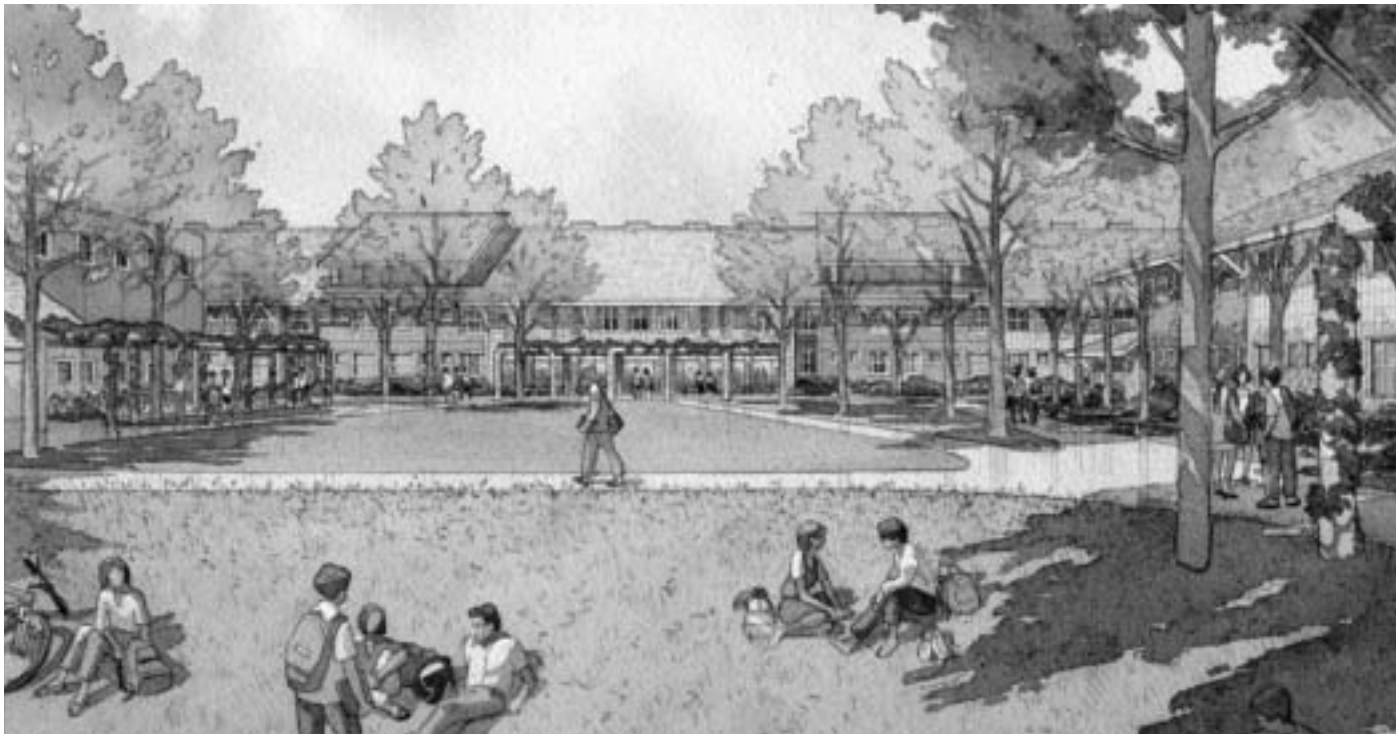
UNIVERSITY OF CALIFORNIA, MERCED

2006 - 2007 CATALOG

YOU BELONG HERE!

2006-2007 CATALOG



Sierra Terraces Housing Complex

You Belong Here!

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HOW TO OBTAIN THE CATALOG
Copies of this catalog may be obtained from:
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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 records for undergraduate major requirements and is updated annually.

Cover photos:
Ellen Lou (Skidmore, Owings & Merrill LLP), Christine Lai, Mike Karibian

Inside page:
Artist rendering of the Sierra Terraces Housing

Printed on recycled paper with soy-based inks.

FALL SEMESTER 2006

Semester begins	August 22, 2006	Tuesday
Instruction begins	August 28, 2006	Monday
Labor Day holiday	September 4, 2006	Monday
Veterans Day holiday	November 10, 2006	Friday
Thanksgiving holiday	November 23-24, 2006	Thursday-Friday
Instruction ends	December 8, 2006	Thursday
Final examinations preparation	December 9, 2006	Saturday
Final examinations	December 11-15, 2006	Monday-Friday
Semester ends	December 15, 2006	Friday
Winter holiday	December 25-26, 2006	Monday-Tuesday
New Year's holiday	December 29, January 1, 2006	Friday, Monday

SPRING SEMESTER 2007

Semester begins	January 9, 2007	Tuesday
Martin Luther King Jr. holiday	January 15, 2007	Monday
Instruction begins	January 16, 2007	Tuesday
Presidents' Day holiday	February 19, 2007	Monday
Spring recess	March 26-30, 2007	Monday-Friday
Cesar Chavez Day holiday	March 30, 2007	Friday
Instruction ends	May 8, 2007	Tuesday
Final examinations preparation	May 9-10, 2007	Wednesday-Thursday
Final examination	May 11, 12, 14-16, 2007	Friday, Saturday, Monday-Wednesday
Semester ends	May 16, 2007	Wednesday

PROPOSED FALL SEMESTER 2007

Semester begins	August 21, 2007	Tuesday
Instruction begins	August 27, 2007	Monday
Labor Day holiday	September 3, 2007	Monday
Veterans Day holiday	November 12, 2007	Monday
Thanksgiving holiday	November 22-23, 2007	Thursday-Friday
Instruction ends	December 10, 2007	Thursday
Final examinations preparation	December 11-12, 2007	Tuesday- Wednesday
Final examinations	December 13-18, 2007	Thursday-Saturday, Monday-Tuesday
Semester ends	December 18, 2007	Tuesday
Winter holiday	December 24-25, 2007	Monday-Tuesday
New Year's holiday	December 31, 2007-January 1, 2008	Monday-Tuesday

PROPOSED SPRING SEMESTER 2008

Semester begins	January 15, 2008	Tuesday
Martin Luther King Jr. holiday	January 21, 2008	Monday
Instruction begins	January 22, 2008	Tuesday
Presidents' Day holiday	February 18, 2008	Monday
Spring recess	March 24-28, 2008	Monday-Friday
Cesar Chavez Day holiday	March 28, 2008	Friday
Instruction ends	May 12, 2008	Monday
Final examinations preparation	May 13-14, 2008	Tuesday-Wednesday
Final examination	May 15-17, 19-20, 2008	Thursday-Saturday, Monday-Tuesday
Semester ends	May 20, 2008	Tuesday

UNDERGRADUATE DEGRESS

Applied Mathematical Sciences, B.S.*
Emphasis: Computational Biology
Computer Science and Engineering
Economics
Engineering Mechanics
Physics
**Transfer students will be accepted starting Fall 2008*

Bioengineering, B.S.
Emphases: Nanobioengineering
Tissue Engineering

Biological Sciences, B.S.
Cores: Human Biology
Integrative Biology
Molecular and Cell Biology
Emphases: Bioinformatics and Computational Biology
Cell Biology and Development
Cognitive Science
Ecology and Conservation Biology
Evolutionary Biology
Human Health
Molecular Biology and Biochemistry
Microbiology and Immunology
Psychology

Chemical Sciences, B.S.*
Emphases: Biological Chemistry
Chemistry
Environmental Chemistry
Materials Chemistry
**Transfer students will be accepted starting Fall 2008*

Computer Science and Engineering, B.S.

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

Management, B.A.*
**Transfer students will be accepted starting Fall 2007*

Materials Science and Engineering, B.S.*
**Freshmen only Fall 2006*

Mechanical Engineering, B.S.*
**Freshmen only Fall 2006*

Physics, B.S.*
Emphases: Atomic/Molecular/Optical Physics
Biophysics
Earth and Environmental Physics
Mathematical Physics
**Transfer students will be accepted starting Fall 2008*

Psychology, B.A.*
**See web site for description*

Social and Cognitive Sciences, B.A.
Emphases: Cognitive Science
Economics
Psychology
Public Policy*
**Transfer students will be accepted starting Fall 2007*

World Cultures and History, B.A.
Emphases: History
Literature

MINORS

- Minor in American Studies
- Minor in Arts
- Minor in Cognitive Science
- Minor in Economics
- Minor in History
- Minor in Philosophy
- Minor in Psychology
- Minor in Services Science
- 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

- Anthropology, B.A.
- Art, B.A.
- Cognitive Science, B.A., B.S.
- Economics, B.A.
- International Communications, B.A.
- Law and Society, B.A.
- Literature and Cultural Studies, B.A.
- Museum Studies, B.A.
- Philosophy, B.A.
- Political Science, B.A.
- Public Policy, B.A.
- Spanish Language and Cultures, B.A.

GRADUATE DEGREES

- Individual Graduate Program M.A., M.S., Ph.D.
  Graduate Group Emphases include:
  Applied Mathematics
  Atomic and Molecular Science and Engineering
  Computer and Information Systems
  Environmental Systems
  Quantitative and Systems Biology
  Social and Cognitive Sciences
  World Cultures

PLANNED INDIVIDUAL GRADUATE PROGRAM:

- Global Peace and Security Issues

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SUMMER SESSIONS
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WORLD CULTURES INSTITUTE
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GREAT VALLEY CENTER
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(661) 861-7955

Fresno
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Fresno, CA 93710
(559) 241-7400

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

Merced gives you a feeling of belonging and homeliness. 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, FRESHMAN

Education is not
the filling of a pail,
but the lighting of a fire.

W. B. YEATS

Congratulations on your choice to pursue a university education and welcome to UC Merced.

Your choice to pursue a university education will help you prepare to create and analyze new ideas, solve real-world problems and engage with others in productive discussion throughout your life. UC Merced aims to set you on the path toward those activities with engaging, innovative courses and unparalleled opportunities to excel individually and in teams with your fellow students.

In its early years, our campus offers an experience that simply cannot be found anywhere else.

Some of the best researchers in the world will teach your classes, meet with you in their offices, lead your field trips, talk to you on the phone and open up opportunities for you to participate in their research projects. You can expect these professors to know your name and take an active role in facilitating your academic success.

You can count on the stability of the ten-campus University of California system, uniquely manifest in an intimate setting on our fledgling campus. Great opportunities like the UC system's exchange and internship programs are available to you, all while you enjoy a personal atmosphere where faculty and staff members care about you individually.

If you are searching for a chance to shine, you've chosen the right campus. Large strides have been made in student activities and organizations, but a tremendous amount of work remains as we grow. The chance to be a pioneer is definitely available for you.

When you chart your academic course at UC Merced, you can choose from 14 majors and 10 new minors, crafting an interdisciplinary program of study that will combine your interests and strengths to move you toward your greatest dreams and plans. Talk with the faculty and staff in our three academic schools and in our Student Advising and Learning Center – an unbeatable resource dedicated to your success – to find the best path for you. You may find a route that will give you an advantage over others who are following more traditional paths.

UC Merced celebrates several new facilities for you to use and enjoy this year. Our Science and Engineering Building will be fully operational shortly after classes begin, as will the Joseph Edward Gallo Recreation and Wellness Center. The excitement of watching history take shape as our campus grows is still a once-in-a-lifetime opportunity.

Carol Tomlinson-Keasey
Chancellor

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. Entering its second year of instruction in fall 2006, UC Merced is the tenth and newest campus of the University of California, offering a continuing journey in education through our commitment 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 groundbreaking research that crosses and links a wide array of disciplines. Signature research institutes created at UC Merced to conduct region- and statewide research with national and international import include the Sierra Nevada Research Institute and the World Cultures 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.

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 910-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.

Governor Arnold Schwarzenegger, with Chancellor Carol Tomlinson-Keasey, tours UC Merced with faculty, students and staff.

Yosemite National Park: less than two hours from campus.

STUDENT LIFE

Back on campus, students who join UC Merced's pioneer classes will 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 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!

ACADEMIC BUILDINGS

The first phase of campus development, spanning approximately 100 acres, includes three academic buildings, in addition to housing and dining complexes, and a 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, lecture halls and computer labs will be located in the Classroom Building. Featuring the 377-seat Lakireddy Auditorium and multi-media and studio laboratory spaces, other building amenities include faculty and graduate student offices. The three-story Science and Engineering Building incorporates teaching in both wet and dry research laboratories.

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

LIVING ON CAMPUS

New students have the opportunity to live on campus within the safe, comfortable environment of the Valley Terraces. Students can make their home-away-from- home in these apartment-style suites. Serving up a range of healthy and satisfying cuisine for breakfast, lunch and dinner, the Yablokoff-Wallace Dining Commons 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. The Joseph Edward Gallo Recreation and Wellness Center offers traditional health services, recreational activities from aerobics classes to whitewater rafting, and wellness activities such as student peer health counseling, nutrition programs and more.

LIVING IN MERCED

In the neighboring city of Merced, students interested in living off campus will find affordable housing options and an excellent quality of life. Currently home to some 73,000 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. 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.

UC MERCED IN THE OPENING YEARS

UC Merced opened in 2005-06 year with almost 900 students. UC Merced welcomes students, faculty and staff of diverse ethnic and cultural backgrounds to enrich the academic, learning and social environment. The campus is expected to grow rapidly, with an addition of about 600 students a year. 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.

UNIQUE EDUCATIONAL EXPERIENCE

To better meet the needs of students from the region, the state and the nation, a network is being created to extend outstanding educational opportunities far beyond the UC Merced campus. As part of this educational network, UC Merced has centers in Fresno and Bakersfield and the Tri-College Center in Merced which offer selected UC credit courses, professional development opportunities, student outreach activities and many other programs. Other unique off-campus locations, such as the Sierra Nevada Research Institute's Yosemite Field Station in Wawona, expand the educational experience at UC Merced.

We invite you to visit the UC Merced campus and the Merced community to get a feel for the home of the tenth University of California campus. UC Merced's guided tours consist of an admission presentation as well as a walking tour of the campus.

To make a reservation, please call the Office of Admissions/Relations with Schools & Colleges toll free in California at (866) 270-7301.

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.

FIAT LUX. LET THERE BE LIGHT

The University of California, Merced, is the tenth campus of the University of California, one of the largest and most highly acclaimed institutions of higher learning in the world.

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 209,000 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 49 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 Computer, 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-14 academic preparation initiatives directly affect hundreds of thousands of students and educators each year.

UC Merced students hiking to the top of Vernal Falls in Yosemite National Park.

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 systemwide 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: 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 – On-site retention ponds treat building and site contaminants released by storm water runoff.

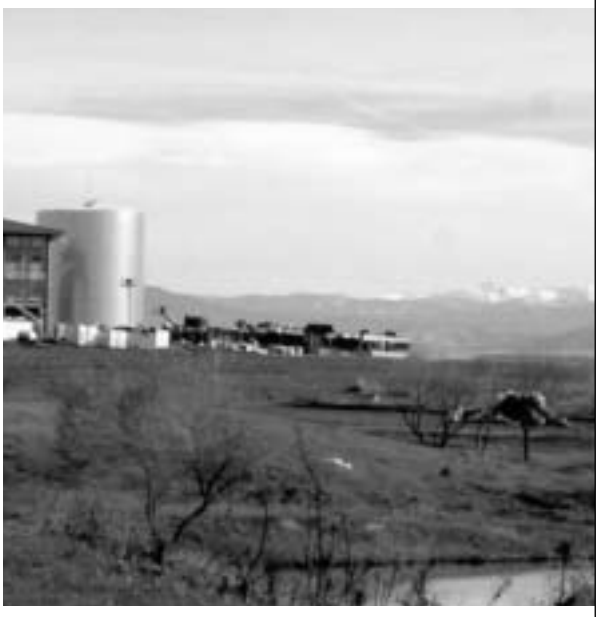
RECYCLING – Construction practices recycle more than 75 percent of the job site waste, limit the distance that materials are transported to the site and incorporate recycled content materials and sustainable harvested wood products.

INDOOR ENVIRONMENT - Buildings are designed to provide increased ventilation and use natural daylight, creating a more pleasant working environment inside.

WATER CONSERVATON – Water reduction in the buildings and landscape will lower the use of potable water up to 30% 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.

LEARNING FROM THE PHYSICAL CAMPUS – The buildings will become ongoing teaching tools for the campus and community.



Little Lake, with the TES tank in background, key to campus energy savings.

Entryway to UC Merced's 5000-acre vernal pool preserve.

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 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 in connecting 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 opens as 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.

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 the Director of Human Resources/Affirmative Action Officer at ucmercedjobs@ucmerced.edu.

Discussing UC Merced Ambassadors Program.

COLLEGE ONE

College One is responsible for overseeing the general education experience at UC Merced, including the required Core Course Sequence and the Freshman Seminar Program. College One provides a network to connect students with advising and coursework that meets 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.

Engineering Dean Jeff Wright and Natural Sciences Dean Maria Pallavicini celebrate the 2005 Topping Out of the Science/Engineering Building.

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 three undergraduate majors--Management, Social and Cognitive Sciences, and World Cultures and History—as well as minors in a range of disciplines.

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 a scope of 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 seven areas: Applied Mathematics; Atomic and Molecular Science and Engineering; Computer and Information Systems; Quantitative and Systems Biology; Environmental Systems; 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 seminar 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 planned Biomedical and Systems Biology Research Institute.

THE UC MERCED LIBRARY

Not what research libraries are…

what they will be.

The University of California, Merced library is both a physical building–the Leo and Dottie Kolligian Library–and an information nexus. As a research library for the 21st century, it is a physical place on campus as well as 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 in the building and from computers connected to the campus network and to the Internet. Some library resources are in physical packages that sit on the shelves, including books, paper archives, sound recordings, photographs and much more. Others are in digital packages, such as online journal articles, 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 entranceway reading room has an adjacent coffee house and bookstore. Quieter spaces and collaborative workrooms are found throughout the building. Wireless and hardwired 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 130,000 online books, 10,000 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. With collections totaling 32 million volumes, the libraries of the University of California system are surpassed in size on the American continent only by the Library of Congress collections.

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, placing particular emphasis on the digitization of specialized materials that are of importance to the Sierra Nevada and San Joaquin Valley regions. For further information, contact us at library@ucmerced.edu or visit library.ucmerced.edu.

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.

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 software 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 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.

STUDENT LIFE

The University of California, Merced is committed to providing its students with the best education possible. Students—their education and development—are the priority at UC Merced. Our goal is to be a student-centered research university with learning taking place both in and outside the classroom. Our student life programs are designed to support student success and to create a vibrant community where students from all backgrounds can excel as they live and learn together. The finest faculty and staff, excellent facilities and co-curricular activities all contribute to the overall learning and development experience at UC Merced.

Located within the Office of Student Life in Kolligian Library 184, you will find Student Clubs and Organizations, Student Government, Student Activities, Volunteer Services, Judicial Affairs, Leadership Development, Intercultural Programs and many more services.

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 73,000 and offers restaurants, parks, a weekly farmers market and an active multicultural arts center. In addition to the local cinemas, Playhouse Merced and the Mainzer Theater have full calendars 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.

