST 031: Modern European History [4]

A survey of the economic, social/cultural and political history of Europe from the early modern era to the present day.

HIST 060: The Silk Road [4]

For millennia, monks, merchants, warriors and brides traveled a network of routes throughout Eurasia, exchanging religious beliefs, disease pathogens, foodstuffs and luxury goods. This interdisciplinary and multi-media course examines the Silk Road through maps, art, travel narratives, archaeological reports, and other genres.

Prerequisite: HIST 010 or HIST 011, or consent of instructor.

HIST 070: History of Islam I: From Muhammad to the Caliphate [4]

Fundamental principles of the Islamic religion, the emergence of Islam under the Prophet

Muhammad, and the expansion of Islam under the First Four Caliphs to 661 A.D. Students examine Islam as a religion, a historical phenomenon, and a cultural impulse.

HIST 071: History of Islam II: From the Caliphate to the Present [4]

Covers the spread of Islam from the end of the Era of Rightly Guided Caliphs (661 AD) until the present, including Islamic empires, art and culture, colonialization and the contemporary Muslim world; and cultural and political contacts between Islam and the West.

HIST 090X: Freshman Seminar [1]

Examination of a topic in history.

May be repeated for credit.

HIST 095: Lower Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

HIST 098: Lower Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

HIST 099: Lower Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

HIST 100: The Historian's Craft [4]

Focuses upon the various techniques of research and writing used by historians, from Thucydides to the so-called revisionists of today's "culture wars," and the changing audience of the historian.

Prerequisite: Junior standing or consent of instructor.

HIST 108: Topics in World History [4]

Topics in the field of World History.

May be repeated twice with different topics Prerequisite: HIST 010 and HIST 011, or consent of instructor. Letter grade only. May be repeated for credit twice with different topics.

HIST 109: Topics in the History of Science and Technology [4]

Addresses the relationship between historical change and significant scientific or technological developments. Possible areas include technologies of war, scientific revolutions, agricultural intensification, hydrology or other topics as determined by the instructor.

Prerequisite: (HIST 010 and HIST 011) or (HIST 016 and HIST 017) or HIST 100, or consent of instructor. Letter grade only. May be repeated for credit twice with different topics.

HIST 110: Climate Change and World History [4]

Draws upon both environmental science and history to examine how the rise and fall of civilizations; the evolution of farming, pastoralism, and trade; the course of wars, and patterns of migration have been affected by fluctuations in temperature and rainfall. It also examines how humans have contributed to climate change.

Prerequisite: One lower-division HIST or ESS recommended.

HIST 117: Topics in Regional or State History [4]

In-depth study of a particular topic in the history of a region or state. Possible topics include the social, cultural, economic, or political history of that region or state.

May be repeated for credit twice with different topics. Prerequisite: (HIST 010 and HIST 011) or (HIST 016 and HIST 017) or HIST 100, or consent of instructor. May be repeated for credit twice with different topics.

HIST 118: Topics in Environmental History [4]

In-depth study of a particular topic in environmental history. Possible topics include the impact of industrialization upon the natural world, the changing notion of "wilderness," the role of national parks, California's "water wars," and others.

Prerequisite: (HIST 010 and HIST 011) or (HIST 016 and HIST 017) or HIST 100, or consent of instructor. May be repeated for credit twice with different topics.

HIST 119: Topics in the History of Migration and Immigration [4]

In-depth study of a particular topic in the history of migration and/or immigration. Possible topics include the origins and history of America's culturally diverse population with a focus upon the experiences of European, Native, African, Chicano/Latino and Asian Americans.

May be repeated twice with different topics. Prerequisite: (HIST 010 and HIST 011) or (HIST 016 and HIST 017) or HIST 100, or consent of instructor. May be repeated for credit twice with different topics.

HIST 120: Essence of Decision: Case Studies in History [4]

Examines the art and science of decision-making with specific examples from historical case studies. The focus is upon the historical determinates of both successful and unsuccessful decisions, and upon decisions that had both foreign policy and domestic implications.

Prerequisite: HIST 016 and HIST 017, or consent of instructor.

HIST 124: African American History from Slavery to Civil Rights [4]

Examines the history of African Americans from the era of slavery through emancipation, Jim Crow segregation, and the Civil Rights and Black Power movements. Topics include the development of a distinct African American culture as well as political movements ranging from abolitionism to black nationalism.

Prerequisite: Junior standing or consent of instructor. Lower-division survey in American literature or history recommended. Letter grade only.

HIST 128: The United States and the Vietnam War [4]

Examines the roots and conduct of the war from the initial American involvement after World War II through the withdrawal of American troops in 1973. Additionally, students explore the way in which the war both reflected and amplified divisions within American society during this period.

Prerequisite: HIST 016 or HIST 017, or consent of instructor.

HIST 130: The Cold War, 1941-1991 [4]

The political, cultural, and intellectual history of America's confrontation with Communist at home and abroad, from U.S. entry into the Second World War to the collapse of the Soviet Union and its aftermath.

Prerequisite: HIST 016 and HIST 017, or consent of instructor.

HIST 131: Topics in National History: "Manifest Destiny:" The United States and the World, 1840s-Present [4]

Beginning with the Mexican-American war and the conquest of the West, this seminar examines the way in which the U.S. has aggressively expanded its role on the world stage. Major themes include the impact of economics and religion and ongoing debates over globalization and imperialism.

Prerequisite: (HIST 010 and HIST 011) or (HIST 016 and HIST 017) and HIST 100, or consent of instructor. HIST 100 may be taken concurrently. May be repeated for credit twice with different topics.

HIST 132: Intelligence and National Security, 1945-2000 [4]

Focuses upon the roles that intelligence and espionage have played in U.S. national security since 1945. A particular emphasis lies in those historical instances where technical intelligence had a part in resolving, or avoiding, major Cold War crises.

Prerequisite: HIST 016 and HIST 017, or consent of instructor.

HIST 134: History and Literature of the Great Depression [4]

Focusing on the turbulent decade of the 1930s, we use the lens of history and literature to explore how events from 1929 - 1941 helped shape modern America. Particular attention is paid to the impact of these years upon California and the West.

Prerequisite: Junior standing and (LIT 020, LIT 021, HIST 016 or HIST 017). Letter grade only.

HIST 135: History and Literature of the 1960s [4]

Examines American politics, culture, and society in the 1960s. Topics include civil rights, feminism, the Vietnam War, the Beat and other counterculture movements, and the sexual revolution.

Prerequisite: LIT 030, LIT 031, HIST 016 or HIST 017. Letter grade only.

HIST 139: Topics in United States History [4]

Topics in the History of the United States.

Prerequisite: HIST 016 and HIST 017, or consent of instructor. May be repeated for credit twice with different topics.

HIST 150: The Cold War, 1941-1991 [4]

The political, cultural, and intellectual history of America's confrontation with Communism at home and abroad, from U.S. entry into the second World War to the collapse of the Soviet Union and its aftermath.

Prerequisite: HIST 016 and HIST 017, or consent of instructor.

HIST 165: From Tang to Song: China in the Medieval World [4]

During the period from the seventh to the fourteenth century, China was the world's most wealthy, powerful and technologically sophisticated society. This time of social transformation also set the course for the later imperial era. We examine the history and achievements of middle period China in the context of the wider Eurasian world.

Prerequisite: HIST 010, HIST 011and junior standing, or consent of instructor.

HIST 171: Modern European Intellectual History [4]

Examines the ideas and ideologies which transformed modern Europe: the French Revolution, nationalism, totalitarianism, the world wars, and the Cold War. Throughout, we place the major (and lesser) figures of the modern European intellectual scene in relation (or contrast) to the political and social scene in which they found themselves.

Prerequisite: HIST 030 or HIST 031, or consent of instructor.

HIST 179: Topics in European History [4]

In-depth study of a particular topic in the history of Europe. Possible topics include the social, cultural, economic, or political/diplomatic history of Europe.

Prerequisite: (HIST 010 and HIST 011) or (HIST 030 and HIST 031), or consent of instructor. May be repeated for credit twice with different topics.

HIST 190: Applied Research [4]

Directed individual or group project designed around either an internal UCM faculty-directed research project or that of external agency in an area of vital public interest. End product may be in the form of a written report, interpretive text for the public, web site, etc. Extensive writing is required.

Prerequisite: HIST 100 and junior standing.

HIST 191: Senior Thesis [4]

Capstone course for majors. Completion of a senior thesis. Extensive writing required.

Prerequisite: HIST 190 and senior standing.

HIST 193: Advanced Thesis Research [4]

Advanced thesis research. Part of a two-semester sequence. Recommended for students considering graduate school in History. Extensive writing required.

Permission of instructor required. Prerequisite: HIST 190 and senior standing. Permission of instructor required.

HIST 194: Honors Thesis [4]

Students write a 50-100 page Honors thesis under the supervision of a faculty mentor.

Prerequisite: HIST 193 and senior standing. Permission of instructor required.

HIST 195: Upper Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

HIST 196: Internship in History [4]

Oversight and structure for a student's internship in a field related to History. Students are required to write an original research paper based on the internship.

Prerequisite: Junior standing. Permission of instructor required. Pass/No Pass grading only. May be repeated for credit twice.

HIST 198: Upper Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

HIST 199: Upper Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

HIST 200: The Uses and Abuses of the Past: History's Role in Society [4]

Examines the role of history, and the historian, in modern American society. Topics to be considered include the various potential roles of the historian as writer and biographer, curator, social critic, ethicist, and the phenomenon of "history for hire."

HIST 295: Graduate Research [1-12]

Supervised research.

Permission of instructor required. May be repeated for credit.

HIST 298: Directed Group Study [1-12]

Group project under faculty supervision.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

HIST 299: Directed Independent Study [1-12]

Independent project under faculty supervision.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

INTEGRATED CALCULUS AND PHYSICS

ICP 001A: Integrated Calculus and Physics: Calculus Component [4]

Introduction to differential and integral calculus of a single variable together with an introduction to kinematics and dynamics. For the most part, we cover the same subject material as Math 21 and Phys 8, but the structure of the course is designed to teach the two subjects in a cohesive fashion, emphasizing their historic and logical connections. Students receive a separate grade for the calculus component (ICP 1A) and the physics component (ICP 1B). ICP 001B must be taken concurrently.

Prerequisite: MATH 005 or equivalent score on Math Placement Exam.

ICP 001B: Integrated Calculus and Physics: Physics Component [4]

Introduction to differential and integral calculus of a single variable together with an introduction to kinematics and dynamics. For the most part, we cover the same subject material as Math 21 and Phys 8, but the structure of the course is designed to teach the two subjects in a cohesive fashion, emphasizing their historic and logical connections. Students receive a separate grade for the calculus component (ICP 1A) and the physics component (ICP 1B). ICP 001A must be taken concurrently.

Prerequisite: MATH 005 or equivalent score on Math Placement Exam.

JAPANESE

JPN 001: Elementary Japanese I [4]

Introduction to speaking, reading, writing and understanding modern Japanese.

Letter grade only.

JPN 002: Elementary Japanese II [4]

Introduction to speaking, reading, writing and understanding modern Japanese.

Prerequisite: JPN 001. Letter grade only.

JPN 003: Intermediate Japanese I [4]

Continuation of elementary Japanese. Emphasizes the further development of speaking, writing and reading skills, with an intensive review of basic grammar as well as an introduction to more advanced grammar and vocabulary.

Prerequisite: JPN 002. Letter grade only.

JPN 004: Intermediate Japanese II [4]

Continuation of elementary Japanese and Japanese 3. Emphasizes the further development of speaking, writing and reading skills, with an intensive review of basic grammar as well as an introduction to more advanced grammar and vocabulary.

Prerequisite: JPN 003. Letter grade only.

JPN 103: Advanced Japanese I [4]

Continuation of Intermediate Japanese II. Emphasizes the further development of reading, writing and speaking Japanese, with learning social and cultural issues of contemporary Japanese society.

Prerequisite: JPN 004 or consent of instructor. Letter grade only.

JPN 104: Advanced Japanese II [4]

Continuation of Advanced Japanese II. Emphasizes the further development of reading, writing and speaking Japanese, with learning social and cultural issues of contemporary Japanese society.

Prerequisite: JPN 103 or consent of instructor. Letter grade only.

LITERATURE

LIT 020: Introduction to World Culture and Literature I [4]

Introduction to the connections between language, literature, and culture over time and across national traditions through a variety of literary genres. Introduces the masterworks of world literature in their cultural contexts, through comparative analysis.

Prerequisite: WRI 001 or passing score on the entry level analytical writing placement exam or equivalent.

LIT 021: Introduction to World Culture and Literature II [4]

Introduction to the connections between language, literature, and culture over time and across national traditions through a variety of literary genres. Introduces the masterworks of world literature in their cultural contexts, through comparative analysis.

Prerequisite: WRI 001 or passing score on the entry level analytical writing placement exam or equivalent.

LIT 030: Introduction to American Literature I [4]

Survey of the history and major works of literature of the United States from colonial times to the present, with a special emphasis on the range of American cultural traditions in a comparative context.

Prerequisite: WRI 001 or passing score on the entry level analytical writing placement exam or equivalent.

LIT 031: Introduction to American Literature II [4]

Survey of the history and major works of literature of the United States from colonial times to the present, with a special emphasis on the range of American cultural traditions in a comparative context.

Prerequisite: WRI 001 or passing score on the entry level analytical writing placement exam or equivalent.

LIT 032: American Women Writers [4]

Selected works of writers from pre-Columbian to the present, with an emphasis on social, cultural and historical constraints on women's arts; the rise in feminist artistic strategies; and contemporary trends in literary production. Includes some study of influences on American women writers.

Prerequisite: WRI 001 or passing score on the entry level analytical writing placement exam or equivalent. Letter grade only.

LIT 040: Introduction to British Literature I [4]

Survey of the history and major works of the literature of the British Isles from the Middle Ages to the present.

Prerequisite: WRI 001 or passing score on the entry level analytical writing placement exam or equivalent.

LIT 041: Introduction to British Literature II [4]

Survey of the history and major works of the literature of the British Isles from the Middle Ages to the present.

Prerequisite: WRI 001 or passing score on the entry level analytical writing placement exam or equivalent. Letter grade only.

LIT 042: British Women Writers [4]

From selected works of British women writers, we include a variety of texts, from early religious treatise through the birth of the British novel and beyond. Students study economic, social and cultural constraints, and examine the relationship between historical context and artistic production of women writers.

Prerequisite: WRI 001 or passing score on the entry level analytical writing placement exam or equivalent. Letter grade only.

LIT 050: Introduction to Hispanic Literature I [4]

Survey of the history and major works of Peninsular, Latin American and Latino literatures until the nineteenth century.

Prerequisite: SPAN 004, SPAN 011 or equivalent score on the Spanish Placement Exam.

LIT 051: Introduction to Hispanic Literature II [4]

Survey of the history and major works of Peninsular, Latin American and Latino literatures from the 19th. C to the 21st. C.

Prerequisite: SPAN 004, SPAN 011 or equivalent score on the Spanish Placement Exam.

LIT 055: Introduction to Portuguese and Brazilian Literature and Culture [4]

Emphasis on reading and discussion of literary texts representative of different literary movements and authors of the Luso-Brazilian world. Discussion of significant historical, social and cultural trends in the Portuguese-speaking world. We focus on Portugal, Azores, Portuguese Africa, the Portuguese in the United States and Brazil.

LIT 061: Hispanic/Latino Children's Literature and Film [4]

Explores Latino/Hispanic children's literature and film from theoretical and cultural perspectives. We study texts, contexts, illustrations, traditions, as well as issues related to production, reception, publishing and marketing. Special attention is paid to linguistic issues, including bilingualism and translation, and to visual forms of representation, including comic books.

Prerequisite: WRI 001 or passing score on the entry level analytical writing placement exam or equivalent.

LIT 063: Hispanic Film and Popular Culture [4]

Theoretical and historical overview of Hispanic film and popular culture, including music, performing arts, traditional storytelling, mass entertainment, among others. Particular attention is paid to connections with the arts and literature. Course, films, and readings are given in Spanish.

Prerequisite: (WRI 001 or passing score on the entry level analytical writing placement exam or equivalent) and SPAN 004. Letter grade only.

LIT 067: Multicultural Children's Literature [4]

Explores the field of children's literature from a theoretical and a cultural perspective. Readings include books from many cultural traditions as well as secondary sources on multiculturalism and cultural literacy. We study texts, contexts, illustrations, traditions, as well as issues related to publishing and marketing.

Prerequisite: WRI 001 or passing score on the entry level analytical writing placement exam or equivalent. Letter grade only.

LIT 069: US Latino Literature [4]

A representative overview of U.S. Latino literature, from its colonial and pre-colonial origins to the present. A socio-historical framework is first outlined in order to situate the different periods in the history of this literature. Main groups studied include Chicanos, Puerto Ricans, and Cuban-Americans, though others are represented as well.

Prerequisite: WRI 001 or passing score on the entry level analytical writing placement exam or equivalent.

LIT 090X: Freshman Seminar [1]

Examination of a topic in Literature.

May be repeated for credit.

LIT 095: Lower Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

LIT 098: Lower Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

LIT 099: Lower Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

LIT 100: Engaging Texts: Introduction to Critical Practice [4]

An introduction to issues and approaches in literary theory and criticism, with an emphasis on applications of methods to selected literary texts.

Prerequisite: Junior standing or consent of instructor.

LIT 110: Topics in World Literature [4]

Topics may include literature of one country or region of the world or comparisons of multiple literatures.

Prerequisite: LIT 020, LIT 021, LIT 030, LIT 031, LIT 040, LIT 041, LIT 050 or LIT 051. May be repeated for credit twice with different topics.

LIT 111: Empire, the Postcolonial, and Representation: Reading East and West [4]

Study though literature, film and mass media of emancipatory uprisings and postcolonial challenges of the last 200 years that unsettled the old Eurocentric and the U.S. colonial order. Includes Occidental readings on Asian and African cultures. Topics: racism, xenophobia, illegal migrations and terrorism. Strong interdisciplinary approach to case examination.

Prerequisite: LIT 020, LIT 021, LIT 030, LIT 031, LIT 040, LIT 041, LIT 050 or LIT 051. Letter grade only.

LIT 112: Literature and History [4]

Emphasizes historical contextualization of literature, including theoretical approaches such as Marxism, Post colonialism, Intellectual and Social Historicism. Explores ways in which literary histories are written. Course may focus on a specific historical period in order to understand the distinct relationship among literature, history and cultural production.

Prerequisite: LIT 020, LIT 021, LIT 030, LIT 031, LIT 040, LIT 041, LIT 050 or LIT 051. Letter grade only.

LIT 120: Topics in the Literature of Difference [4]

In-depth study of representative literary works in a single genre: novel, poetry, drama, et. al.

Prerequisite: LIT 020, LIT 021, LIT 030, LIT 031, LIT 040, LIT 041, LIT 050 or LIT 051. May be repeated for credit twice with different topics.

LIT 125: Literary Genres [4]

Explores how individual literary genres articulate larger cultural, aesthetic, and social issues. In addition, we analyze literary genres alongside other media in which those issues are also articulated, exploring differences and similarities in their treatment of those matters.

Prerequisite: LIT 020, LIT 021, LIT 030, LIT 031, LIT 040, LIT 041, LIT 050 or LIT 051. Letter grade only.

LIT 130: Topics in American Literature [4]

In-depth study of a period, theme, et. al. in American literature.

Prerequisite: LIT 020, LIT 021, LIT 030, LIT 031, LIT 040, LIT 041, LIT 050 or LIT 051. May be repeated for credit twice with different topics.

LIT 131: American Literature of the Expanding Nation [4]

We focus on the narratives by which America constructed its "manifest destiny." Some writers or works that may be covered: Bradford, Bradstreet, Edwards, early Native American texts and colonial captivity narratives, and early exploration narratives. Also, we look at writers who justified and critiqued westward expansion.

Prerequisite: LIT 020, LIT 021, LIT 030, LIT 031, LIT 040, LIT 041, LIT 050 or LIT 051. Letter grade only.

LIT 132: American Protest Literature [4]

Readings and discussion focus on literary genres that have voiced dissent, protest, and social displacements. While race and gender play a significant role in the course, protests against subjugation and/or oppression based on labor issues, religious preference, class, and age also be covered.

Prerequisite: LIT 020, LIT 021, LIT 030, LIT 031, LIT 040, LIT 041, LIT 050 or LIT 051. Letter grade only.

LIT 133: New Voices in American Fiction and Poetry [4]

Provides and exploration of contemporary practices in the field of American literature. Students study themes and forms in the fields of poetry, prose and fiction as they have been developed and interrogated by America's young and new writers.

Prerequisite: LIT 020, LIT 021, LIT 030, LIT 031, LIT 040, LIT 041, LIT 050 or LIT 051. Letter grade only.

LIT 134: Literature and History of the Great Depression [4]

Focusing on the turbulent decade of the 1930s, we use the lens of history and literature to explore how events from 1929 - 1941 helped shape modern America. Particular attention is paid to the impact of these years upon California and the West.

Prerequisite: Junior standing and (LIT 020, LIT 021, HIST 016 or HIST 017). Letter grade only.

LIT 135: Literature and History of the 1960s [4]

Examines American politics, culture, and society in the 1960s. Topics include civil rights, feminism, the Vietnam War, the Beat and other counterculture movements, and the sexual revolution.

Prerequisite: Junior standing and (LIT 030, LIT 031, HIST 016 or HIST 017). Letter grade only.

LIT 136: Literature and Culture of African Americans [4]

American literature from the slavery period through the Harlem Renaissance and into the present. We emphasize African American writers in the context of cultural history that influenced and often repressed their literary production, with special emphasis on specific discursive practices and the rise and fall of various literary movements.

Prerequisite: LIT 020, LIT 021, LIT 030, LIT 031, LIT 040, LIT 041, LIT 050 or LIT 051. Letter grade only.

LIT 140: Topics in British Literature [4]

In-depth study of a period, theme et. al.l. in British literature.

Prerequisite: LIT 020, LIT 021, LIT 030, LIT 031, LIT 040, LIT 041, LIT 050 or LIT 051. May be repeated for credit twice with different topics.

LIT 141: British Literature of the Expanding Empire [4]

A look at British colonial literature, from early travel narratives such as Behn's Oroonoko to Forster, Orwell and current writers. Emphasis is on understanding the processes which literature helped to construct the idea of an empire. Attention is paid to relationships between postcolonial narratives and emerging character of colonized nations.

Prerequisite: LIT 020, LIT 021, LIT 030, LIT 031, LIT 040, LIT 041, LIT 050 or LIT 051.

LIT 143: New Voices in British Fiction and Poetry [4]

Exploration of contemporary practices in the field of British literature. Students study themes and forms in the fields of poetry, prose and fiction as they have been developed and interrogated by young and new writers in Britain and Ireland.

Prerequisite: LIT 020, LIT 021, LIT 030, LIT 031, LIT 040, LIT 041, LIT 050 or LIT 051.

LIT 145: Plays and Poetry of Shakespeare [4]

Introduction and analysis of Shakespeare's major plays and works of poetry.

Prerequisite: Junior standing.

LIT 146: Shakespeare: Early Works [4]

Selected work from Shakespeare's early period up to the middle works, between 1599 and 1604.

Prerequisite: LIT 020, LIT 021, LIT 030, LIT 031, LIT 040, LIT 041, LIT 050 or LIT 051.

LIT 147: Shakespeare: Later Works [4]

Selected work from Shakespeare's middle works, between 1599 and 1604, until the end of his career.

Prerequisite: LIT 020, LIT 021, LIT 030, LIT 031, LIT 040, LIT 041, LIT 050 or LIT 051.

LIT 150: Topics in Hispanic Literature [4]

In depth study of Spanish literature of a single country, one of more countries in a comparative context, a period et. al.l.

Prerequisite: LIT 050 or LIT 051, or consent of instructor. May be repeated for credit twice with different topics.

LIT 151: Golden Age Spanish Literature [4]

Study through theater, novel and poetry of Renaissance and Baroque Peninsular literature (1492-1680): poetry of Garcilaso, Lope de Vega and the Spanish Baroque Theater; Cervantes and the origins of the modern novel; Conceptism and Culteranism; and relevant Portuguese figures (e.g., Gil Vicente and Camões). Course is conducted in Spanish.

Prerequisite: LIT 050 or LIT 051, or consent of instructor.

LIT 152: The Transatlantic Baroque [4]

Course centers around Transatlantic exploration of Golden Age Spain and colonial Latin America. Special attention and analysis is paid to commerce and cultural contact, travel writing, center and periphery, literary representation, arts, music, and other relevant cultural forms of the times. Course and readings are conducted in Spanish.

Prerequisite: LIT 050 or LIT 051, or consent of instructor.