Student Talent Night at Valley Terraces Center.

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 including Hershey's Visitors Center in Oakdale, the Lee Institute for Japanese Art in Hanford, 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

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 Campus Regulations Applying to Campus Activities, Organizations and Students lays the foundation for that understanding and governs the conduct of all University of California 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 reinforces the expectations, obligations and privileges of participating as a member of the UC Merced community.

UC Merced Internship Fair.

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, in collaboration with the Student Advising and Learning 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."

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.

STUDENT HEALTH SERVICES

Student health and wellness services are provided to UC Merced students at the newly constructed Rajender Reddy Health Center in the Joseph Edward Gallo Recreation and Wellness Center. The Rajender Reddy Health Center provides quality health care and wellness education focused on the needs of undergraduate and graduate students.

All registered students are eligible to use the services at the Rajender Reddy Health Center. These include injury and illness visits with medical practitioners, appointments with a health educator, laboratory testing, pharmacy, immunizations and injections, and health 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, pharmaceuticals and immunizations.

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 students to become active participants in their health and wellness.

Medical Insurance Services

All students attending a UC campus are required to have major medical health insurance as a nonacademic condition of enrollment. Students are automatically enrolled in UC Merced's Student Health Insurance Plan (SHIP) and billed through their student account. This comprehensive and affordable health insurance plan supplements the campus services available at the Rajender Reddy Health Center and provides extended medical care services when you need them.

If you are covered by other health insurance, the SHIP 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 SHIP is waived, you are still eligible like all other registered students to utilize campus health services. For further information on insurance, including SHIP waivers, contact health@ucmerced.edu.

Mandatory Hepatitis B 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 order to prevent delays with enrollment, students are required to provide Health Services with documentation demonstrating their compliance.

In addition to the Hepatitis B immunization requirement and the standard pediatric immunization series, 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 optional immunizations for college students:

MMR (measles, mumps & rubella). Two doses at least one month apart if born after 1956.

Meningococcal Polysaccharide 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 more information regarding immunizations, contact the Rajender Reddy Health Center or review the information on the Internet at health.ucmerced.edu.

COUNSELING SERVICES

UC Merced's Counseling 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 Services resources. If Counseling 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 Services is located on the first floor of the Kolligian Library 113.

UC Merced students taking a break at nearby Lake Yosemite.

I enjoy the entrepreneurial spirit of UC Merced students! They are constantly creating and contributing to the academic culture of the campus!

LECTURER MICHAEL TRUONG, MERCED WRITING PROGRAM

Team members with client, Dr. Mary Jane Hawkes of the Castle Science and Technology Center. Project: to create an exhibit on the Space Elevator, carbon nanotubes and nanotechnology. Pictured from l-r Shaun Ekhause, Maureen Long, Luke Poole, Dr. Mary Jane Hawkes, Enemesio Cano, Matthew Ferea, Anne Mahacek, Jenny Aguilar, Jennifer Aguilar.

ENGINEERING STUDENTS IN SERVICE TO THEIR COMMUNITY

From their first day on campus, Engineering students can work hands-on and earn academic credit at the same time through UC Merced's remarkable Foster Family Center for Engineering Service Learning. Under faculty guidance, student-led teams of freshmen through seniors help non-profit organizations solve problems. Service Learning students learn technical skills, leadership, teamwork, communication and project management, while experiencing the value of the engineering profession in the community. The many projects now under way include helping The Women's Place set up an information management system; creating innovative curriculum materials for Merced County schools; designing new exhibits for the Castle Science and Technology Center; and creating a digital data library for Yosemite National Park.

DISABILITY SERVICES

The Disability Services Center, located in Kolligian Library 107, 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 Office at disabiltyservices@ucmerced.edu.

OFF-CAMPUS HOUSING OPPORTUNITIES

A variety of off-campus housing options are highlighted on the UC Merced web site, where information about local apartment complexes and links to rental listings are updated each semester. The site includes average rental rates, amenities of the complex, distance from local services and contact information. When possible, photographs of the apartment facilities are included. In addition to this service, local landlords and homeowners are encouraged to list their rental properties or rooms for rent with our Off-Campus Housing listing service. Please go to our web site at housing.ucmerced.edu or contact the Office of Residential Life for more information about living off-campus in Merced and Atwater.

ON-CAMPUS HOUSING

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.

UC Merced's first residential community, the Valley Terraces, offer apartment-style suites located in nine two-story buildings. All residence halls offer workshops and events for getting to know faculty better. Each suite has two or three bedrooms attached to a furnished living room. Bedrooms have a bed, desk, bookshelf and closet space for each resident. A limited number of singles also are available. 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 students.ucmerced.edu/. All freshmen and transfer students are encouraged to consider on-campus housing. On-campus housing options will continue to expand, as the campus grows, with an additional 400 beds available in the fall of 2007.

For further information about housing, on- or off-campus, contact the Office of Residence Life at housing@ucmerced.edu or check our web site at housing.ucmerced.edu

Valley Terraces offer comfortable suite-style on-campus living.

Intramural Flag Football game on UC Merced recreation field.

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 a diverse intramural sports program and comprehensive outdoor adventures trip and resources program. 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 others. For those students who are looking for more competition, the Sports Club program offers students the opportunity to form competitive teams that compete against other California colleges and universities. For complete information on all Campus Recreation activities, visit recreation.ucmerced.edu.

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. There is a daily shuttle service to Yosemite from Merced. For more information about the Yosemite shuttle service, see www.yarts.com. Not far from Merced are a number of golf courses including Stevinson Ranch, voted the second-best golf course in California.

STUDENT ADVISING AND LEARNING CENTER

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 professional programs (e.g., medicine, dentistry, law) following graduation and any student who has questions about degree or University requirements. The advisors in the Student Advising and Learning Center work closely with the faculty and advisors in the Schools 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 offer programs focusing on effective study skills, critical reading and analytical writing that helps all students, regardless of major. Mathematics, science and writing courses sometimes present challenges for learners. Individual tutoring and group study sessions, often led by peer tutors, are available to provide assistance to students of all levels of ability and preparation. Additional programs and study sessions assist students in specific courses and areas such as engineering, English, math, science and the social sciences. The Student Advising and Learning Center, working closely with Career Services, 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. Contact the Student Advising and Learning Center for more information or visit our web site at learning.ucmerced.edu.

STUDENT GOVERNMENT, CLUBS AND ORGANIZATIONS

In its initial years, UC Merced students have the unique opportunity to establish UC Merced's Associated Student government, 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. For more information, check the Student Life section of our web site at students.ucmerced.edu or e-mail: studentlife@ucmerced.edu

Starting the first student clubs at UC Merced.

THE BOBCAT BOOKSTORE

The UC Merced Bobcat Bookstore is your principal source for textbooks, electronic items, Bobcat apparel, school supplies and snacks. Visit our website at 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 pick up in the Textbook Annex. At the end of the semester, the bookstore buys back used textbooks for cash.

Electronics, Spirit Gear and Convenience

The Bobcat Bookstore has partnered with Apple® to provide computers, iPods™ and accessories at the best possible price. The Bobcat Bookstore also carries a large assortment of batteries, calculators, cables and peripherals. Find all of your Golden Bobcat gear at the UC Merced apparel headquarters: T-shirts, sweatshirts, caps and more. Classroom supplies and convenience items are also available.

Student services contact list, for further information:

- Web site: students.ucmerced.edu
- E-mail: admissions@ucmerced.edu
- E-mail: careerservices@ucmerced.edu
- E-mail: counseling@ucmerced.edu
- E-mail: disabilityservices@ucmerced.edu
- E-mail: finaid@ucmerced.edu
- E-mail: health@ucmerced.edu
- E-mail: housing@ucmerced.edu
- E-mail: judicialaffairs@ucmerced.edu
- E-mail: learning@ucmerced.edu
- E-mail: recreation@ucmerced.edu
- E-mail: registrar@ucmerced.edu
- E-mail: studentsfirst@ucmerced.edu
- E-mail: studentlife@ucmerced.edu

Biking toward campus from Lake Yosemite.

TRANSPORTATION AND PARKING SERVICES

BICYCLES

Bicycles are encouraged and welcomed 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. 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. Bicycles may be registered in Merced at:

The City of Merced Police Department
611 West 22nd Street, Merced, CA 95340
For more information call (209) 385-6912 and ask for Records Department

PUBLIC TRANSIT

As parking is limited on campus, UC Merced encourages students and staff to use alternative public transit. Merced County boasts a full service, comprehensive transit system. UC Merced is working with the public transit authority, "THE BUS" (209) 384-3111 or (800) 395-3111, to provide additional routes between the campus and various locations in Merced County.

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 pm and 2:00 am 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.

VEHICLE PARKING

Parking, while limited, is available on campus. Some parking is reserved specifically for students living on campus in the residence halls. Traffic is restricted within the academic core of the main campus. All vehicles parking anywhere on campus must display a valid regular or visitor UC Merced parking permit from 7 a.m. to 4 p.m. daily, Monday through Friday. Resident and commuter students will have an opportunity to purchase parking permits prior to the start of classes. We encourage all students to purchase parking permits through the e-pay system at https://epay.ucmerced.edu. You may also pay at the Cashier's Office located on the first floor of the Kolligian Library next to the Students First Center. Information on fees and campus parking regulations can be obtained from the TAPS web site listed above.

Transportation and Parking Services
UC Merced – Facilities Services
(209) 381-6981

AVERAGE ANNUAL EXPENSES

The range of estimated nine-month expenses, including fees, for students attending UC Merced during the 2005-2006 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	Estimated Nine-Month Expenses
Undergraduate (California resident*)	On-campus	$21,692
	Off-campus	$19,252
	At home	$15,209
Graduate (California resident*)	Off-campus	$23,166

**Nonresident undergraduate students should add $17,820 and nonresident graduate students should add $14,961 for additional fees and nonresident tuition*

STUDENT FEES

2006-07 FEE SCHEDULE *Note: Fees shown are per semester*

Educational Fee	$2,703.00	$2,961.00
University Registration Fee	$367.50	$367.50
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
Student Health Insurance*	$316.00	$316.00
Non-Resident Tuition	N/A	$9,084.00
TOTAL	**$3,642.50**	**$12,984.50**

GRADUATES	Residents	Nonresidents
Educational Fee	$3,081.00	$3,214.00
University Registration Fee	$367.50	$367.50
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
Student Health Insurance*	$538.00	$538.00
Non-Resident Tuition	$N/A	$7,347.00
TOTAL	**$4,242.50**	**$11,722.50**

* 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 $427.00, for graduate students the rate is $732.00. Graduate students who wish to cover spouses, domestic partners or children should contact Health Services at health@ucmerced.edu for rates.

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.

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 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.

I like UC Merced because of its quiet and calm environment.

JHOANA ROH, UNDERGRADUATE

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 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 Student First Center by phone at (209) 228-7178 (CATS-1ST), by e-mail at studentsfirst@ucmerced.edu, or in person in Kolligian Library 122. 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.

Students come first at UC Merced and at the Students First Center. Stop by and see how easy it can be to get the help you need!

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.

Outside Valley Terraces housing.

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. Students can also print a remittance document and mail in payments with a check or money order.

In-Person Payment

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.

In the Kolligian Library lantern.

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.

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.

I like the small campus environment. It's way easier to find friends that share similar interests.

RODNEY NICKENS, UNDERGRADUATE

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.

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 Veterans Service 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.

UNDERGRADUATE ADMISSION

Prospective students interested in attending the University of California, Merced are encouraged to contact the Admissions/Relations with Schools and Colleges 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.

ADMISSIONS/RELATIONS WITH SCHOOLS AND COLLEGES (ARSC)

5200 N. Lake Road

Merced, CA 95343-5603

(209) 228-4682

(866) 270-7301 (toll-free in California)

Web site: students.ucmerced.edu (Click on the Admissions link)

E-mail: admissions@ucmerced.edu

E-mail: transfer@ucmerced.edu

- **Campus tours**
- **Admissions presentations**
- **Pre-application advising**
- **Transfer advising**
- **Transfer Admission Guarantees**

FINANCIAL AID AND SCHOLARSHIPS

See the Financial Aid section of this catalog.

Financial Aid code for UC Merced: 001313 (Same as UC Davis)

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

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 Admissions/Relations with Schools and Colleges 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. Prospective applicants who have not filed during the priority filing period should contact Admissions/Relations with Schools and Colleges for more information about the advisability of filing a late application.

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 Admissions/Relations with Schools and Colleges 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 1 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 transfers. If you cannot afford the $100 deposit, contact Admissions/Relations with Schools and Colleges 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 record 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 ACKNOWLEDGEMENT

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 Admissions/Relations with Schools and Colleges 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 along with the paper application or following the submission of the online 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.

Taking a break in the Valley Terraces Center.

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 an Extended Opportunity Programs and Service (EOPS) program can obtain a fee waiver authorization from the EOPS office. All students: If you cannot afford the application fee and meet fee waiver guidelines, you can request a fee waiver authorization from any UC campus Admissions, Relations with Schools or Educational Opportunity Programs and Services office, or simply request a fee waiver when you submit the online 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 of a School 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 – or have completed a California Certificate of Proficiency, an equivalent proficiency examination from another state or the General Education Development (GED) certificate – but have not enrolled in a college or university since the summer after leaving high school. 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.
- **Nonresidents** are applicants whose legal permanent residence (as determined by the University) is outside of 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 Admissions/Relations with Schools and Colleges for information well in advance of the application filing period.
- **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.
- **Special status** applicants are 21 years of age or older who have not had the opportunity to complete the full requirements for admission or who have not completed a substantial amount of college work, but for reason of special attainment or background may be prepared to undertake certain courses at UC Merced toward a definite and limited objective. Conditions for special status are determined by the director of admissions and are subject to the approval of the dean of the School in which the student wants to study. Approval to matriculate must be made by the School dean. Application, fees and filing dates are the same as those for new applicants and a petition for special status must be submitted with the application.

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 deadline: freshmen
June 1	Statement of Intent to Register (SIR) fall semester deadline: transfers
July 15	Final, official transcripts due to Admissions/Relations with Schools and Colleges (fall semester applicants)
July 31	Application priority filing deadline for admission to spring semester
October 15	Statement of Intent to Register (SIR) spring semester deadline
January 6	Final, official transcripts due to Admissions/Relations with Schools and Colleges (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 students.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.

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.

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 of or the entire 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.

Beginning with the Fall 2007 semester, 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 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 with Admissions/Relations with Schools and Colleges 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.

Contact the appropriate testing organization. Information for the ACT is available at www.act.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. Because of the recent changes to the ACT and SAT, the Eligibility Index is being revised and was unavailable at press time. The new index, along with an online calculator you can use to assess your eligibility, will be available at www.universityofcalifornia.edu/admissions/scholarshipreq in Summer 2006.

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 by 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 satisfy the same examination requirement as students who are eligible in the statewide context. You must achieve a test score total, as calculated according to the UC Eligibility Index, of at least 3450 (3550 for nonresident students). Additionally, students who take the SAT Reasoning Test must score at least 580 on each of its three components; students who take the ACT Assessment plus Writing must score at least 25 in math, science, reading and English/writing. All students qualifying by this path must score at least 580 on each of their two SAT Subject Tests.

You cannot qualify for this path if you have completed 12 or more units of transferable coursework at a college or university after high school, or if you have taken transferable college courses in any subject covered by the SAT Subject Tests.

An applicant who is currently attending high school may qualify for admission to the University by examination alone without completing his or her high school program.

Nonresident Freshmen 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. At time of publication, examination requirements are under review. For updated information visit www.universityofcalifornia.edu/admissions/welcome.html.

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 with 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.

FRESHMEN WITH ADVANCED STANDING

If you complete transferable college courses as defined below or achieve an appropriate score on Advanced Placement or International Baccalaureate Higher Level examinations while in high school, you may receive transfer credits when you enter UC Merced as a freshman. Completing examinations and transferable college courses while still in high school or in the summer immediately following high school graduation does not make you a transfer student, even though you may have earned a significant number of college credits. Tables on the following pages identify the amount and type of transfer credit awarded for appropriate scores in the identified examinations.

TRANSFERABLE COLLEGE COURSES

The University awards transfer credit for courses that are determined by Admissions/Relations with Schools and Colleges to be comparable to those offered for the undergraduate degree at any UC campus, when 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 at www.assist.org.

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 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

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, 2-D Design or 3-D Design exempts one 4-unit GE course in Arts
2-D Design	5.3	
3-D Design	5.3	
	(CREDIT WILL BE GRANTED FOR EITHER THE IB OR AP EXAMS THIS SECTION)	
AP Art History	5.3	Score 4 or 5 exempts one (1) course in Arts
AP Biology	5.3	Score 4 or 5 exempts BIS 1
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	1.3	None
Comp Science AB	2.7	None
	(2.7 UNIT MAXIMUM BOTH TESTS)	

Subject Exam	Units	Course Exemptions
IBH Economics	5.3	Score 6 or 7 exempts ECON 1
AP Economics:		
Macroeconomics	2.7	Score 4 or 5 on both Microeconomics AND Macroeconomics exempts ECON 1
Microeconomics	2.7	
	(CREDIT WILL BE GRANTED FOR EITHER THE IB OR AP EXAMS IN THIS SECTION)	
IBH English Language	5.3	Score 5 or above satisfies WRI 1 and ELWR. Score 6 or 7 exempts WRI 10
AP English:		
Language/Composition	5.3	Score 3 or above either AP exam satisfies WRI 1 and ELWR
Literature/Composition	5.3	Score 4 or 5 Lang/Comp exempts WRI 10
	(5.3 UNIT MAXIMUM ALL TESTS THIS SECTION)	Score 4 or 5 Lit/Comp exempts LIT 20-21, 30-31, or 40-41 sequence
AP Environmental Science	2.7	Score 4 or 5 exempts ESS 1
AP Government and Politics:		
United States	2.7	Score 4 or 5 exempts POLI 1
Comparative	2.7	Score 4 or 5 exempts POLI 1
IBH History	5.3	Score 6 or 7 exempts one (1) lower division history sequence
AP History:		
US History	5.3	Score 4 or 5 exempts HIST 16-17
European History	5.3	None
World History	5.3	Score 4 or 5 exempts HIST 10-11
	(CREDIT WILL BE GRANTED FOR EITHER THE IB OR AP EXAMS IN THIS SECTION)	
IBH Geography	5.3	None
AP Human Geography:	2.7	None
	(CREDIT WILL BE GRANTED FOR EITHER THE IB OR AP EXAMS IN THIS SECTION)	
IBH Language Other Than English		
French	5.3	Score 6 or 7 on French or German exempts WCH foreign language requirement
German	5.3	
Spanish	5.3	Score 6 or 7 exempts SPAN 4 and/or WCH foreign language requirement
AP Language Other Than English:		
French Language	5.3	Score 4 or 5 on French Language and/or French Literature and/or German Language
French Literature	5.3	and/or German Literature exempts WCH foreign language requirement
German Language	5.3	
German Literature	5.3	
Spanish Language	5.3	Score 4 or 5 exempts SPAN 4 and/or WCH foreign language requirement
Spanish Literature	5.3	Score 4 or 5 exempts LIT 50-51
	(CREDIT WILL BE GRANTED FOR EITHER THE IB OR AP EXAMS IN THE SAME LANGUAGE IN THIS SECTION)	
AP Latin:		
Latin Literature language requirement	2.7	Score 4 or 5 on Latin Literature and/or Vergil exempts WCH foreign
AP Mathematics		Score 4 or 5 on either exam exempts Math Readiness Exam and SSHA's Quantitative Reasoning Requirement
Calculus AB	2.7	Score 4 or 5 exempts MATH 21
Calculus BC	5.3	Score 3 exempts Calculus Readiness exam and MATH 21, Score of 4 or 5 exempts Math 21 and MATH 22
Calculus BC Subscore AB	2.7	Score 4 or 5 exempts MATH 21
	(5.3 UNIT MAXIMUM ALL TESTS THIS SECTION)	
IBH Music	5.3	Score 6 or 7 exempts one (1) GE course in Arts
AP Music Theory	5.3	None
	(5.3 UNIT MAXIMUM ALL TESTS THIS SECTION)	

Subject Exam	Units	Course Exemptions and General Education
AP Physics:		
Physics B	5.3	None
Physics C Mechanics	2.7	Score 5 exempts PHYS 8
Physics C Electricity and Magnetism	2.7 (5.3 UNIT MAXIMUM ALL TESTS THIS SECTION)	None
IBH Psychology **AP Psychology**	5.3 2.7 (CREDIT WILL BE GRANTED FOR EITHER THE IB OR AP EXAMS IN THIS SECTION)	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 Score 5 exempts ECON 10
IBH Theatre Arts	5.3	Score 5 or above exempts one (1) GE Course in Arts

ADMISSION AS A TRANSFER STUDENT

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 has a strong commitment 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 89 transferable semester units (90 to 133.5 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 Admissions/Relations with Schools and Colleges 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 Admissions/Relations with Schools and Colleges to inquire about Transfer Admission Guarantee contracts and visit www.assist.org for information on courses to take to prepare for your major.

TRANSFERABLE COLLEGE UNITS AND GRADE POINT AVERAGE (GPA)

The University awards transfer credit for courses that are determined by Admissions/Relations with Schools and Colleges 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 Admissions/Relations with Schools and Colleges 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 89 transferable semester (133.5 quarter) units and still be eligible to transfer. It is important to note, however, that UC Merced considers students who have completed more than 89 semester units to have excess units and will not admit those students without special approval. A student who completes 89 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
   (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 already satisfied the course pattern requirement.

TRANSFER REQUIREMENTS FOR NONRESIDENTS

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

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.

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 Admissions/Relations with Schools and Colleges at UC Merced, along with your final, official transcript from the last community college you attended.

Carving pumpkins at Valley Terraces.

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 Admissions/Relations with Schools and Colleges at (209) 228-4682 or (866) 270-7301 toll free in California. The following majors are available for fall 2007 and 2008 TAG contracts:

Required GPA	Major, Degree
3.10	Computer Science & Engineering, B.S.
3.00	Environmental Engineering, B.S.
2.80	Biological Sciences, B.S.
2.80	Earth Systems Science, B.S.
2.80	Social and Cognitive Sciences, B.A.
2.80	World Cultures and History, B.A.

ADMISSIONS INFORMATION FOR INTERNATIONAL STUDENTS

International students who plan to enter UC Merced as freshmen must have completed a rigorous program of studies and activities comparable to that required of domestic freshman applicants selected for admission and must demonstrate proficiency in the English language by one of the methods described later in this section. International applicants are also required to take the ACT Assessment Plus Writing test or the SAT Reasoning Test and two SAT Subject Tests selected from two of the following subject areas: history, literature, mathematics (Math Level II only), science or a language other than English.

International students enrolled in California Community Colleges will be considered for admission for Fall 2006 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-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.toefl.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 English Language (APIEL). Information about the APIEL is available at www.collegeboard.com/ap/students/apel/
- Earn grades of B or better in each of two UC-transferable English composition courses taken at are regionally accredited post-secondary institution in the United States.

Prospective international students are strongly encouraged to contact the Admissions/Relations with Schools and Colleges 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 Admissions/Relations with Schools and Colleges 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 receive an invitation 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 Admissions/Relations with Schools and Colleges at least five business days prior to their scheduled New Student Orientation session or registration will be delayed.

CALIFORNIA RESIDENCY STATUS

The admission requirements for California residents also apply to dependents of the University of California employees. 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).

Hughson High School AVID students visit campus.

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

MAKE UC MERCED YOUR TRANSFER DESTINATION

UC Merced is finding new ways to be a welcoming educational home for transfer students, with support from the William and Flora Hewlett Foundation and the Ford Foundation. Transfer students who joined UC Merced's inaugural class are forming an association, and exchanging views and experiences on life at a start-up university. As UC Merced ambassadors, they are visiting a 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. They are also building a transfer web site that tells students what they need to know. From his own experience, Faculty Advisor Jeff Yoshimi knows the value of transferring from a California Community College to the University of California. He says, "I transferred from Pasadena City College to UC Berkeley and my parents met at Los Angeles City College, so transfer is meaningful to me based on my personal background. I believe in it!"

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 class, as the pioneering work of university-building continues.

TRANSFER STUDENTS: YOU BELONG HERE

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 international students, students on special or limited status or students enrolled in the Division of Professional Studies.)

All students, regardless of income, are encouraged to apply for financial aid. In 2005-06, 71 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:	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). The 2007-2008 FAFSA will be available beginning in December 2006.

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 Pell Grants and Federal 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!

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.

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.

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). 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.

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.

University Return-to-Aid Grants and Scholarships: 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 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. To determine eligibility, we subtract a student and parent contribution, any federal or state resources the student receives and a standard work and loan contribution from the cost of attendance. Additional guidelines for awarding the grants and scholarships are determined annually and are in part determined based on the amount of grant aid available.

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 Subsidized Stafford Loans are awarded to students with financial need. This loan is "subsidized" in that the U.S. government pays the interest while the student is in school and during the grace period (the first six months after leaving school or dropping to less than half-time enrollment status). Federal Unsubsidized Stafford Loans are not based on financial need and 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.

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 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.

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.

Transfer Units	Financial Aid Eligibility at UC Merced
Freshman	10 semesters
Sophomore	8 semesters
Junior	6 semesters
Senior	4 semesters

MINIMUM NUMBER OF UNITS EACH YEAR

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.

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

SATISFACTORY ACADEMIC PROGRESS

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 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 if the student has completed two consecutive terms on academic probation without achieving a cumulative grade point average of 2.0.

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

Students sometimes find that they need to withdraw from school. This may be due to illness or a family emergency. If you leave school after the term begins, this is considered a withdrawal. (If you cancel your registration for a term before the term begins, you are not eligible to receive any financial aid for that term.) Whatever the reason, if you are considering withdrawal, you should first discuss your decision with a financial aid advisor. **Financial aid recipients who withdraw may no longer be eligible for all of the financial aid they have received.** If you are a financial aid recipient and withdraw, you should expect to pay back part of your financial aid. UC Merced uses the Federal Formula required for Title IV aid recipients (Pell Grants, FFELP, Parent Loans for Undergraduate Students) to determine the amount of all forms of aid a student must return, including Cal Grants and scholarships.

The percentage of aid to be repaid is the percentage of the total days in the semester that are remaining after the date of withdrawal. For instance, if you received $2,000 in financial aid and withdraw when the semester is exactly 50 percent over, you will need to repay $1,000.

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

FOR ADDITIONAL INFORMATION: Please refer to our web site financialaid.ucmerced.edu for additional information and assistance.

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 multiple summer sessions during the summer term. Quarter units earned previously at another institution are converted to semester units by multiplying by two-thirds (or .667 per unit); for example, 180 quarter units equals 120 semester units.

SUMMER COURSES

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 AND ENROLLMENT LIMITS

ENROLLING IN COURSES

UC Merced students register each semester using the online registration system, MyUCMerced. 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. MyUCMerced is an interactive computer system that 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. Preassigned 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 MyUCMerced. Students may add and drop courses during the adjustment period, which starts after preregistration ends and extends through the first three weeks of instruction. A new or readmitted student must also:

- Obtain a student ID card, and
- Complete the on-line Statement of Legal Residence petition on the Office of the Registrar's web site (registrar.ucmerced.edu) under the Residency and Fee Related Programs section.

The Schedule of Classes and other information on registration are available on the MyUCMerced web site.

Registration Priority: Access to registration (via MyUCMerced) 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 after the first day of instruction and extends through the 10th day of instruction. Students are assessed a 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 registration/payment fee may be assessed.

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 appropriate dean. 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 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 4th 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 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 appear under the course grade on the student's transcript.

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 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, F, U, or Not Passed was received. Undergraduate courses in which a grade of D or F has been earned may not be repeated on a passed/not passed basis. Similarly, a graduate course in which a C, 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.

In computing the grade point average of an undergraduate who repeats a course in which he/she received a D or F, only the most recently earned grade and grade points shall be used for the first 16 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, undergraduate students must be registered for 10 units (including workload units) or fewer by the 10th day of instruction that semester 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 web site at registrar.ucmerced.edu, and at the Graduate Studies web site 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. Undergraduates 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. After filing the PELP form, a student must file an exit form with Student Accounting. An application fee will be charged to the student's account when he/she enrolls in the PELP program. This fee is identical to that paid by a student who withdraws and the student is required to pay a readmission fee upon return.

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 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 leave will be automatically withdrawn from the University.

Grants and other financial aid will be discontinued for the period of the leave, 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 terms 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 term, completing the 120 units necessary for graduation in four years. The Office of the Registrar and the appropriate dean will ensure that students are making normal progress toward their degrees. An extension of enrollment beyond nine terms 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 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 web site. 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

A student wishing to declare a double major must petition the School(s) responsible for the major(s). The student must be in good academic standing and have a GPA of at least 2.0 in the upper division courses taken in each major program. Except under unusual circumstances, no declaration of a double major will be permitted after a student has attained senior standing (90 units). Double-major students must satisfy all requirements for both majors.

ADDITIONAL ENROLLMENT OPPORTUNITIES

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 web site 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.

UC/CSU/Community College Intersegmental Cross Enrollment

Interested students who wish to take a particular class at a nearby California State University or California Community College, may do so through the Intersegmental Cross Enrollment program. Enrollment is limited to one course per term, a Memo of Understanding must exist between the home and host campus, and participating students need the approval of both the home and the host campus.

Senate Bill 361 requires that UC, CSU and the California Community Colleges permit students to enroll in one course per term at a campus of either of the other two systems on a space available basis at the discretion of the two campuses involved. This program aims to encourage community college students to enroll concurrently in courses offered at local universities, potentially increasing the number of community college transfers.

To participate, students must have completed at least one term at the home campus as a matriculated student; be enrolled in at least twelve semester units at the home campus during the term in which they seek to cross-enroll; have a grade-point average of 2.0 for work completed; be in good academic standing; have paid tuition and fees required by the home campus for the academic term in which they seek to cross-enroll; and be certified by their home campus as to eligibility, residence, fee, financial aid and health status.

Generally, students will be allowed to add a class, if space is available, after the add/drop period on the host campus. To add a course, students must obtain the faculty member's approval and signature on a Cross Enrollment form, available at their home campus Registrar's Office. The student takes the signed form to the Office of the Registrar at the host campus for processing. All course work taken via the Intersegmental Cross Enrollment program is recorded on a host campus transcript and must follow the normal transfer of credit procedures at the home campus.

Move-in day on campus.

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 be 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 term 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 web site 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.

Professor Roger Bales and students in the field as part of Freshman Seminar, "Climate Change, Sierra Nevada Snowpack & California's Water Supply"

ENRICH YOUR FIRST YEAR WITH A FRESHMAN SEMINAR!

From Harvard to Berkeley, research universities find that freshman seminars are an excellent way to help new freshmen make the transition to university life. Freshman seminars give new students the chance to get to know a faculty member personally from the beginning.

Benefits to students include:

- helping to decide on a major;
- studying a topic in depth with a small group of peers; and
- beginning an association that leads to a faculty letter of reference at the end of the undergraduate career.

Freshman seminars are normally one-credit and offered on a Pass/No Pass basis only.

I like being in UC Merced because it's so easy to make friends. Everybody is so nice and cool!

JANICE COSIO,
NATURAL SCIENCES UNDERGRADUATE

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. 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 term 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.

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 Center 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 term 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 web site 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.

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).

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, and P/NP = N/A. 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. The grade of I is excluded from 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 term.

Grade Appeals

The Grade Appeal Policy and Process can be found on the Office of the Registrar's web site (registrar.ucmerced.edu) and at the School/College deans' offices, and from the Dean of Graduate Studies and the Vice Chancellor of Student Affairs.

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 web site 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 should not re-enroll in the course; if they do, it is recorded twice on the transcript. Once an I grade is assigned, it remains permanently on the transcript along with the passing grade students may later receive for that course.

I grades are not counted in computing the grade point average. An I grade received in the fall term must be replaced by the first day of instruction in the following fall term. An I grade received in the spring or summer terms must be replaced by the first day of instruction in the following spring term.

Except as noted below, any I grade that has not been replaced within the deadlines above will be converted to grade F (or NP/U if taken passed/not passed). After that time, but not retroactively, the grade is 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 (or NP/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 term where the evaluation of the student's performance is deferred until the end of the final term, 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.

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 web site 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 web site: 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).

Retroactive Grade Changes

All grades except I and IP are final when filed by an instructor at the end of the semester. No final grade except I may be revised by examination or the submission of additional work after the close of the semester.

If a clerical or procedural error in the reporting of a grade by the instructor can be documented, the student may request a change of grade with a petition available from school dean's office. The request must be made by the fifth week of the following 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.

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 that 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 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

Grades are generally available as soon as possible after a semester has ended. Students can check their grades online using the MyUCMerced enrollment/records system.

Grade Reports: After grades are recorded for a semester or summer session, they are available online via MyUCMerced. With the availability of online grade reporting, students can print their grade reports from the Internet. Grade reports printed by the Office of the Registrar will be provided at the request of the student.

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:

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 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 without achieving a cumulative grade point average of 2.0.

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 notation will be removed from the transcript and 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 Disqualification

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 120-unit 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 enrolled. 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 about probation and dismissal.

Readmission

Policy available on the Office of the Registrar web site.

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 (official and unofficial) may be ordered via MyUCMerced as soon as possible after the end of the semester. Alumni and students who are not registered may order transcripts from the Office of the Registrar. See the Office of the Registrar's web site 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. There is a $7 charge for each transcript and $14 (plus shipping) for all rush requests. The alumnus/a or student's financial account must be paid in full prior to the acceptance of the total amount due for the transcript request, and the transcript fees must accompany the application. Students who urgently need a transcript that would normally take 7 to 10 days to issue can expect a 48-hour turn-around for the rush request.

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 web site. Legally recognized proof of the change of name will be required before the petition is accepted and implemented. (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 MyUCMerced or submit a Change of Address form downloaded from Office of the Registrar's web site.

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, 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 term must file a Notice of Cancellation/Withdrawal, available from the Office of the Registrar's web site 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 term.

Being at UC Merced, it 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 the campus. What more do you want?!

You can play such a pivotal role in the development of the university and student life. Also, the opportunities; how many deans from other campuses invite their students to a BBQ at their house?

UC MERCED DEFINES "OPPORTUNITY"

JULIA ZHOU
UNDERGRADUATE

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 House.

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 an Application for Graduation, 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.

Nonregistered Students: Students who are not registered must submit the Declaration of Candidacy form that can be downloaded from the Office of the Registrar's web site at registrar.ucmerced.edu. It can be mailed along with the appropriate fee to the Office of the Registrar. The form must be received by the Office of the Registrar by December 1 to file to graduate in the following Spring or Summer terms, or by April 1 of each year 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.

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.

Confirmation of Candidacy: 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

Commencement exercises to honor students who have earned baccalaureate and graduate degrees, and to give recognition and awards to students who are graduating with distinction, are held each year in May. Students who have earned their degrees in the previous fall semester or in summer sessions are welcome to participate.

Diplomas

Diplomas are not distributed at commencement but are available several months afterward. The Office of the Registrar will mail each diploma 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.

Chancellor Carol Tomlinson-Keasey, left, marches down Scholars Lane with UC Merced's first graduates: Eve Delfin, Daniel Santillano and Kristi Imberi.

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

College One welcomes all undergraduate students to an adventure in intellectual exploration. College One is home to UC Merced's general education program, introducing you to the major domains of intellectual inquiry and helping you to build important college-level skills. Our top priority is to promote and foster your academic success.

What is general education? All universities aspire to educate the whole student. As John Nichols of St. Joseph's University puts it, your major will prepare you to make a living, while general education will equip you with the skills, knowledge and attitudes to make a life.

As society grows more and more complex, it becomes increasingly necessary to train students to be able to solve problems in real world settings. 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.

How does College One help you meet these goals for general education? While UC Merced is new and growing, all faculty and students are affiliated with College One. The faculty have 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. You can read more about the Core Course Sequence a little further on in this Catalog.

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

College One is a hub of information, both on the UC Merced web site and physically, in the Kolligian Library. College One will help you connect with such exciting opportunities as the Freshman Seminar Program, Undergraduate Research Opportunities, and University of California programs in Sacramento, Washington DC and overseas. You will be encouraged to keep track of your progress in meeting your general education goals by the faculty who are all part of College One, as well as by your advisors in the Student Advising and Learning Center and in the Schools.

GUIDING PRINCIPLES FOR GENERAL EDUCATION AT UC MERCED

UC Merced is planning educational experiences 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.

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;

Professor Henry Forman introduces CORE1 students to principles of science.

- 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 of $65 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 from the Educational Testing Service (ETS). Students must make checks or money orders payable to ETS and submit them by the date indicated. A postage-paid return envelope will be included. Students who are not from California may take the 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 College One 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 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.

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 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, 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 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.

At a Core Friday event, Professor Dunya Ramicova discusses her costume designs for the John Adams opera, *Doctor Atomic*.

CORE Course faculty members: Professor Valerie Leppert, Professor Henry Forman and Professor Wil van Breugel at CORE Friday Star Party.

The best aspect about UC Merced is the UC education with the benefit of having a smaller student population. This allows students to leave their mark on this campus as well as have an outstanding educational experience with small class sizes and close student-professor relationships.

JASON CASTILLO,
UNDERGRADUATE

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.

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

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 microsensors 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 satisfaction and quality of life. Engineering is a "people-serving profession" and a pathway to financial security. In short, engineering makes the world work!

THE SCHOOL OF ENGINEERING WILL OFFER THE FOLLOWING MAJORS IN 2006-07:

- Bioengineering (BIOE)
- Computer Science and Engineering (CSE)
- Environmental Engineering (ENVE)
- Materials Science and Engineering (MSE) (freshman only Fall 2006)
- Mechanical Engineering (ME) (freshman only Fall 2006)

LETTER OF WELCOME FROM THE DEAN

Dear Future Engineering Student:

I am delighted to learn of your interest in UC Merced and, in particular, your interest in becoming an engineer. Engineering is a people-serving 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, last throughout your careers 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 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. 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 leader for tomorrow.