LIT 153: Spanish Literature Since the 20th Century [4]

From Generations of 1898 through 1927, the Civil War, Francoist and Post-Francoist literature, to contemporary voices. Selected readings on Spanish nationalisms: from Rizal to Teixidor. Course critically examines the constructions of Spain and "Spanishness", seeking to build a more complex understanding of its cultures. Conducted in Spanish.

Prerequisite: LIT 050 or LIT 051, or consent of instructor.

LIT 155: Latin American Colonial Literature [4]

Selected readings on chronicles, poetry and theater from Columbus travel narratives to Fernandez de Lizardi's El periquillo sarniento. Emphasis on understanding the various processes by which literature helped to construct the idea of identity and independence. Theoretical frame based on cultural studies: the relationship between knowledge and power, the text and its context. Conducted in Spanish.

Prerequisite: LIT 050 or LIT 051, or consent of instructor.

LIT 156: Latin American Literature Since the Independence [4]

Primary concentration is on Romantic poetry; Indigenist, Anti-slavery and Indianist novel: Marti, Ruben Dario and Modernismo; Rodo and the essayist of the early XX century; the novel of the Mexican Revolution; and the Latin American 'Boom' and 'Post Boom'. Some selected readings on Brazilian literature after Dom Pedro Primeiro are included. Conducted in Spanish.

Prerequisite: LIT 050 or LIT 051, or consent of instructor.

LIT 157: Caribbean Literatures and Cultures [4]

Explores the cultures and literatures of the Hispanic Caribbean, including those of Cuba, Puerto Rico, and the Dominican Republic. We also explore multiple cultural substrata (e.g. Spanish, African, Anglo-American, Native) as well as their current presence in the Caribbean islands. Course and readings are conducted in Spanish.

Prerequisite: LIT 050 or LIT 051, or consent of instructor.

LIT 158: Transatlantic Modernismo [4]

Study through poetry, novel, essay and chronicle of principal characteristics of Spanish-American and Peninsular Modernismo. We examine the issue of the influence of Latin American writers in Spain (e.g. Ruben Dario, Gomez Carrillo), and the evolution of poets or prose writers out of Modernismo into the Generation of '98 (e.g. Antonio Machado) or into a unique, independent voice (e.g. Juan Ramon Jimenez, Valle-Inclan, Unamuno). Conducted in Spanish.

Prerequisite: LIT 050 or LIT 051, or consent of instructor.

LIT 159: Diasporas and Exiles in the Hispanic World [4]

Concentration on literary works of political exiles from oppressive regimes (e.g., Spain's Franco, Portugal's Salazar) and 70's and 80's South American dictatorships. Focus on diasporas produced by economical constraints in the U.S., Latin America and Spain. Strong interdisciplinary approach in examining of cases and ideas. Conducted in Spanish.

Prerequisite: LIT 050 or LIT 051, or consent of instructor.

LIT 160: Hispanic Women Writers [4]

Explores the development of writing by women in the Hispanic world, including the formation of a feminine aesthetics, the reception of works by women writers, canons and exclusions, and connections with writings by women from other cultures. Course and readings are conducted in Spanish.

Prerequisite: LIT 051.

LIT 162: Bilingualism and Borders in Hispanic Literatures [4]

Explores cultural and linguistic contacts in borderland areas throughout the Hispanic world, from medieval times to the present. We focus on the artistic, social, and historical effects of coexistence around borders, with special attention to issues of bilingualism and cultural hybridism. Course and readings are conducted in Spanish.

Prerequisite: LIT 051.

LIT 164: Hispanic Drama and Performing Arts [4]

Both textual and non-textual dramatic works from all around the Hispanic world are covered. Special attention is paid to Golden Age theatre, didactic and ritual dramas in the Americas, contemporary dance, Latin American theater, and the rise and development of Chicano theater. Course and most readings are conducted in Spanish.

Prerequisite: LIT 051.

LIT 165: Great Writers [4]

In-depth examination of the works of a single writer, read in the original language of that writer.

Prerequisite: LIT 020, LIT 021, LIT 030, LIT 031, LIT 040, LIT 041, LIT 050 or LIT 051.

LIT 168: Chicano Literature [4]

Representative overview of Chicano literature, from its colonial and pre-colonial origins to the present. Through the analysis of works from different genres, students are exposed to the main themes, techniques, styles, etc. of some of the most influential Chicano writers to date.

Prerequisite: LIT 021, LIT 031 or LIT 051.

LIT 169: US Latino Literature [4]

Representative overview of U.S. Latino literature, from its colonial and precolonial origins to the present. A socio-historical framework is first outlined in order to situate the different periods in the history of this literature. Main groups studied include Chicanos, Puerto Ricans, Cuban-Americans and Central Americans.

Prerequisite: LIT 021, LIT 031 or LIT 051.

LIT 170: Topic in Language and Linguistics [4]

Topics may include linguistic theories, history of the English language.

Prerequisite: LIT 020, LIT 021, LIT 030, LIT 031, LIT 040, LIT 041, LIT 050 or LIT 051. May be repeated for credit twice with different topics.

LIT 171: Teaching Literature and Culture [4]

An exploration of historical and contemporary issues related to the teaching of literature and culture. Discussions include teaching practices, pedagogy and assignments. Students are required to submit a semester project. Strongly recommended for teaching credential candidates.

Prerequisite: LIT 021. LIT 100 recommended.

LIT 180: American Literature and the Environment [4]

Studies the developing attitude of America toward the wilderness and constructed environments as it is shaped by and reflected in literature. Attention paid to British and Biblical influences, with emphasis on "founding" nature writers (e.g., Thoreau, Emerson, King, Muir, Austin), and more recent environmental thinkers (e.g., Snyder, Abbey and Silko).

Prerequisite: LIT 031.

LIT 181: Literature of California [4]

Exploration of the developing identity of California, with emphasis on how that identity is reflected in and shaped by its literature. Covers early Native and California life, the Gold Rush, the major waves of immigration, and contemporary issues, all within a political, cultural and intellectual framework. Term paper required.

Prerequisite: LIT 031.

LIT 183: Literature and the Other Arts [4]

A study of the relationship between literature and the arts, including both visual and performative arts. The course may be focused on a detailed study of one specific period of artistic development. Semester project required.

Prerequisite: LIT 021 or consent of instructor.

LIT 185: Literature and Power [4]

Subjects of discussion based on selected texts that deal with the use and abuse of power. We address all literary genres and concentrate in XIX through XXI century writings. Strong theoretical frame based on Foucault and Post-structuralism, Colonial and Postcolonial studies.

Prerequisite: LIT 021.

LIT 190: Senior Thesis [4]

Capstone course for majors. Completion of a senior thesis. Extensive writing required.

Prerequisite: Senior standing. Letter grade only.

LIT 195: Upper Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. Letter grade only. May be repeated for credit.

LIT 196: Internship in Literature and Cultures [4]

Oversight and structure for a student's internship in a field related to Literatures and Cultures. Students are required to write an original research paper based on the internship.

Prerequisite: Junior standing. Permission of instructor required. Pass/No Pass grading only. May be repeated for credit once.

LIT 198: Upper Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

LIT 199: Upper Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

MATHEMATICS

MATH 005: Preparatory Calculus [4]

Preparation for calculus. Elementary functions, trigonometry, polynomials, rational functions, systems of equations and analytical geometry.

Course cannot be taken after obtaining credit for MATH 021. Letter grade only.

MATH 015: Introduction to Scientific Data Analysis [2]

Fundamental analytical and computational skills to find, assemble and evaluate information, and to teach the basics of data analysis and modeling using spreadsheets, statistical tool, scripting languages, and high-level mathematical languages. Not for students from the School of Engineering.

Prerequisite: MATH 005 or equivalent score on Math Placement Exam. MATH 005 may be taken concurrently.

MATH 018: Statistics for Scientific Data Analysis [4]

Analytical and computational methods for statistical analysis of data. Descriptive statistics, graphical representations of data, correlation, regression, causation, experiment design, introductory probability, random variables, sampling distributions, inference and significance.

Prerequisite: MATH 015 and (MATH 005 or equivalent score on the Math Placement Exam). Letter grade only.

MATH 021: Calculus of a Single Variable I [4]

An introduction to differential and integral calculus of functions of one variable. Elementary functions such as the exponential and the natural logarithm, rates of change and the derivative with applications to natural sciences, engineering and social sciences.

Prerequisite: MATH 005 or equivalent score on Math Placement Exam. Letter grade only.

MATH 022: Calculus of a Single Variable II [4]

Continuation of MATH 021. Analytical and numerical techniques of integration with applications, infinite sequences and series, first order ordinary differential equations.

Prerequisite: MATH 021 or ICP 001A. Letter grade only.

MATH 023: Vector Calculus [4]

Calculus of several variables. Topics include parametric equations and polar coordinates, algebra and geometry of vectors and matrices, partial derivatives, multiple integrals, and introduction to the theorems of Green, Gauss, and Stokes.

Prerequisite: MATH 022. Letter grade only.

MATH 024: Linear Algebra and Differential Equations [4]

Introduces ordinary differential equations, systems of linear equations, matrices, determinants, vector spaces, linear transformations and linear systems of differential equations.

Prerequisite: MATH 022. Letter grade only.

MATH 030: Calculus II for Biological Sciences [4]

A version of Math 22 for students majoring in the life sciences. Analytical and numerical techniques of integration, modeling differential equations for biology.

Prerequisite: MATH 021 or ICP 001A. Letter grade only.

MATH 032: Probability and Statistics [4]

Concepts of probability and statistics. Conditional probability, independence, random variables, distribution functions, descriptive statistics, transformations, sampling errors, confidence intervals, least squares and maximum likelihood. Exploratory data analysis and interactive computing.

Prerequisite: MATH 021 or ICP 001A.

MATH 090X: Freshman Seminar [1]

Topics in mathematics.

Letter grade only.

MATH 091: General Topics in Applied Mathematics [1]

Introduction to a variety of concepts useful in applied mathematics. Topics covered included floating point arithmetic, methods of proofs, random walks, stereographic projections, transforms, etc. Students are exposed to advanced mathematical topics in preparation for their ongoing studies.

Prerequisite: MATH 023 and MATH 024. Either of which may be taken concurrently. Pass/No Pass grading only.

MATH 095: Lower Division Undergraduate Research [1-5]

Supervised research in mathematics.

Permission of instructor required. May be repeated for credit.

MATH 098: Lower Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

MATH 099: Lower Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

MATH 121: Applied Math Methods I: Introduction to Partial Differential Equations [4]

Introduction to Fourier series. Physical derivation of canonical partial differential equations of mathematical physics (heat, wave and Laplace's equation). Separation of variables, Fourier integrals and general eigenfunction expansions.

Prerequisite: MATH 023 and MATH 024.

MATH 122: Applied Math Methods II: Complex Variables and Applications [4]

Introduction to complex variables, analytic functions, contour integration and theory of residues. Mappings of the complex plane. Introduction to mathematical analysis.

Prerequisite: MATH 023 and MATH 024.

MATH 131: Numerical Analysis I [4]

Introduction to numerical methods with emphasis on algorithm construction, analysis and implementation. Programming, round-off error, solutions of equations in one variable, interpolation and polynomial approximation, approximation theory, direct solvers for linear systems, numerical differentiation and integration, initial-value problems for ordinary differential equations.

Prerequisite: MATH 024. Letter grade only.

MATH 132: Numerical Analysis II [4]

Initial-value problems for ordinary differential equations, interactive techniques for solving linear systems, numerical solutions of nonlinear systems of equations, boundary-value problems for ordinary differential equations, numerical solutions to partial differential equations.

Prerequisite: MATH 121 and MATH 131. Letter grade only.

MATH 140: Mathematical Methods for Optimization [3]

Linear programming and a selection of topics from among the following: matrix games, integer programming, semidefinite programming, nonlinear programming, convex analysis and geometry, polyhedral geometry, the calculus of variations and control theory.

Prerequisite: MATH 023. Letter grade only.

MATH 141: Linear Analysis I [4]

Applied linear analysis of finite dimensional vector spaces. Review of matrix algebra, vector spaces, orthogonality, least-squares approximations, eigenvalue problems, positive definite matrices, singular value decomposition with applications in science and engineering.

Prerequisite: MATH 122 and MATH 131. MATH 131 may be taken concurrently. Letter grade only.

MATH 142: Linear Analysis II [4]

Applied linear analysis of infinite dimensional vector spaces. Inner product spaces, operators, adjoint operators, Fredholm alternative, spectral theory, Sturm-Liouville operators, distributions and Green's functions with applications in science and engineering.

Prerequisite: MATH 141. Letter grade only.

MATH 171: Mathematical Logic [4]

Introduction to the meta-theory of first-order logic. Topics include the consistency, compactness, completeness and soundness proofs for propositional and first-order logic; model theory; the axiomatization of number theory; Godel's incompleteness theorems and related results.

Prerequisite: PHIL 005 or consent of instructor.

MATH 195: Upper Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

MATH 198: Upper Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

MATH 199: Upper Division Individual Study [1-5]

Prerequisite: Junior standing. Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

MATH 201: Teaching and Learning in the Sciences [1]

Students are introduced to 'scientific teaching' - an approach to teaching science that uses many of the same skills applied in research. Topics include how people learn, active learning, designing, organizing and facilitating teachable units, classroom management, diversity in the classroom and assessment design.

Satisfactory/Unsatisfactory grading only.

MATH 221: Partial-Differential Equations I [4]

Partial differential equations (PDEs) of applied mathematics. Topics include modeling physical phenomena, linear and nonlinear first-order PDEs, D'Alembert's solution, second-order linear PDEs, characteristics, initial and boundary value problems, separation of variables, Sturm-Liouville problem, Fourier series, Duhamel's Principle, linear and nonlinear stability.

Prerequisite: MATH 122 or consent of instructor. Letter grade only.

MATH 222: Partial-Differential Equations II [4]

Continuation of Math 221. Topics include integral transforms, asymptotic methods for integrals, integral equations, weak solutions, point sources and fundamental solutions, conservation laws, Green's functions, generalized functions, variational properties of eigenvalues and eigenvectors, Euler-Lagrange equations, Maximum principles.

Prerequisite: MATH 221 or consent of instructor. Letter grade only.

MATH 223: Asymptotics and Perturbation Methods [4]

Asymptotic evaluation of integrals, matched asymptotic expansions, multiple scales, WKB, and homogenization. Applications are made to ODEs, PDEs, difference equations, and integral equations to study boundary and shock layers, nonlinear wave propagation, bifurcation and stability, and resonance.

Prerequisite: MATH 222 or consent of instructor. Letter grade only.

MATH 231: Numerical Solution of Differential Equations I [4]

Examines fundamental methods typically required in the numerical solution of differential equations. Topics include direct and indirect methods for linear systems, nonlinear systems, interpolation and approximation, eigenvalue problems, ordinary-differential equations (IVPs and BVPs), and finite differences for elliptic partial-differential equations. A significant amount of programming is required.

Prerequisite: MATH 132 or consent of instructor. Letter grade only.

MATH 232: Numerical Solution of Differential Equations II [4]

Fundamental methods presented in Math 231 are used as a base for discussing modern methods for solving partial-differential equations. Numerical methods include variational, finite element, collocation, spectral, and FFT. Error estimates and implementation issues are discussed. A significant amount of programming is required.

Prerequisite: MATH 231 or consent of instructor. Letter grade only.

MATH 233: Scientific Computing [4]

Theoretical and practical introduction to parallel scientific computing. Survey of hardware and software environments, and selected algorithms and applications. Topics include linear systems, N-body problems, FFTs, and methods for solving PDEs. Practical implementation and performance analysis are emphasized in the context of demonstrative applications in science and engineering.

Prerequisite: MATH 232 or consent of instructor. Letter grade only.

MATH 291: Applied Mathematics Seminar [1]

Seminar series covering various topics in applied mathematics presented by faculty, graduate students, and visiting speakers.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

MATH 295: Graduate Research [1-12]

Supervised research.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

MATH 298: Directed Group Study [1-6]

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

MATH 299: Directed Independent Study [1-6]

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

MATH 399: University Teaching [1]

Centered on a student's classroom experiences as a Teaching Assistant in an undergraduate Applied Mathematics course. Provides a faculty-directed opportunity to implement teaching practices presented in the course Teaching and Learning in the Sciences. Involves video-taping of teaching, peer review, and weekly meetings with faculty.

Prerequisite: MATH 201 or QSB 201. Either of which may be taken concurrently. Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit once.

MECHANICAL ENGINEERING

ME 120: Component Design [3]

Three-dimensional stress analysis; deflection and stiffness; static an dynamic loading; failure theories and fatigue; fasteners; welded joints; mechanical springs; bearing; gears; shafts; clutches; breaks and couplings; belts and pulleys.

Prerequisite: ENGR 151. Offered in spring only. Letter grade only.

ME 135: Finite Element Analysis [3]

Introduces finite element methods used for solving linear problems in structural and continuum mechanics. Covers modeling, mathematical formulation, and computer implementation. Students develop a 2D plane-stress finite element program. Topics in nonlinear finite-element analysis, heat transfer, and fluid dynamics are introduced as time permits.

Prerequisite: MATH 131. Offered in spring only. Letter grade only.

ME 137: Computer Aided Engineering [4]

Introduction to the use of modern computational tools used for design and analysis. Primary focus is on product design with solid modeling and finite-element analysis. Software used is representative of that found in industry. Topics such as 2-D and 3-D drawing, tolerance specification, and FEA validation are also covered.

Prerequisite: ME 135. Offered in fall only. Letter grade only.

ME 140: Vibration and Control [3]

Modeling and control of dynamical systems including mechanical, fluid, and electrical system; classification of systems, Laplace transforms, harmonic forcing and response, Fourier series. Linear-time-invariant systems, transfer functions, zero/pole/gain, Bode diagrams, phase and gain margins, and Nyquist theorem.

Prerequisite: MATH 024. Offered in spring only. Letter grade only.

ME 142: Mechatronics [4]

Introduction to digitally controlled electro-mechanical systems. We focus on design and implementation of software to achieve functional specifications for mechanical systems. It covers design methodology, real time computing, sensing, actuating, networking, analog and digital signal domains, operator interface, applicable computational technology, and basic interfacing.

Prerequisite: ENGR 057 and ENGR 165. Offered in fall only. Letter grade only.

ME 170: Capstone Design [4]

Design project must be selected and approved; project feasibility study and outline of the design project is completed; design methodology, optimization, product reliability and liability, economics, use of ASME codes. A final presentation is given at the end of the semester.

Prerequisite: ME 137. Offered in spring only. Letter grade only.

ME 190: Special Topics in Mechanical Engineering [3]

Lectures on special topics are announced at the beginning of the semester in which the course is offered. Topics may include special mechanisms, non-Newtonian fluid mechanics, non-equlibrium thermodynamics, design methods for special applications, among other possibilities.

Prerequisite: Junior standing. Permission of instructor required. Letter grade only. May be repeated for credit twice with different topics.

ME 195: Upper Division Undergraduate Research [1-4]

Supervised research.

Permission of instructor required. May be repeated for credit.

ME 198: Upper Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ME 199: Upper Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

MECHANICAL ENGINEERING AND APPLIED MECHANICS

MEAM 201: Advanced Dynamics [4]

Rigid body dynamics, including topics such as: dynamical systems, motion representation and constraints, Newtonian, Lagrangian and Hamiltonian mechanics, stability analysis and introduction to multibody dynamics.

Prerequisite: MATH 024 and ENGR 057. Offered in fall only. Letter grade only. May be repeated for credit once.

MEAM 202: Transport Phenomena [4]

Systematic analysis of fluid flow, heat transfer and mass transfer phenomena, with emphasis on the analogies and specific techniques used in treating such boundary value problems.

Prerequisite: ES 235 or ENGR 135. Offered in spring only. Letter grade only.

MEAM 210: Linear Control Systems [3]

Concepts related to Feedback Control, State-Space Representation of Dynamic Systems, Dynamics of Linear Systems, Frequency-Domain Analysis, Controllability and Observability, Linear Observers, Compensator Design, Linear Quadratic Optimum Control.

Prerequisite: MATH 024. Letter grade only. May be repeated for credit once.

MEAM 220: Continuum Mechanics [4]

Cartesian tensors in mechanics, coordinate transformations, analysis of stress and strain, principal values, invariants, equilibrium and compatibility equations, constitutive relations, field equations; problems in elasticity; computational methods.

Prerequisite: ENGR 120. Offered in fall only. Letter grade only.

MEAM 221: Rheology [4]

Basic concepts (forces, displacements, stress, tensor, strain, etc.), linear and nonlinear elastic solids, linear viscous fluids, linear viscoelastic fluids and solids, and selected topics in nonlinear viscoelastic behavior.

Prerequisite: MEAM 220. Letter grade only.

MEAM 236: Advanced Mass Transfer [4]

Steady and unsteady mass diffusion; mass convection, simultaneous heat and mass transfer; Fick's law in a moving medium; similarity and integral methods in mass transfer; high mass transfer theory; research project in mass transport.

Prerequisite: ES 235 or ENGR 135. Letter grade only. May be repeated for credit once.

MEAM 251: Viscous Flows [4]

Study of the Navier-Stokes equations; Stokes' problems; creeping flows; internal and external flows; similarity and integral methods in boundary layer flows; stability and transition to turbulence.

Prerequisite: ES 235 or ENGR 135. Offered in fall only. Letter grade only. May be repeated for credit once.

MEAM 295: Graduate Research [1-12]

Supervised research.

Permission of instructor required. Satisfactory/ Unsatisfactory grading only. May be repeated for credit.

MEAM 298: Directed Group Study [1-6]

Permission of instructor required. Satisfactory/ Unsatisfactory grading only. May be repeated for credit.

MEAM 299: Directed Independent Study [1-6]

Permission of instructor required. Satisfactory/ Unsatisfactory grading only. May be repeated for credit.

MANAGEMENT

MGMT 002: Case Study Seminar on Business and Management [1]

Survey of the field of business management. Invited speakers from local companies and public organizations cover topics that include the business environment, human relations, technology in business, ethical behavior, global and economic forces, organization, quality, products and services, functional management, and current issues and developments.

Prerequisite: ECON 001. May be repeated for credit once.

MGMT 025: Introduction to Finance [4]

Particular attention is paid to how managers maximize shareholder wealth. This class covers the foundations of financial management, including the time value of money, capital budgeting and evaluation, capital structure, and valuation of various capital sources.

MGMT 026: Introduction to Accounting [4]

A broad introduction and accounting. Students are equipped to draw up and interpret accounts and are introduced to some key ideas of auditing. Covers the fundamental accounting concepts and how to apply them; record accounting entries, prepare accounts for different business entities and understand the differences between them, the basic principles of auditing.

MGMT 090X: Freshman Seminar [1]

Examination of a topic in management.

May be repeated for credit.

MGMT 095: Lower Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

MGMT 097: Service Learning: Engineering Projects in Community Service [1-3]

Multi-disciplinary teams of freshman through senior students work with community organizations to design, build, and implement engineering-based solutions for real-world problems. Students gain insight into the design and development process, and Management students gain practical experience working in a team of engineers and managing a project. Students are encouraged to participate at both the lower division and upper-division (MGMT197) levels.

Permission of instructor required. May be repeated for credit twice.

MGMT 098: Lower Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

MGMT 099: Lower Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

MGMT 100: Intermediate Microeconomic Theory [4]

We explore the foundations of microeconomic theory, focusing on the behavior of individuals and firms, and the interaction of these agents in the market. Price determination and resource distribution theory under conditions of perfect and imperfect competition. General equilibrium and welfare economics.

Prerequisite: ECON 001 and (MATH 021 or ICP 001A), or consent of instructor.

MGMT 101: Intermediate Macroeconomic Theory [4]

Analysis of output, employment, interest rates, and the price level. The effects of these on changes in monetary and fiscal variables.

Prerequisite: ECON 001 and (MATH 021 or ICP 001A), or consent of instructor.

MGMT 115: Economics of Industrial Organization [4]

The organization and structure of industrial production in the United States economy.

Prerequisite: ECON 100 or MGMT 100.

MGMT 116: Organizational Strategy [4]

Discussion of critical issues in the design and functioning of effective organizations. Topics covered include: the boundary of the firm, firm structure, arrangements within the firm, alliances and contracts between firms, and trust and culture in the firm. We combine case studies with relevant economic theory to provide insight into the functioning of organizations.

Prerequisite: ECON 100 or MGMT 100. Letter grade only.

MGMT 120: Marketing [4]

Marketing is about identifying consumer needs, developing products and services which meet the changing consumer needs or market conditions. We provide an examination of principles of customer marketing as well as business-to-business marketing. It focuses those aspects of marketing which most frequently demand strategic attention in any business.

Prerequisite: Junior standing or consent of instructor.

MGMT 130: Econometrics [4]

Introduction of problems of observation, estimation and hypotheses testing in economics through the study of the theory and application of linear regression models, critical evaluation of selected examples of empirical research and exercises in applied economics.

Prerequisite: (ECON 010 or POLI 010) and (MATH 021 or ICP 001A).

MGMT 135: Business Law [4]

Conceptual and functional analysis of legal principles relevant to the conduct and understanding of commercial business transactions. Topics include personal and real; government regulations; negotiable instruments; debtor/creditor relationships; and bankruptcy and reorganization. Salient legal aspects of international business are also discussed.

Prerequisite: MGMT 025 and MGMT 026, or consent of instructor.

MGMT 141: Industrial Relations and Human Resource Economics [4]

Examines how firms make decisions involving human resources. Topics covered include employee hiring and recruitment, compensation and use of incentives, and employee motivation and teamwork. Builds on both economic theory and practical examples to illuminate key concepts.

Prerequisite: ECON 100 or MGMT 100. Letter grade only.

MGMT 150: Services Science and Management [4]

Services - e.g., restaurants, hotels, lawyers, information technology operations, business consulting -- account for more than 70% of the US economy. Through case studies of businesses and scientific studies of people in real service settings, we focus on how to align people and technology effectively to generate value.

Prerequisite: ECON 001. Letter grade only.

MGMT 151: Public Economics [4]

The influence of governmental revenue and expenditure decisions on economic performance. Examines such issues as public goods and

externalities, as well as specific expenditure and taxation programs.

Prerequisite: ECON 100 or MGMT 100.

MGMT 152: Law and Economics [4]

The economic analysis of legal rules and institutions, including property, contract, and tort law. We also consider issues surrounding crime and punishment.

Prerequisite: ECON 100 or MGMT 100.

MGMT 153: Judgment and Decision Making [4]

An introduction to the study of human judgment and decision making. Topics include decision making under uncertainty, financial choices, health decision making, group decisions, rational theories of choice behavior, and improving decision making. The material is related to cognitive science, psychology, economics, and other social sciences.

Prerequisite: COGS 001 or PSY 001.

MGMT 154: Cognitive Science Applications for Management [4]

Covers thought, behavior, and interaction in modern businesses, where knowledge workers interact with one another and with technology. Topics include business decision making, risk behavior, attitudes toward risk, planning, communication, information management, information systems, human-computer interaction, neuroeconomics, and organizational behavior.

Prerequisite: COGS 001 or PSY 001, or consent of instructor.

MGMT 155: Decision Analysis in Management [4]

Presents the tools of decision science using a quantitative approach, with a focus on investment, finance and management decisions. These tools include decision tree analysis, risk and uncertainty analysis, stochastic dominance, the value of information, probability bias, and subjective probability.

Prerequisite: (ECON 100 or MGMT 100) and (ECON 010 or POLI 010), or consent of instructor.

MGMT 165: Intermediate Finance [4]

Expansion upon the ideas introduced in MGMT 25, by exploring advanced capital budgeting topics, (estimating future operating cash flows and analyzing real options), financing decisions (corporate structure and restructuring, long-term financing, securities), advanced working capital management, and multinational finance.

Prerequisite: MGMT 025.

MGMT 180: Entrepreneurship [4]

Integrates the skills students have developed in prior MGMT courses, and provides a framework for the consideration of new business ventures. Topics covered include: market research, creation of a formal business plan, marketing strategy, financing, establishing channels of distribution and bringing products or services to market.

Prerequisite: MGMT 165 and junior standing, or consent of instructor.

MGMT 190: Internship in Management [1-4]

Oversight and structure for the student's internship in a field related to Management. While the student is responsible for finding her or his own internship for the semester or subsequent summer, the class assists students with the process and helps them evaluate their experience. May be repeated upon approval of a new Internship proposal that demonstrates new tasks and objectives related to business and management and that continues to advance application of academic theory in the workplace.

Prerequisite: Junior standing. May be repeated for credit twice.

MGMT 191: Topics in Management [4]

Intensive treatment of a special topic or problem in management. May be repeated for credit in different subject areas.

Prerequisite: MGMT 025, MGMT 026 and junior standing, or consent of instructor. May be repeated for credit three times.

MGMT 195: Upper Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

MGMT 196: Case Study Seminar in Management [4]

Seminar and capstone experience presents case studies in the field of business management. Issues explored are the ethical behavior, global and economic forces, organization, quality, products and services, functional management, and current issues and developments. Students work in teams analyzing the cases presented.

Prerequisite: Senior standing, MGMT 025, MGMT 026, ECON 010 and (ECON 130 or MGMT 130) and (ECON 100 or MGMT 100). Letter grade only.

MGMT 197: Service Learning: Engineering Projects in Community Service [1-3]

Multi-disciplinary teams of freshman through senior students work with community organizations to design, build, and implement engineering-based solutions for real-world problems. Students gain insight into the design and development process, and Management students gain practical experience working in a team of engineers and managing a project. Students are encouraged to participate at both the lower division (MGMT97) and upper-division (MGMT197) levels.

Permission of instructor required. May be repeated for credit twice.

MGMT 198: Upper Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

MGMT 199: Upper Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

MGMT 290: Labor Studies Seminar [3]

Research presentations by visiting scholars in the area of quantitative labor studies.

MATERIALS SCIENCE AND ENGINEERING

MSE 110: Solid State Materials Properties [4]

Structure of atomic and molecular solids; crystallography of inorganic and organic solids; symmetry; short range order; 1-, 2- and 3-dimensional defects; energy levels; band theory of conductors, semiconductors and insulators; mechanical, thermal, optical and magnetic properties of materials and their relevance to processing and devices.

Prerequisite: CHEM 002, ENGR 045 and (ICP 001A or MATH 021) and (ICP 001B or PHYS 008).

MSE 111: Materials Processing [4]

Thermodynamics of sold solutions; enthalpy, entropy and free energy of mixing; Ellingham diagrams; phase diagrams for 2- and 3-component systems; phase rule; lever rule; nucleation and growth; spinodal decomposition; control of microstructure; materials extraction/synthesis, forming and joining processes.

Prerequisite: CHEM 002, ENGR 045 and (ICP 001A or MATH 021) and (ICP 001B or PHYS 008).

MSE 112: Materials Selection and Performance [3]

Design considerations in the use of materials; safety factors; statistical methods of assessing performance; quality control; selecting materials to optimize multiple properties; materials failure; long-term materials properties, materials behavior under extreme conditions; corrosion.

Prerequisite: MSE 110 and MSE 111.

MSE 113: Materials Characterization [4]

Characterization of materials structure and properties. Interactions between electromagnetic radiation and matter, and between electron beams and matter. Principles of image formation; Fourier methods and convolution; image processing. X-ray diffraction, optical and electron imaging and diffraction; scanned probe methods. Thermal analysis. Mechanical property and failure characterization.

Prerequisite: (ICP 001A or MATH 021) and (ICP 001B or PHYS 008) and PHYS 009. Offered in spring only. Letter grade only.

MSE 114: Polymeric Materials [3]

Polymer synthesis, characterization and processing techniques. Relationships between configuration, conformation, molecular order, microstructure and properties of polymeric materials; concepts relevant to tailoring polymer molecules and microstructures for specific applications.

Prerequisite: Junior standing, CHEM 002, CHEM 008, PHYS 009, ENGR 045 and (ICP 001A or MATH 021) and (ICP 001B or PHYS 008), or consent of instructor. Offered in spring only. Letter grade only.

MSE 115: Ceramic Materials [3]

Crystallography of inorganic compounds; packing and connectivity of co-ordination polyhedral. Defects in ionic and covalent crystals and their effect on properties. Ceramics, glasses and cements. Engineering ceramics. Production of powders; compaction; sintering; control of nanostructure and microstructure; bulk defects. Zeolites. Hydration of cement and concrete. Biological ceramics.

Prerequisite: PHYS 008, ENGR 045 and (ICP 001A or MATH 021) and (ICP 001B or PHYS 008).

MSE 116: Composites [3]

Hard materials and soft materials. Roles of matrix and filler phases. "Rule of mixtures" as a function of morphology and connectivity. Length scale effects: nanocomposites, microcomposites and macrocomposites. Biological composites. Porous materials. Interface characteristics and their effect on properties. Toughening mechanisms in composites. Processing and joining. Structure and property characterization.

Prerequisite: PHYS 009 and ENGR 045.

MSE 117: New Materials [3]

Materials requirements for electronics, communication, transportation, energy, data storage, homeland security, healthcare. Non-linear optical materials. Liquid crystals. "Whole life cycle" concepts and sustainability. Green materials. Self-assembling materials. Self healing materials. Biological and bioinspired materials. Biomedical materials.

Prerequisite: PHYS 009, ENGR 045 and (ICP 001A or MATH 021) and (ICP 001B or PHYS 008). Offered in spring only.

MSE 118: Introduction to Nanotechnology and Nanoscience [3]

An introduction for engineers in nanotechnology and nanoscience. Topics covered include nanoscale phenomena; nanofabrication (top-down and bottom-up approaches); and applications relevant to engineering, the physical sciences and biology. Interdisciplinary aspects of nanotechnology and nanoscience are discussed, including perspectives from materials science, chemistry, physics, and biology.

Prerequisite: (MATH 021, PHYS 008, ICP 001A or ICP 001B) and CHEM 002. Offered in fall only. Letter grade only.

MSE 119: Materials Modeling [3]

Difference between modeling and theory. Atomic and molecular scale modeling. Ab initio, Monte Carlo and molecular dynamics methods. Lattice models. Mesoscale and multiscale modeling. Finite element methods. Modeling phase separation, nanostructure and microstructure evolution and material properties.

Prerequisite: MATH 023, MATH 024 and (ICP 001A or MATH 021) and (ICP 001B or PHYS 008).

MSE 120: Materials Capstone Design [3]

Design project based on materials selection and performance evaluation, with reference to engineering standards and realistic constraints that include most of the following considerations: economic environmental, sustainability, processability, ethical, health and safety, social, political.

Prerequisite: MSE 112 and MSE 113.

MSE 126: Nanodevice Fabrication: Bridging Research and Education [3]

Blending lectures with labs, we challenge students to solve problems both individually and in groups and bridges education and research. It begins with an introduction to sensing principles and then an overview of nanomaterial-enabled sensing devices and systems. The electronic detection schemes using CNT-based sensors are presented in detail. Up-to-date breakthroughs as well as the gap between research and commercially successful products are discussed. At the lab sessions, students gain hands-on experience in making CNT-based electronic devices, characterizing their sensing performance, and more importantly conducting their own experiments in the six week self-designed project.

Prerequisite: Junior standing, CHEM 002, PHYS 009 and ENGR 165. Letter grade only.

MSE 195: Upper Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

MSE 198: Upper Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

MSE 199: Upper Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

NATURAL SCIENCES EDUCATION

NSED 023: Introduction to Teaching Science in Elementary School [1]

Introduction to teaching science in elementary school. Emphasis on inquiry-based learning practices and effective research-based teaching strategies. Activities include seminars, discussions, and experimentation using inquiry-based learning modules.

NSED 024: Fieldwork: Introduction to Teaching Science in Elementary School [1]

Fieldwork component for the NSED 23 course. Classroom observations and teaching practicum at an elementary school under the guidance of a mentor teacher. Emphasis on inquiry-based learning practices and effective research-based teaching strategies.

NSED 023 must be taken concurrently.

NSED 033: Introduction to Teaching Mathematics in Elementary School [1]

Introduction to teaching mathematics in elementary school. Emphasis on inquiry-based learning practices and effective research-based teaching strategies. Activities include seminars, discussions, and experimentation using inquiry-based learning modules.

NSED 034: Fieldwork-Introduction to Teaching Mathematics in Elementary School [1]

Fieldwork component for the NSED 33 course. Classroom observations and teaching practicum at an elementary school under the guidance of a mentor teacher. Emphasis on inquiry-based learning practices and effective research-based teaching strategies.

NSED 033 must be taken concurrently.

NSED 043: Introduction to Teaching Science in Middle School [1]

Introduction to teaching science in middle school. Emphasis on inquiry-based learning practices and effective research-based teaching strategies. Activities include seminars, discussions, and experimentation using inquiry-based learning modules.

NSED 044: Fieldwork-Introduction to Teaching Science in Middle School [1]

Fieldwork component for the NSED 43 course. Classroom observations and teaching practicum at a middle school under the guidance of a mentor teacher. Emphasis on inquiry-based learning practices and effective research-based teaching strategies.

NSED 043 must be taken concurrently.

NSED 053: Introduction to Teaching Mathematics in Middle School [1]

Introduction to teaching mathematics in middle school. Emphasis on inquiry-based learning practices and effective research-based teaching strategies. Activities include seminars,

discussions, and experimentation using inquiry-based learning modules.

NSED 054: Fieldwork-Introduction to Teaching Mathematics in Middle School [1]

Fieldwork component for the NSED 53 course. Classroom observations and teaching practicum at a middle school under the guidance of a mentor teacher. Emphasis on inquiry-based learning practices and effective research-based teaching strategies.

NSED 053 must be taken concurrently.

NSED 063: Introduction to Teaching Science in High School [1]

Introduction to teaching science in high school. Emphasis on inquiry-based learning practices and effective research-based teaching strategies. Activities include seminars, discussions, and experimentation using inquiry-based learning modules.

NSED 064: Fieldwork-Introduction to Teaching Science in High School [1]

Fieldwork component for the NSED 63 course. Classroom observations and teaching practicum at a high school under the guidance of a mentor teacher. Emphasis on inquiry-based learning practices and effective research-based teaching strategies.

NSED 063 must be taken concurrently.

NSED 073: Introduction to Teaching Mathematics in High School [1]

Introduction to teaching mathematics in High school. Emphasis on inquiry-based learning practices and effective research-based teaching strategies. Activities include seminars, discussions, and experimentation using inquiry-based learning modules.

NSED 074: Fieldwork-Introduction to Teaching Mathematics in High School [1]

Fieldwork component for the NSED 73 course. Classroom observations and teaching practicum at a high school under the guidance of a mentor teacher. Emphasis on inquiry-based learning practices and effective research-based teaching strategies. NSED 073 must be taken concurrently.

NSED 090X: Introduction to Teaching Science/Math [1]

Freshman seminar.

Pass/No Pass grading only.

NSED 095: Lower Division Undergraduate Research [1-6]

Supervised research.

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

NSED 098: Lower Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

NSED 099: Lower Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

NSED 100: Introduction to Instruction, Assessment, and Management for Beginning Teachers [4]

A general introduction to instruction, assessment, and classroom management strategies to assist student teachers in the initial development and implementation of a comprehensive classroom teaching plan based on current educational theories and attending to the diverse needs of the public school population.

Letter grade only.

NSED 120: Diversity in Education [4]

Focusing on American education, we examine historical and current issues of diversity, noting controversial initiatives such as mainstreaming, bilingual education, multiculturalism, and gender-neutral or gender-segregated instruction. Students also consider cultural and linguistic challenges of teaching English language learners, including those who are generation 1.5 students.

Letter grade only.

PHILOSOPHY

PHIL 001: Introduction to Philosophy [4]

An introduction to the main areas of philosophy using classic and contemporary sources. Consideration of central and enduring problems in philosophy, such as skepticism about the external world, the mind-body problem, and the nature of morality.

PHIL 005: Logic and Critical Reasoning [4]

Introduction to formal and informal logic. Topics include argumentation analysis, fallacies, soundness vs. validity, inductive vs. deductive reasoning, truth tables, proof techniques in statement and predicate logic, and the probability calculus.

PHIL 009: Phenomenology and Existentialism [4]

Consideration of central themes in phenomenology and existentialism and their philosophical origins in nineteenth century philosophy. Readings from such figures as Nietzsche, Husserl, Sartre, Freud, Merleau-Ponty, and Heidegger.

PHIL 090X: Freshman Seminar [1]

Examination of a topic in philosophy.

May be repeated for credit.

PHIL 095: Lower Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

PHIL 098: Lower Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

PHIL 099: Lower Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

PHIL 101: Metaphysics [4]

Inquiry into the fundamental nature of reality: the categories of being; the differences between abstract entities, concrete entities, substances, properties, and processes; what constitutes identity of objects through time; necessity and possibility; free will and determinism; space, time, and causation.

Prerequisite: PHIL 001 and PHIL 005, or consent of instructor.

PHIL 103: Philosophy of the Mind [4]

Selected topics in the philosophy of mind, including the relation between mind and body, the self, personal identity, consciousness, the unconscious, materialism, functionalism, behaviorism, determinism and free will, and nature of psychological knowledge.

PHIL 107: Philosophy of Religion [4]

An examination of core issues in the philosophy of religion, using classical and contemporary sources. Topics may include: arguments for and against the existence of God, differing concepts of the divine, the rationality of religious belief, mysticism, divine foreknowledge and free will, death and immortality.

Prerequisite: PHIL 001 and junior standing, or consent of instructor.

PHIL 110: Philosophy of Cognitive Science [4]

Consideration of philosophical and foundational issues in cognitive science, including the Turing Test, the Chinese Room argument, the nature of cognitive architecture, animal cognition, connectionism vs. symbolic artificial intelligence, and the possibility of thinking machines.

Prerequisite: PHIL 001 and (COGS 001 or PSY 001), or consent of instructor.

PHIL 111: Philosophy of Neuroscience [4]

Questions at the intersection of philosophy and neuroscience. Relevance of recent research in neuroscience to epistemology and metaphysics. Specific topics include the mind-body problem, free will, consciousness, religion, and the nature of the self.

PHIL 150: Topics in Phenomenology [4]

Study of the foundations of phenomenology in Husserl and its background in Bolzano, Frege, Brentano, Meinong, Kant, and Descartes. Topics include phenomenological method, theory of intentionality, meaning, perception, evidence, ego, other minds, intersubjectivity, and the life-world, as well as application of phenomenological

methods to themes in natural science, social science, art, and literature.

May be repeated for credit once with different topics.

PHIL 160: Mathematical Logic [4]

Introduction to the meta-theory of first-order logic. Topics include the consistency, compactness, completeness and soundness proofs for propositional and first-order logic; model theory; the axiomatization of number theory; Godel's incompleteness theorems and related results.

Prerequisite: PHIL 005 or consent of instructor.

PHIL 190: Advanced Seminar in Philosophy [4]

Intensive treatment of a special topic or problem within philosophy. May be repeated for credit in different subject area.

Prerequisite: Junior standing. Permission of instructor required. Pass/No Pass grading only. May be repeated for credit once.

PHIL 195: Upper Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

PHIL 198: Upper Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

PHIL 199: Upper Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

PHYSICS

PHYS 005: Energy and the Environment [3]

Introduction to energy and the environment. Examines different types of renewable and nonrenewable energy sources and the environmental effects of using these energy resources. We cover environmental, economic and sustainability considerations associated with fossil fuels and alternative energy sources.

Letter grade only.

PHYS 006: The Cosmos, Science and You [4]

Introduction to physics and astronomy for non science and engineering majors. Topics include: Scientific method as illustrated by astronomical discoveries about the Cosmos; and the concepts of matter and energy; and the formation of the Universe, galaxies, stars and the Solar System. Throughout the course our physical connection and dependence the Cosmos are illustrated using new discoveries in astrophysics, astrochemistry and astrobiology.

PHYS 008: Introductory Physics I [4]

Introduction to classical and contemporary physics. Intended for students with preparation in calculus and algebra. Topics include introduction to forces, kinetics, equilibria, fluids, waves, and heat. Experiments and computer exercises are integrated into the course content.

Prerequisite: MATH 021 or ICP 001A, either of which may be taken concurrently.

PHYS 009: Introductory Physics II [4]

Continuation of introduction to classical and contemporary physics. Topics include introduction to electricity, magnetism, electromagnetic waves, optics, and modern physics. Experiments and computer exercises are integrated into the course content.

Prerequisite: (PHYS 008 or ICP 001B) and (MATH 021 or ICP 001A) and (MATH 022 or MATH 030). MATH 022 or MATH 030 may be taken concurrently.

PHYS 010: Introductory Physics III [4]

An introduction to developments in modern physics over the last 150 years that have radically altered our view of nature. Particular emphasis is placed on relativity, quantum theory, and thermodynamics with applications to atoms, molecules, solids, and light.

Prerequisite: PHYS 009.

PHYS 012: Light, Color, and Vision [4]

Introduction to the physics, chemistry, and biology of light and vision for nonscientists. Covers basic optics, optical instruments, photography, light and color in nature, human and animal vision, visual perception and optical illusions, and aspects of modern technology including fiber optics and lasers. Includes classroom demonstrations and out-of-class observational exercises.

PHYS 018: Introductory Physics I for Biological Sciences [4]

First introductory physics course for biological science majors. Topics include vectors, kinematics, Newton's Laws, Work, Energy and Conservation, Torque and rotation, Fluids and Elasticity, Oscillations and Waves all with an emphasis on biological applications.

Prerequisite: MATH 021 or ICP 001A, either of which may be taken concurrently. Letter grade only.

PHYS 019: Introductory Physics II for Biological Sciences [4]

The physical principles of electromagnetism and thermodynamics are introduced, examined, and discussed in the context of biological applications.

Prerequisite: PHYS 018 and (MATH 021 or ICP 001A).

PHYS 090X: Freshman Seminar [1]

Examination of a topic in physics.

May be repeated for credit.

PHYS 095: Lower Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

PHYS 098: Lower Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

PHYS 099: Lower Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

PHYS 105: Analytic Mechanics Core [4]

Rigorous, mathematical foundation in classical mechanics. Topics include Newtonian mechanics; motion of particles in one, two and three dimensions; central force motion; moving coordinate systems; mechanics of continuous media; oscillations; normal modes; Lagrange's equations; and Hamiltonian methods.

Prerequisite: (PHYS 008 or ICP 001B) and MATH 022.

PHYS 110: Electrodynamics Core [4]

Intermediate Electrodynamics. Topics covered include vector calculus including divergence, curl and vector field theorems; Electrostatics including field, potential, work and energy; Laplace's equation including solutions in different geometries, separating variables, method of images and multipole expansions; Electrostatics in media including polarization and dielectrics (linear/nonlinear); Magnetostatics including the Biot-Savart Law, Ampere's Law and vector potentials; Magnetic fields in matter including magnetization, linear and non-linear media; and Electrodynamics including EMF, induction and Maxwell's equations as well as conservation of charge, energy, and momentum in EM fields.

Prerequisite: PHYS 009 and MATH 023.

PHYS 111: Electromagnetic Radiation Minicourse [2]

This half-semester minicourse covers plane electromagnetic waves including polarization, reflection, refraction and dispersion. Electromagnetic waves in wave guides and cavities also are covered. Additional topics include radiation, both dipole and multipole as well as scattering and diffraction.

Prerequisite: PHYS 110 and PHYS 122.

PHYS 112: Statistical Mechanics Core [4]

Covers the fundamental concepts of statistical mechanics, which form the microscopic basis for thermodynamics. Topics include applications to macroscopic systems, condensed states, phase transformations, quantum distributions, elementary kinetic theory of transport processes, and fluctuation phenomena.

Prerequisite: PHYS 010 and MATH 022.

PHYS 120: Physics of Materials [4]

Electrical, optical, and magnetic properties of solids. Free electron model, introduction to band theory. Crystal structures and lattice vibrations. Mechanisms and characterization of electrical conductivity, optical absorption, magnetic behavior, dielectric properties, and p-n junctions.

Prerequisite: PHYS 009 and CHEM 112.

PHYS 122: Waves Minicourse [2]

This half-semester minicourse covers scalar wave phenomena and mathematical methods in Physics.

Prerequisite: PHYS 010 and MATH 024.

PHYS 124: Rotational Mechanics Minicourse [2]

This half-semester minicourse covers classical and quantum rotational dynamics. Classical topics include rigid body rotations, tops, and gyroscopes. Quantum topics include molecular rotational spectra, nuclear magnetic resonance, and the hydrogen atom. The connection between classical and quantum angular momentum is emphasized.

Prerequisite: PHYS 137 and PHYS 105.

PHYS 126: Special Relativity Minicourse [2]

This half-semester minicourse introduces the exciting and thought-provoking physics of special relativity. Topics include hallmark experiments; Lorentz transformations; time dilation and length contraction; relativistic optics; tensor techniques; mass, energy, and momentum; relativistic mechanics; and relativistic electricity and magnetism.

Prerequisite: PHYS 009. PHYS 110 recommended.

PHYS 137: Quantum Mechanics Core [4]

Fundamentals of quantum mechanics, which form the foundation of our modern understanding of matter at the atomic and molecular level. Topics include the Schroedinger equation, Hilbert spaces, the operator formalism, the Heisenberg Uncertainty Principle, tunneling, perturbation and WKB theory, fermions, and bosons.