Jeff Wright, Dean
School of Engineering

Astronaut Stephen K. Robinson meets Student Affairs Fellow Jeffrey Chang, while Engineering Dean Jeff Wright looks on.

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 will have a freshman year that lays the foundation for further study in the majors. Students will 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 will have the opportunity to form service learning teams that will 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 will 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 will 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 will be formally assessed through regular written reports and panel interviews.

In addition to obtaining practical experience that complements their formal course work, students will 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 will extend across multiple semesters and years, clients will be 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.

The School of Engineering degree requirements are at least 120 but not more than 132 semester units to include the following:

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 (BIS 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 (ENGR 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.

Note: Service Learning can be counted for up to six general education units; Freshman Seminars cannot be counted for general education.

MAJOR PREPARATION (28 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

ENGINEERING FUNDAMENTALS (15 units total with 3 units specified): The following fundamentals course is required for all engineering majors:

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

Remaining fundamentals courses should be selected from following list of approved Engineering Fundamentals courses. Additional fundamentals courses are available in specific major, and some majors may specify particular courses (see specific majors and talk to your advisor to find the best set of fundamentals courses for you).

- Introduction to Materials (ENGR 45) . . . . . .4 units
- Statics (ENGR 50) . . . . . .2 units
- Dynamics (ENGR 57) . . . . . .2 units
- Strength of Materials (ENGR 51) . . . . . .3 units
- Computer Modeling and Analysis (ENGR 52) . . . . . .3 units
- Materials and the Environment (ENGR 53) . . . . . .4 units
- Fluid Mechanics (ENGR 120) . . . . . .4 units
- Thermodynamics (ENGR 130) . . . . . .4 units
- Introduction to Object-Oriented Programming (ENGR 140) . . . . . .3 units
- Discrete Math and Computer Modeling (ENGR 160) . . . . . .3 units
- Circuits (ENGR 165) . . . . . .4 units
- Spatial Analysis and Modeling (ENGR 180) . . . . . .4 units

MAJOR AREA UPPER DIVISION COURSES (at least 26 units) selected from a list of acceptable courses designated by the faculty in that area, some of which may be specified. These courses include required 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: Students with at least 45 transferable units who have completed and had certified the Intersegmental General Education Transfer Curriculum (IGETC) will have satisfied the lower division general education requirements. All transfer students will 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 at least 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 less than 45 transferable units who have followed the above pattern will be required to take CORE 1; students with more than 45 transferable units who have not completed the above pattern will 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:

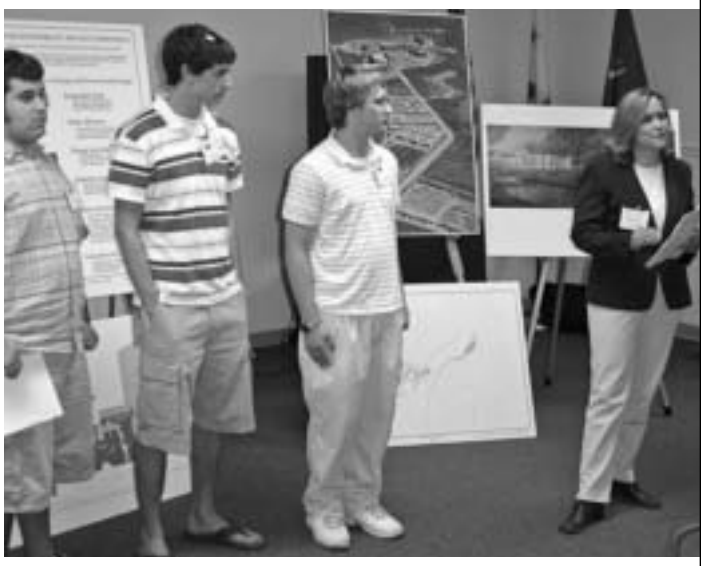
- three semesters of calculus, plus linear algebra and differential equations
- one semester of general chemistry with laboratory
- two semesters of calculus-based physics with laboratory
- two semester introduction to computer science

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. Students should consult the Information for Prospective Students link on the School of Engineering web site: engineering.ucmerced.edu for more information.

THE MAJORS

BIOENGINEERING PROGRAM

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.



Professor Valerie Leppert with Service Learning team.

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 will allow the program to draw efficiently on the talents of the biologists, chemists, physicists and other UC Merced faculty in basic engineering and science programs.

In addition, much convergence between engineering and biology are at the nanoscale level – the level of biological molecules, molecular aggregates and cellular processes – and this convergence 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. 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. 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 creating synergy with nanobioengineering by employing the use of small nanoparticles or nanocomposite 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 include:

ENGINEERING FUNDAMENTALS (14 units are specified):

- Introduction to Materials (ENGR 45) . . . . . .4 units
- Fluid Mechanics (ENGR 120) . . . . . .4 units
- Thermodynamics (ENGR 130) . . . . . .3 units
- Engineering Economic Analysis (ENGR 155) . . . . . .3 units

ENGINEERING FUNDAMENTALS (choose at least 1 course from the suggested list):

- Statics (ENGR 50) . . . . . .2 units
- Dynamics (ENGR 57) . . . . . .2 units
- Circuits (ENGR 165) . . . . . .4 units
- Contemporary Physics (PHYS 50) . . . . . .4 units

BIOENGINEERING CORE (23 units): The bioengineering core consists of 6 courses (1 lower division and 5 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 (BIS 100) . . . . . .4 units
- Physiology for Engineers (BIOE 100) . . . . . .4 units
- Biosensors and Bioinstrumentation (BIOE 103) . . . . . .4 units (or Biosensors BIOE 102)
- The Cell (BIS 110) . . . . . .4 units
- Bioengineering Design (BIOE 150) . . . . . .3 units (or appropriate Service Learning Project - by approval only)

ADDITIONAL DEGREE REQUIREMENTS (11-15 units):

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

TECHNICAL ELECTIVES: Technical electives (at least 3 courses) 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.

- Modeling Nanoscale Processes in Biology (BIOE 101) . .3 units
- Self-Assembling Molecular Systems (BIOE 110) . . . . . .3 units
- Biomembranes (BIOE 111) . . . . . .3 units
- Biomolecule-Substrate Interactions (BIOE 112) . . . . . .3 units
- Tissue Engineering (BIOE 114) . . . . . .3 units
- Modeling Nanoscale Processes in Biology (BIOE 101) . .3 units
- Electron Microscopy (ENGR 170 and 170L) . . . . . .3-4 units
- Biochemistry (BIS 101) . . . . . .4 units
- Molecular Biology (BIS 102) . . . . . .4 units
- Biophysics (BIS 104) . . . . . .4 units
- Embryos, Genes and Development (BIS 150) . . . . . .4 units
- Molecular Immunology (BIS 151) . . . . . .4 units
- Biostatistics (BIS 175) . . . . . .4 units
- Computational Biology (BIS 181) . . . . . .4 units
- Bioinformatics (BIS 182) . . . . . .4 units
- Biomedical Ethics (BIS 185) . . . . . .4 units
- Material Structure and Characterization (MSE 113) . . .3 units
- Polymeric Materials (MSE 114) . . . . . .3 units
- Introduction to Nanotech and Nanoscience (MSE 118) .3 units
- Numerical Analysis (Math 133) . . . . . .4 units
- Research credit (BIOE 95 or 195) . . . . . .1-5 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

- Modeling Nanoscale Processes in Biology (BIOE 101)* .3 units
- Introduction to Nanotech and Nanoscience (MSE 118) .3 units
- Self-Assembling Molecular Systems (BIOE 110) . . . . . .3 units
- Biomembranes (BIOE 111) . . . . . .3 units
- Biomolecule-Substrate Interactions (BIOE 112) . . . . . .3 units
- Electron Microscopy (ENGR 170) . . . . . .3 units

Tissue Engineering

- Tissue Engineering (BIOE 114)* . . . . . .3 units
- Biomolecule-Substrate Interactions (BIOE 112) . . . . . .3 units
- Material Structure and Characterization (MSE 113) . . .3 units
- Polymeric Materials (MSE 114) . . . . . .3 units
- Embryos, Genes, and Development (BIS 150) . . . . . .4 units
- Molecular Immunology (BIS 151) . . . . . .4 units
- Biostatistics (BIS 175) . . . . . .4 units
- Biomedical Ethics (BIS 185) . . . . . .4 units
- Electron Microscopy (ENGR 170 and 170L) . . . . . .3-4 units
- Computational Biology (BIS 181) . . . . . .4 units

SAMPLE PLAN OF STUDY FOR BIOENGINEERING DEGREE

SEMESTER 1	
CORE 1 The World at Home	4
CSE 20 Introduction to Computing 1	2
ENGR 97 Service Learning: Engineering Projects in Community Service	1
ICP 1 Integrated Calculus and Physics	8
Semester Units	**15**

SEMESTER 2	
MATH 22 Calculus of a Single Variable II	4
CSE 21 Introduction to Computing 2	2
BIS 1 Contemporary Biology	4
PHYS 9 Physics II	4
ENGR 90X/97 Freshman Seminar or 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
BIOE 30 Introduction to Bioengineering	4
ENGR 97 Service Learning: Engineering Projects in Community Service	1
Semester Units	**16**

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 130 Thermodynamics	3
Engineering Fundamental	4
BIS 100 Molecular Machinery of Life	4
General Education Elective (Arts/Humanities)	4
ENGR 97/197 Service Learning: Engineering Projects in Community Service	1
Semester Units	**16**

SEMESTER 6	
BIS 110 The Cell	4
ENGR 120 Fluid Mechanics	4
CORE 100 The World at Home	4
Technical Elective	3
ENGR 97/197 Service Learning: Engineering Projects in Community Service	1
Semester Units	**16**

SEMESTER 7	
BIOE 100 Physiology for Engineers	4
BIOE 103 Biosensors and Bioinstrumentation	4
Technical Elective	3
General Education Elective (Social/Cognitive Sciences)	4
ENGR 97/197 Service Learning: Engineering Projects in Community Service	1
Semester Units	**16**

SEMESTER 8	
Technical Elective	3
BIOE 150 Bioengineering Design	3
ENGR 155 Engineering Economics Analysis	3
Free Elective	4
ENGR 191 Professional Seminar	1
Semester Units	**14**

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 PROGRAM

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 will prepare 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, to informatics and personal computation, careers in computer science and engineering are among the most satisfying and rewarding of any.

Computer Science and Engineering students at UC Merced will 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 will empower 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 region and the nation, offering a broad spectrum of career opportunities. Education at UC Merced will provide 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 will gain insights that will 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 will 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 science, 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 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 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
- Introduction to Operating Systems (CSE 150) . . . . . .4 units
- Networking (CSE 160) . . . . . .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. These courses should be selected from the computer science upper division technical electives, or with approval, include other upper division courses outside your major.

Student versus staff: Flag Football

SAMPLE PLAN OF STUDY FOR COMPUTER SCIENCE & ENGINEERING DEGREE

SEMESTER 1	
CORE 1 The World at Home	4
CSE 20 Introduction to Computing 1	2
ICP 1 Integrated Calculus and Physics	8
ENGR 97 Service Learning: Engineering Projects in Community Service	1
Semester Units	**15**

SEMESTER 2	
CSE 21 Introduction to Computing 2	2
MATH 22 Calculus of a Single Variable II	4
BIS 1 Contemporary Biology	4
PHYS 9 Physics II	4
ENGR 90x Engineering Freshman Seminar	1
Semester Units	**15**

SEMESTER 3	
CSE 30 Introduction to Computer Science and Engineering I	3
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	**15**

SEMESTER 4	
CSE 31 Introduction to Computer Science and Engineering II	3
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	**15**

SEMESTER 5	
CSE 100 Algorithm Design and Analysis	3
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 111 Database 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 150 Introduction to Operating Systems	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 160 Networking	4
Technical Elective	4
Technical Elective	3
ENGR 191 Professional Seminar	1
Semester Units	**16**
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.

ENVIRONMENTAL ENGINEERING PROGRAM

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.

Energy sustainability: 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 will 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 science, business, humanities and arts are an important part of the curriculum. The result is a curriculum 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: Principles of Organic Chemistry (CHEM 8, 4 units), Engineering Fundamentals (15 units), Environmental Engineering Core (16 units), and Technical electives (19-21 units, including at least one Field Methods Course)

ENGINEERING FUNDAMENTALS (15 units; 3 units specified). The following fundamentals course is required:

- Engineering Economic Analysis (ENGR 155) . . . . . .3 units
  Remaining fundamentals courses should be selected from following list of approved Engineering Fundamentals courses (* denotes recommended courses for student planning to take the Fundamentals of Engineering (FE) Examination).
- Introduction to Materials (ENGR 45)* . . . . . .4 units
- Statics (ENGR 50)* . . . . . .2 units
- Dynamics (ENGR 57)* . . . . . .2 units
- Strength of Materials (ENGR 51)* . . . . . .3 units
- Computer Modeling and Analysis (ENGR 52) . . . . . .3 units
- Materials and the Environment (ENGR 53) . . . . . .4 units
- Fluid Mechanics (ENGR 120)* . . . . . .4 units
- Thermodynamics (ENGR 130)* . . . . . .4 units
- Introduction to Object-Oriented Programming (ENGR 140) . . . . . .3 units
- Discrete Math and Computer Modeling (ENGR 160) . . . . .3 units
- Circuits (ENGR 165)* . . . . . .4 units
- Spatial Analysis and Modeling (ENGR 180) . . . . . .4 units

I like UC Merced because of the people I have met. They are very influential in all aspects of my life.

JINOUTH VASQUEZ, UNDERGRADUATE

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:

- Principles of Organic Chemistry (CHEM 8) . . . . . .4 units

TECHNICAL ELECTIVES (19-21 units): Required courses are one course containing significant lab (L) or field (F) experience (in addition to the required field course) and two courses containing significant design (D) experiences. 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. These courses should be selected from the following list of approved technical electives or, with approval, can include other upper division courses outside your major. A maximum of 4 Service Learning (ENGR 97/197) and/or Undergraduate Research (ENGR 99/199) units may be used as technical elective units.

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

List of recommended course choices for emphasis tracks:

Hydrology

- Subsurface Hydrology (ENVE 112) . . . . . .4 units
- Mountain Hydrology of the Western U.S. (ENVE 114) . . . .4 units
- Remote Sensing of the Environment (ENVE 152) . . . . . .3 units
- Watershed Biogeochemistry (ESS 105) . . . . . .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

- 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
- Water and Wastewater Treatment (ENVE 176) . . . . . 3 units
- Field Methods in Subsurface Hydrology (ENVE 183) . . . .1-3 units
- Field Methods in Environmental Chemistry (ENVE 184) . .1-3 units

Air pollution

- Global Change (ENVE 118) . . . . . .4 units
- Water Resources and Management (ENVE 140) . . . . . .3 units
- Remote Sensing of the Environment (ENVE 152) . . . . . .3 units
- Air Pollution Control (ENVE 132) . . . . . .3 units
- Watershed Biogeochemistry (ESS 105) . . . . . .3 units
- Sustainable Energy (ENVE 160) . . . . . .4 units

Sustainable energy

- Global Change (ENVE 118) . . . . . .4 units
- Water Resources and Management (ENVE 140) . . . . . .3 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

Lake Yosemite at sunset.

SAMPLE PLAN OF STUDY FOR ENVIRONMENTAL ENGINEERING DEGREE

SEMESTER 1	
CORE 1 The World at Home	4 units
CSE 20 Introduction to Computing 1	2 units
ICP 1 Integrated Calculus and Physics	8 units
ENGR 97 Service Learning: Engineering Projects in Community Service	1 unit
Semester Units	**15**

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

SEMESTER 3	
MATH 32 Probability and Statistics	3 units
CHEM 2 General Chemistry	4 units
MATH 23 Multi-Variable Calculus	4 units
ENVE 20 Introduction to Environmental Science and Technology	4 units
ENGR 97 Service Learning: Engineering Projects in Community Service	1 unit
Semester Units	**16**

SEMESTER 4	
MATH 24 Introduction to Linear Algebra and Differential Equations	4 units
CHEM 8 Principles of Organic Chemistry	4 units
Engineering Fundamentals	2 units
WRI 10 College Reading and Composition	4 units
ENGR 97 Service Learning: Engineering Projects in Community Service	1 unit
Semester Units	**15**

SEMESTER 5	
Engineering Fundamentals	4 units
Engineering Fundamentals	3 units
Engineering Fundamentals	3 units
General Education Elective (Arts/Humanities)	4 units
ENGR 197 Service Learning: Engineering Projects in Community Service	1 unit
Semester Units	**15**

SEMESTER 6	
ENVE 100 Environmental Chemistry	4 units
ENVE 130 Meteorology and Air Pollution	4 units
CORE 100 The World at Home	4 units
ENGR 155 Engineering Economics Analysis	3 units
ENGR 197 Service Learning: Engineering Projects in Community Service	1 unit
Semester Units	**16**

SEMESTER 7	
ENVE 110 Hydrology and Climate	4 units
Technical Elective (D)	3 units
Technical Elective (L)	4 units
General Education Elective (Social/Cognitive Sciences)	4 units
ENGR 197 Service Learning: Engineering Projects in Community Service	1 unit
Semester Units	**16**

SEMESTER 8	
Technical Elective (F)	4 units
Technical Elective (D)	3 units
Technical Elective	3 units
Free Elective	4 units
ENGR 191 Professional Seminar	1 unit
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.

MATERIALS SCIENCE AND ENGINEERING PROGRAM

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, cermets, 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 limited by 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 course 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 (16 units), MSE Core (26 units), and Technical electives (at least 12 units).

ENGINEERING FUNDAMENTALS (16 units; specified):
The following fundamentals courses are required:

- Statics (ENGR 50) . . . . . .2 units
- Strength of Materials (ENGR 51) . . . . . .3 units
- Fluid Mechanics (ENGR 120) . . . . . .4 units
- Thermodynamics (ENGR 130) . . . . . .4 units
- Engineering Economic Analysis (ENGR 155) . . . . . .3 units

MATERIALS SCIENCE & ENGINEERING CORE (26 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
- Materials and the Environment (ENGR 53) . . . . . .4 units

Upper Division Course

- 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: The following course is required:

- Freshman Seminar (ENGR 90x) . . . . . .1 unit

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) . . . . . .4 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
- Introduction to MEMS (MECH 119) . . . . . .3 units
- Quantum Chemistry and Spectroscopy (CHEM 112) . .3 units

SAMPLE PLAN OF STUDY FOR MATERIALS SCIENCE AND ENGINEERING DEGREE

SEMESTER 1	
ICP 1 Integrated Calculus and Physics	8 units
CORE 1 The World at Home	4 units
CSE 20 Introduction to Computing 1	2 units
ENGR 90x Freshman Seminar	1 unit
Semester Units	**15**

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

SEMESTER 3	
CHEM 2 General Chemistry	4 units
MATH 23 Multi-Variable Calculus	4 units
ENGR 51 Strength of Materials	3 units
MATH 32 Probability and Statistics	4 units
ENGR 97 Service Learning: Engineering Projects in Community Service	1 unit
Semester Units	**15**

SEMESTER 4	
ENGR 45 Introduction to Materials	4 units
MATH 24 Introduction to Linear Algebra and Differential	4 units
ENGR 53 Materials and the Environment	4 units
WRI 10 College Reading and Composition	4 units
ENGR 97 Service Learning: Engineering Projects in Community Service	1unit
Semester Units	**17**

SEMESTER 5	
MSE 110 Solid State Materials Properties	4 units
ENGR 120 Fluid Mechanics	4 units
ENGR 50 Statics	2 units
General Education Elective (Arts/Humanities)	4 units
ENGR 197 Service Learning: Engineering Projects in Community Service	1 unit
Semester Units	**15**

SEMESTER 6	
ENGR 130 Thermodynamics	4 units
ENGR 155 Engineering Economics Analysis	3 units
MSE 111 Materials Processing	4 units
CORE 100 The World at Home	4 units
ENGR 197 Service Learning: Engineering Projects in Community Service	1 unit
Semester Units	**16**

SEMESTER 7	
MSE 112 Materials Selection and Performance	3 units
MSE 113 Materials Characterization	4 units
Technical Elective	3 units
General Education Elective (Social/Cognitive Sciences)	4 units
ENGR 197 Service Learning: Engineering Projects in Community Service	1 unit
Semester Units	**15**

SEMESTER 8	
MSE 120 Materials Capstone Design	3 units
Technical Elective	3 units
Technical Elective	3 units
Technical Elective	4 units
ENGR 191 Professional Seminar	1unit
Semester Units	**14**
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.

MECHANICAL ENGINEERING PROGRAM

The undergraduate major in Mechanical Engineering provides students with a solid foundation and the necessary skills to assume leadership roles in industry or government agencies. Mechanical Engineering exerts an impact 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, textile and consulting firms. 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. UC Merced emphasizes 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 in their community. The team projects will 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 science, business, humanities and arts are an important part of the curriculum. The result is a curriculum 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 fundamentals courses should be selected from following list:

- 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 (26 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
- 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
- Vibrations and Controls (ME 140) . . . . . .3 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

The thing I enjoy most at UC Merced is working with students. Everyone here has the pioneering spirit which makes teaching class especially fun and exciting.

PROFESSOR ARNOLD KIM, MATHEMATICS

SAMPLE PLAN OF STUDY FOR MECHANICAL ENGINEERING DEGREE

SEMESTER 1

CORE 1 The World at Home . . . . . .4 units
CSE 20 Introduction to Computing 1 . . . . . .2 units
ENGR 90x/ENGR 97 Freshman Seminar/Service Learning:
Engineering Projects in Community Service* . . . . . .1 unit
ICP 1 Integrated Calculus and Physics . . . . . .8 units

Semester Units 15

SEMESTER 2

MATH 22 Calculus of a Single Variable II . . . . . .4 units
CSE 21 Introduction to Computing 2 . . . . . .2 units
BIS 1 Contemporary Biology . . . . . .4 units
PHYS 9 Physics II . . . . . .4 units
ENGR 97 Service Learning:
Engineering Projects in Community Service* . . . . . .1 unit

Semester Units 15

SEMESTER 3

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

Semester Units 15

SEMESTER 4

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

Semester Units 16

SEMESTER 5

ENGR 130 Thermodynamics . . . . . .3 units
ENGR 151 Strength of Materials (Lab) . . . . . .4 units
MATH 131 Numerical Methods I . . . . . .4 units
Technical Elective . . . . . .3 units
Free Elective . . . . . .3 units

Semester Units 17

SEMESTER 6

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

Semester Units 16

SEMESTER 7

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

Semester Units 16

SEMESTER 8

ME 170 Capstone Design* with Lab . . . . . .4 units
ENGR 140 Vibrations and Controls* with Design . . . . .3 units
Free Elective . . . . . .4 units
ENGR 155 Engineering Economic Analysis . . . . . .3 units
Field Methods . . . . . .3 units
General Education Elective (Social/Cognitive Sciences) . . .4 units
ENGR 191 Professional Seminar . . . . . .1 unit

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.

** = Design Component*

The most incomprehensible thing about the world is that it is comprehensible.

–ALBERT EINSTEIN (1879–1955)

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.

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 will 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 will 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 will be 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 will be at the forefront of state-of-the art research and technology to unravel biological complexity. They will be the world's future scientists, healers and policy makers.

LETTER OF WELCOME FROM THE DEAN

Dear Prospective 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 men and women 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, integrative biology and human biology), 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

SCHOOL OF NATURAL SCIENCES REQUIREMENTS

All School of Natural Sciences students, regardless of major, are expected to meet the minimum requirements for the BS and BA degrees. The School of Natural Sciences degree requirements are:

At least 120, but not more than 136 semester units to include the following:

- At least 47 general education semester units.
- At least 60 semester units of upper division courses.

General Education Requirements (47 – 48 units):

School of Natural Science 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 (MATH 32) . . . . . .4 units
- Introductory Physics I (PHYS 8)* . . . . . .4 units
- Computer Science Course . . . . . .2-3 units
- General Chemistry (CHEM 2) . . . . . .4 units

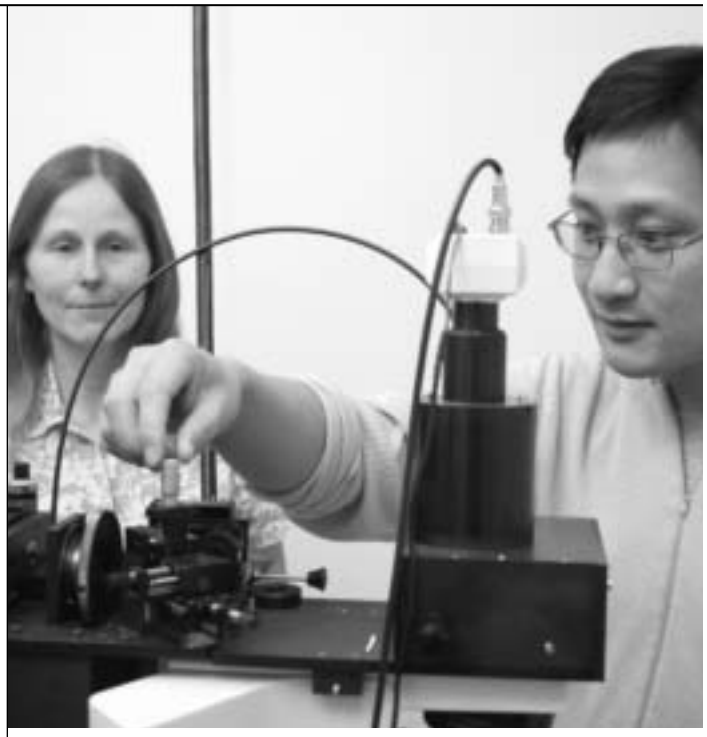
  *Integrated Calculus/Physics (ICP 1, 8 units) may be taken in place of MATH 21 and PHYS 8

General Education Courses Outside Natural Sciences and Engineering:

- The World at Home 1 and 2 (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 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)
- Freshman Seminar . . . . . .1 unit

Students in Natural Sciences will have a freshman year that lays the foundation for further study in the majors. Students will 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. The first course of the Core Course sequence, CORE 1, The World at Home, is common for all UC Merced students. 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 will also take CORE 100, The World at Home, as a junior.



Professor Anne Kelley with postdoc Weinan Leng.

Transfer Students

To satisfy General Education: Students with at least 45 transferable semester units who have completed and had certified the Intersegmental General Education Transfer Curriculum (IGETC) need take no additional lower division general education. All transfer students will need to complete at least 7 units of upper division general education, including CORE 100, and may need to complete some lower division major prep or prerequisite courses where equivalents are not offered at other institutions.

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 courses within the 45 units:

- Two English composition courses
- One mathematics course [a mathematics course that satisfies major prep 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 prep will also satisfy this requirement]

Students who transfer with fewer than 45 transferable semester units will need to complete Natural Sciences general education requirements.

Major area upper division courses and emphasis track requirements are unique to each major. These are presented in the following section on Majors.

THE MAJORS

APPLIED MATHEMATICAL SCIENCES PROGRAM

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. However, mathematics is becoming more important in the social sciences and life sciences which are all new application areas for applied mathematical sciences. Thus, the field 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 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 designed to provide 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 those courses, students take an emphasis track consisting of courses in other fields. Some examples of emphasis tracks include physics, computational biology and economics. New emphasis tracks will be added to new programs developing at UC Merced.

A degree in applied mathematical sciences opens the door to a wide variety of careers. Employers understand well 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 provides an excellent preparation to teach mathematics at the elementary or high school levels.

REQUIREMENTS FOR THE APPLIED MATHEMATICAL SCIENCES (AMS) MAJOR

In addition to adhering to the UC Merced and School of Natural Sciences requirements, 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 (64-68 units):
The Applied Mathematical Sciences major consists of 17 courses (5 lower division and 12 upper division) 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 (BIS 1), Introduction to Earth Systems Science (ESS 1) or Introduction to Biological Earth Systems (ESS 5) . . . . . .4 units
- Calculus of a Single Variable II (MATH 22) . . . . . .4 units
- Multi-Variable Calculus (MATH 23) . . . . . .4 units
- Linear Algebra and Differential Equations (MATH 24) . . . . .4 units
- Physics II (PHYS 9) . . . . . .4 units

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
- Mathematical Modeling (MATH 150) . . . . . .4 units
- Upper division directed group study (MATH 198) . . . . .4 units

Emphasis Tracks (20-24 units)

The student must complete at least 20 units of approved course work from other programs toward the completion of an emphasis track. At least 14 of these 20 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

- Contemporary Physics (PHYS 50) . . . . . .4 units
- Analytical Mechanics (PHYS 105) . . . . . .4 units
- Electromagnetics I (PHYS 110) . . . . . .4 units
- Electromagnetics II (PHYS 111) . . . . . .4 units
- Quantum Mechanics I (PHYS 136) . . . . . .4 units
- Quantum Mechanics II (PHYS 137) . . . . . .4 units

Additional requirements for Computational Biology Emphasis Track

- Contemporary Biology (BIS 1) . . . . . .4 units
- Molecular Machinery of Life (BIS 100) . . . . . .4 units
- The Cell (BIS 110) . . . . . .4 units
- Mathematical Modeling for Biology (BIS 180) . . . . . .4 units
- Survey of Computational Biology (BIS 181) . . . . . .4 units
- Bioinformatics (BIS 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 upper division ECON course (ECON 111, 115, 120, 140, 145, 150, 151, 152, 155, 160, or 161) . . . . . .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
- Operating Systems (CSE 150) . . . . . .4 units
- Networking (CSE 160) . . . . . .4 units

Additional requirements for Engineering Mechanics Emphasis Track

- Dynamics (ENGR 57) 3
- Introduction to Materials (ENGR 45) 3
- Fluid Mechanics (ENGR 120) 4
- Finite Element Analysis (ME 135) 3
- Vibrations and Controls (ME 140) or Analytic Mechanics (PHYS 105) 3
- Strength of Materials (ENGR 151) 4

Transfer students. Applied Mathematical Sciences will accept junior level and above transfer students beginning in Fall 2008. Transfer students who wish to major in Applied Mathematical Sciences should complete two semesters of calculus of a single variable, multi-variable 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 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	
ICP 1 Integrated Calculus and Physics	8
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	4
WRI 10 College Reading and Composition	4
Semester Units	**16**

SEMESTER 3	
MATH 23 Multi-Variable Calculus	4
MATH 32 Probability and Statistics	4
PHYS 50 Contemporary Physics	4
General Education Elective (Arts/Humanities)	4
Semester Units	**16**

SEMESTER 4	
MATH 24 Linear Algebra and Differential Equations	4
PHYS 105 Analytic Mechanics	4
BIS 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 Electromagnetics I	4
General Education (communication)	4
Free elective	3
Semester Units	**15**

SEMESTER 6	
MATH 122 Applied Mathematical Methods II	4
PHYS 111 Electromagnetics II	4
CORE 100 The World at Home	4
Free Elective	3
Semester Units	**15**

SEMESTER 7	
MATH 131 Numerical Analysis I	4
PHYS 136 Quantum Mechanics I	4
General Education Elective	4
MATH 198 Directed Group Study	2
Semester Units	**14**

SEMESTER 8	
MATH 132 Numerical Analysis II	4
PHYS 137 Quantum Mechanics II	4
MATH 150 Mathematical Modeling	4
MATH 198 Directed Group Study	2
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.

**or ESS 1 Introduction to Earth Systems Science or ESS 5 Introduction to Biological Earth Systems*

SAMPLE PLAN OF STUDY FOR APPLIED MATHEMATICAL SCIENCES DEGREE – COMPUTATIONAL BIOLOGY EMPHASIS

SEMESTER 1	
ICP 1 Integrated Calculus and Physics	8
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	4
WRI 10 College Reading and Composition	4
Semester Units	**16**

SEMESTER 3	
MATH 23 Multi-Variable Calculus	4
BIS 1 Contemporary Biology	4
CHEM 8 Principles of Organic Chemistry	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
BIS 100 Molecular Machinery of Life	4
General Education Elective (Social and Cognitive Sciences)	4
Semester Units	**16**

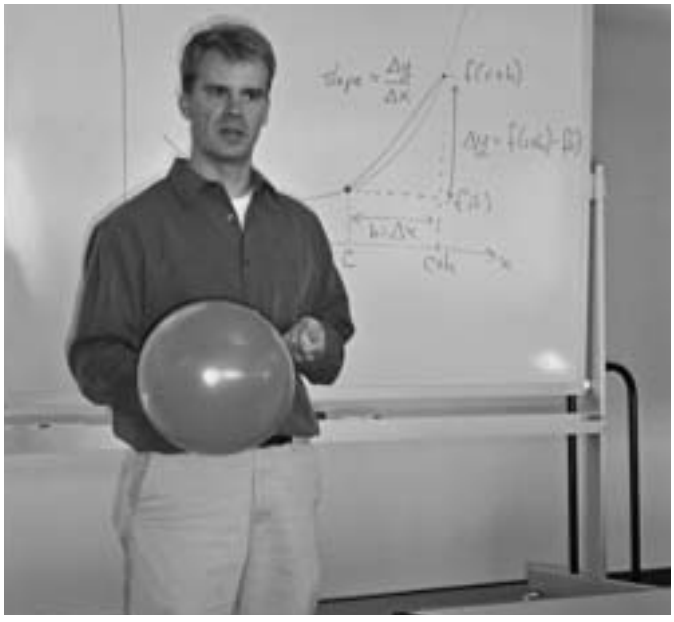
SEMESTER 5	
MATH 121 Applied Mathematical Methods I	4
BIS 110 The Cell	4
General Education (communication)	4
Free Elective	3
Semester Units	**15**

SEMESTER 6	
MATH 122 Applied Mathematical Methods II	4
BIS 180 Mathematical Modeling for Biology	4
CORE 100 The World at Home	4
Free Elective	3
Semester Units	**15**

SEMESTER 7	
MATH 131 Numerical Analysis I	4
BIS 181 Survey of Computational Biology	4
General Education Elective	4
MATH 198 Directed Group Study	2
Semester Units	**14**

SEMESTER 8	
MATH 132 Numerical Analysis II	4
BIS 182 Bioinformatics	4
MATH 150 Mathematical Modeling	4
MATH 198 Directed Group Study	2
Semester Units	**14**

Total Program Units	**121**



Professor Kevin Mitchell, Integrated Calculus and Physics class.

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	
ICP 1 Integrated Calculus and Physics	8
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	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
BIS 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
ECON 130 Econometrics	4
General Education Elective	4
MATH 198 Directed Group Study	2
Semester Units	**14**

SEMESTER 8	
MATH 132 Numerical Analysis II	4
Upper Division Economics course	4
MATH 150 Mathematical Modeling	4
MATH 198 Directed Group Study	2
Semester Units	**14**

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.

** 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*

SAMPLE PLAN OF STUDY FOR APPLIED MATHEMATICAL SCIENCES DEGREE – COMPUTER SCIENCE AND ENGINEERING EMPHASIS TRACK

SEMESTER 1	
ICP 1 Integrated Calculus and Physics	8
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	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
BIS 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 150 Introduction to Operating Systems	4
General Education Elective	4
MATH 198 Directed Group Study	2
Semester Units	**14**

SEMESTER 8	
MATH 132 Numerical Analysis II	4
CSE 160 Networking	4
MATH 150 Mathematical Modeling	4
MATH 198 Directed Group Study	2
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.

**or ESS 1 Introduction to Earth Systems Science or ESS 5 Introduction to Biological Earth Systems*

SAMPLE PLAN OF STUDY FOR APPLIED MATHEMATICAL SCIENCES DEGREE – ENGINEERING MECHANICS EMPHASIS TRACK

SEMESTER 1	
ICP 1 Integrated Calculus and Physics	8
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	4
WRI 10 College Reading and Composition	4
Semester Units	**16**

SEMESTER 3	
MATH 23 Multi-Variable Calculus	4
ENGR 57 Dynamics	3
BIS 1 Contemporary Biology *	4
General Education Elective (Arts/Humanities)	4
Semester Units	**15**

SEMESTER 4	
MATH 24 Linear Algebra and Differential Equations	4
ENGR 45 Introduction to Materials	3
MATH 32 Probability and Statistics	4
General Education Elective (Social/Cognitive Sciences)	4
Semester Units	**15**

SEMESTER 5	
MATH 121 Applied Mathematical Methods I	4
ENGR 151 Strength of Materials	4
General Education (communication)	4
Free Elective	3
Semester Units	**16**

SEMESTER 6	
MATH 122 Applied Mathematical Methods II	4
ME 140 Vibrations and Controls **	3
ENGR 120 Fluid Mechanics	4
CORE 100 The World at Home	4
Semester Units	**15**

SEMESTER 7	
MATH 131 Numerical Analysis I	4
Free Elective	4
General Education Elective	3
MATH 198 Directed Group Study	2
Semester Units	**13**

SEMESTER 8	
MATH 132 Numerical Analysis II	4
ME 135 Finite Element Analysis	3
MATH 150 Mathematical Modeling	4
MATH 198 Directed Group Study	2
Free Elective	3
Semester Units	**16**

Total Program Units	**120**

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.

**or ESS 1 Introduction to Earth Systems Science or ESS 5 Introduction to Biological Earth Systems*

*** or PHYS 105 Analytic Mechanics*

BIOLOGICAL SCIENCES PROGRAM

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 will be 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 three cores providing background in different areas of biology: Molecular and Cell Biology, Integrative Biology and Human Biology. These cores consist of a sequence of five or six upper division courses that are taken in the second, third and fourth years of the program. In addition to the core courses, students select an emphasis area involving three thematically linked upper division courses that will give more background in a specific area of biology. Biological Sciences majors also have the opportunity to apply for a Master's Degree program requiring an additional year of study.

REQUIREMENTS FOR THE BIOLOGICAL SCIENCES (BIS) MAJOR

In addition to adhering to the UC Merced and School of Natural Sciences requirements, the additional 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 11 or 12 upper division, depending on the core) designed to give all students a common foundation of core knowledge specific to the discipline.