Prerequisite: PHYS 105, MATH 023 and MATH 024.

PHYS 141: Condensed Matter Physics [3]

Classification of solids and their bonding; electromagnetic, elastic, and particle waves in periodic lattices; thermal, magnetic, and dielectric properties of solids; energy bands of metals and semiconductors; superconductivity; magnetism; ferroelectricity; magnetic resonance.

Prerequisite: PHYS 137.

PHYS 144: Modern Atomic Physics [4]

The description and calculation of the properties of atomic energy levels based on the central field approximation. Modern experimental methods in atomic physics and some of the important physics obtained from them. Examples include magnetic resonance, lasers and masers, ion and neutral atom traps, optical pumping and beam foil spectroscopy.

Prerequisite: PHYS 124.

PHYS 148: Modern Optics [4]

Geometrical optics, radioative transfer, partial coherence, lasers, quantum optics.

Prerequisite: PHYS 111.

PHYS 150: Energy Sources [3]

Fossil energy resources, nuclear energy, solar energy, and other renewable energy sources (wind, hydro, geothermal.)

Prerequisite: (ICP 001B, PHYS 008 or MATH 022) and PHYS 009.

PHYS 151: Solar Energy [3]

The solar energy resource, modeling and simulation, thermal collectors, photovoltaic collectors, solar energy systems, special applications (solar lasers, material processing).

Prerequisite: MATH 022 and PHYS 009.

PHYS 159: Particle Physics [4]

Tools of particle and nuclear physics. Properties, classification, and interactions of particles including the quark-gluon constituents of hadrons. High-energy phenomena analyzed by quantum mechanical methods. Quantum number determination of resonances, hardon structure functions, introductory electroweak theory with dirac matrices, Standard Model (overview), grand unified theories.

Prerequisite: PHYS 137.

PHYS 160: Modern Physics Lab [4]

Provides a rigorous foundation in physics laboratory techniques, with an emphasis on hands-on laboratory training. The nature of the experiments available to students cover a range of modern topics, from nonlinear dynamics and chaos through nonlinear optics and spectroscopy. Emphasis is placed on error estimation, data analysis, and interpretation.

Prerequisite: PHYS 050.

PHYS 161: Astrophysics and Cosmology [3]

Elements of general relativity. Physics of pulsars, cosmic rays, black holes. The cosmological distance scale, elementary cosmological models, properties of galaxies and quasars. The mass density and age of the universe. Evidence for dark matter and concepts of the early universe and of galaxy formation. Reflections on astrophysics as a probe of the extrema of physics.

Prerequisite: MATH 022 and PHYS 009.

PHYS 192: Special Topics in Physics [1-4]

Treatment of a special topic or theme in Physics. May be repeated for credit in a different subject area.

Prerequisite: PHYS 009 or PHYS 019, or consent of instructor. May be repeated for credit with different topics.

PHYS 195: Upper Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

PHYS 198: Upper Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

PHYS 199: Upper Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

PHYS 205: Classical Mechanics [4]

Topics in classical mechanics, including Lagrangian and Hamiltoninan formulations, Conservation Laws and Symmetry and the relationship, Calculus of variations and variational principle, Euler angles and rigid body dynamics, Oscillations and normal modes.

Letter grade only.

PHYS 210: Electrodynamics and Optics I [4]

Introduction to electrodynamics. Electrostatics including Poisson and Laplace Equations, Green's Theorem and different Boundary Value Problems, Polarizibility, Susceptibility and dielectric media. Magnetostatics, Maxwell's equations, Plane Electromagnetic Waves, Polarization of light, Electromagnetic radiation in different media.

Letter grade only.

PHYS 211: Electrodynamics and Optics II [4]

Continuation of electrodynamics. Wave guides and resonant cavities, Multipole radiation, Relativistic charged particles in electromagnetic fields, Collisions between charged particles and radiation from moving charges with relativistic corrections, introductory magnetohydrodynamics.

Prerequisite: PHYS 210. Letter grade only.

PHYS 212: Statistical Mechanics [4]

Topics include: General principles of statistical mechanics including microcanonical,

macrocanonical and grand canonical ensembles, fluctuations and equilibrium. Thermodynamics including Legendre transforms and Maxwell relations, fluctuations and stability and Landau theory. Quantum statistical mechanics including Bose-Einstein and Fermi-Dirac statistics.

Letter grade only.

PHYS 237: Quantum Mechanics I [4]

Introductory Quantum Mechanics starting with simple Quantum two-state systems and one dimensional problems, Uncertainty relations, Solution of Schrodinger's equation for important two and three dimensional physical situations, Angular momentum, identical particles and spin statistics. Hydrogen and multi-electron atoms.

Letter grade only.

PHYS 238: Quantum Mechanics II [4]

Perturbation methods, both stationary and time-dependent, Scattering, interaction with electromagnetic fields, Stark effect, Measurement theory and decoherence, Quantum Hall effect.

Prerequisite: PHYS 237. Letter grade only.

PHYS 290: Current Topics in Physics and Chemistry [3]

Exploration of current research directions, problems, and techniques in molecular and materials chemistry, physics and engineering. Course format emphasizes student-led presentation, analysis, and discussion of reading assignments from the current and recent scientific literature. Topics determined by the instructor and changes each semester.

May be repeated for credit.

PHYS 291: Physics and Chemistry Seminar [1]

Graduate seminar on current research in molecular and materials chemistry, physics, and engineering.

Satisfactory/Unsatisfactory grading only. May be repeated for credit.

PHYS 292: Special Topics in Physics [1-4]

Treatment of a special topic or theme in Physics at the graduate level. May be repeated for credit in a different subject area.

Permission of instructor required. May be repeated for credit.

PHYS 293: Physics Colloquium [1]

This is a colloquium series with talks on a wide range of research topics in Physics. Speakers for the colloquia are primarily invited researchers from other Institutions. Some of the seminars additionally showcase the research performed by UC Merced Physics faculty, post doctoral researchers and graduate students. This is a forum to introduce the undergraduate and graduate students to cutting edge research in Physics conducted on-site and elsewhere, and to give them an opportunity to meet researchers and faculty from other Universities/Research Institutions.

Satisfactory/Unsatisfactory grading only. May be repeated for credit.

PHYS 295: Graduate Research [1-12]

Supervised research.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

PHYS 298: Directed Group Study [1-12]

Group project under faculty supervision.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

PHYS 299: Directed Independent Study [1-12]

Independent project under faculty supervision.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

POLITICAL SCIENCE

POLI 001: Introduction to American Politics [4]

A general introduction to political institutions and political behavior in the United States. Specific topics include the U.S. Constitution, Congress, the presidency, the federal judiciary, political parties, interest groups, mass public opinion, elections, and voting behavior.

POLI 002: Controversies in American Politics [4]

Examination of select problems in contemporary American politics. Possible subjects include campaign finance, culture wars and party polarization, barriers to third party success, and media coverage of politics.

POLI 003: Introduction to Comparative Politics [4]

Introduction to the cross-national study of political institutions and behavior. Formal and informal aspects of politics in selected countries are covered, as are comparative research methods.

POLI 005: Introduction to International Relations [4]

Introduction to the study of the politics of conflict and war, diplomacy, international cooperation, and international institutions.

POLI 006: Global Issues [4]

Examination of select problems in international relations and foreign policy. Possible topics include terrorism, proliferation of nuclear weapons, and conflict in the Middle East.

POLI 009: Community Mobilization and Politics [4]

Examination of political and social mobilization at the local level, including strategies for organization and advocacy.

POLI 010: Statistical Inference [4]

Introduction to the application of social scientific methods to the study of economics, politics, and management. Covers research design, random sampling, descriptive and inferential statistics, hypothesis testing, and the linear regression model with an emphasis on applications.

Prerequisite: MATH 005 or equivalent score on Math Placement Exam.

POLI 090X: Freshman Seminar [1]

Examination of a topic in political science.

May be repeated for credit.

POLI 095: Lower Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

POLI 098: Lower Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

POLI 099: Lower Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

POLI 100: Political Process and Institutions [4]

Elections and representation, legislative organization and process, legislative parties and leadership, lobbying, legislative outcomes, and the determinants of these outcomes in the U.S. Congress.

Prerequisite: POLI 001 and (POLI 010 or ECON 010).

POLI 101: The Presidency [4]

Powers, constraints, and behavior of the U.S. president and executive branch. Includes specific topics such as legislative-executive interactions, presidential control of the bureaucracy, nomination campaigns and general elections, and public opinion and the presidency.

Prerequisite: POLI 001 and (POLI 010 or ECON 010).

POLI 102: Judicial Politics [4]

Structure, function, and politics of the U.S. court system, with a particular focus on the selection of judges, judicial decision making, external political influences on the judiciary, and the impact of court decisions.

Prerequisite: POLI 001 and (POLI 010 or ECON 010).

POLI 105: Interest Groups and Political Parties [4]

Formation, strategies, and effectiveness of interest groups and political parties in the U.S.

Prerequisite: POLI 001 and (POLI 010 or ECON 010).

POLI 107: State Politics [4]

The structure and performance of state governments, including California state politics.

Prerequisite: POLI 001 and (POLI 010 or ECON 010).

POLI 108: Direct Democracy [4]

The politics of the initiative, referendum, and recall in the American states. Specific topics may include the history and origins of direct democracy, voter support for ballot measures, the role of interest groups, the effect of initiatives

and referenda on candidate elections and civic engagement, and policy implications.

Prerequisite: POLI 001 and (POLI 010 or ECON 010).

POLI 110: Governmental Power and the Constitution [4]

Introduces students to the manner in which Supreme Court decisions shape our political system by delineating the sources and limits of governmental power. The powers of the three branches of the federal government are covered, as is the relationship between the federal government and the states.

Prerequisite: POLI 001 and junior standing, or consent of instructor.

POLI 111: Liberty, Equality and the Constitution [4]

Examines the constitutional politics of landmark U.S. Supreme Court cases involving civil liberties and civil rights. Specific topics may include First Amendment freedoms, privacy, the rights of criminal suspects, and discrimination based on race, gender, and sexual orientation.

Prerequisite: POLI 001and junior standing, or consent of instructor.

POLI 120: Voting Behavior, Campaigns, and Elections [4]

Voting behavior, voter turnout, campaign strategies, and election outcomes.

Prerequisite: POLI 001 and (POLI 010 or ECON 010).

POLI 125: Public Opinion [4]

An examination of the nature and origins of public opinion in the United States and the role of public opinion in the policy process.

Prerequisite: POLI 001 and (POLI 010 or ECON 010).

POLI 127: Race, Gender, and Politics [4]

Contemporary and historical identity politics in the U.S., with a focus on the importance of race and gender in political representation, attitude formation, and civil rights.

Prerequisite: POLI 001 and (POLI 010 or ECON 010).

POLI 130: Comparative Political Institutions [4]

Cross-national comparison of the design, evolution, and impact of political institutions, such as electoral systems, legislatures, executives, courts, and parties.

Prerequisite: POLI 003 and (POLI 010 or ECON 010).

POLI 135: Comparative Political Behavior [4]

Analysis of multiple forms of political behavior across a variety of countries. Includes public opinion, political culture, voting, and less conventional forms of participation.

Prerequisite: POLI 003 and (POLI 010 or ECON 010).

POLI 140: Democratization [4]

Formation of democratic institutions and norms. Particular attention is paid to nations labeled as developing democracies.

Prerequisite: POLI 003 and (POLI 010 or ECON 010).

POLI 150: Causes of International Conflict [4]

Investigation of the causes of international conflict and war, the conduct of war, its ultimate termination, and the possibility of its prevention.

Prerequisite: POLI 005 and (POLI 010 or ECON 010).

POLI 155: International Political Economy [4]

The connections between politics, policy, and international economics.

Prerequisite: POLI 005 and (POLI 010 or ECON 010).

POLI 160: US Foreign Policy [4]

The formation of U.S. foreign policy, with an emphasis on the modern era and an introduction to analytical tools for understanding current foreign policy issues and debates.

Prerequisite: POLI 005 and (POLI 010 or ECON 010).

POLI 170: Theoretical Models of Politics [4]

The development, utility, and limitations of theoretical models of the political world. May include rational choice theory, game theory, and psychological theories of politics.

Prerequisite: POLI 010 or ECON 010.

POLI 190: Topics in Political Science [4]

Intensive treatment of a special topic or problem in political science. May be repeated for credit in different subject area.

Prerequisite: POLI 001 and junior standing, or consent of instructor. May be repeated for credit three times with different topics.

POLI 195: Upper Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

POLI 198: Upper Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

POLI 199: Upper Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

PSYCHOLOGY

PSY 001: Introduction to Psychology [4]

Introduction to psychology as a science of behavior, including history, research methods, biological bases of behavior, cognition, personality, social behavior, psychological disorders, techniques of therapy and applied science.

PSY 010: Analysis of Psychological Data [4]

Design and analysis of psychological research including experimental design, correlational research, and descriptive and inferential statistics. Students in the Psychology major or minor must take this course before taking any upper division Psychology courses.

Prerequisite: COGS 001 or PSY 001.

PSY 015: Research Methods in Psychology [4]

Survey of common methodological approaches in psychological research.

Prerequisite: PSY 010.

PSY 090X: Freshman Seminar [1]

Examination of a topic in psychology.

May be repeated for credit.

PSY 095: Lower Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

PSY 098: Lower Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

PSY 099: Lower Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

PSY 105: Research Methods in Psychology [4]

Survey of common methodological approaches in psychological research.

Prerequisite: PSY 010.

PSY 110: History of Psychology [4]

Major schools of psychology, as well as the philosophical and physiological influences that lead to the birth of psychology as an independent discipline. Focus is on integration over these areas with the goal of better understanding the current state of the science of psychology.

Prerequisite: PSY 001 and junior standing, or consent of instructor.

PSY 123: Alcohol, Drugs, and Behavior [4]

Survey of major drugs of abuse, their mode of action, and their behavioral effects, both acute

and chronic; etiology and maintenance of drug abuse and review of prominent strategies for prevention, intervention and treatment.

Prerequisite: PSY 001.

PSY 130: Developmental Psychology [4]

Covers the stages that children go through as they develop; covers cognitive development, biological development, social development, personality development, emotional development, among others. Focus is on integrating across these different content areas.

Prerequisite: PSY 001 and junior standing, or consent of instructor.

PSY 131: Social Psychology [4]

Behavior of the individual in social situations, surveying problems of social cognition, social interaction, group tensions, norm development, attitudes, values, public opinion, status.

Prerequisite: PSY 001.

PSY 135: Language Acquisition [4]

Covers the stages that children go through as they learn their first language. We also explore the causal mechanisms behind language acquisition as outlined by the major theoretical approaches in the field. Bilingual language acquisition are also covered.

Prerequisite: PSY 130 and junior standing, or consent of instructor.

PSY 136: Cognitive Development [4]

Covers the major theories and stages of children's cognitive development. Among others, we cover Piaget, Vygotsky, information processing theories, and connectionist approaches to learning.

Prerequisite: PSY 130 and junior standing, or consent of instructor.

PSY 137: Conceptual Development [4]

Exploration of how children learn about specific conceptual domains, such as naive biology and theory or mind. The major theoretical approaches in the area are covered. Questions of process, such as radical reorganization vs. enrichment of content areas set the context for the course.

Prerequisite: PSY 130 and junior standing

PSY 138: The Development of Social Mind [4]

Considers the emergence of social reasoning and behavior from infancy to adulthood. Special focus on the cognitive processes underlying reasoning about others as intentional agents, as members of social groups such as race and gender.

Prerequisite: PSY 001.

PSY 139: Cognitive Development and Education [4]

How can developmental psychology inform educational practice? We review current developmental theories as well as attempts to apply them to education, with the aim of building an understanding of both the promise and pitfalls of a developmentally based approach to education.

Prerequisite: PSY 130.

PSY 140: Clinical Psychology [4]

Major theoretical approaches to clinical psychology, including psychoanalysis, existentialism, humanism, systems theory, and behavioral approaches. A review of what clinical psychologists do, including assessment methods, professional roles, and approaches to treatment.

Prerequisite: PSY 001.

PSY 142: Abnormal Psychology [4]

Descriptive and functional account of behavioral disorders, with primary consideration given to neurotic and psychotic behavior.

Prerequisite: PSY 001.

PSY 143: Abnormal Child Psychology [4]

Approaches to and current scientific knowledge about psychological disorders during childhood are reviewed. Examples are anxiety, attention deficit, autistic, and substance use disorders. Interventions implemented to prevent or treat these disorders are also examined.

Prerequisite: PSY 001.

PSY 144: Clinical Neuropsychology [4]

The organization of the brain at the gross, cellular and molecular level and how the brain accomplishes vision, hearing, sleep, motor skills, emotions and memory. Brain disease such as agnosias, depression, addictions, stroke, Alzheimer's and Parkinson's are investigated.

Prerequisite: PSY 001. Letter grade only.

PSY 145: Human Sexuality [4]

Survey of existing knowledge of human sexual behavior; physiological, anatomical, psychological, and cultural components; normative sexual functioning. Such topics as sexual deviation, sexual dysfunctions, and types of treatment are also considered.

Prerequisite: PSY 001.

PSY 147: Health Psychology [4]

Survey of topics in health psychology, behavioral medicine, and pediatric health psychology.

Prerequisite: PSY 001.

PSY 150: Psychological Perspective on Cultural, Racial Ethnic Diversity [4]

Issues that bear upon race, ethnicity, and culture, such as the cultural specificity of psychological theories, cultural influences on child development, ethnic identity, psychological issues in immigration, ethnic and racial prejudice, and assessment and interventions with culturally diverse and ethnic minority populations.

Prerequisite: PSY 001.

PSY 151: The Psychology of Stereotyping and Prejudice [4]

Cognitive processes underlying stereotyping and prejudice are reviewed. Focuses on the relationship between stereotyping and categorization in general, the development of stereotyping and prejudice, and empirical proposals to reduce bias through contact or other forms of intervention.

Prerequisite: PSY 001 or COGS 001.

PSY 159: Personality Psychology [4]

The theories of Freud, Erikson, and other major twentieth-century contemporary approaches to personality.

Prerequisite: PSY 001.

PSY 160: Cognitive Psychology [4]

Introduction to human information processing, mental representation and transformation, imagery, attention, memory, language processing, concept formation, problem solving, and computer simulation.

Prerequisite: PSY 001.

PSY 161: Perception [4]

An introduction to key theoretical constructs and experimental procedures in visual and auditory perception. Topics include psychophysics; perception of color, space, shape and motion; pattern recognition; perceptual attention; and brain areas engaged in perception.

Prerequisite: PSY 001 or COGS 001.

PSY 162: Visual Perception [4]

A survey of central topics in the psychological study of vision: neurophysiological structure and function of the visual system; psychophysical methods for studying visual perception; color, motion, and form perception; three dimensional space perception; visual attention and oculomotor behavior; evolutionary advantages of vision; psychological and philosophical theories of visual consciousness.

Prerequisite: PSY 001.

PSY 170: Industrial and Organizational Psychology [4]

How psychology is applied to industrial and organizational problems, including workplace testing, personnel issues, advertising, etc.

Prerequisite: PSY 001.

PSY 171: Psychological Tests and Measurement [4]

Principles of measuring behavior and developing and selecting psychological tests are explained. Common tests are also surveyed, such as intelligence, achievement, personality, and employment related tests.

Prerequisite: PSY 001.

PSY 172: Forensic Psychology [4]

Survey of the application of psychology to the criminal justice system, including public policy,

sanity, competency, eyewitness testimony and treatment of mentally ill offenders.

Prerequisite: PSY 001.

PSY 180: Physiological Psychology [4]

Relationship of brain structure and function to behavior, motivation, emotion, language, and learning in humans and other animals. Review of research methods used in physiological psychology and neuroscience.

Prerequisite: PSY 001.

PSY 190: Topics in Psychology [4]

Intensive treatment of a special topic or problem of psychological interest. May be repeated for credit in different subject area.

Prerequisite: PSY 001 and junior standing, or consent of instructor. May be repeated for credit three times with different topics.

PSY 191: Fieldwork in Psychology [1-4]

Supervised experience off and on campus, in community and institutional settings.

Letter grade only. May be repeated for credit.

PSY 195: Upper Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

PSY 198: Upper Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

PSY 199: Upper Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

PSY 200A: Professional Seminar for First-Year PhD Graduate Students I [4]

A two semester sequence required of and limited to first-year Ph.D. students in Psychology. Survey of major issues in contemporary psychology with their historical backgrounds.

Letter grade only.

PSY 200B: Professional Seminar for First-Year Graduate Students II [4]

A two semester sequence required of and limited to first-year Ph.D. students in Psychology. Survey of major issues in contemporary psychology with their historical backgrounds.

Letter grade only.

PSY 202A: Advanced Psychological Statistics I [4]

The nature of causal inference; experimental and quasi-experimental designs including randomized experiments, nonrandomized control group studies, time series, regression discontinuity; generalizing from experiments; ethical issues and ethical principles of research conduct; practical problems in experiments.

Letter grade only.

PSY 202B: Advanced Psychological Statistics II [4]

Classical test theory; factor analysis; generalizability theory; item-response theory; inter-rater reliability; fundamental measurement theory.

Letter grade only.

PSY 202C: Multivariate Analysis [4]

Introduction to analysis of data having multiple dependent variables. Topics include continuous multivariate distributions, multiple regression, multivariate analysis of variance, discriminant analysis, classification, canonical correlation, principal component analysis. Applications from clinical, cognitive, physiological, and social psychology. Computer methods.

Letter grade only.

PSY 204: Research Design and Methodology [4]

The nature of causal inference; experimental and quasi-experimental designs including randomized experiments, nonrandomized control groups studies, time series, regression discontinuity; generalizing from experiments; ethical issues and ethical principles of research conduct; practical problems in experiments.

Letter grade only.

PSY 205: Measurement Theory and Psychometrics [4]

Classical test theory, factor analysis, generalizability theory, item response theory, interrater reliability, fundamental measurement theory.

Letter grade only.

PSY 206: Quantitative Methods for Reviewing Research [4]

Quantitative procedures (meta-analysis) for reviewing research findings; techniques for locating and coding research studies, calculating effect sizes, and analyzing study findings.

Letter grade only.

PSY 207: Linear Structural Modeling [4]

Path models, path analysis, cross-lagged panel studies, confirmatory factor analysis, and complete latent variable causal models, applications to experimental and nonexperimental data.

Letter grade only.

PSY 208A: Methods for Program Evaluation [4]

Introduction to program evaluation. Survey of the many methods used in program evaluation, including needs assessment, surveys, experiments, and qualitative methods. Discussion of policy and strategy issues, and of utilization of findings.

Letter grade only.

PSY 208B: Theory of Program Evaluation [4]

History and nature of program evaluation, review of different approaches taken to evaluation by variety of major theorists in the field; practice in evaluation.

Letter grade only.

PSY 211: Computer Programming for Social Sciences [4]

An introduction to specialty computer programs that are useful in the social sciences, such as Matlab, GAUSS, specialty programs in meta-analysis, and basic languages.

Letter grade only.

PSY 212: Special Problems in Psychological Statistics [4]

Special problems in psychological statistics and data analysis.

Letter grade only.

PSY 214: History of Psychology [4]

Covers the major schools of psychology, including Wundtian psychology, structuralism, functionalism, behaviorism, gestalt psychology, cognitive psychology, etc., as well as the philosophical and physiological influences that lead to the birth of psychology as an independent discipline. Focus is on integration over these areas with the goal of better understanding the current state of the science of psychology. Major recurring themes within these schools include the mind/body problem, the nature/nurture debate, and the criteria for practicing a science.

Letter grade only.

PSY 220: Health Psychology [4]

A review of theory and research on how behavior affects health and disease as well as how disease affects behavior (e.g., cognitions, emotions, relationships) in humans. Research into behavioral interventions to improve, ameliorate, or prevent disease are also reviewed. Focus is placed on the role of behavior for the major diseases and threats to health in children, adolescents, and adults.

Letter grade only.

PSY 230: Developmental Psychology [4]

The stages that children go through as they develop. Covers cognitive development, biological development, social development, personality development, emotional development, among others. Focus is on integrating across these different content areas.

Letter grade only.

PSY 234: The Nativism Empiricism Debate [4]

A major debate in developmental psychology concerns the relative contribution of innate versus learned knowledge and skills. We focus on theoretical and empirical contributions

to this debate, and try to place them within a broader framework of contemporary cognitive development.

Letter grade only.

PSY 235: Language Acquisition [4]

The stages that children go through as they learn their first language. Course also explores the causal mechanisms behind language acquisition as outlined by the major theoretical approaches in the field. Bilingual language acquisition are also covered.

Letter grade only.

PSY 236: Cognitive Development [4]

The major theories and stages of children's cognitive development. Among others, we cover Piaget, Vygotsky, information processing theories, and connectionist approaches to learning.