Lower Division Major Requirements (24 units)

- Contemporary Biology (BIS 1) . . . . . .4 units
- Principles of Organic Chemistry (CHEM 8) . . . . . .4 units
- Principles of Physical Chemistry (CHEM 10) . . . . . .4 units
- Mathematical Biology (MATH 30) or Calculus of a Single Variable II (MATH 22) . . . . . .4 units
- Statistics (MATH 32) . . . . . .4 units
- Physics II or Biophysics for Life Sciences (PHYS 9 or PHYS 19) . . . . . .4 units

Core courses (20 – 25 units): (Details on the Cores are given in next section)

- Molecular and Cell Biology: 5 courses
- Human Biology: 5 courses (with Human Physiology lab)
- Integrative Biology: 6 courses (with Comparative Physiology lab)

Upper Division Emphasis Area (three thematically linked courses chosen from recommended list or approved by student's advisor).

- One course with lab . . . . . .5 units
- Two additional courses (one of which must include a field component for Integrative Biology students) . . . . . .8-9 units

Additional Upper Division Courses (5 – 11 units):

- Research seminar (BIS 190) . . . . . .1 unit
- Research Projects in Biological Sciences (BIS 195) . . .1-6 units
- One non-biology science or engineering course . . . .3-4 units

Undergraduate Major in Biological Sciences Research Requirement. As a capstone to the Biological Sciences Program, all Biological Science majors will participate in a research experience. In the Spring Semester of their junior year, students will attend research lectures by UC Merced faculty, and students can elect to then go on to participate in research projects during their senior year.

Transfer Students. Transfer students who wish to major in Biological Sciences should complete one year of calculus, one year of physics, one year of general chemistry, at least one semester of organic chemistry and two to three semesters of general biology. Students should consult the Information for Prospective Students link on the School of Natural Sciences web site naturalsciences.ucmerced.edu for more information.

Professor Matthew Meyer

BIOLOGICAL SCIENCES CORES

I. MOLECULAR AND CELL BIOLOGY

The Molecular and Cell Biology (MCB) core will provide 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. When combined with the 5-year Masters Degree program, this core is an excellent preparation for jobs in biotechnology. The MCB core 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. After completing the MCB core, students can select emphasis courses for more background in areas ranging from immunology to computational biology.

Molecular and Cell Biology Upper Division Courses (20 units)

- Molecular Machinery of Life (BIS 100) . . . . . .4 units
- The Cell (BIS 110) . . . . . .4 units
- Genetics (BIS 140) . . . . . .4 units
- Evolution (BIS 141) . . . . . .4 units
- Mathematical Modeling for Biologists (BIS 180) . . . . . .4 units

II. HUMAN BIOLOGY

The Human Biology (HB) core 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 major will also provide a strong foundation for careers in biomedical research. The HB core includes the courses most broadly required for advanced study in health professions and students can choose emphasis areas ranging from human health to psychology.

Human Biology Upper Division Courses (21 units)

- Molecular Machinery of Life (BIS 100) . . . . . .4 units
- The Cell (BIS 110) . . . . . .4 units
- Genetics (BIS 140) . . . . . .4 units
- Biochemistry (BIS 101) . . . . . .4 units
- Human Physiology (BIS 161/161L) . . . . . .5 units

III. INTEGRATIVE BIOLOGY

The Integrative Biology (IB) core 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. Integrative Biology incorporates multidisciplinary approaches to address biological questions in an evolutionary framework. Areas of research in Integrative Biology include behavioral biology, 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.

Professor Wil van Breugel prepares CORE 1 students for a Star Party.

Integrative Biology Upper Division Courses (25 units)

- Cell and Molecular Biology (BIS 106) . . . . . .4 units
- Biodiversity and the Tree of Life (BIS 143) . . . . . .4 units
- Genetics (BIS 140) . . . . . .4 units
- Evolution (BIS 141) . . . . . .4 units
- Ecology (BIS 147) . . . . . .4 units
- Comparative Physiology (BIS 160/160L) . . . . . .5 units

Biological Sciences Emphasis Areas

In addition to the BIS cores described above, each student in this major will choose an emphasis area involving three thematically linked upper division courses at least one of which must have a laboratory component (as well as a field component for students following the Integrative Biology core). Students may choose their own set of three courses for their emphasis area with approval of their advisor. Additionally, recommended lists of courses for emphasis areas are available from the School of Natural Sciences (see examples of emphasis areas listed below). Although there are no specific restrictions linking specific core sequences to emphasis areas, students must be sure that their BIS core fulfills the prerequisites for the emphasis courses they plan to take.

Examples of recommended emphasis areas (course lists for each area available from School of Natural Sciences):

- Bioinformatics and Computational Biology
- Cell Biology and Development
- Cognitive Science
- Ecology and Conservation Biology
- Evolutionary Biology
- Human Health
- Molecular Biology and Biochemistry
- Microbiology and Immunology
- Psychology

SAMPLE PLAN FOR THE MOLECULAR AND CELL BIOLOGY CORE

SEMESTER 1	
BIS 1 Contemporary Biology	4
CORE 1 The World at Home	4
CHEM 2 General Chemistry	4
Freshman Seminar	1
Semester Units	**13**

SEMESTER 2	
MATH 21 Calculus of a Single Variable I	4
CHEM 8 Principles of Organic Chemistry	4
WRI 10 College Reading and Composition	4
Computer Science Course	2
Semester Units	**14**

SEMESTER 3	
BIS 100 Molecular Machinery of Life	4
MATH 30 Mathematical Biology	4
CHEM 10 Principles of Physical Chemistry	4
General Education Elective (Arts/Humanities)	4
Semester Units	**16**

SEMESTER 4	
BIS 110 The Cell	4
MATH 32 Probability and Statistics	4
PHYS 8 Introductory Physics I	4
General Education Elective (Social/Cognitive Sciences)	4
Semester Units	**16**

SEMESTER 5	
BIS 140 Genetics	4
BIS 180 Mathematical Modeling for Biology	4
PHYS 19 Biophysics for Life Sciences *	4
Free Elective	4
Semester Units	**16**

SEMESTER 6	
BIS 141 Evolution	4
BIS Emphasis Track Course	4
CORE 100 The World at Home	4
General Education Elective (communication)	4
Semester Units	**16**

SEMESTER 7	
BIS Emphasis Track Course (w/Lab)	5
BIS 195 Research Projects in Biological Sciences	1
General Education Elective	4
Free Elective	4
Semester Units	**14**

SEMESTER 8	
BIS Emphasis Track Course	4
Science/Math/ Engineering Elective	4
Free Elective	4
BIS 195 Research Projects in Biological Sciences	2
BIS 190 Research Seminar	1
Semester Units	**15**

Total Program Units	**120**

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.

** or PHYS 9 Introductory Physics II*

SAMPLE PLAN FOR THE HUMAN BIOLOGY CORE

SEMESTER 1	
BIS 1 Contemporary Biology	4
CORE 1 The World at Home	4
CHEM 2 General Chemistry	4
Freshman Seminar	1
Semester Units	**13**

SEMESTER 2	
MATH 21 Calculus of a Single Variable I	4
CHEM 8 Principles of Organic Chemistry	4
WRI 10 College Reading and Composition	4
Computer Science Course	2
Semester Units	**14**

SEMESTER 3	
BIS 100 Molecular Machinery of Life	4
MATH 30 Mathematical Biology	4
CHEM 10 Principles of Physical Chemistry	4
General Education Elective (Arts/Humanities)	4
Semester Units	**16**

SEMESTER 4	
BIS 110 The Cell	4
MATH 32 Probability and Statistics	4
PHYS 8 Introductory Physics I	4
General Education Elective (Social/Cognitive Sciences)	4
Semester Units	**16**

SEMESTER 5	
BIS 140 Genetics	4
BIS 161 Human Physiology	5
PHYS 19 Biophysics for Life Sciences *	4
Free Elective	4
Semester Units	**17**

SEMESTER 6	
BIS 101 Biochemistry	4
BIS Emphasis Track Course	4
CORE 100 The World at Home	4
General Education Elective (communication)	4
Semester Units	**16**

SEMESTER 7	
BIS Emphasis Track Course (w/Lab)	5
BIS 195 Research Projects in Biological Sciences	1
General Education Elective	4
Free Elective	4
Semester Units	**14**

SEMESTER 8	
BIS Emphasis Track Course	4
Math/Science/Engineering Elective	4
Free Elective	4
BIS 195 Research Projects in Biological Sciences	2
BIS 190 Research Seminar	1
Semester Units	**15**

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.

** or PHYS 9 Introductory Physics II*

SAMPLE PLAN FOR THE INTEGRATIVE BIOLOGY CORE

SEMESTER 1	
BIS 1 Contemporary Biology	4
CHEM 2 General Chemistry	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 8 Principles of Organic Chemistry	4
WRI 10 College Reading and Composition	4
Computer Science Course	2
Semester Units	**14**

SEMESTER 3	
BIS 106 Cell and Molecular Biology	4
MATH 30 Mathematical Biology	4
CHEM 10 Principles of Physical Chemistry	4
General Education Elective (Arts/Humanities)	4
Semester Units	**16**

SEMESTER 4	
BIS 143 Biodiversity and the Tree of Life	4
MATH 32 Probability and Statistics	4
PHYS 8 Introductory Physics I	4
General Education Elective (Social/Cognitive Sciences)	4
Semester Units	**16**

SEMESTER 5	
BIS 140 Genetics	4
BIS 147 Ecology	4
PHYS 19 Biophysics for Life Sciences *	4
Free Elective	4
Semester Units	**16**

SEMESTER 6	
BIS 141 Evolution	4
BIS Emphasis Track Course	4
CORE 100 The World at Home	4
General Education Elective (communication)	4
Semester Units	**16**

SEMESTER 7	
BIS 160/160L Comparative Physiology	5
BIS Emphasis Track Course (w/lab)	5
General Education Elective	4
BIS 195 Research Projects in Biological Sciences	1
Semester Units	**15**

SEMESTER 8	
BIS Emphasis Track Course (w/ Field)	5
Science/Math/Engineering Elective	4
Free Elective	4
BIS 195 Research Projects in Biological Sciences	2
BIS 190 Research Seminar	1
Semester Units	**16**

Total Program Units	**122**

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.

** or PHYS 9 Introductory Physics II*

CHEMICAL SCIENCES PROGRAM

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 additional 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):

- BIS 1: Contemporary Biology . . . . . .4 units
- CHEM 8: Principles of Organic Chemistry . . . . . .4 units
- CHEM 10: Principles of Physical Chemistry . . . . . .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 110/BIS 100: Molecular Machinery of Life . . . . . .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

- CHEM 111/BIS 101: Biochemistry . . . . . .4 units
- BIS 101L: Biochemistry lab . . . . . .1 units
- BIS 102: Molecular Biology . . . . . .4 units
- BIS 102L: Molecular Biology lab . . . . . .1 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 25: Introduction to Ecosystem Science . . . . . .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: Spectroscopic and Microscopic Methods . . . . . .3 units
- CHEM 95/195: Research . . . . . .at least 3 units total

Transfer students. Chemical Sciences will begin accepting junior level and above transfer students beginning in Fall 2008. 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 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	
BIS 1 Contemporary Biology	4
CHEM 2 General Chemistry	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 8 Principles of Organic Chemistry	4
WRI 10 College Reading and Composition	4
Semester Units	**16**

SEMESTER 3	
MATH 22 Calculus of a Single Variable II	4
CHEM 100 Organic Synthesis and Mechanism	3
PHYS 9 Physics II	4
General Education Elective (Arts/Humanities)	4
Semester Units	**15**

SEMESTER 4	
CHEM 10 Principles of Physical Chemistry	4
MATH 32 Probability and Statistics	4
MATH 23 Multi-Variable Calculus	4
General Education Elective (Social/Cognitive Sciences)	4
Semester Units	**16**

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 110 Molecular Machinery of Life	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**

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	
BIS 1 Contemporary Biology	4
CHEM 2 General Chemistry	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 8 Principles of Organic Chemistry	4
WRI 10 College Reading and Composition	4
Semester Units	**16**

SEMESTER 3	
MATH 22 Calculus of a Single Variable II	4
CHEM 100 Organic Synthesis and Mechanism	3
PHYS 9 Physics II	4
General Education Elective (Arts/Humanities)	4
Semester Units	**15**

SEMESTER 4	
CHEM 10 Principles of Physical Chemistry	4
MATH 32 Probability and Statistics	4
MATH 23 Multi-Variable Calculus	4
General Education Elective (Social/Cognitive Sciences)	4
Semester Units	**16**

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
Free Elective	4
CORE 100 The World at Home	4
ENGR 45 Introduction to Materials	4
Semester Units	**15**

SEMESTER 7	
CHEM 110 Molecular Machinery of Life	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**

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	
BIS 1 Contemporary Biology	4
CHEM 2 General Chemistry	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 8 Principles of Organic Chemistry	4
WRI 10 College Reading and Composition	4
Semester Units	**16**

SEMESTER 3	
MATH 22 Calculus of a Single Variable II	4
CHEM 100 Organic Synthesis and Mechanism	3
CHEM 110 Molecular Machinery of Life	4
General Education Elective (Arts/Humanities)	4
Semester Units	**15**

SEMESTER 4	
CHEM 10 Principles of Physical Chemistry	4
MATH 32 Probability and Statistics	4
MATH 23 Multi-Variable Calculus	4
PHYS 9 Physics II	4
Semester Units	**16**

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	4
BIS 101L Biochemistry Lab	1
Semester Units	**16**

SEMESTER 6	
CHEM 113 Chemical Thermodynamics and Kinetics	3
BIS 102 Molecular Biology	4
CORE 100 The World at Home	4
General Education Elective (Social/Cognitive Sciences)	4
BIS 102L Molecular Biology Lab	1
Semester Units	**16**

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
Biology Elective	4
CHEM 195 Research	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.

SAMPLE PLAN OF STUDY FOR CHEMICAL SCIENCES DEGREE - ENVIRONMENTAL EMPHASIS

SEMESTER 1	
BIS 1 Contemporary Biology	4
CHEM 2 General Chemistry	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 8 Principles of Organic Chemistry	4
ESS 20 Fundamentals of Earth Processes	4
Semester Units	**16**

SEMESTER 3	
MATH 22 Calculus of a Single Variable II	4
CHEM 100 Organic Synthesis and Mechanism	3
PHYS 9 Physics II	4
WRI 10 College Reading and Composition	4
Semester Units	**15**

SEMESTER 4	
CHEM 10 Principles of Physical Chemistry	4
MATH 32 Probability and Statistics	4
MATH 23 Multi-Variable Calculus	4
General Education Elective (Arts/Humanities)	4
Semester Units	**16**

SEMESTER 5	
ESS 100 Environmental Chemistry	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
MATH 24 Differential Equations and Linear Algebra	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 (Social/Cognitive Sciences)	4
CHEM 110 Molecular Machinery of Life	4
Semester Units	**15**

SEMESTER 8	
ESS 106 Spectroscopic and Microscopic Methods	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**

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 PROGRAM

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. A freshman seminar is designed to expose students to current topics, research and career opportunities in Earth Systems Science early in the program. Upper division requirements consist of four core courses that provide students with a balance of key physical, chemical and biological concepts in Earth Systems Science, including a field-intensive course that integrates these principles in practical applications and exercises. In the upper division, students select an emphasis area that allows exploration of a particular topical area in more depth. Selection of three courses from within an emphasis area allows students 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, economics, ethics and public policy 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.

REQUIREMENTS FOR THE EARTH SYSTEMS SCIENCE (ESS) MAJOR

In addition to adhering to the UC Merced and School of Natural Sciences requirements, the additional requirements that must be met to receive the B.S. in Earth Systems Science at UC Merced are:

Earth Systems Science Requirements (54-57 units): The Earth Systems Science program consists of a minimum of 15 courses (8 lower division and 7 upper division) designed to give all students a common foundation of core knowledge specific to the discipline.

Lower Division Major Requirements

- Introduction to Earth Systems Science (ESS 1), Introduction to Biological Earth Systems (ESS 5), or Contemporary Biology (BIS 1) . . . . . .4 units
- Fundamentals of Earth Processes (ESS 20) . . . . . .4 units
- Principles of Organic Chemistry (CHEM 8) . . . . . .4 units
- Calculus of a Single Variable II (MATH 22) . . . . . .4 units
- Linear Algebra and Differential Equations (MATH 24) .3 units
- Introductory Physics II (PHYS 9) . . . . . .4 units
- Introduction to Computing II (CSE 21) . . . . . .2 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 Physical Chemistry (CHEM 10) . . . . . .4 units
- Introduction to Environmental Science and Technology (ENVE 20) . . . . . .4 units

Upper Division Major Requirements

- Environmental Chemistry (ESS 100) . . . . . .4 units
- Hydrology and Climate (ESS 110) . . . . . .4 units
- Geomicrobiology (ESS 120) . . . . . .4 units
- Field Methods in Earth Systems (ESS 180) . . . . . .4 units

Emphasis Track

- Three courses from emphasis track . . . . . .9-12 units

Additional Degree Requirements (19-27 units):

- Intermediate Microeconomic Theory (ECON 100) . . . .4 units
- Undergraduate Seminar (ESS 190) . . . . . .1 unit
- General Education elective emphasizing policy and ethics . . . . . .4 units
- Three upper division electives in Natural Sciences or Engineering . . . . . .9-12 units
- Research (ESS 95 or ESS 195 and/or Service Learning (ENGR 97 or ENGR 197) . . . . . .1-6 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 (ESS 104) . . . . .3 units
- Watershed Biogeochemistry (ESS 105) . . . . . .3 units
- Microbial Ecology (ESS 125) . . . . . .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
- Ecology and Ecosystems (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
- Ecology and Ecosystems (ESS 124) . . . . . .4 units
- Microbial Ecology (ESS 125) . . . . . .4 units
- Environmental Genomics (ESS 126) . . . . . .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 (BIS 141) . . . . . .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, one semester of organic chemistry and two to three semesters of general biology or Earth or environmental science courses. Students should consult the Information for Prospective Students link on the School of Natural Sciences web site naturalsciences.ucmerced.edu for more information.

The thing I love most about UC Merced was the people, everyone was so friendly and welcoming that I was able to feel comfortable in a new place so far from home; in fact, UC Merced became my home away from home.

ANGELA MERCADO, UNDERGRADUATE

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.