Letter grade only.

PSY 237: Conceptual Development [4]

Explores how children learn about specific conceptual domains, such as naive biology and theory or mind. The major theoretical approaches in the area are covered. Questions of process, such as radical reorganization vs. enrichment of content areas set the context for the course.

Letter grade only.

PSY 238: The Development of Social Mind [4]

Considers the emergence of social reasoning and behavior from infancy to adulthood. Special focus on the cognitive processes underlying reasoning about others as intentional agents, as members of social groups such as race and gender.

Letter grade only.

PSY 239: Cognitive Development and Education [4]

How can developmental psychology inform educational practice? We review current developmental theories as well as attempts to apply them to education, with the aim of building an understanding of both the promise and pitfalls of a developmentally based approach to education.

Letter grade only.

PSY 250: Social Psychology [4]

Designed for graduate psychology students. Intensive consideration of concepts, theories, and major problems in social psychology.

Letter grade only.

PSY 251: The Psychology of Prejudice and Stereotyping [4]

Cognitive processes underlying prejudice and stereotyping are reviewed. We focus on the relationship between stereotyping and categorization in general, the development of stereotyping and prejudice, and empirical proposals to reduce bias through contact or other forms of intervention.

Letter grade only.

PSY 261: Neural Networks [4]

Overview of classical neural network architectures, algorithms, and applications to psychology are followed by the development of a student project.

Prerequisite: Some ability in computer programming. Letter grade only.

PSY 262: Cognitive Modeling [4]

Projects-based seminar in cognitive modeling. Students are required to complete a project applying some form of computer model (neural network, symbolic, statistical, genetic algorithm) to the study of cognitive phenomena.

Letter grade only.

PSY 263: Language and Communication in Everyday Life [4]

Conversational language, metaphor, idioms, ambiguity, spatial language, gesture, sign language, propaganda, dialects, cross-cultural variation, semantic change.

Letter grade only.

PSY 264: Language, Mind and Brain [4]

Language and linguistic representation from various angles and disciplines, including psychology, linguistics, philosophy, and neuroscience. Possible topics: sentence processing, word meaning, neurolinguistic deficits, language learning, artificial intelligence (natural language processing), and the interaction of language with other cognitive processes.

Letter grade only.

PSY 265: Foundations of Cognitive Science [4]

Consideration of foundational questions in cognitive science, including: What is a representational system? How do representations interact? What kind of formal structure, if any, is appropriate in characterizing human mental processing? What constitute valid means of testing for intelligence?

Letter grade only.

PSY 269: Seminar in Cognitive Science [4]

Seminar on a specific topic in cognitive science.

May be repeated for credit on a different topic. May be repeated for credit three times.

PSY 286: Presentation of Psychological Materials [4]

Supervised practicum in undergraduate teaching. Students serve as discussion section leaders in selected undergraduate courses, and give guest lectures in courses where appropriate.

Satisfactory/Unsatisfactory grading only.

PSY 288: Psychological Research Practicum [1-4]

Faculty and graduate students who share interests discuss current literature, new ideas, methodological issues, and preliminary findings. Meetings include research presentations and opportunities for feedback on current and proposed research activity to encourage, support, and facilitate student research expertise. Assigned reading including.

Satisfactory/Unsatisfactory grading only.

PSY 289: Psychology Colloquium [1]

One and one-half hours of colloquium per week. Reports and discussions of original research in psychology. Not all participants must report in any given semester, but all are expected to attend and to enter into the discussion.

Satisfactory/Unsatisfactory grading only.

PSY 290: Special Topics Study Course [1-4]

Under faculty supervision, group of students meets each week for a semester in a student-led study group to pursue a specific topic of their choice that is not covered in other department courses.

Satisfactory/Unsatisfactory grading only. May be repeated for credit with different topics.

PSY 294: Individual Studies [2-12]

Designed primarily as preparation for qualifying examinations. May be required by some area committees as a requisite for taking examinations.

Satisfactory/Unsatisfactory grading only. May be repeated for credit.

PSY 295: Graduate Research [1-12]

Supervised research.

Permission of instructor required. May be repeated for credit.

PSY 296: Research Topics in Psychology [1]

Research group meeting, one hour. Limited to graduate students. Discussion of current literature, new ideas, methodological issues, and preliminary findings. Research presentations and opportunities for feedback on current and proposed research activity to encourage, support, and facilitate student research expertise. Assigned readings included.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit with different topics.

PSY 297: Research for Ph.D. Dissertation [2-12]

At least one 297 course is required during each year following completion of qualifying examinations.

Satisfactory/Unsatisfactory grading only. May be repeated for credit.

PSY 298: Directed Group Study [1-12]

Group project under faculty supervision.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

PSY 299: Directed Individual Research and Study in Psychology [2-12]

One 299 course is required during second semester of the first year of graduate study, and both semesters of the second year of graduate study.

Permission of instructor required. Satisfactory/ Unsatisfactory grading only. May be repeated for credit.

PUBLIC POLICY

PUBP 001: Introduction to Public Policy [4]

Interdisciplinary introduction to public policy and policy issues facing the American voter. Emphasis is on how difficult it is to arrive at an informed decision—not on determining what that decision ought to be. Examines a diverse set of policy topics, including environment, health, education, and social policy, among others.

Letter grade only.

PUBP 090X: Freshman Seminar [1]

Examination of a topic in public policy.

Pass/No Pass grading only. May be repeated for credit.

PUBP 095: Lower Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

PUBP 098: Lower Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

PUBP 099: Lower Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

PUBP 100: Political Process and Institutions [4]

Political and governmental context of policy, form agenda setting to evaluation. Course examines the context for setting constitutional, federal and local policy, as well as processes by which governmental institutions make decisions. We also examine interactions between institutions and approaches that further policy decision making.

Prerequisite: PUBP 001 or POLI 001. Letter grade only.

PUBP 110: Poverty and Social Policy [4]

Overview of poverty and social policy in the United States in a historical context from the nineteen century until the present. Discusses current policy issues and policy debates surrounding poverty and inequality.

Prerequisite: (PUBP 001, PUBP 100, ECON 100 and PSY 105) or ECON 130. Letter grade only.

PUBP 120: Health Care Policy [4]

Examines current health policy issues and policy approaches, as a way of exploring problems in the design and implementation of policy. It concentrates on issues of access to care, quality of care, health care costs, health insurance, health behavior, and the cultural and linguistic issues facing immigrants' access to care.

Prerequisite: (PUBP 001, PUBP 100, ECON 100 and PSY 105) or ECON 130. Letter grade only.

PUBP 130: Environmental Policy [4]

Examines current environmental policy as a way of exploring problems in the design and implementation of policy. Provides an overview of basic concepts and methods of environmental policy analysis and implementation looking at a range of local and global environmental policy issues, such as environmental justice, air quality, and urbanization.

Prerequisite: (PUBP 001, PUBP 100, ECON 100 and PSY 105) or ECON 130. Letter grade only.

PUBP 140: Immigration and Public Policy [4]

Examines the origins, consequences, and characteristics of immigrants to the United States, from the nineteenth century to the present. We look at social and economic forces behind immigration; the impact of immigrants; and their process of integration. We also examine various debates on immigrant and immigration policy.

Prerequisite: (PUBP 001, PUBP 100, ECON 100 and PSY 105) or ECON 130. Letter grade only.

PUBP 150: Race, Ethnicity and Public Policy [4]

Examines the ways in which policies are shaped by and respond to issues of race, ethnicity and culture. Among others, we explore issues of inequality in the labor market, segregation, discrimination, environmental justice, health care access, and social and political inequality.

Prerequisite: (PUBP 001, PUBP 100, ECON 100 and PSY 105) or ECON 130. Letter grade only.

PUBP 195: Upper Division Undergraduate Research [1-4]

Supervised research.

Permission of instructor required. May be repeated for credit.

PUBP 196: Individual Internship [1-4]

Involves an internship in the public policy field. For example, a 10-week internship, usually completed during the summer between junior and senior year at a governmental or non-profit organization, a research center, or UC Centers in Sacramento or Washington, D.C.. Public Policy majors are required to write an original research paper based on the internship.

Prerequisite: PUBP 100, ECON 100 and (PSY 105 or ECON 130).

PUBP 198: Upper Division Directed Group Study [1-5]

Group directed study.

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

PUBP 199: Upper Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

QUANTITATIVE AND SYSTEMS BIOLOGY

QSB 200: Molecular Cell Biology [3]

A graduate-level course focusing on molecular aspects of cellular processes, including signal transduction, cell division, differentiation, protein synthesis and degradation, and regulation of gene expression. Each topic is accompanied by critical evaluation of classic papers and recent publications. Upper division undergraduate courses in cell and molecular biology should have been completed as course requisites for this course.

Letter grade only.

QSB 201: Teaching and Learning in the Sciences [1]

Students are introduced to 'scientific teaching' - an approach to teaching science that uses many of the same skills applied in research. Topics include how people learn, active learning, designing, organizing and facilitating teachable units, classroom management, diversity in the classroom and assessment design.

Permission of instructor required. Satisfactory/ Unsatisfactory grading only. May be repeated for credit.

QSB 212: Advanced Signal Transduction and Growth Control [4]

Signal transduction in mammalian cells with emphasis on molecular and genetic regulation of these processes and their role in cell function. Graduate requirement includes an advanced discussion section involving research methodology and data interpretation led by the instructor.

Prerequisite: An undergraduate biochemistry course or consent of instructor.

QSB 214: Tissue Engineering Design [3]

Fundamental topics include: issues related to the cell source (including stem cells, plasticity, transdifferentiation, therapeutic cloning vs. reproductive cloning, bone marrow transplants, and cell differentiation and purification), cell culture and tissue organization, gene therapy delivery methods, cell adhesion and migration, issues in construct design, tissue preservation, and immunoisolation and/or modulation. Current case studies and issues for FDA approval oftissue engineered products are also covered.

Prerequisite: ICP 001A, ICP 001B and BIO 100, or equivalent.

QSB 215: Principles of Biological Technologies [3]

The principles underlying commonly used and cutting-edge technical procedures in biological research. Lectures and primary literature critiques on biochemical, molecular, cellular, bioengineering and computational techniques.

Prerequisite: QSB 290 or consent of instructor.

QSB 217: Lab on a Chip: Developing 3rd World Diagnostics for Global Health [3]

This is the first-ever four campus course between UC San Francisco, UC Berkeley, UC Santa Cruz, and UC Merced which aims to 1) raise awareness and knowledge about global health issues 2) teach students critical engineering skills such as nano/micro-fabrication 3) enable students to design, build, and test their own diagnostics and 4) develop entrepreneurial skills. Students learn about tuberculosis from leading experts at UCSF and then address the dearth of sensitive diagnostics by designing and testing their own nano/micro-systems. Taught at UC Merced with teleconferencing to the other campuses and two field trips. Funded in part by QB3.

Letter grade only.

QSB 220: Cellular Microbiology [3]

Emphasizes the molecular basis of interaction between microbial pathogens (bacteria, viruses and protozoan parasites) and host cells. We also include discussion of the immune response to infection. Student-led presentations and discussion of reading assignments from the current scientific literature.

Letter grade only.

QSB 227: Virology [3]

Overview of viruses, focusing on structure, infecting cycle, interactions with host, transmission and methods of detection and control.

Prerequisite: QSB 290.

QSB 241: Advanced Genomic Biology [4]

Comprehensive introduction to the language of genes and genomes, including genotype to phenotype relationships, gene regulation of development and disease, sources of phenotypic variation, and organization of genomes across the domains of life. Graduate requirements include advanced discussion section led by instructor and genome informatics project.

QSB 242: Genome Biology [5]

Introduction to the concepts behind genome biology and a detailed overview of the many tools used in comparative genomics. Specific topics include genome assembly, gene modeling and comparative genomics, transcriptomics, and proteomics of prokaryotic and eukaryotic organisms. Students carry out real scientific projects in collaboration with course faculty and produce new genomic data of publishable quality. Mandatory weekly three hour lab is part of this course.

Prerequisite: BIO 141. Letter grade only.

QSB 244: Phylogenetics: Speciation and Macroevolution [3]

Theory underlying reconstruction of evolutionary relationships and introduces the comparative methods and tools of phylogenetics. Topics include morphological, molecular, and fossil data in distance, parsimony, likelihood, and Bayesian frameworks for investigating geographic patterns and rates of speciation, phenotypic evolution, diversification, extinction, and biogeography.

Letter grade only.

QSB 244L: Phylogenetics Laboratory: Speciation and Macroevolution [1]

Practice in reconstruction of evolutionary relationships and introduces the comparative methods and tools of phylogenetics. Topics include morphological, molecular, and fossil data in distance, parsimony, likelihood, and Bayesian frameworks for investigating geographic patterns and rates of speciation, phenotypic evolution, diversification, extinction, and biogeography.

Prerequisite: QSB 244, which may be taken concurrently. Letter grade only.

QSB 250: Embryos, Genes and Development [3]

Principles of developmental biology as revealed through analysis of invertebrate and vertebrate system. Animal models are used to examine the molecular and cellular mechanisms that influence cell fate. Cell signaling is studied in the context of embryonic pattern formation and the development of body plans and organ systems. Graduate level students read discuss and critique current research papers relevant for the field.

Prerequisite: QSB 290 and BIO 110, or consent of instructor. Letter grade only.

QSB 252: Cancer Genetics and Tumor Biology [3]

Topics include viral and hormonal carcinogenesis, molecular aberrations in cancer, tumor development, epigenetic and cancer, tumor immunology, oncogenes.

Letter grade only.

QSB 261: Human Physiology [3]

Understanding the mechanisms underlying function of major human organs. Emphasis includes neural transmission and action potential, cardiovascular, renal and gastrointestinal physiology, metabolism, and endocrinology. Laboratory experiments demonstrating and reinforcing topics covered in lecture with an emphasis on scientific method. Discussion section critically reads and evaluates papers in physiology and provide an opportunity for the students to practice presenting scientific data to an audience.

Permission of instructor required. Letter grade only.

QSB 280: Advanced Mathematical Biology [3]

Graduate level mathematical modeling and data analysis skills for life science researchers taught through hands-on computational laboratories. Topics include population models, predator-prey and competition systems, epidemic models with applications to sexually transmitted diseases, dynamic diseases, enzyme kinetics, biological oscillators, and switches.

Letter grade only.

QSB 281: Advanced Computational Biology [4]

Introduction to the principles and application of computational simulations and modeling in biology, ranging from bioinformatics to computational cell biology. Topics to be covered include genome sequence analysis and annotation, phylogenic analysis, protein structure prediction, molecular modeling, and docking and simulations of metabolic and regulatory networks. Graduate requirements include advanced discussion section led by instructor and computational biology project.

QSB 283: Population Genetics [3]

The various factors that affect gene flow and frequency within a population. Theories of selection, neutrality, drift, hitchhiking, recombination, mutation, isolation, in-breeding, and selfish genetic elements are taught along with statistical tests and experimental methods for detecting these forces.

Letter grade only.

QSB 290: Current Topics in Quantitative and Systems Biology [3]

Discussion, reading, and study that exposes students to current research directions in the field; student-led presentation, analysis, and discussion of reading assignments from the scientific literature.

Letter grade only.

QSB 291: Quantitative and Systems Biology Seminar [1]

Seminar series covering various topics in quantitative and systems biology presented by QSB Graduate Group faculty and visiting speakers.

Letter grade only. May be repeated for credit.

QSB 292: Quantitative and Systems Biology Group Meeting [1]

Meetings to describe current progress and research plans lead by individual QSBGG faculty.

Letter grade only. May be repeated for credit.

QSB 293: Quantitative and Systems Biology Journal Club [1]

Student-led presentation, analysis, and discussion of reading assignments from the scientific literature.

Letter grade only. May be repeated for credit.

QSB 294: Responsible Conduct of Research [1]

Seminar covering responsibilities and expectations for researchers as well as advice for success in graduate school and science careers, required for NIH-funded graduate students.

Satisfactory/Unsatisfactory grading only.

QSB 295: Graduate Research [1-12]

Supervised research.

Permission of instructor required. May be repeated for credit.

QSB 298: Directed Group Study [1-12]

Group project under faculty supervision.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

QSB 299: Directed Independent Study [1-12]

Independent project under faculty supervision.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

QSB 399: University Teaching [1]

Centered on a student's classroom experiences as a Teaching Assistant in an undergraduate Biological Sciences course. Provides a faculty-directed opportunity to implement teaching practices presented in the course Teaching and Learning in the Sciences. Involves video-taping of teaching, peer review, and weekly meetings with faculty.

Prerequisite: QSB 201 or MATH 201, either of which may be taken concurrently. Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit once.

SOCIAL AND COGNITIVE SCIENCES

SCS 090X: Freshman Seminar [1]

Examination of a topic in the social, behavioral and cognitive sciences.

May be repeated for credit.

SCS 095: Lower Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

SCS 098: Lower Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

SCS 099: Lower Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

SCS 140: Psychology and Economics [4]

A review of psychological and economic research on departures from perfect rationality, self-interest, and other classical assumptions of economics. The implications of these new findings for classical economics are explored.

Prerequisite: PSY 001 and ECON 001.

SCS 145: Second Language Learning and Bilingualism [4]

Issues in second language acquisition, including processing of linguistic information by bilinguals (perception, recall, translation), structure of bilingual discourse, child bilingualism, language maintenance or shift, with particular focus on the North American Context.

Prerequisite: PSY 001.

SCS 192: Integrative Topics [4]

Special topics that integrate theory or research from more than one discipline in the social and behavioral sciences.

Prerequisite: PSY 001, ECON 001, SOC 001 or POLI 001, or consent of instructor. May be repeated for credit.

SCS 195: Upper Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

SCS 198: Upper Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

SCS 199: Upper Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

SCS 210: Philosophy of Cognitive Science [4]

Consideration of philosophical and foundational issues in cognitive science, such as: behaviorism, functionalism, the Turing Test, the Chinese Room argument, the nature of cognitive architecture, animal cognition, connectionism vs. symbolic artificial intelligence, consciousness, the self, free will, embodiment, and ethics.

Letter grade only.

SCS 295: Graduate Research [1-12]

Supervised research.

Permission of instructor required. May be repeated for credit.

SCS 298: Directed Group Study [1-12]

Group project under faculty supervision.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

SCS 299: Directed Independent Study [1-12]

Independent project under faculty supervision.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

SOCIOLOGY

SOC 001: Introduction to Sociology [4]

The study of groups, culture, collective behavior, classes and caste, community and ecology, role, status, and personality.

SOC 002: Marriage and the Family [4]

Introduction to basic sociological theories, concepts and issues regarding marriage and the family in a larger societal context. Investigates the diversity that marriages and families have in society, and examine how theoretical paradigms influence the way sociology perceives and studies marriages and families.

SOC 009: Community Mobilization and Politics [4]

Examination of political and social mobilization at the local level, including strategies for organization and advocacy.

SOC 030: Introduction to Social Stratification [4]

Examines the main classical and modern explanations of the causes of social, economic and political inequality. Issues include: power; processes that create/maintain inequality, the central axes of inequality in society (race/class/gender); consequences of inequality for individuals and groups; how policy can mitigate or exacerbate inequality.

SOC 040: Introduction to the Sociology of Organizations [4]

Examines the role of organizations in production, market transactions, social movements, and as a source of income and mobility. We explore the relationships of modern organizations to environments and internal structure and processes and analyze organizational phenomena in society using literature and case studies.

Pass/No Pass grading only.

SOC 050: Self and Society [4]

Focuses on the major theoretical perspectives, and their assumptions and problems, in interpersonal processes and social psychology from a sociological point of view. Examines techniques of investigation and methodological issues as well as focus on the dominant perspectives.

SOC 060: Introduction to Sociology of Gender [4]

Examines gender inequality in contemporary society and its maintenance. The social/relative nature of knowledge and the problem this poses for understanding sex differences and gendered behavior. Examining and analyzing gender inequalities such as socialization, interaction and socioeconomic processes; as well as social consequences of gender inequality.

SOC 070: Introduction to Crime and Deviance [4]

Examines the process of criminal justice in the US and address major theories of crime and deviance. In addition: how individuals and social groups are processed through the criminal court system; historical changes in correctional philosophy and organizational structure; inmate socialization, and social environment changes in U.S. prisons.

SOC 080: Issues of Race and Ethnicity [4]

Examines racial and ethnic relations in the U.S. and elsewhere, as well as examine the construction and meanings of racial identities in the U.S. Processes that render ethnic/racial boundaries, as well why some groups become targets of ethnic attacks, and the dynamics of hostility and of protest movements.

SOC 090X: Freshman Seminar [1]

Examination of a topic in sociology.

May be repeated for credit.

SOC 095: Lower Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

SOC 098: Lower Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

SOC 099: Lower Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

SOC 110: Social Movements, Protest and Collective Action [4]

Introduction to the social scientific study of social protest (meaning all forms of non-routine, or contentious politics) and collective action. Examines organized collective efforts to promote or resist change in society that rely, in some part, on non-institutionalized forms of political action.

Prerequisite: POLI 001, SOC 001 or PUBP 001, or consent of instructor.

SOC 115: Political Sociology [4]

Sociological analysis of types of political organization and action and their relations to elements of social life. Topics include: Social movements, voting, interest group politics, protest behavior, revolutions, human rights, global political diffusion, and other elements of the interaction between the political structure and everyday life.

Prerequisite: SOC 001, POLI 001 or PUBP 001. Letter grade only.

SOC 130: Advanced Topics in Social Stratification [4]

In-depth examination of the main classical and modern explanations of the causes of social, economic and political inequality. Issues include: Power; processes that create/maintain inequality, the central axes of inequality in society (race/class/gender); consequences of inequality for individuals and groups; how policy can mitigate or exacerbate inequality.

Prerequisite: SOC 001, PUBP 001, POLI 001 or ANTH 001. Letter grade only.

SOC 131: Urban Inequality [4]

The goal of this course is to examine a small selection of the work on urban poverty in the United States in a seminar setting. We examine in depth theories behind the evolution of the urban poor, as well as the impact of poverty upon individuals.

Prerequisite: SOC 001, SOC 003, SOC 008, POLI 001 or PUBP 001, or consent of instructor. Letter grade only.

SOC 132: Sociology of Education [4]

Focuses on how social forces (such as politics, economics, demographics and institutional context) create variation in school practices, and how variation in school practices affects individual student achievement and behavior. Students also become familiar with presenting, interpreting, and discussing public education data.

Prerequisite: SOC 001, ANTH 001 or POLI 001, or consent of instructor.

SOC 134: Sports and Society [4]

Sports are often dismissed as unimportant to society's working. However, some of society's most important moments, racial integration (Jackie Robinson), gender equality (Title IX), and recognition of new nations (Olympics) have been through sports. We examine the dynamics sports play in society, focusing on issues of race, gender and nationality.

Prerequisite: SOC 001, ANTH 001 or POLI 001, or consent of instructor.

SOC 160: Advanced Topics in Sociology and Gender [4]

The role gender plays in structuring social lives. We begin by discussing sociological theories of gender, gender socialization/parenting, gender identity and intersections of gender and sexuality. We then examine gender on an institutional and systemic level-focusing on how organizations, such as work, education, the law, and politics are gendered.

Prerequisite: SOC 001, POLI 001, ANTH 001 or SOC 060, or consent of instructor. Letter grade only. May be repeated for credit three times.

SOC 161: Sociology of Sexuality [4]

Since its inception in the 1960s, the sociological study of sexuality has developed along two lines, one focusing on the social construction of sexuality and the other on sexual behavior and demographic trends. Although we cover both perspectives in the class, our primary focus is on work within the social constructionist tradition.

Prerequisite: SOC 001, POLI 001, ANTH 001 or SOC 060, or consent of instructor. Letter grade only.

SOC 180: Advanced Issues in Race and Ethnicity [4]

Examines in depth the main classical and modern explanations of the issues surrounding Race and Ethnicity. Issues include: Power; processes that create/maintain inequality ,biological vs social constructions of race, race and ethnicity in the age of conquest, race and ethnicity in modern society.

Prerequisite: SOC 001, PUBP 001, POLI 001 or ANTH 001. Letter grade only.

SOC 185: Topics in Sociology [4]

Intensive treatment of a special topic or problem in sociology. May be repeated for credit in different subject area.

Prerequisite: SOC 001. May be repeated for credit three times with different topics.

SOC 190: Sociology Capstone [4]

The sociology minor capstone, which has the students create a sociological question, and examine the existing literature for explanations to the social phenomena in question.

Prerequisite: SOC 001 and junior standing. Letter grade only.

SOC 195: Upper Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

SOC 198: Upper Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

SOC 199: Upper Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

SPANISH

SPAN 001: Elementary Spanish I [4]

Introduction to speaking, reading, writing, and understanding Spanish. Classes conducted in Spanish.