SAMPLE PLAN OF STUDY FOR EARTH SYSTEMS SCIENCE DEGREE

SEMESTER 1	
*ICP 1 Integrated Calculus and Physics	8
CORE 1 The World at Home	4
CSE 20 Introduction to Computing I	2
Semester Units	**14**

SEMESTER 2	
Lower Division Science Course (ESS 1 or BIS 1)	4
CHEM 2 General Chemistry	4
MATH 22 Calculus of a Single Variable II	4
CSE 21 Introduction to Computing II	2
ESS 90x Freshman Seminar	1
Semester Units	**15**

SEMESTER 3	
PHYS 9 Introductory Physics II	4
CHEM 8 Principles of Organic Chemistry	4
MATH 32 Probability and Statistics	3
WRI 10 College Reading and Composition	4
Semester Units	**15**

SEMESTER 4	
ESS 20 Fundamentals of Earth Processes	4
MATH 24 Introduction to Linear Algebra	4
Lower Division Science Course	4
General Education Elective (Arts/Humanities)	4
Semester Units	**16**

SEMESTER 5	
ESS 110 Hydrology and Climate	4
ESS 100 Environmental Chemistry	4
General Education Elective (communication)	4
ECON 100 Intermediate Microeconomic Theory	4
Semester Units	**16**

SEMESTER 6	
ESS 120 Geomicrobiology	4
ESS 180 Field Methods in Earth Systems	4
CORE 100 The World at Home	4
Free Elective	4
Semester Units	**16**

SEMESTER 7	
ESS Emphasis Track Course	4
ESS Emphasis Track Course	3
General Education Elective (Policy and Ethics)	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
Natural Sciences or Engineering Elective	4
Research or Service Learning (ESS 195 or ENGR 197)	1
Semester Units	**16**

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.

** Can substitute MATH 21 Calculus of a Single Variable I (4 units) and PHYS 8 Introductory Physics I (4 units)*

PHYSICS PROGRAM

Physics is the study of nature at its most fundamental. Its scope covers the tiniest pieces of matter and energy – molecules, atoms, photons, nuclei, etc. – all the way up to the large scale structure of the universe, and everything in between. Physics seeks to reduce complex phenomena to elemental principles: What causes an object to fall? What makes molecules stick together? What is light? What causes electricity? Is there a speed limit in the universe? What is the fundamental nature of matter? Far from being purely academic questions, these inquiries have revolutionized our society. It is nearly impossible to imagine an area of science or engineering that has not been profoundly affected by fundamental developments in physics. One need only think of the harnessing of electricity, the invention of the transistor or the discovery of the laser. Current and future revolutions in physics will continue to have an impact on our society and our view of the very essence of nature.

The physics major at UC Merced provides a strong foundation in the fundamental physical properties of the natural world, while recognizing the interdisciplinary role that physicists play in the scientific and technological community. This is reflected in the core plus emphasis tracks 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 specialization allows students to follow one of four tracks of interest: (1) Atomic, Molecular and Optical Physics; (2) Mathematical Physics; (3) Biological Physics; and (4) Earth and Environmental Physics.

Physics students learn how to reduce complex problems to essential core issues. This is achieved through grounding in quantitative and analytical reasoning. These fundamental skills are excellent training for a wide range of technically sophisticated careers in such fields as aerospace, biotechnology, computers and engineering. In addition, physics provides a strong background for diverse careers such as education, law and business.

REQUIREMENTS FOR THE PHYSICS MAJOR

In addition to adhering to the UC Merced and School of Natural Science requirements, the additional requirements that must be met to receive the B.S. in physics at UC Merced are (69-73 units):

Required additional lower-division courses (20 units):

- MATH 22: Calculus of a Single Variable II . . . . . .4 units
- MATH 23: Multi-Variable Calculus . . . . . .4 units
- MATH 24: Introduction to Linear Algebra and Differential Equations . . . . . .4 units
- PHYS 9: Introductory Physics II . . . . . .4 units
- PHYS 50: Contemporary Physics . . . . . .4 units

Required upper-division core physics courses (28 units):

- PHYS 110/111: Electricity and Magnetism I/II . . . . . .4/4 units
- PHYS 105: Analytical Mechanics . . . . . .4 units
- PHYS 136/137: Quantum Mechanics I/II . . . . . .4/4 units
- PHYS 112: Thermodynamics and Statistical Mechanics . . .4 units
- PHYS 160: Modern Physics Lab . . . . . .4 units

Additional Required Courses (21-25 units):

- One breadth science or engineering elective (i.e. not physics or math) . . . . . .3-4 units
- Two upper division science or engineering free electives . . . . . .6-8 units
- Required upper division courses in the emphasis track, as specified below . . . . . .12-13 units

Atomic/Molecular/Optical (AMO) Physics

- PHYS 108: Optics . . . . . .4 units
- PHYS 138: Modern Atomic and Molecular Physics . . . . . .4 units
- PHYS 195: Undergraduate Research . . . . . .at least 4 units

Mathematical Physics

- MATH 121: Applied Math Methods I: Boundary-Value Problems and Fourier Analysis . . . . . .4 units
- MATH 122: Applied Math Methods II: Complex Variables and Applications . . . . . .4 units
- MATH 198: Upper Division Directed Group Study . . . . . .at least 4 units

Biophysics

- BIS 100: Molecular Machinery of Life* . . . . . .4 units
- BIS 104/104L: Biophysics/Biophysics Laboratory* . . . . . .4/1 units
- BIS 110: The Cell* . . . . . .4 units

*BIS 1 and CHEM 8 are course requisites and can be used as free elective units

Earth and Environmental Physics

The student must take at least 3 upper division ESS or ENVE courses from the list below.

The program should be approved by the student's advisor, who may authorize alternate courses as appropriate.

- ESS 110: Hydrology and Climate . . . . . .4 units
- ESS 131: Atmospheric Chemistry and Physics . . . . . .4 units
- ESS 150: Geomorphology and Surface Processes . . . . . .4 units
- ENVE 112: Subsurface Hydrology . . . . . .4 units
- ENVE 130: Meteorology and Air Pollution . . . . . .4 units
- ENVE 152: Remote Sensing of the Environment . . . . . .3 units
- ENVE 160: Sustainable Energy . . . . . .4 units

Typically, a student will also take the lower division course ESS 20: Fundamentals of Earth Processes.

Transfer students. Physics will begin accepting junior level and above transfer students beginning in Fall 2008. 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 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	4
Semester Units	**16**

SEMESTER 3	
MATH 23 Multi-Variable Calculus	4
MATH 32 Probability and Statistics	4
General Education Elective (Arts/Humanities)	4
PHYS 50 Contemporary Physics	4
Semester Units	**16**

SEMESTER 4	
MATH 24 Introduction to Linear Algebra and Differential Equations	4
PHYS 112 Introduction to Statistical and Thermal Physics	4
BIS 1 Contemporary Biology	4
General Education Elective (Social/Cognitive Sciences)	4
Semester Units	**16**

SEMESTER 5	
PHYS 105 Mechanics	4
PHYS 110 Electromagnetics I	4
Physics/Math Elective	4
General Education Elective (communications)	4
Semester Units	**16**

SEMESTER 6	
PHYS 160 Modern Physics Lab	4
PHYS 136 Quantum Mechanics I	4
PHYS 111 Electromagnetics II	4
Core 100 The World at Home	4
Semester Units	**16**

SEMESTER 7	
PHYS 137 Quantum Mechanics II	4
PHYS 108 Optics	4
General Education Elective	4
PHYS 195 Undergraduate Research	3
Semester Units	**15**

SEMESTER 8	
PHYS 138 Modern Atomic Physics	4
Physics/Math Elective	4
Free Elective	4
PHYS 195 Undergraduate Research	3
Semester Units	**15**

Total Program Units	**125**

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 - APPLIED MATH 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	4
Semester Units	**16**

SEMESTER 3	
MATH 23 Multi-Variable Calculus	4
MATH 32 Probability and Statistics	4
General Education Elective (Arts/Humanities)	4
PHYS 50 Contemporary Physics	4
Semester Units	**16**

SEMESTER 4	
MATH 24 Introduction to Linear Algebra and Differential Equations	4
PHYS 112 Introduction to Statistical and Thermal Physics	4
BIS 1 Contemporary Biology	4
General Education Elective (Social/Cognitive Sciences)	4
Semester Units	**16**

SEMESTER 5	
MATH 121 Applied Mathematical Methods I	4
PHYS 105 Mechanics	4
PHYS 110 Electromagnetics I	4
General Education Elective (communications)	4
Semester Units	**16**

SEMESTER 6	
MATH 122 Applied Mathematical Methods II	4
PHYS 136 Quantum Mechanics I	4
PHYS 160 Modern Physics Lab	4
CORE 100 The World at Home	4
Semester Units	**16**

SEMESTER 7	
PHYS 137 Quantum Mechanics II	4
MATH 198 Directed Group Study	2
General Education Elective	4
MATH 133 Numerical Analysis I	4
Semester Units	**14**

SEMESTER 8	
PHYS 111 Electromagnetics II	4
MATH 198 Directed Group Study	2
Free Elective	4
MATH 134 Numerical Analysis II	4
Semester Units	**14**

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.

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
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	4
Semester Units	**16**

SEMESTER 3	
MATH 23 Multi-Variable Calculus	4
BIS 1 Contemporary Biology	4
General Education Elective (Arts/Humanities)	4
PHYS 50 Contemporary Physics	4
Semester Units	**16**

SEMESTER 4	
MATH 24 Introduction to Linear Algebra and Differential Equations	4
MATH 32 Probability and Statistics	4
PHYS 112 Introduction to Statistical and Thermal Physics	4
CHEM 8 Organic Chemistry	4
Semester Units	**16**

SEMESTER 5	
BIS 100 Molecular Machinery of Life	4
PHYS 105 Mechanics	4
PHYS 110 Electromagnetics I	4
General Education Elective (Communications)	4
Semester Units	**16**

SEMESTER 6	
BIS 110 The Cell	4
PHYS 136 Quantum Mechanics I	4
PHYS 160 Modern Physics Lab	4
CORE 100 The World at Home	4
Semester Units	**16**

SEMESTER 7	
PHYS 137 Quantum Mechanics II	4
BIS 181 Computational Biology	4
General Education Elective (Social/Cognitive Sciences)	4
Science/Engineering Elective	4
Semester Units	**16**

SEMESTER 8	
BIS 104 Biophysics	4
BIS 104L Biophysics Lab	1
PHYS 111 Electromagnetics II	4
General Education Elective	4
Semester Units	**13**

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.

SAMPLE PLAN OF STUDY FOR PHYSICS DEGREE – EARTH AND ENVIRONMENTAL 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	4
Semester Units	**16**

SEMESTER 3	
MATH 23 Multi-Variable Calculus	4
BIS 1 Contemporary Biology	4
General Education Elective (Arts/Humanities)	4
PHYS 50 Contemporary Physics	4
Semester Units	**16**

SEMESTER 4	
MATH 24 Introduction to Linear Algebra and Differential Equations	4
MATH 32 Probability and Statistics	4
PHYS 112 Introduction to Statistical and Thermal Physics	4
ESS 20 Earth Processes	4
Semester Units	**16**

SEMESTER 5	
ESS 110 Hydrology and Climate	4
General Education Elective (communications)	4
PHYS 105 Mechanics	4
PHYS 110 Electromagnetics I	4
Semester Units	**16**

SEMESTER 6	
ESS 150 Geomorphology	4
PHYS 136 Quantum Mechanics I	4
PHYS 160 Modern Physics Lab	4
CORE 100 The World at Home	4
Semester Units	**16**

SEMESTER 7	
PHYS 137 Quantum Mechanics II	4
ENVE 112 Subsurface Hydrology	4
General Education Elective (Social/Cognitive Sciences)	4
PHYS 195 Undergraduate Research	3
Semester Units	**15**

SEMESTER 8	
ENVE 152 Remote Sensing	4
PHYS 111 Electromagnetics II	4
General Education Elective	4
PHYS 195 Undergraduate Research	3
Semester Units	**15**

Total Program Units	**125**

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.

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 known as the social sciences, humanities and the arts. 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. Consider these two examples:

Imagine the question: "What is a metaphor?"

Poets and novelists use metaphor to evoke vivid images in their readers. Scientists rely on metaphor to make leaps in discovery and theory. Teachers use metaphor to explain logarithmic functions, quasars and other relatively abstract phenomena. Politicians employ metaphor to frame issues and influence public policy. We all use metaphor in our daily conversations and writing, and often we are not even aware of it. Our interdisciplinary programs will allow students to explore the meaning, use and power of metaphors across several disciplines, including psychology, cognitive science, literature, art, history, philosophy and public policy. What does metaphor say about everyday thought? How does it influence society?

Imagine the question: "What is social change?"

Throughout human history, peoples have created new societies, regimes and systems of belief. Social change can be studied at a global scale over thousands of years, yet California's Central Valley is also a laboratory for understanding these issues. Agricultural fields that replaced meadow land only a hundred years ago are being converted to housing and industry. Explosive population growth is fundamentally transforming the local economy, while at the same time pressuring the capacity of public infrastructure and social services. In order to understand changes like these, students need to step away from thinking of economics and business, history, sociology, government, biology and geography as a set of simple, separate disciplines. Instead, students need to learn to integrate key ideas and interdisciplinary tools to understand all the dimensions of a given issue. How can a diverse society use these insights to make better decisions?

The School of Social Sciences, Humanities and Arts offers undergraduate and graduate programs that allow flexible courses of study and opportunities for research at the intersections where the interesting questions lie. Students will have the opportunity to follow personal paths of discovery in interdisciplinary curricula, while at the same time gaining depth and expertise in methodological domains such as social statistics, historiography, GIS, economics, cultural analysis and cognitive science.

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 an interdisciplinary 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 will learn to evaluate and use evidence and construct persuasive arguments based upon actual events and previous experience.

A WELCOME FROM THE OFFICE OF THE DEAN

We are pleased to extend you an invitation to study in the School of Social Sciences, Humanities and Arts at UC Merced. Our faculty are world-class teachers, scholars and researchers, who are engaged in cutting edge work that takes us from the past, through the present, and into the future.

As the first American research university built in the twenty-first century, UC Merced offers a once-in-a-generation opportunity both to draw upon the unmatched resources, intellectual as well as material, of the University of California system, while at the same time benefiting from the intimate learning environment present in many of our courses.

As a student in the School of Social Sciences, Humanities and Arts, you will be immersed in an unparalleled interdisciplinary course of study which will provide you with the tools and understanding to succeed in a world where the ability to solve problems by drawing on a broad range of knowledge and experience is crucial.

If you share with us a desire to better understand the world in which we live, then we look forward to you joining the School of Social Sciences, Humanities and Arts at UC Merced.

Learning is ubiquitous. Some of the best learning occurs out 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 discoveries depend 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.

All politics is local. 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. Jobs lost in the Central Valley may be gained in Asia, Latin America or Nevada and vice versa. Central Valley cotton may be shipped to India to be made into fabric,

assembled into clothing in Guatemala and then shipped back to local stores for sale. Music and art can cross borders at a rate limited only by the speed of the internet. We envision our community of students as developing a zone of comfort that allows them to act simultaneously as local and global citizens.

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 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 lifeways, institutions and works of the imagination, they will develop perspectives that enable them to be better able to understand and shape our futures.

SCHOOL OF SOCIAL SCIENCES, HUMANITIES AND ARTS REQUIREMENTS

All School of Social Sciences, Humanities and Arts students, regardless of major, are expected to meet the minimum requirements for the BA degree. The School of Social Sciences, Humanities and Arts degree requirements are:

At least 120, but not more than 130 semester units to include the following:

- At least 45 general education semester units. 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.

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 General Education Requirements

- College One Core Course sequence, The World at Home (CORE 1) 4 units
- College Reading and Composition (WRI 10) . . . . . .4 units
- Natural Science/Engineering Introductory course with laboratory, field or studio . . . . . .4 units
- Second Natural Science or Engineering Course . . . . . .4 units
- Mathematical/quantitative reasoning Course . . . . . .4 units
- Introductory World Culture and History or Arts Course (WCH Majors: Course outside your emphasis area) . . . . . .4 units
- Introductory SCS Course (SCS Majors: Course outside emphasis area) . . . . . .4 units

Upper Division General Education Requirements

- College One Core Course Sequence, The World at Home (CORE 100) . . . . . .4 units
- Four Upper Division Courses Outside Area of Emphasis or Major . . . . . .16 units

Students in the School of Social Sciences, Humanities and Arts will have a freshman year that lays the foundation for further study in the majors. Students will 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.

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 will 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 with 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 sshaadvising@ucmerced.edu.

In 2006 – 2007, the School of Social Sciences, Humanities and Arts introduces ten new minor programs (American Studies, Arts, Cognitive Science, Economics, History, Philosophy, Psychology, Services Science, Spanish and Writing). Detailed descriptions of each minor, as well as minor requirements are listed following the overview of major programs.

Major area upper division courses and emphasis track requirements are unique to each major. These are presented in the following section on majors.

THE MAJORS

MANAGEMENT PROGRAM

The Management program responds to the growing need of California industry, especially in the Central Valley. UC Merced's management education is interdisciplinary and consists of a blend of courses from the fields of economics, management theory and the social sciences. Real life management problems do not fit neatly into subject areas. Today's managers and economists tackle issues that involve a number of management functions - so solutions need to account for all the areas involved. The UC Merced approach is to step away from thinking of management and economics as a set of simple, separate disciplines. Instead, the 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 represents a unique hands-on approach to management development and economics, positioning courses at the leading edge of dynamic business performance. 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 skills development 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.

Using a multidisciplinary approach, the Management major prepares students for a broad range of management-related careers. The curriculum provides a strong foundation in economics, organization, business, finance, accounting and quantitative methods. UC Merced's Management program also emphasizes the historical and cultural dimensions of economics and management. 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 will develop skills to build quantitative models of complex operations and be able to use those models to facilitate decision-making.

The Management degree provides students with the analytical tools to operate successfully in a modern, volatile business environment. The core management courses provide a rigorous foundation in economics, organizations, finance, accounting and psychology.

Students who graduate with a major 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
- Evaluate ethical, social, cultural and political issues as they relate to the organization, operations, human resources and business ventures.

Transfer Students. The Management major will be available for transfer students starting Fall 2007. 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 humanities/arts and psychology; two lower division natural science or engineering courses, at least one of which has a lab, field or studio component; principles of economics; a two-course sequence in accounting; and one UC transferable course in calculus. Please consult www.assist.org for suggested course equivalencies.

REQUIREMENTS FOR THE MANAGEMENT (MGMT) 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 Management at UC Merced are:

Management Course Requirements. The Management major requires 63 units (some of which 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. 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.

Professor Sean Malloy in class.

Required courses include:

Lower Division Major Requirements (27 units):

- Case Study Seminar on Business and Management (MGMT 2) . . . . . .1 unit
- Introduction to Finance and Accounting I and II (MGMT 25 and 26) . . . . . .6 units
- Introduction to Economics (ECON 1) . . . . . .4 units
- Analysis of Economic Data (ECON 10) * . . . . . .4 units
- Introduction to Psychology or Cognitive Science (PSY 1 or COGS 1)* . . . . . .4 units
- Calculus of a Single Variable I (MATH 21)* . . . . . .4 units
- Management Information Systems (MIS) or Computer Science course# . . . . . .4 units

Upper Division Major Requirements (36 units):

- Intermediate Microeconomic Theory (ECON 100) . . . .4 units
- Intermediate Macroeconomic Theory (ECON 101) . . . .4 units
- Econometrics (ECON 130) . . . . . .4 units
- Financial Economics (ECON 162) . . . . . .4 units
- Industrial and Organizational Psychology (PSY 141) * . . . . . .4 units

Additional requirements: Students are required to take at least 16 semester units of upper division Economics (ECON) or Management (MGMT) courses that should be selected to provide depth in a specific management area, such as personnel economics, finance, strategy, industrial organization or regulatory policy. Please consult a SSHA advisor and/or visit SSHA's web site for a list of approved courses.