SPAN 002: Elementary Spanish II [4]

Introduction to speaking, reading, writing, and understanding Spanish. Classes conducted in Spanish.

Prerequisite: SPAN 001 or equivalent score on the Spanish Placement Exam.

SPAN 003: Intermediate Spanish I [4]

Review of Spanish grammar with emphasis on building speaking and writing skills and on

readings to build cultural understanding. Classes conducted in Spanish.

Prerequisite: SPAN 002.

SPAN 004: Intermediate Spanish II [4]

Review of Spanish grammar with emphasis on building speaking and writing skills and on readings to build cultural understanding. Classes conducted in Spanish.

Prerequisite: SPAN 003.

SPAN 010: Spanish for Heritage Speakers I [4]

For native speakers with limited experience in grammar and composition. Emphasis on formal language study and writing. Classes and discussion conducted in Spanish.

Prerequisite: Passing score on Spanish Placement Exam.

SPAN 011: Spanish for Heritage Speakers II [4]

For native speakers with limited experience in grammar and composition. Emphasis on formal language study and writing. Classes conducted in Spanish.

Prerequisite: SPAN 010.

SPAN 090X: Freshman Seminar [1]

Examination of a topic in Spanish.

May be repeated for credit.

SPAN 095: Lower Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

SPAN 098: Lower Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

SPAN 099: Lower Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

SPAN 103: Spanish Composition and Conversation [4]

To develop a student's abilities to communicate in spoken and written Spanish, we emphasize the importance of the interaction between writer, reader, purpose and message. We focus on the four major modes of writing: description, narration, exposition and argumentation. Oral practice is also be a major component in this course.

Prerequisite: SPAN 004 or SPAN 011. Letter grade only.

SPAN 105: Hispanic Cultures I [4]

The cultures of the Hispanic world from an interdisciplinary perspective. Covers the period ending in the nineteenth century, emphasizing conversation and composition.

Prerequisite: SPAN 4 or equivalent score on the Spanish Placement Exam.

SPAN 106: Hispanic Cultures II [4]

Hispanic cultural manifestations from an interdisciplinary perspective. Covers from the nineteenth century to the present, emphasizing conversation and composition.

Prerequisite: SPAN 105.

SPAN 110: Spanish Linguistics [4]

Introduction to the study of key areas of Spanish Linguistics such as the sound system, word form, syntactic patterns, the development of language, and regional and social variations.

Prerequisite: SPAN 103 or consent of instructor. Letter grade only.

SPAN 141: Spanish for Health Professionals [4]

Specialized Spanish vocabulary and expressions that health-care professionals need to communicate with Hispanic patients and to carry out research in that language. Includes the reading of medical essays and composition.

Prerequisite: SPAN 004 or SPAN 011.

SPAN 142: Spanish for Business and Management [4]

Specialized Spanish vocabulary and expressions used to carry out business with Hispanic individuals or companies. Addresses cultural awareness and includes the reading of essays that deal with the course's topics. In addition, students learn how to write professional letters and other documents in Spanish.

Prerequisite: SPAN 004 or SPAN 011.

SPAN 180: Topics in Hispanic Languages and Cultures [4]

In-depth study of Spanish Languages and/or Hispanic Culture. Possible topics include Latin American and Spanish Film, the Mexican Corrido, Gender and Latin American Popular Music. With permission of the instructor, can be repeated for credit as topics change.

Prerequisite: SPAN 103 or equivalent score on the Spanish Placement Exam. Permission of instructor required. Letter grade only. May be repeated for credit twice with different topics.

SPAN 195: Upper Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

SPAN 198: Upper Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

SPAN 199: Upper Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

UNDERGRADUATE STUDIES

USTU 010: Introduction to Undergraduate Studies [1]

Combining weekly, large-group, interactive lectures and small-group discussion sessions, we focus on topics related to navigating campus life and strategies for effective learning at UC Merced. Reflective writings and engagement in activities on campus that promote self-empowerment and academic success play key roles in this course.

Pass/No Pass grading only.

WORLD CULTURES AND HISTORY

WCH 100: Topics in Area Studies [4]

In-depth study of the history and cultural, political, and economic systems of a region.

Prerequisite: Junior standing or consent of instructor. May be repeated for credit three times with different topics.

WCH 190: World Cultures and History Proseminar: Research [4]

Capstone course for majors. Students conduct research under faculty supervision to culminate in a senior thesis. Required of all World Cultures and History majors.

Prerequisite: Senior standing. Pass/No Pass grading only.

WCH 191: World Cultures and History Proseminar: Senior Thesis [4]

Capstone course for majors. Completion of a senior thesis; extensive writing required. Required of all World Cultures and History majors.

Prerequisite: WCH 190 and senior standing. Letter grade only.

WCH 192: Public Research Project in World Cultures and History [1-4]

Directed individual or group project designed around need of an external agency for research and public communication on an issue of vital public interest. End product may be in the form of a written report, interpretive text for the public, web site, etc. Extensive writing is required. Required of all World Cultures and History majors. Students may petition to complete this requirement through alternative activities, subject to review and approval by the Dean.

Letter grade only.

WCH 195: Upper Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

WCH 198: Upper Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

WCH 199: Upper Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

WCH 200: The University as an Institution [4]

Provides students with the capacity to critically analyze the university as an institution embedded in American society. Students address issues such as the corporate funding of university research, the relationship between academia and foreign policy, and what happens when professors write controversial books.

Letter grade only.

WCH 201: Research Proseminar [4]

Introduces graduate students to the different methods of research employed in the disciplines represented in World Cultures and History. Students work on specific topics pertaining to their research, and they approach them using a variety of those methods covered in class.

Letter grade only.

WCH 202: Theories and Methods in the Study of Cultures [4]

Seminar introduces graduate students to the wide variety of theories and methods employed in the disciplines represented in World Cultures and History. It also serves to prepare students for their Comprehensive Examination. Students work with members of the Examination Committee to compose reading lists tailored to their research interests.

Letter grade only. May be repeated for credit once.

WCH 203: The Historian's Craft [4]

Various techniques of research and writing used by historians, from Thucydides to the so-called revisionists of today's "culture wars," and the changing audience of the historian.

Letter grade only.

WCH 210: Topics in California Studies: Constructing California [4]

Major texts that have helped to construct our understanding of and attitude toward California's environment, with an interdisciplinary emphasis that includes publications in environmental policy and law, conservation, quality assessment, landmark legal and historical cases, as well as fiction, poetry and non-fiction.

Letter grade only.

WCH 220: Chicano/a Literature [4]

Multidisciplinary analysis of Chicano/a literature. Main aspects covered include: Chicano/a literary history (including issues of canonicity and reception), bilingualism and literature (including both stylistic and sociolinguistic approaches), ethnicity and race, gender parameters, the aesthetics of the borderlands, class and regional variations, migration and diaspora, film and folklore, and the journalistic tradition.

Letter grade only. May be repeated for credit twice.

WCH 225: Philosophy and Theory [4]

Seminar explores the interdisciplinary common ground between philosophy and literary theory. Authors studied may include Husserl, Heidegger, Gadamer, Iser, Jauss, Fish, Deleuze, Sartre, Wittgenstein, Kant, and Aristotle, among others. Course is complemented by a practical application of these theories to selected literary texts.

Letter grade only.

WCH 230: Topics in Humanities and New Media [4]

How emerging technologies are used to record, analyze and communicate information about history and culture; read critical theory in order to understand the characteristics of text, image, and interactive media; and survey the future challenges and prospects for new media in the humanities.

Letter grade only. May be repeated for credit.

WCH 231: The Great Depression in History and Literature [4]

Focusing on the turbulent decade of the 1930s, we use the lens of history and literature to explore how events from 1929-1941 helped shape modern America. Particular attention is paid to the impact of these years upon California and the West.

Letter grade only.

WCH 240: Topics in United States Social and Cultural History [4]

Selected topics in U.S. social and cultural history through a reading of both classic and newer studies in areas such as race, ethnicity, class, and gender. Students are exposed to both theoretical approaches to these issues as well as monograph case studies.

Letter grade only.

WCH 245: China and World History [4]

Topics concerning the middle period of imperial China, the world's most durable and successful agrarian empire. Second, course locates China in world history, raising historiographical questions about the study of a regional history in both a national and a global tradition.

WCH 248: Race, Empire, and US Foreign Policy [4]

U.S. foreign policy from the 1890s through the present using the lenses of empire and race. Students are introduced to theories and methods within the study of U.S. foreign policy in the course of studying events ranging from the Spanish American War of 1898 to the Iraq war.

Letter grade only.

WCH 250: The Cold War, 1941-1991 [4]

The political, cultural, and intellectual history of America's confrontation with Communist at home and abroad, from U.S. entry into the second World War to the collapse of the Soviet Union and its aftermath.

Letter grade only.

WCH 258: Hispanic and Anglo-American Modernisms [4]

Study through novel of principal characteristics of Hispanic Modernismo and Anglo-American Modernism. We examine the representation of the city in literature through the works of Pio Baroja, Valle Inclan, James Joyce and John Dos Passos, among others. Texts are analyzed through key urban literature historians/critics such as Lewis Mumford, Walter Benjamin, Raymond Williams, Burton Pike and Richard Lehan. Seminar is taught in English.

Letter grade only.

WCH 260: Social Memory [4]

Theoretical exploration of the practices, sites, and functions of social memory. Topics include the social construction of the past; how societies remember; the relationship between history and memory; collective identity; oral history; tradition and modernity; public memory; nostalgia; amnesia; and the politics of memory.

Letter grade only.

WCH 262: Material Culture [4]

Multidisciplinary examination of material objects and the role artifacts play in human social relations, identity, and representation in both the past and present. Explores the range of production and use of material objects, including theories of material culture, technology, identity, class, gender, value, style, meaning, memory, agency, commodification, collecting, and museums.

Letter grade only.

WCH 270: Transatlantic Utopias in Literature and Culture [4]

Comparative and trans spatial approach to examining Utopian constructions in literature. Using both primary sources such as novels, and secondary readings in theory and criticism, course seeks to examine the role such constructions play in historical and contemporary understandings of society.

Letter grade only. May be repeated for credit once.

WCH 280: American Nature Writing and Literature of the Environment [4]

Seeks to understand American attitudes toward natural and constructed landscapes by examining various modes of literary responses to the American environment, including poetry, non fiction, and fiction. Attention is given to historical and political movements and texts.

Letter grade only.

WCH 290: Teaching Pedogogy and Practice [4]

Designed for graduate student teaching assistants. Discussion focuses on pedagogical issues such as grading, syllabus design and assignments, as well as on classroom practices. Students meet at frequent intervals, and they have the chance to meet with professors in their areas of expertise and to meet as a group.

WCH 291: Themes in Cultural Studies [4]

Exploration of various themes in cultural studies. Course reading list is drawn from foundational texts as well as contemporary writings drawn from feminist theory, gender studies, and critical theory.

Letter grade only.

WCH 295: Graduate Research [1-12]

Supervised research.

Permission of instructor required. May be repeated for credit.

WCH 296: Research for MA Thesis [1-6]

Research and writing of M.A. thesis.

Permission of instructor required. Satisfactory/Unsatisfactory grading only.

WCH 297: Research for PhD Dissertation [2-12]

Research and writing of Ph.D. dissertation. At least one 297 course is required during each year following completion of qualifying examinations.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

WCH 298: Directed Group Study [1-12]

Group project under faculty supervision.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

WCH 299: Directed Independent Study [1-12]

Independent project under faculty supervision.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

WORLD HERITAGE

WH 001: Introduction to World Heritage [4]

Introduction to the concept of cultural and natural World Heritage. Topics include international policy in heritage management, the role of governments and organizations in identifying and protecting heritage, methods for documenting and interpreting heritage sites, and cultural and intellectual property ethics.

WH 095: Lower Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

WH 098: Lower Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

WH 099: Lower Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

WH 100: Virtual Heritage and World Heritage [4]

Introduction to virtual heritage and world heritage, definitions and methods. Students learn how to describe, analyze, contextualize, preserve, and communicate information derived from heritage resources.

Prerequisite: WH 001 or consent of instructor.

WH 110: Reconstructing Ancient Worlds [4]

Methodological issues concerning the reconstruction and depiction of the ancient world; study of validation processes for virtual reconstruction; epistemological and anthropological issues. Techniques of documentation, reconstruction, 3D modeling, computer graphics, virtual reality.

WH 140: Cultural Heritage Policy and Practice [4]

Critical examination of the legal, practical, and ethical aspects of cultural heritage management in the United States and abroad. Topics include cultural resource management in public and private contexts, participation of stakeholders, the application of anthropological knowledge, and public outreach.

Prerequisite: Junior standing and (ANTH 003 or WH 001), or consent of instructor.

WH 195: Upper Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

WH 198: Upper Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

WH 199: Upper Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

WRITING

WRI 001: Academic Writing [4]

Development of critical reading, thinking, and academic writing ability. Intensive practice in analysis of college-level texts and in expository writing and revision. Section placement based on the student's UC Entry Level Writing Requirement Exam score. Completion with a grade of C or better meets University of California Entry Level Writing Requirement.

Letter grade only.

WRI 001A: Intensive Academic Writing [2]

For students who are repeating WRI 001, or students entering with AWPE scores of 4 or lower, we provide an intensive focus on academic language, including grammar, vocabulary, and editing practices.

Not available for academic credit. Letter grade only.

WRI 010: College Reading and Composition [4]

Development of college-level skills in effective use of language, analysis and argumentation, organization and strategies for creation, revision and editing.

Prerequisite: WRI 001 or passing score on the entry level analytical writing placement exam or equivalent. Letter grade only.

WRI 025: Introduction to Creative Writing [4]

Introduction to the craft of writing poetry, fiction, and creative non-fiction. Students study literary devices and style by considering a variety of texts by published authors. In addition, we provide an opportunity to explore their own imaginative participation in the world around them. They also compose poems, short stories, and literary essays.

Prerequisite: WRI 010. Letter grade only.

WRI 030: Introduction to Professional Writing [4]

Students develop proficiency in forms of written communication typical in academic and professional settings. In addition, students perform critical analyses of texts within a variety of rhetorical modes. Assignments emphasize responsible and ethical practices in writing to communicate in the professional world.

Prerequisite: WRI 010. Letter grade only.

WRI 095: Lower Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

WRI 098: Lower Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

WRI 099: Lower Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

WRI 100: Advanced Writing [4]

Follows WRI 10 and continues to have an interdisciplinary emphasis. However, the emphasis is on the development of style, voice and syntax within writing projects. This could be considered a pre-professional writing course, and it includes readings and writing in creative non-fiction as well as writing for popular and academic periodicals.

Prerequisite: WRI 025 or WRI 030. Letter grade only.

WRI 105: Grammar and Style [4]

Basic principles of language study, including the key distinction between classifying and explaining linguistic forms and functions. Building on these principles of language study, students analyze texts of various genres and formats, ranging from literary to conversational to disciplinary discourse. No prior knowledge of grammar or linguistics is required.

Prerequisite: WRI 010 and sophomore standing. Letter grade only.

WRI 110: Tutor Training [4]

Students develop, understand and practice professional ethics as they gain experience in the tutoring process. The theoretical and practical parameters of how students learn to write, and pedagogies for working with second language students, and a diverse student population, including students with learning disabilities are addressed through readings, reflective journals, research, writing projects and a practicum.

Prerequisite: WRI 100. Letter grade only.

WRI 115: Topics in Science Writing [4]

To better understand the difficult process of explaining technical information in clear, accessible, non-technical language, students read widely in the scientific literature, including works by established science journalists and by prominent scientists who have written for the general public. Oral presentations and group projects complement various writing tasks.

Prerequisite: WRI 100. Letter grade only. May be repeated for credit twice with different topics.

WRI 116: Science Writing in Natural Sciences [4]

To improve their command of scientific discourse, students in the School of Natural Sciences read widely in scientific literature, including research published in established scientific journals and articles or books by prominent scientists who have written for the general public. Oral presentations and group projects complement various writing tasks.

Prerequisite: WRI 010. Permission of instructor required for non-science majors. Letter grade only.

WRI 117: Writing for the Social Sciences and Humanities [4]

Analysis and practice of various research methods and forms of writing in the social sciences and humanities including qualitative/ethnographic, quantitative, interpretive and theoretical. Writing projects such as literature reviews, proposals, case studies, scientific reports, interviews. Attention to disciplinary resources, formal conventions, graphics and style.

Prerequisite: (WRI 025 or WRI 030) and WRI 100. Letter grade only.

WRI 118: Management Communication Theory and Practice [4]

Students analyze and demonstrate effective managerial communication skills, with an emphasis on public speaking, presentations, and writing. Topics include business ethics, media relations, intercultural communication, interviewing, persuasion, and the visual representation of data. Extensive work in impromptu oral and written communication in various managerial, organizational, interpersonal situations.

Prerequisite: WRI 010 and ECON 001. Letter grade only.

WRI 119: Writing for Engineering [4]

Intensive practice in the presentation of technical subject matter. Students survey the range of audiences to which engineering communities respond, and explore variations in the style and logic of written discourse within the profession. Assignments may include technical reports, design projects, project proposals, press releases, oral presentations, and collaborative projects.

Prerequisite: WRI 010. Letter grade only.

WRI 125: Topics in Creative Writing [4]

Provides an opportunity to pursue advanced work in creative writing. Each section focuses on one genre: poetry, fiction, drama, or creative nonfiction. Workshop format with a focus on student writing. With permission of the instructor, this course can be repeated for credit as topics change.

Prerequisite: WRI 100. Letter grade only. May be repeated for credit twice with different topics.

WRI 130: Topics in Professional Writing [4]

Specialized instruction in one aspect of Professional writing. Topics include, but are not limited to, Journalism, Technical Writing, Copy-Editing, Writing for the Internet, and Research for Writers. Class provides practical instruction in "real-world" writing scenarios, considering important factors such as clarity, tone, audience, ethics, and context. With permission of the instructor, can be repeated for credit as topics change.

Prerequisite: WRI 100. Letter grade only. May be repeated for credit twice with different topics.

WRI 131: Journal Production [1-2]

Intended for students working on the Undergraduate Research Journal, we examine issues of journal production in print and electronic forms, including editorial analysis of texts and principles of revision. Course work is adjusted to match each student's experience in publication.

Prerequisite: WRI 100 recommended. May be repeated for credit.

WRI 195: Upper Division Undergraduate Research [1-4]

Supervised research.

Permission of instructor required. May be repeated for credit.

WRI 198: Upper Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

WRI 199: Upper Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

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Donald Barclay
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Counsel

Elisabeth Gunther
University Counsel

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Director, UC Merced Writing Project

Larry Salinas
Executive Director, Governmental Relations

Brad Samuelson
Director, Environmental Affairs

Rita Spaur
Chief of Police

Thea Vicari
Director, Sponsored Projects

John O. White
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Computational biology of gene expression systems: their structure, function, evolution, and coevolution with genomes, functional and evolutionary bioinformatics of RNA and proteins, evolutionary genomics of prokaryotes

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Applied mathematics, dynamical systems and applied analysis, waves in discrete/inhomogeneous/dispersive media, numerical analysis, and scientific computing

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Analyzing risk in construction projects, researching the use of information technology in construction, understanding decisions on investments in information technology

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Fluid mechanics and related numerical methods, focusing on sedimentation and multiphase flows

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Nineteenth-century American literature and culture, Mark Twain, American literary sentimentalism

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Cellular signaling, cellular engineering, polymer gel assembly, biopolymer gels

JINAH CHOI

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Hepatitis C virus (HCV) and the mechanism of synthesis and functions of novel HCV proteins that are produced by programmed translational frame shifting, as well as how

HCV replication might be regulated by endogenous and exogenous agents

MICHELLE M. CHOUINARD

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B.A., University of California, Berkeley; M.A., Ph.D., Stanford University

Mechanisms of conceptual change in the context of conversational interaction, the role of children's questions in conceptual development, development of biological knowledge, language acquisition, word learning

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B.S., University of California, Davis; Ph.D., Stanford University

Stem cell biology

CARLOS COIMBRA

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B.S. (2), University of Brasilia; M.S., Instituto Superior Tecnico of Lisbon; Ph.D., University of California, Irvine

Particle dynamics, stability of fluids, variable order modeling, turbulent multi-phase mixing layer, computational fluid dynamics, combustion

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Computational and systems biology, biotechnology, computational chemistry

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Biogeochemistry, metal cycling, surface water/shallow groundwater interactions, organic chemical distribution in soil and groundwater, chemical processes in snow, K-12 environmental education

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B.Sc., University of Newcastle-Upon-Tyne, England; M.Sc., University of York, England; Ph.D., University of California, Los Angeles

Assembly of evolution of communities, population dynamics in relation to climate change, evolution of morphology and behavior at micro-and macro-evolutionary scales

BENOIT DAYRAT

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M.S., Ecole Normale Supérieure, Paris; Ph.D., University of Paris VII and National Museum of Natural History

Understanding strategies for macroevolutionary transitions between aquatic and terrestrial habitats, taxonomy approaches that integrate phylogeography, genomics, and paleontology to examine lineages of species

ROBIN DELUGAN

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B.A., M.A., Ph.D., University of California, Berkeley

Nation-state identity, globalization, immigration, transnationalism

GERARDO C. DIAZ

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B.S., Universidad de Santiago de Chile; M.S., Ph.D., University of Notre Dame

Energy conversion systems, dynamic simulation and control of thermal systems, absorption chillers and heat pumps, vapor compression systems with alternate refrigerants

YARROW DUNHAM

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B.A., University of California, Santa Barbara; M.S., Ph.D., Harvard University

Child representation in social group concepts, automatic social judgment, social cognition, cognitive development

ARIEL ESCOBAR

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Bachelor's degree, ENET 28 "Republica Francesa", CONET; Electronic Engineer, Universidad Tecnologica Nacional, Argentina; Ph.D., University of the Republic (PEDECIBA) R.O.U.

Cardiac signaling, development of new optical and spectroscopic techniques for studying the subcellular dynamics of second messengers using fluorescent probes

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U.S. national popular culture, African American music cultures (primarily jazz),

Asian American popular culture, Pacific Island/ Hawaiian studies

HENRY JAY FORMAN

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Signal transduction, antioxidants and redox signaling, lung disease

MAURIZIO FORTE

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Digital and landscape archaeology and spatial technologies

CAROLIN FRANK

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Evolutionary genomics of prokaryotes and fungi, evolution of host-parasite interactions, marine genomics and metagenomics

MARCOS GARCIA-OJEDA

Assistant Professor, School of Natural Sciences

B.S., University of Illinois; M.A., University of California, Santa Cruz; Ph.D., Stanford

University

Stem cell research, cell biology, immunology, biotechniques, virology

SAYANTANI GHOSH

Assistant Professor, School of Natural Sciences

B.Sc., St. Stephen's College, India; B.A.,University of Cambridge; M.S., Ph.D., University of Chicago

Nanodevices, solid state materials, quantum information, optical science

JAN GOGGANS

Assistant Professor, School of Social Sciences, Humanities and Arts

B.A., M.A., California State University, Sacramento; Ph.D., University of California, Davis

American literature, American nature writing and literature of the environment, California literature and culture, literature of the Central Valley, literature and culture of the Great Depression, literature and photography

AJAY GOPINATHAN

Assistant Professor, School of Natural Sciences

M.Sc., Indian Institute of Technology, Kanpur; Ph.D., University of Chicago

Cell motility, actin bundle dynamics

QINGHUA GUO

Assistant Professor, School of Engineering

B.S., M.S., Peking University, China; Ph.D., University of California, Berkeley

Methodological and applied aspects of geographical information science

THOMAS HANSFORD

Associate Professor, School of Social Sciences, Humanities and Arts

B.A., Saint Mary's College of Maryland; Ph.D., University of California, Davis

Politics of the federal judiciary, campaigns and elections

THOMAS C. HARMON

Professor, School of Engineering

B.S., Johns Hopkins University; M.S., Ph.D., Stanford University

Contaminant transport in aquatic systems, soil and groundwater remediation, development and use of environmental sensors

EVAN HEIT

Professor, School of Social Sciences, Humanities and Arts

B.S.E., B.A., University of Pennsylvania; Ph.D., Stanford University

Categorization, inductive reasoning, recognition memory, computer simulation and mathematical modeling, intuitive statistical judgment

GREGG HERKEN

Professor, School of Social Sciences, Humanities and Arts

B.A., University of California, Santa Cruz; Ph.D., Princeton University

History, American diplomatic history, nuclear history, history of Cold War

LINDA HIRST

Assistant Professor, School of Natural Sciences

B.Sc., Ph.D., Manchester University, UK

Experimental biophysics, soft condensed mater physics, molecular self-assembly and structure-function relationships

KATHLEEN HULL

Assistant Professor, School of Social Sciences, Humanities and Arts

M.A., University of Calgary; B.A., Ph.D., University of California, Berkeley

Cultural impact of colonial encounters of the native people in North America, interplay of demography and culture, ethnicity and ethnogenesis in pre-literate societies

BOAZ ILAN

Assistant Professor, School of Natural Sciences

B.Sc., Ph.D., Tel Aviv University

Mathematics involved with real-world phenomena, with application to such areas as the control of intense laser beams and high-precision measurements of frequency and time, numerical computation

MARCELO KALLMANN

Assistant Professor, School of Engineering

B.S., State University of Rio de Janeiro; M.S., Federal University of Rio de Janeiro; Ph.D.,

Swiss Federal Institute of Technology

Geometric modeling, computer graphics, computer animation, autonomous agents, robotics, artificial intelligence

SUNG-MO "STEVE" KANG

Chancellor, Professor of Engineering

B.S., Fairleigh Dickinson University; M.S., State University of New York, Buffalo; Ph.D.,

University of California, Berkeley

Low power VLSI design, modeling and simulation of semiconductor devices and circuits, high-speed optoelectronic circuits and fully optical network systems, nanoelectronics

SHAWN E. KANTOR

Professor, School of Social Sciences, Humanities and Arts

B.A., University of Rochester; M.S., Ph.D., California Institute of Technology

Political economy, law and economics, U.S. economic history, economic development, public economics

ANNE MYERS KELLEY

Professor, School of Natural Sciences

B.S., University of California, Riverside; Ph.D., University of California, Berkeley

Resonance Raman spectroscopy and microscopy, molecular photochemistry and photophysics, organic materials for nonlinear optics, modeling of spectroscopic data

DAVID F. KELLEY

Professor, School of Natural Sciences

B.S., Whitworth College; Ph.D., University of Washington

Spectroscopy and dynamics of semiconductor nanoparticles, ultrafast spectroscopy of excited states and reactive intermediates, solvation effects on proton and electron transfer reactions, vibrational dynamics of gas phase molecules

CHRISTOPHER KELLO

Associate Professor, School of Social Sciences, Humanities and Arts

B.A., University of Rochester; Ph.D., University of California, Santa Cruz

Speech and reading processes, coordinative bases of cognitive systems

MICHELLE KHINE

Assistant Professor, School of Engineering

B.S., M.S., Ph.D., University of California, Berkeley

Micro-Electro-Mechanical System design, cellular biology, electroporation, impedance spectroscopy, cell mechanics, automation

ARNOLD D. KIM

Associate Professor, School of Natural Sciences

B.S., Northwestern University; M.S., Ph.D., University of Washington

Wave propagation in random media, light propagation in tissues, wireless communications, scientific computing, asymptotic and perturbation methods

LARA KUEPPERS

Assistant Professor, School of Natural Sciences

B.S., M.S., Stanford University; Ph.D., University of California, Berkeley

Ecosystem feedbacks to climate change, species composition and ecosystem function, regional climate models, climate change policy

VALERIE J. LEPPERT

Associate Professor, School of Engineering

B.A. (2), California State University, Sonoma; Ph.D., Northwestern University

Electron microscopy, nanomaterials for application in technology and the environment

ANDY LIWANG

Associate Professor, School of Natural Sciences

B.A., University of California, Berkeley; Ph.D., University of Washington

Structure and function of circadian clock proteins

PATRICIA LIWANG

Professor, School of Natural Sciences

B.S., Massachusetts Institute of Technology; Ph.D., Harvard University

Structure and function of anti-HIV Chemokines

IGNACIO LOPEZ-CALVO

Professor, School of Social Sciences, Humanities and Arts

B.A., Universidad Complutense, Madrid, Spain; M.A., California State University Los Angeles; M.A., Ph.D., University of Georgia

Nineteenth- and twentieth-century Latin American narratives with an emphasis on the cultural production of the Caribbean and the Southern Cone, Chicano literature and culture

JENNIFER LU

Assistant Professor, School of Engineering

B.S., Shanghai University; M.S., Drexel University; M.S., Ph.D., University of Michigan

Nanotechnology, nanofabrication

SEAN MALLOY

Assistant Professor, School of Social Sciences, Humanities and Arts

B.A., University of California, Berkeley; M.A., Ph.D., Stanford University

War and morality, American political history, utopian and extremist movements in the 1930s, the domestic sources of U.S. foreign policy, the ways in which economics, religion and culture shape Americans' interactions with the rest of the world

JENNIFER MANILAY

Assistant Professor, School of Natural Sciences

B.A., University of California, Berkeley; Ph.D., Harvard University

Mechanisms that control cell fate decisions in the immune system, the development of T lymphocytes, important components of immune defense against pathogens

MANUEL M. MARTIN-RODRIGUEZ

Professor, School of Social Sciences, Humanities and Arts

Licenciatura, Universidad de Sevilla; M.A., University of Houston; Ph.D., University of California, Santa Barbara

Cross-disciplinary perspectives from cultural, ethnic and film studies, border studies, textual recovery, intra-cultural difference, the Hispanic context of Chicano/Chicana literature, popular culture and the mass media.

183

TEENIE MATLOCK

Assistant Professor, School of Social Sciences, Humanities and Arts

B.A., M.A., California State University, Fresno; Ph.D., University of California, Santa Cruz

Cognitive science, psycholinguistics, spatial cognition, metaphor, semantics, gesture

KARA E. MCCLOSKEY

Assistant Professor, School of Engineering

B.S., M.S., Ohio State University; Ph.D., Ohio State University and Cleveland Clinic Foundation

Engineering principles, such as analysis and design, as they apply to the advancements being made in stem cells and tissue engineering, cardiovascular cell lineage

MONICA MEDINA

Assistant Professor, School of Natural Sciences

B.S., Universidad de Los Andes, Bogota, Colombia; Ph.D., University of Miami

Phylogenetics and organelle genome evolution of marine invertebrate animals, genomics of coral-zooxanthellae symbioses in Caribbean reefs

MATTHEW MEYER

Assistant Professor, School of Natural Sciences

B.S., University of Kansas, M.S., University of Wisconsin, Ph.D., Texas A&M University

Research on using temperature-dependent isotope effects as a probe for enzyme dynamics in soybean lipoxygenase-1

KEVIN A. MITCHELL

Assistant Professor, School of Natural Sciences

B.S., Carnegie Mellon University; M.A., Ph.D., University of California, Berkeley

Nonlinear dynamics and classical/ quantum chaos, semi-classical phase-space techniques, topological and geometric methods for low-dimensional systems, the geometric/Berry phase and gauge theory

NATHAN MONROE

Assistant Professor, School of Social Sciences, Humanities and Arts

B.A., University of California, Santa Barbara; M.A., Ph.D., University of California, San Diego

American political institutions, role of political parties and organizational institutions within Congress, legislative politics

RUTH MOSTERN

Assistant Professor, School of Social Sciences, Humanities and Arts

B.S., Georgetown University, M.A., Ph.D., University of California, Berkeley

Geography and state power in Middle Period China, georeferencing, the digital mapping of historical and cultural phenomena

TODD NEUMANN

Assistant Professor, School of Social Sciences, Humanities and Arts

B.S., M.A., Miami University; Ph.D., University of Arizona

Applied microeconomics, industrial organization, labor economics/program evaluation, economic history

SHAWN D. NEWSAM

Assistant Professor, School of Engineering

B.S., University of California, Berkeley; M.S., University of California, Davis; Ph.D., University of California, Santa Barbara

Image processing, computer vision, pattern recognition, machine learning, content based information retrieval, digital libraries, data mining

STEPHEN NICHOLSON

Associate Professor, School of Social Sciences, Humanities and Arts

B.A., University of California, Los Angeles; M.A., Ph.D., University of California, Davis

Political behavior in the United States, Direct democracy on political outcomes, divided partisan control of government on public opinion and political behavior, effects of issues on Latino political behavior, media effects on trust in government

DAVID NOELLE

Assistant Professor, Schools of Engineering and Social Sciences, Humanities and Arts

B.S., University of California, Los Angeles; M.A., Ph.D., University of California, San Diego

Computational cognitive neurosciences, connectionism, cognitive control, learning, concept formation, working memory, cognitive neuroscience, cognitive psychology, machine learning, artificial intelligence

ROBERT S. OCHSNER

Senior Lecturer SOE, Director of Writing Program, Director, Center for Research on Teaching Excellence

B.A., Western Washington University; M.A., Ph.D., University of California, Los Angeles

Social and cultural issues of teaching "white" English, a research focus that joins ESL theory with social constructionist insights about the power relationships between teacher and student or among diverse students in groups

PEGGY A. O'DAY

Professor, School of Natural Sciences

B.S., University of California, Davis; M.S., Cornell University; Ph.D., Stanford University

Aqueous, surface and environmental geochemistry, biogeochemistry and transport of inorganic contaminants in natural systems, geochemical applications of spectroscopy and microscopy, chemistry in hydrothermal systems

SONGHWAI OH

Assistant Professor, School of Engineering

B.S., M.S., Ph.D., University of California, Berkeley

Wireless sensor networks, networked embedded systems, machine learning

DAVID M. OJCIUS

Vice Provost for Academic Personnel and Professor, School of Natural Sciences

B.A., Ph.D., University of California, Berkeley

Infection by intracellular pathogens, particularly chlamydia trachomatis, interaction between infected cells and the immune system mechanisms of cell death, innate immunity

RUDY MARTIN ORTIZ

Assistant Professor, School of Natural Sciences

B.A., M.Sc., Texas A&M University; Ph.D., University of California, Santa Cruz

Endocrine physiology, physiological adaptations in water and electrolyte homeostasis and fat metabolism during extreme conditions such as prolonged fasting and altered gravitational load

MARIA G. PALLAVICINI

Dean, School of Natural Sciences, and Professor, School of Natural Sciences

B.S., University of California, Berkeley; Ph.D., University of Utah

Stem cell biology, genomic and proteomic abnormalities in cancer (particularly leukemia and breast cancer), relationships between genetic damage induced by chemical exposure and cancer development

DUNYA RAMICOVA

Professor, School of Social Sciences, Humanities and Arts

B.F.A., Goodman School of Drama; M.F.A., Yale University School of Drama

Costume design for theatre, opera, ballet, dance, film and television, history of costume design, history of clothing and fashion, drawing, watercolor painting

JASON RAYMOND

Assistant Professor, School of Natural Sciences

B.S., B.A., Southwestern Oklahoma State University; Ph.D., Arizona State University

Evolution of metabolism, geobiology/microbe-environment interactions, comparative genomics and metagenomics, microbial diversity and taxonomy, origin and evolution of life

CRISTIAN H. RICCI

Assistant Professor, School of Social Sciences, Humanities and Arts

B.A., California State University, Los Angeles; M.A., Ph.D., University of California, Santa Barbara

Nineteenth and Twentieth Century Spanish literature, Nineteenth and Twentieth Century Spanish-American literature, Portuguese literature, Golden Age and Colonial literature

WOLFGANG ROGGE

Associate Professor, School of Engineering

Dipl. Ing., Technical University, Berlin, Germany; M.S., Ph.D., California Institute of Technology Air pollution science and engineering

WILLIAM R. SHADISH

Professor, School of Social Sciences, Humanities and Arts

B.A., Santa Clara University; M.S., Ph.D., Purdue University

Clinical psychology, experimental and quasi experimental design, meta-analysis, program evaluation, psychology of science

JAY SHARPING

Assistant Professor, School of Natural Sciences

B.S., University of Wisconsin, Whitewater; M.A., Rose-Hulman Institute of Technology; Ph.D., Northwestern University

Non linear fiber optics, atomic and molecular optics, quantum optics, carbon annotates

ANNA SONG

Assistant Professor, School of Social Sciences, Humanities and Arts

B.A., University of Michigan, Ann Arbor; Ph.D., University of California, Davis

Adolescent decision making relating to their health and well-being

MICHAEL SPIVEY

Professor, School of Social Sciences, Humanities and Arts

B.A., University of California, Santa Cruz; Ph.D., University of Rochester

Language/vision interaction, sentence processing, spoken word recognition, visual memory, visual attention, visual imagery, problem solving, eye movements, neural networks and dynamical systems

MICHAEL A. SPRAGUE

Assistant Professor, School of Natural Sciences

B.S., University of Wisconsin, Madison; M.S., Ph.D., University of Colorado, Boulder

Development and use of mathematical models and numerical methods for studying time-dependent problems of practical importance; physical problems including fluid-structure interaction, rotating convection, geophysical fluid dynamics, turbulent flow, and structural dynamics; numerical methods including finite and spectral-element methods, global spectral methods, and parallel computing

JIAN-QIAO SUN

Professor, School of Engineering

B.S., Huazhong University of Science and Technology; M.S., Ph.D., University of California, Berkeley

Bio-mechanics, bio-medical engineering

LIN TIAN

Assistant Professor, School of Natural Sciences

B.S., Tsinghua University; M.S., Beijing University; Ph.D., Massachusetts Institute of Technology

Theoretical studies of quantum information and quantum computation

MAYYA TOKMAN

Assistant Professor, School of Natural Sciences

B.S., University of California, Los Angeles; Ph.D., California Institute of Technology

Mathematical modeling of nonlinear phenomena, numerical analysis, scientific computing

CAROL TOMLINSON-KEASEY

Chancellor Emerita, and Professor Emerita, School of Social Sciences, Humanities and Arts

B.A., Pennsylvania State University; M.S., Iowa State University; Ph.D., University of California, Berkeley

Developmental psychology, development of cognitive potential

SAMUEL J. TRAINA

Acting Vice Chancellor of Research, Acting Dean of the Graduate Division, Professor, Schools of Natural Sciences and Engineering and holder of the Ted and Jan Falasco Chair in Earth Sciences and Geology

B.S., Ph.D., University of California, Berkeley

Surface, colloidal and complexation chemistry in soils, sediments and natural waters, remediation of contaminated soils and sediments

MENG-LIN TSAO

Assistant Professor, School of Natural Sciences

B.S., M.S., National Taiwan University; Ph.D., Ohio State University

Organic chemistry, chemical biology

JACK VEVEA

Associate Professor, School of Social Sciences, Humanities and Arts

B.A., M.S., San Francisco State University; A.B., University of California, Berkeley; Ph.D., University of Chicago

Innovation of statistical methods to address problems that cannot be solved by conventional techniques

CHRISTOPHER VINEY

Vice Provost for Undergraduate Education and Professor, School of Engineering

B.A., Ph.D., Cambridge University

Biomolecular materials (design of materials synthesis, assembly, processing and physical optimization strategies based on examples from nature), physical science and engineering of polymers and liquid crystals (structure-property-processing relationships)

JAN WALLANDER

Professor, School of Social Sciences, Humanities and Arts

B.A., Ashland College; M.S., Ph.D., Purdue University

Health psychology, pediatric psychology

SHI-PU WANG

Assistant Professor, School of Social Sciences, Humanities and Arts

B.A., M.A., Indiana University, Bloomington; Ph.D., University of California, Santa Barbara

History and theory of 20th century American Art with concentration on American artists of Asian origin, study of the role that national, cultural, and/or ethnic identity plays in the work of artists, the impact that US Cold War cultural programs played in the development of new art trends in Asia Since World War II

VICKI WEDEL

Assistant Professor, School of Social Sciences, Humanities and Arts

B.A., M.A., University of Oklahoma; MCJA., Oklahoma City University; Ph.D., University of California, Santa Cruz

Biological anthropology, biocultural analyses based on human osteology and bone histology, forensic anthropology

SIMON WEFFER-ELIZONDO

Assistant Professor, School of Social Sciences, Humanities and Arts

B.A., University of Chicago; M.A., Ph.D., Stanford University

Understanding the linkages between collective action and urban inequality, the effect of collective action rates on voting rates, examining the spatial dynamics and issues in neighborhood mobilization

ANTHONY WESTERLING

Assistant Professor, Schools of Engineering and Social Sciences, Humanities and Arts

B.A., University of California, Los Angeles; Ph.D., University of California, San Diego

Research efforts to model climatic influences on wildfire and on water and energy resources, working with policy makers to explore alternatives for building sustainable resource management structures

ALEXANDER WHALLEY

Assistant Professor, School of Social Sciences, Humanities and Arts

B.A., University of Western Ontario; M.A., University of British Columbia; Ph.D., University of Maryland, College Park

Labor economics, macroeconomics, applied econometrics

KATIE L. WINDER

Assistant Professor, School of Social Sciences, Humanities and Arts

B.A., Lewis and Clark College; Ph.D., Johns Hopkins University

Applied microeconomics, labor economics, economics of gender and discrimination, economics of welfare and poverty

ROLAND WINSTON

Professor, Schools of Engineering and Natural Sciences and Presidential Chair

B.S., M.S., Ph.D., University of Chicago

Solar power and renewable energy, elementary particle physics, non-imaging optics

J. ARTHUR WOODWARD

Professor Emeritus, School of Social Sciences, Humanities and Arts

B.S., Wake Forest University; M.A., Ph.D., Texas Christian University

Experimental design, statistical genetics, applied statistics and psychometrics

JEFF R. WRIGHT

Dean, School of Engineering, and Professor, School of Engineering

B.A., B.S.E., M.S.E., University of Washington; Ph.D., Johns Hopkins University

Water resources and environmental management, design and implementation of computer-based spatial decision support systems for civil infrastructure, transportation, water resources, land resources engineering and management

TAO YE

Assistant Professor, School of Natural Sciences

B.S., Peking University; M.S., Ph.D., University of Pittsburgh

Nanoscale science, bioanalysis

JEFFREY YOSHIMI

Assistant Professor, School of Social Sciences, Humanities and Arts

B.A., University of California Berkeley; M.A., Ph.D., University of California, Irvine

Philosophy of mind, philosophy of cognitive science, phenomenology (especially Husserl), neural networks

■ ADJUNCT PROFESSORS

PHILIP B. DUFFY

Associate Adjunct Professor, School of Natural Sciences

A.B., Harvard University; M.S., Ph.D., Stanford University

Global climate change, climate modeling, detection of anthropogenic climate change, societal impacts of climate change

ALEKSANDR NOY

Associate Adjunct Professor, School of Natural Sciences

B.A., Moscow State University; M.S., Ph.D., Harvard University

Nanosynthesis, single-molecule imaging and measurements

WILLEM J.M. Van BREUGEL

Adjunct Professor, School of Natural Sciences

Ingeniur degree, Eindhoven University; Ph.D., Leiden University

Distant massive galaxies, the effects of their central super-massive black holes on the galaxy-formation process, the formation and evolution of the largest structures known in the Universe: clusters of galaxies

ANTHONY W.H. Van BUUREN

Associate Adjunct Professor, School of Natural Sciences

B.Sc., Simon Fraser University, M.Sc., Ph.D., University of British Columbia

Synthesis and electronic structure of nanomaterials

■ UNIVERSITY ENDOWED CHAIRS

Endowed chairs and professorships are critical to the successful development of the University of California, Merced. Hiring the very finest scholars ensures that UC Merced will continue the University of California's tradition of excellence in teaching and research, and endowments are pivotal in attracting educators and researchers of the highest quality.

At the time of publication, UC Merced is fortunate to have received commitments for 17 chairs in disciplines ranging from the sciences to the arts.

THE ENDOWED CHAIRS AT UC MERCED

E.W. and Dorothy Bizzini
Chair in Biological Sciences

Bizzini Family
Chair in Systems Biology

Coats Family
Chair in The Arts

Tony Coelho
Chair in Public Policy

County Bank
Chair in Economics

Emmett, Bernice and Carlston Cunningham
Chair in Cognitive Development

Ted and Jan Falasco
Chair in Earth Sciences and Geology

Reno Ferrero Family
Chair in Electrical Engineering

Vincent Hillyer
Chair in Early Literature

Joe and Margaret Josephine
Chair in Biological Sciences

Art and Fafa Kamangar
Chair in Biological Sciences

The McClatchy Company
Chair in Communications

John and Lucia Myers
Chair for the Sierra Nevada Research Institute

PRESIDENTIAL CHAIR

Ruiz Family
Chair in Entrepreneurship

Keith and Elinor Shaffer and Bettylou George
Chair in Engineering

Thondapu Family
Chair in Bioengineering

PEOPLE HERE MAKE ME FEEL AT HOME. IT'S FAMILY. FRIENDS I'VE MADE HERE ARE FRIENDS THAT I WILL KEEP THROUGHOUT MY LIFE.

—Jennifer Tseng, Torrance, Management Major

Appendix

ACCREDITATION

The University of California, Merced was granted full candidacy status from the Accrediting Commission for Senior Colleges and Universities of the Western Association of Schools and Colleges. Final status is expected to be received in 2011.

CLERY ACT AND CRIME STATISTICS

"Safety Matters" is UC Merced's annual security report. This publication offers information about our police department, campus crime statistics and a wealth of information about safety and security. Check it out at http://police.ucmerced.edu/docs/sm.pdf or learn more about UC Merced's 2006 annual crime statistics at http://ope.ed.gov/security/.

UNIVERSITY POLICY ON NONDISCRIMINATION, SEXUAL HARASSMENT, STUDENT RECORDS AND PRIVACY

Nondiscrimination

The University of California, in accordance with applicable federal and state laws and University policy, does not discriminate on the basis of race, color, national origin, religion, sex, disability, age, medical condition (cancer- related), ancestry, marital status, citizenship, sexual orientation or status as a Vietnam-era veteran or special disabled veteran. The University also prohibits sexual harassment. This nondiscrimination policy covers admission, access and treatment in University programs and activities.

Inquiries regarding the University's student related nondiscrimination policies may be directed to Student Judicial Affairs.

Sexual Harassment

Sexual harassment of all persons who participate in University programs and activities is prohibited by law and by University regulation (Policy 380-12). Sexual harassment is unacceptable and will not be condoned on the UC Merced campus.

Disclosures from Student Records

In accordance with the Federal Family Educational Rights and Privacy Act of 1974 and campus procedures implementing the University of California Policies Applying to the Disclosure of Information from Student Records, students at the UC Merced campus of the University have the following rights:

- The right to inspect and review their own student records within 45 days of the date the University receives a written request for access. Students should submit their requests in writing to the University registrar, dean, or other appropriate campus official for the office having custody of the requested records. The request must identify the record(s) they wish to inspect and review. The campus official will make arrangements for access and notify the student of the time and place where the records may be inspected.

  If the records are not maintained by the official receiving the request, that official shall advise the student of the correct official and redirect the request.

- The right to request the amendment of their own student records if a student believes the records are inaccurate or misleading. Students should submit a written request to amend a record that they believe is inaccurate or misleading to the campus official responsible for the record, clearly identifying the portion of the record they want changed, and specifying why it is believed to be inaccurate or misleading. If the University determines that the record should not be amended as requested by the student, the University will notify the student of the decision and advise him/her of the right to a hearing regarding the request for amendment. Additional information regarding the hearing procedures will be provided to the student when notified of the right to a hearing.

- The right to consent to disclosures of personally identifiable information contained in their student records, except to the extent that law and policy authorize disclosure without consent.

One exception permitting disclosure without consent is disclosure to campus officials having a legitimate educational interest in the records. A campus official is any individual designated by the campus to perform an assigned function on behalf of the campus. Legitimate educational interest means a demonstrated need to know by officials who act in a student's educational interest. A campus official has a "legitimate educational interest" in a record if the official is performing a task

(1) specified in his or her job description;

(2) specifically related to the official's participation in the student's education;

(3) specifically related to the discipline of a student; or

(4) specifically related to providing a service or benefit associated with a student or student's family, such as health care, counseling, job placement or financial aid.

Another exception permitting disclosure without consent is Public Information, defined as information contained in a student record that would not generally be considered harmful or an invasion of privacy if disclosed, unless the student has notified the Office of the Registrar that such information is to be treated as confidential with respect to him/herself. UC Merced has designated as public the following categories of information regarding students: the student's name, local address(es) and telephone number(s); UC Merced e-mail address; major field of study; dates of attendance; enrollment status (full-time, part-time); degrees and awards received; participation in officially recognized activities; and photographs. Parental/guardian information is confidential. It is used by the University only for notification of events, ceremonies, awards and development or in case of an emergency involving the student.

- The right to file a complaint with the U.S. Department of Education concerning alleged failures by UC Merced to comply with the requirements of the Federal Educational

Rights and Privacy Act, addressed to the Family Policy Compliance Office, U.S. Department of Education, 400 Maryland Avenue, SW., Washington, D.C. 20202-4605

Questions about these rights should be referred to the Registrar at UC Merced.

Students who desire to withhold all information (including address, phone number and UC Merced e-mail address) from the category of public information must file a form in the Office of the Registrar by the tenth day of instruction. If a student does not choose this option, this information may be released and the student's local address, phone number and UC Merced e-mail address will be included in the campus student directory.

Students availing themselves of this right should understand what the consequences of such action might be. For example, if all information is designated nonpublic information, the campus cannot make public any Honors received by the student and cannot include the student's name and degree earned in the campus commencement program without the student's written consent. Similarly, if all information is designated non-public information, the student's status as a student or any degrees earned cannot be verified for potential employers without the student's written consent.

Privacy Act

A student's Social Security number is used to verify personal identity in the UC Merced Student Records System. In accordance with the Federal Privacy Act of 1974, students are hereby notified that disclosure of their social security number is mandatory. This record keeping system was established prior to January 1, 1975 pursuant to the authority of The Regents of the University of California under Art. IX, Sec. 9, of the California Constitution.

REGISTER TO VOTE

The 1998 reauthorization of the federal Higher Education Act includes a requirement that higher education institutions make a "good faith effort" to make mail voter registration forms available to all enrolled students. This federal legislation supports the campus' longstanding goals of engendering leadership and citizenship among the student body.

UC Merced provides students with several options for registering to vote. Voter registration forms are available at the Students First Center.

CALIFORNIA RESIDENCY AND NONRESIDENT TUITION FEE

(Updated information on California Residency requirements can be found via the UC Merced Office of the Registrar web site at registrar.ucmerced.edu.)

Tuition Fee for Nonresident Students

If you have not been living in California with intent to make it your permanent home for more than one year immediately before the residence determination date for each semester in which you propose to attend the University, you must pay a non-resident tuition fee in addition to all other fees. The residence determination date is the day instruction begins at the University of California, Merced.

Law Governing Residence

The rules regarding legal residence for tuition purposes at the University of California are governed by the California Education Code and implemented by the Standing Orders of The Regents of the University of California. Under these rules, adult citizens or certain classes of aliens can establish residence for tuition purposes. There are also particular rules that apply to the residence classification of minors (see below).

Who is a California Resident?

If you are an adult who is not an alien present in the U.S. in a nonimmigrant status which precludes you from establishing domicile in the U.S. (e.g., a B, F, H2, H3, or J visa) and you want to be classified as a resident for tuition purposes, you must have established your continuous presence in California more than one year immediately preceding the residence determination date for the semester during which you propose to attend the University, and you must have given up any previous residence. You must also present objective evidence that you intend to make California your permanent home. Evidence of intent must be dated one year before the term for which you seek resident classification. If these steps are delayed, the one-year durational period will be extended until you have demonstrated both continuous presence and intent for one full year. Physical presence within the state solely for educational purposes does not constitute the establishment of California residence under state law, regardless of the length of your stay. Your residence cannot be derived from your spouse nor, since you are an adult, from your parents.

Establishing Intent to Become a California Resident

Indications of your intent to make California your permanent residence can include registering to vote and voting in California elections; designating California as your permanent address on all school and employment records, including military records if you are in the military service; obtaining a California driver's license or, if you never had a driver's license from any state, a California Identification Card; obtaining California vehicle registration; paying California income taxes as a resident, including taxes on income earned outside California from the date you establish residence; establishing a

California residence in which you keep your permanent belongings; licensing for professional practice in California; and the absence of these indications in other states during any period for which you claim California residence. Documentary evidence is required. All relevant indications will be considered in determining your classification. Your intent will be questioned if you return to your prior state of residence when the University is not in session.

Financial Independence Requirement

Effective Fall 1993, if your parents are not residents of California or if you were not previously enrolled in a regular session at any University of California campus, you will be required to be financially independent in order to be a resident for tuition purposes. If you are an adult student and your parents are not California residents, you must demonstrate financial independence, along with physical presence and intent, when seeking resident classification for tuition purposes. You are considered "financially independent" if one or more of the following applies: (1) you are at least 24 years of age by December 31 of the year you request residence classification; (2) you are a veteran of the U.S. Armed Forces; (3) you are a ward of the court or both of your parents are deceased; (4) you have legal dependents other than a spouse; (5) you are married (or a Registered Domestic Partner) or you are a graduate or professional student and you were not/will not be claimed as an income tax deduction by your parents or any other individual for the tax year preceding the term for which you are requesting resident classification; or (6) you are a single undergraduate student who was not claimed as an income tax deduction by your parents or any other individual for the two tax years immediately preceding the term for which you are requesting resident classification, and you can demonstrate self-sufficiency for those years and the current year. Note: Graduate students who are graduate student instructors, teaching or research assistants, or teaching associates employed at 49% time or more (or awarded the equivalent in University-administered funds, e.g., grants, stipends, fellowships) in the term for which resident classification is sought are exempt from the financial independence requirement.

General Rules Applying to Minors

If you are an unmarried minor (under age 18), the residence of the parent with whom you live is considered your residence. If you have a parent living, you cannot change your residence by your own act, by the appointment of a legal guardian, or by the relinquishment of a parent's right of

control. If you live with neither parent, your residence is that of the parent with whom you last lived.

Unless you are a minor alien present in the U.S. under the terms of a nonimmigrant status that precludes you from establishing domicile in the U.S., you may establish your own residence when both your parents are deceased and a legal guardian has not been appointed. If you derive California residence from a parent, that residence must satisfy the one-year durational requirement.

Specific Rules Applying to Minors

1. Deceased Parents
Even though you are a minor, you may establish your own residence if both of your parents are deceased and a legal guardian has not been appointed for you.

2. Divorced/Separated Parents
If you want to derive California resident status from a California resident parent, you must move to California to live with that parent before your 18th birthday and establish the requisite intent and remain in California until school begins. Otherwise, you will be treated like any other adult coming to California to establish your legal residence.

3. Parent of Minor Moves from California
If you are a minor U.S. citizen or eligible alien whose parent was a resident of California but who left the state within one year of the residence determination date, you are entitled to resident classification if you remain in California after your parent departs, enroll in a California public postsecondary institution within one year of your parent's departure, and, once enrolled, attend continuously until you turn 18.

4. Self-Support
If you are a U.S. citizen or eligible alien and are either a minor or age 18 and can prove that you lived in California for the entire year immediately before the residence determination date, that you have been self supporting for that year, and that you intend to make California your permanent home, you may be eligible for resident status.

5. Two-Year Care and Control
If you are a U.S. citizen or eligible alien and you lived continuously for at least two years before the residence determination date with an adult who was not your parent but was responsible for your care and control, and who, during the one year immediately preceding the residence determination date was a resident of California, you may be entitled to resident status. This exception continues until you become 18 and have resided in the state long enough to become a resident, as long as you continuously attend an educational institution. Exemptions from Nonresident Tuition (Proof of Eligibility is Required)

1. Member of the Military
If you are a member of the U.S. military stationed in California on active duty, unless you are assigned for educational purposes to a state-supported institution of higher education, you may be exempt from the nonresident tuition fee until you have lived in California long enough to become a resident. You must provide the residence deputy on campus with a statement from your commanding or personnel officer stating that your assignment to active duty in California is not for educational purposes. The letter must include the date of your assignment to the state.

2. Spouse, Registered Domestic Partner or Other Dependents of Military Personnel
You are exempt from payment of the nonresident tuition fee if you are a spouse, Registered Domestic Partner, or a natural or adopted child or stepchild who is a dependent of a member of the U.S. military stationed in California on active duty. The exemption is available until you have lived in California long enough to become a resident. You must petition for a waiver of the nonresident tuition fee each semester you are eligible. If you are enrolled in an educational institution and the member of the military is transferred on military orders to a place outside California where he or she continues to serve in the armed forces, or the member of the military retires from active duty immediately after having served in California on active duty, you may retain this exemption under the conditions listed above.

3. Child, Spouse or a Registered Domestic Partner of a Faculty Member
To the extent funds are available, if you are an unmarried dependent child under age 21 or the spouse (or Registered Domestic Partner) of a member of the University faculty who is a member of the Academic Senate, you may be eligible for a waiver of the nonresident tuition fee. Confirmation of the faculty member's membership on the Academic Senate must be secured each semester before this waiver is granted.

4. Child, Spouse or Registered Domestic Partner of a University Employee
If you are an unmarried dependent child or the spouse of a full-time University employee whose assignment is outside California (e.g., Los Alamos National Laboratory or the University of California Washington, DC, Center), you may be eligible for a waiver of the nonresident tuition. The employment status of your parent or spouse (or Registered Domestic Partner) with the University must be ascertained each semester.

5. Spouse, Registered Domestic Partner or Child of Deceased Public Law Enforcement or Fire Suppression Employee
If you are the spouse, Registered Domestic Partner or child of a deceased public law enforcement or fire suppression employee who was a California resident and was killed in the course of fire suppression or law enforcement duties, you may be entitled to a waiver of the nonresident tuition fee.

6. Dependent Child of a California Resident Parent
If you have not been an adult resident of California for more than one year and you are a dependent child of a California resident parent who has been a resident for more than one year immediately before the residence determination date, you may be entitled to a waiver of the nonresident tuition fee until you have resided in California for the minimum time necessary to become a resident as long as you maintain continuous attendance at an educational institution.

7. Native American Graduates of a BIA High School
If you are a graduate of a California high school operated by the Federal Bureau of Indian Affairs, you may be eligible for an exemption from the nonresident fee.

8. Employee of a California Public School District
Any person holding a valid credential authorizing service in the public schools of the state of California who is employed by a school district in a full-time certificate position may be eligible for a nonresident tuition waiver.

9. Student Athlete in Training at U.S. Olympic Training Center, Chula Vista
Any amateur student athlete in training at the United States Olympic Training Center in Chula Vista may be eligible for a waiver of the non-resident tuition until he or she has resided in the state the minimum time necessary to become a resident.

10. Graduate of a California High School
You may be entitled to an exemption from nonresident tuition if you attended high school in California for three (3) or more years and graduated from a California high school (or attained the equivalent). You are

not eligible for this exemption if you are a nonimmigrant alien.

11. Surviving Dependent of a California Resident Killed in the September 11, 2001 Terrorist Attacks
An undergraduate student who is the surviving dependent of a California resident killed in the September 11, 2001 terrorist attacks on the World Trade Center, the Pentagon Building, or the crash of United Airlines Flight 93, may be exempt from nonresident tuition and mandatory system wide fees. Eligible students must meet the financial need requirements for the Cal Grant A program.

12. Recipient of a Congressional Medal of Honor or the Child of a Recipient of a Congressional Medal of Honor
An undergraduate student who is a recipient of a Congressional Medal of Honor or who is the dependent child of a recipient of a Congressional Medal of Honor may be exempt from nonresident tuition and mandatory system wide fees. The recipient of the Medal of Honor must be a California resident or must have been a California resident at the time of his or her death. The student may not be older than 27 and the student's annual income may not exceed the national poverty level.

Temporary Absences

If you are a nonresident student who is in the process of establishing California residency for tuition purposes and you leave California during nonacademic periods (for example, to return to your former or parent's home state), your presence in California will be presumed to be solely for educational purposes, and only convincing evidence to the contrary will rebut this presumption. Students who are in the state solely for educational purposes will NOT be classified as residents for tuition purposes, regardless of the length of stay. If you are a student who has been classified as a resident for tuition purposes and you leave the state temporarily, your absence could result in the loss of your California residence. Again, only strong evidence will rebut the presumption that you are/were in California solely for educational purposes. The burden of proof will be on you to verify that you did nothing inconsistent with your claim of a continuing California residence during your entire absence.

If you are a minor student, your residence is determined by the residence of the parent(s) with whom you live or last lived. You would not lose that residence unless you perform acts inconsistent with a claim of permanent California residence. Some steps that you (or your parent(s) if you are a minor student) should take to retain resident status for tuition purposes are:

- Satisfy California resident income tax obligations. It should be noted that individuals claiming permanent California residence are liable for payment of income taxes on their TOTAL income, including income earned outside the state (abroad or in another state).
- Continue to use a California permanent address ON ALL RECORDS (educational, employment, military, etc.).
- Attend an out-of-state public institution as a non-resident for the entire period of enrollment there.
- Retain your California voter's registration and vote by absentee ballot.
- Maintain a California driver's license and vehicle registration. If it is necessary to change your license or registration while temporarily residing in another state, the license MUST be changed back to California within 10 days of the date of return to the state and the vehicle registration must be changed within 20 days of the date of return.
- Return to California during your vacation periods.

Petitioning for Resident Classification (for continuing students)

If you are a continuing student who is classified as a nonresident for tuition purposes and you believe you will be eligible for resident status, you must file a petition with the University Registrar. The deadline to file the petition is the last working day before the first day of instruction for the term for which you are seeking resident status.

Time Limitation on Providing Documentation

If additional documentation is required for a residence classification but is not readily accessible, you will be allowed until the end of the applicable semester to provide it.

Incorrect Classification

If you were incorrectly classified as a resident, you are subject to reclassification and to payment of all nonresident tuition fees not paid. If you concealed information or furnished false information and were classified incorrectly as a result, you are also subject to University discipline. Resident students who become nonresidents must immediately notify the campus residence deputy.

Inquiries and Appeals

Inquiries regarding residence requirements, determination and/or recognized exceptions should be directed to the Residence Deputy, Office of the Registrar, at UC Merced (209-228-2734) or the Legal Analyst-Residence Matters, 1111 Franklin Street, 8th Floor, Oakland, CA 94607-5200. No other University personnel are authorized to supply information relative to residence requirements for tuition purposes. Any student, following a final decision on residence classification, may appeal in writing to the legal analyst within 30 days of notification of the residence deputy's final decision.

Privacy Notice

All information requested on the Statement of Legal Residence form is required by the authority of Standing Order 110.2 (a)-(d) of the Regents of the University of California for determining whether you are a legal resident for tuition purposes. Registration cannot be processed without this information. The Office of the Registrar maintains the requested information. You have the right to inspect university records containing the residence information requested on the form.

Index

A

Academic Calendar 4
Academic Policies 44
Academic Support Services 21
Accreditation 200
Adding Courses. 45
Address, Change of. 53
Administrative Officers 191
Admission (undergraduate) 29
  freshman 32
  international student 36
  transfer student 34
Admission Criteria (undergraduate) 28
Admission Procedures (undergraduate) 30
  application and filing fees 30
  deadlines 30
  notification 30
  readmission. 31
Admissions
  graduate 125
  second baccalaureate. 27
Advanced Placement Examinations 37
Alliance for Graduate Education and the Professorlate 47
Analytical Writing Placement Exam 31
Anthropology
  courses 138
  major. 102
Appeals, grade 50
Applied Mathematics
  major (UG) 75
  program (GR). 127
Arts courses. 140

B

Bachelor's Degree Requirements
  general education requirement 55
  engineering. 59
  natural sciences. 73
  social sciences, humanities and arts 100
  university requirements 56
Bicycles 24
Bioengineering
  major. 62
  courses 145
Biological Engineering and Small-Scale Technologies
  courses 141
  program (GR). 128
Biological Sciences
  major. 81
  courses 142
Biomedical and Systems Biology Research Institute. 137
Bookstore, Bobcat 17

C

Cal Grants 41
Calendar (academic) 4
Career Services Center 20
Catalog Year 2
Centers
  Bakersfield 6
  Fresno 6
Center for Nonimaging Optics 137
Chancellor, Message from 1
Chancellor's Honors List. 52
Chemical Sciences
  major. 88
  courses 147
Chinese courses. 148
Clery Act (Crime Statistics) 200
Cognitive Science
  courses 149
  major. 104
College One
  description of. 55
  courses 151
Commencement 54
Computer Science and Engineering
  major. 64
  courses 151
Computer Support 15
Concurrent Enrollment 48
Contact Directory 6
Counseling and Psychological Services . . 20
Courses
  adding and dropping 45
  classification and numbering 138
  descriptions. 138
  enrolling in 44
  grading. 50
  prerequisites 138
  repeating 45
  substitutions 45
Credit by Examination 49

D

Dean's Honor List 52
Deferred Payment Plan 26
Degree Requirements (bachelor's)
  engineering. 59
  natural sciences. 73
  social sciences, humanities arts 100
Degree Requirements (graduate) 127
Degrees Offered by UC Merced 5
Diplomas 54
Disability Services 21
Discrimination, University Policy Prohibiting 200
Dismissal 53
Disqualification 52
Dorms 18
Dropping Courses. 45

E

Earth Systems Science
  major. 92
  courses 159
Economics
  major. 107
  courses 153
Education Abroad Program (EAP) 22
Education courses. 155
Electrical Engineering and Computer Science Program 129
Employment, Student. 20
Endowed Chairs 199
Engineering courses. 155
Engineering, School of 59
Environmental Engineering
  major. 66
  courses 156
Environmental Stewardship 10
Environmental Systems
  program 129
  courses 158
Examination in English as a Second Language. 37
Examination Requirement (ACT and SAT) 33
Examinations
  advanced placement 37
  credit by 49
  final 48
  International Baccalaureate 37
  TOEFL (Test of English as a Foreign Language) 37
Expenses and Fees 25

F

Faculty 193
Family Educational Rights and Privacy Act 201
Fees and Expenses 25
  costs for a year at UC Merced 25
  course materials fees 25
  methods of payment 26
  UC employee-student fees 26
Fellowships 135
FERPA. 200
Financial Aid
  undergraduate 39
  graduate 134
French courses 161

G

General Education Principles 55
Geography courses 163
Global Arts Studies Program courses . . . 162
Grade Point Average 50
Grades
  appeals. 50
  changes of 50
  final 52
  in progress 51
  incomplete 51
  midterm 52
  repeated course 45
Graduate Education. 125
Graduation 54
Grants 40

H

Health Insurance 19
Health Services 19
History
major 108
courses 163
Honors
chancellors 52
dean's 52
graduation 54
Housing
on-campus 18
off-campus 18
Human Biology courses 163

I

IGETC 36
Incomplete Grades 51
Information Technology 15
In-Progress Grading 51
Institutes 136
Institutional responsibility 2
Integrated Calculus and Physics
courses 165
Intercampus Exchange Program 48
Intercampus transfer 47
Intercampus Visitors 48
International Baccalaureate 37
International Student
admission (undergraduate) 36
admission (graduate) 126
Intersegmental General Education
Transfer Curriculum (IGETC) 36

J

Japanese courses 165

L

Leadership Excellence Through Advanced
Degrees (UCLEADS) 46
Learning Disabilities 21
Library, University 14
Literatures and Cultures
major 111
courses 166
Loans
undergraduate 41
graduate 135

M

Majors, list of 5
Management
major 114
courses 172
Materials Science and Engineering
major 69
courses 173
Mathematics courses 169
McNair Scholars Program 47
Mechanical Engineering
major 71
courses 171
Mechanical Engineering and Applied
Mechanics
courses 171
program 130
Midterm Grades 52
Minimum Progress 52
Minors, list of 5
Mission Statement 12

N

Name, Change of 53
National Parks Partnership 136
Natural Sciences, School of 73
Natural Sciences Education
courses 174
Nondiscrimination 200
Nonresident Admission 31

P

Parking Permits 24
Part-time Status 45
Passed/Not Passed grading 51
Pell Grants 40
Philosophy courses 175
Physics
major 94
courses 176
Physics and Chemistry Program 130
Planned Educational Leave Program 46
Political Science courses
major 115
courses 178
Principles of Community 11
Privacy Act 201
Probation 53
Psychology
courses 179
major 118
Public Policy courses 183

Q

Quantitative and Systems Biology
program 131
courses 183

R

Readmission 31
Recreation 15
Refunds, fee 27
Regents 191
Registration
cancellation of 54
late 44
procedures 44
Reinstate 53
Repeating Courses 45
Research 136
Residence Life 18
Residence for Tuition Purposes 201
Residency Requirement 54

S

Satisfactory/Unsatisfactory Grading 52
Satisfactory Academic Progress 46
Schedule of Refunds 25
Scholarship Requirement 32
Scholarships 40
Scholastic Assessment Test (SAT) 33
Semester 44
Service Learning 60
Sierra Nevada Research Institute
(SNRI) 136
Simultaneous Enrollment 48
Social and Cognitive Sciences
courses 185
program 133
Social Sciences Humanities and Arts,
School of 100
Sociology courses 185
Spanish courses 186
Statement of Intent to Register 31
Statement of Legal Residence 201
Student Advising and Learning
Center 21
Student conduct and discipline 17
Student Employment 20
Students First Center 19
Student Government 17
Student Housing 18
Student Life 16
Student records, disclosures of 200
Summer Session 44

T

Test of English as a Foreign Language
(TOEFL) 37
Transcripts 53
Transfer 34
Transportation and Parking 24

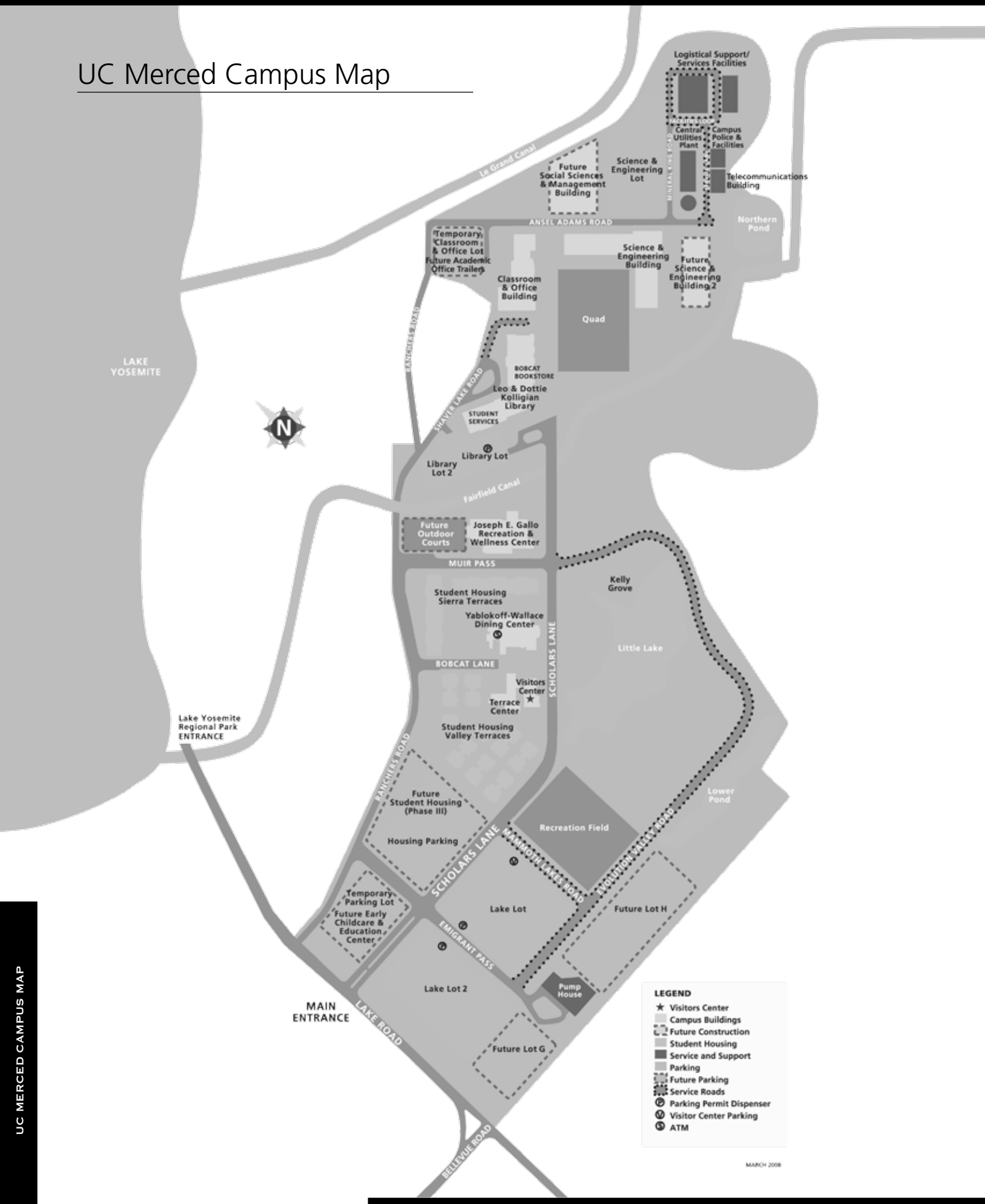
U

UC Center Sacramento 47
UCDC 47
Undeclared 21
Undergraduate Studies courses 187
Units semester to quarter 44
University of California 9
University of California Washington Center
(UCDC) 47
University Officers 191
University Requirements for Bachelor's Degree
55

V

Veteran Services 21

W

Withdrawals 54
World Cultures
courses 187
program 134
World Cultures Institute 137
World Heritage courses 189
Work Study 41
Writing courses 189

UC Merced Campus Map