* CAN SATISFY GENERAL EDUCATION REQUIREMENT

SEE WEB SITE FOR SPECIFIC COURSE NUMBERS AND DESCRIPTIONS

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	**15**

SEMESTER 2	
PSY 1 or COGS 1 Introduction to Psychology or Cognitive Science	4
Introductory WCH or Arts course	4
Nat Sci/Engineering Intro course w/ Lab, Field Work or Studio	4
Elective	4
Freshman Seminar	1
Semester Units	**17**

SEMESTER 3	
ECON 100 Intermediate Microeconomic Theory	4
Natural Science/Engineering course	4
MGMT 2 Case Study Seminar on Business and Management	1
MGMT 25 Introduction to Finance and Accounting	3
Semester Units	**12**

SEMESTER 4	
MGMT 26 Introduction to Finance and Accounting II	3
ECON 10 Analysis of Economic Data[1]	4
Elective	4
Elective	4
Semester Units	**15**

SEMESTER 5	
ECON 101 Intermediate Macroeconomic Theory	4
Upper division GE course outside ECON or MGMT	4
Upper division ECON or MGMT course	4
MIS or CSE course[2]	4
Semester Units	**16**

SEMESTER 6	
Upper division ECON or MGMT course	4
ECON 162 Financial Economics	4
Upper division GE course outside ECON or MGMT	4
CORE 100 The World at Home	4
Semester Units	**16**

SEMESTER 7	
ECON 130 Econometrics	4
PSY 141 Industrial and Organizational Psychology[3]	4
Upper division ECON or MGMT	4
Upper division GE course outside ECON or MGMT	4
Semester Units	**16**

SEMESTER 8	
Upper division GE course outside ECON or MGMT	4
Upper division ECON or MGMT course	4
Elective	4
Elective	4
Semester Units	**16**

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.

[1] *Counts toward GE mathematical/quantitative reasoning requirement*

[2] *Please consult a SSHA advisor and/or visit SSHA's web site for a list of approved MIS or CSE courses*

[3] *Counts toward upper division GE course requirement outside of Management.*

SOCIAL AND COGNITIVE SCIENCES PROGRAM

The undergraduate major in Social and Cognitive Sciences offers a broad preparation that cuts across Economics, Psychology, Political Science, Public Policy and Sociology. Introductory coursework will lay the basis for understanding the major questions and methodologies across the Social and Cognitive Sciences, including a common core of statistical and experimental methods courses. Upper division courses and projects will allow students to synthesize their cross-discipline learning and experiences.

Within this broad framework, four emphases have been developed within the program: **Cognitive Science, Economics, Psychology** and **Public Policy**. Students will select one of these emphases and will receive a notation on their transcript and diploma. Other emphases will be developed as the faculty and program enrollments continue to grow.

The **Cognitive Science** emphasis is interdisciplinary in nature, combining theories and methods from psychology, linguistics, computer science, philosophy, neuroscience, biology, anthropology and related fields, with the aim of understanding human thought and behavior. The Cognitive Science emphasis provides many unique possibilities for original, interdisciplinary study, both within the School of Social Sciences, Humanities and Arts, and across schools, in particular, the School of Engineering and the School of Natural Sciences. Students in this emphasis will have the opportunity to work closely with faculty and gain firsthand experience in a lab.

The Economics emphasis, built on a basis of strong theoretical and statistical training, will give students a solid grounding in economic theory and quantitative methods. The Economics emphasis will provide students with an understanding of how incentives and institutions shape society.

Special emphases will include labor economics, public economics, environmental economics, political economy and quantitative methods. Opportunities to do research with faculty will also be available.

The **Psychology** emphasis provides a broad preparation in psychology as a field and in the research methodologies of psychology. Special emphases include human development (biological and cognitive) and social psychology. This focus also incorporates multicultural perspectives. Inter-school courses also emphasize the intersections of psychology with the biological sciences through the School of Natural Sciences B.A. in Human Biology emphasis. Psychology emphasis students will have opportunities to work with faculty on research and lab experiences.

The **Public Policy** emphasis provides an interdisciplinary education that prepares students for leadership positions in analyzing, implementing and managing public policies. The emphasis prepares students to apply the knowledge and tools from various academic disciplines, spanning such diverse fields as economics, political science, psychology, engineering and biology.

Students will choose an area of emphasis within the program: social policy, health policy or environmental policy. The Public Policy emphasis focuses on the challenging policy issues of today and strives to prepare students to understand and to solve the emerging problems of tomorrow. As one of the best ways to learn is by doing, students will participate in an internship and/or an independent research project.

Depending upon their emphasis within Social and Cognitive Sciences, students will be well prepared for advanced study in law, management, public policy, urban and regional planning and medicine; or for admission into graduate school in one of the social science emphasis fields. Career paths include business; social services agencies; federal, state and local government service; non-governmental organizations and non-profit agencies; community development; and counseling and training programs.

REQUIREMENTS FOR THE SOCIAL AND COGNITIVE SCIENCES (SCS) 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 Social and Cognitive Sciences at UC Merced are:

Cognitive Science emphasis:

The Social and Cognitive Sciences major with a Cognitive Science emphasis requires 64-66 units (some of which simultaneously fill 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. 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 Social and Cognitive Science major with a Cognitive Science emphasis must maintain a 2.0 grade point average in all major coursework.

Required courses include:

Lower Division Major Requirements (32 - 34 units):

- Introductory courses in the Social and Cognitive Sciences . . . . . .12 units
  - Introduction to Cognitive Science (COGS 1)
  - Introduction to Psychology (PSY 1)
  - One course chosen from:
    - Logic and Critical Reasoning (PHIL 5)
    - Introduction to Language and Linguistics (COGS 5)
- Quantitative Methods . . . . . .16-18 units
  - Analysis of Psychological Data (PSY 10)
  - Calculus of a Single Variable I (MATH 21)
  - Calculus of a Single Variable II (MATH 22)
  - Introductory computer programming course(s), totaling 4-6 units
    (Any one of these four options counts toward the General Education Mathematical/quantitative reasoning Requirement)
- Science Core . . . . . .4 units
  - Natural Science or Engineering Introductory Course with Laboratory, Field, or Studio Component.
    (Courses meeting this requirement include BIS 1, BIS 3, CHEM 2, CHEM 8, ENVE 10, ESS 1, ESS 5, PHYS 8, PHYS 9. Please consult a SSHA advisor and/or visit SSHA's web site for a list of approved courses.)

(The Science Core requirement is in addition to the 8 units required for the General Education Natural Science/Engineering Requirement.)

Upper Division Major Requirements (32 units):

- Research Methods in Psychology (PSY 105) . . . . . .4 units
- One upper division course from each of the following three groups: . . . . . .12 units
  - Group A (Cognitive Science and Language): any upper-division COGS course, except COGS 121
  - Group B (Psychology): PSY 120, 121, 130, 131
  - Group C (Philosophy): PHIL 103, 110, 111
- One additional Upper Division COGS Course . . . . . .4 units
- At least three additional upper division courses from Groups A, B, C, BIS, or CSE . . . . . .12 units

(Students are advised to consult with a faculty member in order to choose a set of coherent courses. Note that upper-division courses in BIS and CSE have prerequisites. BIS 100 must be taken before any other upper-division BIS courses).

Economics emphasis:

The Social and Cognitive Sciences major with an Economics emphasis requires 48 units (some of which simultaneously fill 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. 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 Social and Cognitive Science major with an Economics emphasis must maintain a 2.0 grade point average in all major coursework.

Required courses include:

Lower Division Major Requirements (16 units):

- Introductory Courses in the Social and Cognitive Sciences . . . . . .8 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 (POLI 1)
  - Introduction to Public Policy (PUBP 1)
  - Introduction to Sociology (SOC 1)
- Quantitative Methods . . . . . .8 units
  - Analysis of Economic Data (ECON 10)
  - Calculus of a Single Variable I (MATH 21)

  (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

Psychology emphasis:

The Social and Cognitive Sciences major with a Psychology emphasis requires 44 units (some of which simultaneously fill 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. 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 Social and Cognitive Science major with a Psychology emphasis must maintain a 2.0 grade point average in all major coursework.

Required courses include:

Lower Division Major Requirements (12 units):

- Introductory courses in the Social and Cognitive Sciences . . . . . .8 units
  - Introduction to Psychology (PSY 1)
  - One course chosen from:
  - Introduction to Cognitive Science (COGS 1)
  - Introduction to Economics (ECON 1)
  - Introduction to Political Science (POLI 1)
  - Introduction to Public Policy (PUBP 1)
  - Introduction to Sociology (SOC 1)
- Quantitative Methods . . . . . .4 units
- Analysis of Psychological Data (PSY 10)

  (Counts toward the General Education Mathematical/quantitative reasoning Requirement)

Upper Division Major Requirements (32 units):

- Research Methods in Psychology (PSY 105) . . . . . .4 units
- Psychological Perspectives on Cultural, Racial and Ethnic Diversity (PSY 150) . . . . . .4 units
- One upper division Psychology emphasis course from each of the following three groups: . . . . . .12 units
  - Group A (Cognition, Brain and Behavior): Physiological Psychology (PSY 120), Cognitive Psychology (PSY 121) or any upper division COGS course
  - Group B (Social-Personality, Development): Developmental Psychology (PSY 130), Social Psychology (PSY 131), Personality (PSY 132), or Abnormal Psychology (PSY 133)
  - Group C (Applied Psychology): Clinical Psychology (PSY 140), Industrial and Organizational Psychology (PSY 141), Human Sexuality (PSY 145), Alcohol, Drugs and Behavior (PSY 146), Psychology and Economics (SCS 140), or Second Language Learning and Bilingualism (SCS 145)
- At least three additional upper division courses in Psychology or Cognitive Science . . . . . .12 units

Public Policy emphasis:

The Social and Cognitive Sciences major with a Public Policy emphasis requires 52 units (some of which simultaneously fill 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. For limits on pass/no pass grading, please contact ths 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 Social and Cognitive Science major with a Psychology emphasis must maintain a 2.0 grade point average in all major coursework.

Required courses include:

Lower Division Major Requirements (20 units):

- Introductory courses in the Social and Cognitive Sciences . . . . . .12 units
  - Introduction to Economics (ECON 1)
  - Introduction to Political Science (POLI 1)
  - Introduction to Public Policy (PUBP 1)
- Quantitative Methods . . . . . .8 units
  - Analysis of Psychological Data (PSY 10) or Analysis of Economic Data (ECON 10)
  - Calculus of a Single Variable I (MATH 21)

  (Either course counts toward the General Education Mathematical/quantitative reasoning Requirement)

Upper Division Major Requirements (28 units):

- Political Process and Institutions (PUBP 100) . . . . . .4 units
- Intermediate Microeconomic Theory (ECON 100) . . . . . .4 units
- Research Methods in Psychology (PSY 105) or Econometrics (ECON 130) . . . . . .4 units
- Two courses from one of the three areas of study (listed below) and one course from each of the other areas; at least one of these courses must be a public policy (PUBP) course: . . . . . .12 units
- Social Policy – Poverty and Social Policy (PUBP 110), Immigration and Public Policy (PUBP 140), Race, Ethnicity and Public Policy (PUBP 150), Labor Economics (ECON 140), Development Economics (ECON 150), Political Economics (ECON 155), Social Psychology (PSY 131), Developmental Psychology (PSY 130), Psychological Perspectives on Cultural, Racial and Ethnic Diversity (PSY 150), Second Language Learning and Bilingualism (SCS 145).
- Health – Health Care Policy (PUBP 120), Health Economics (ECON 145), Public Finance (ECON 151), Political Economics (ECON 155), Social Psychology (PSY 131), Developmental Psychology (PSY 130), Human Sexuality (PSY 145), Alcohol, Drugs and Behavior (PSY 146), Psychological Perspectives on Cultural, Racial and Ethnic Diversity (PSY 150).

  Additional courses in Natural Sciences or Engineering may be taken to meet the **Health Care Policy** area of study, with the consent of the instructor and the Public Policy Program. Please consult a SSHA advisor and/or visit SSHA's web site for a list of approved courses.
- Environment – Environmental Policy (PUBP 130), Environmental Economics (ECON 120), Law and Economics (ECON 152), Political Economics (ECON 155), Topics in Environmental History (HIST 135).

  Additional courses in Natural Science or Engineering may be taken to meet the Environmental Policy area of study, with the consent of the instructor and the Public Policy Program. Please consult a SSHA advisor and/or visit SSHA's web site for a list of approved courses.
- Directed Research in Public Policy (Internship and/or Independent Study) . . . . . .4 units
  Students must enroll in Individual Internship (PUBP 196) or Upper Division Individual Study (PUBP 199) and complete an original policy research paper. Students must have a faculty advisor in order to enroll in either course. Once the required units are satisfied, Public Policy students can take either course as an elective without a major research paper.

Transfer Students. The Cognitive Science emphasis will be available to transfer students in Fall 2006. The Public Policy emphasis will be available to transfer students in Fall 2007. Transfer students who wish to major in Social and Cognitive Sciences 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 psychology and economics, and two lower division natural science or engineering courses, at least one of which has a lab, field or studio component, and a UC transferable statistics course. Students interested in the Economics or Public Policy emphasis should also take a UC transferable calculus course. Students interested in the Cognitive Science emphasis should take a two-course, UC transferable calculus sequence, a third lower division natural science or engineering course which has a lab, field or studio component, and an introductory computer programming course. Please consult www.assist.org for suggested course equivalencies.

Performers from the San Francisco Opera sing at CORE Friday.

SAMPLE PLAN OF STUDY FOR SCS DEGREE - COGNITIVE SCIENCE EMPHASIS

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	
PSY 1 Introduction to Psychology	4
MATH 21 Calculus of a Single Variable I	4
Nat Sci/Engineering Intro course w/ Lab, Field or Studio	4
Elective	4
Freshman Seminar	1
Semester Units	**17**

SEMESTER 3	
PHIL 5 Logic and Critical Reasoning or COGS 5 Introduction to Language and Linguistics	4
CSE 20 Introduction to Computing I	2
PSY 10 Analysis of Psychological Data	4
MATH 22 Calculus of a Single Variable II	4
Semester Units	**14**

SEMESTER 4	
Introductory WCH or ARTS course	4
CSE 21 Introduction to Computing II	2
PSY 105 Research Methods	4
Elective	4
Semester Units	**14**

SEMESTER 5	
COGS Group A course	4
Nat Sci/Engineering Intro course w/ Lab, Field, or Studio	4
Upper division COGS elective	4
Upper Division GE Elective Outside COGS/PSY	4
Semester Units	**16**

SEMESTER 6	
CORE 100 The World at Home	4
Upper Division GE Elective Outside COGS/PSY	4
COGS Group B course	4
Natural Science or Engineering course	4
Semester Units	**16**

SEMESTER 7	
COGS Group C course	4
Upper Division course (from Groups A, B, C, BIS or CSE)	4
Directed COGS Research	4
Upper Division GE Elective Outside COGS/PSY	4
Semester Units	**16**

SEMESTER 8	
Upper Division course (from Groups A, B, C, BIS or CSE)	4
Upper Division course (from Groups A, B, C, BIS or CSE)	4
Upper Division GE Elective Outside COGS/PSY	4
Elective	4
Semester Units	**16**

Total Program Units	**125**

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 SCS DEGREE - ECONOMICS EMPHASIS

SEMESTER 1	
CORE 1 The World at Home	4
ECON 1 Introduction to Economics	4
WRI 10 College Reading & Composition	4
Elective	4
Semester Units	**16**

SEMESTER 2	
Elective	4
MATH 21 Calculus of a Single Variable I	4
Nat Sci/Engineering Intro course w/ Lab, Field Work or Studio	4
Elective	4
Freshman Seminar	1
Semester Units	**17**

SEMESTER 3	
Introductory SCS course outside Economics	4
Natural Science/Engineering course	4
ECON 10 Analysis of Economic Data	4
Elective	4
Semester Units	**16**

SEMESTER 4	
Introductory WCH or Arts course	4
General Education Elective	4
Elective	4
Elective	4
Semester Units	**16**

SEMESTER 5	
ECON 100 Intermediate Microeconomic Theory	4
Upper Division ECON course	4
Upper Division GE course outside ECON or MGMT	4
Elective	4
Semester Units	**16**

SEMESTER 6	
ECON 101 Intermediate Macroeconomic Theory	4
Upper Division ECON course	4
Upper Division GE course outside ECON or MGMT	4
CORE 100 The World at Home	4
Semester Units	**16**

SEMESTER 7	
Upper Division ECON course	4
Upper Division Division GE course outside ECON or MGMT	4
ECON 130 Econometrics	4
Elective	4
Semester Units	**16**

SEMESTER 8	
Upper Division ECON course	4
Upper Division ECON course	4
Upper Division GE course outside ECON or MGMT	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.

SAMPLE PLAN OF STUDY FOR SCS DEGREE - PSYCHOLOGY EMPHASIS

SEMESTER 1	
CORE 1 The World at Home	4
PSY 1 Introduction to Psychology	4
WRI 10 College Reading & Composition	4
Elective	4
Semester Units	**16**

SEMESTER 2	
PSY 10 Analysis of Psychological Data	4
Nat Sci/Engineering Intro course w/ Lab, Field Work or Studio	4
Elective	4
Elective	4
Freshman Seminar	1
Semester Units	**17**

SEMESTER 3	
Introductory SCS course outside emphasis	4
Natural Science/Engineering course	4
PSY 150 Psychological Perspectives on Cultural, Racial and Ethnic Diversity	4
Elective	4
Semester Units	**16**

SEMESTER 4	
Introductory WCH or Arts course	4
PSY 105 Research Methods in Psychology	4
Elective	4
Elective	4
Semester Units	**16**

SEMESTER 5	
PSY Group A course	4
Upper Division course in PSY/COGS	4
Upper Division GE course outside PSY/COGS	4
Elective	4
Semester Units	**16**

SEMESTER 6	
CORE 100 The World at Home	4
Upper Division course in PSY/COGS	4
Upper Division GE course outside PSY/COGS	4
PSY Group B course	4
Semester Units	**16**

SEMESTER 7	
PSY Group C course	4
Upper Division GE course outside PSY/COGS	4
Elective	4
Elective	4
Semester Units	**16**

SEMESTER 8	
Upper Division course in PSY/COGS	4
Upper Division GE course outside PSY/COGS	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.

SAMPLE PLAN OF STUDY FOR SCS DEGREE – PUBLIC POLICY EMPHASIS

SEMESTER 1	
CORE 1 The World at Home	4
ECON 1 Introduction to Economics	4
WRI 10 College Reading & Composition	4
Elective	4
Semester Units	**15**

SEMESTER 2	
PUBP 1 Introduction to Public Policy	4
MATH 21 Calculus of a Single Variable I	4
Nat Sci/Engineering Intro course w/ Lab, Field Work or Studio	4
Elective	4
Freshman Seminar	1
Semester Units	**15**

SEMESTER 3	
Introductory WCH or Arts course	4
Natural Science/Engineering course	4
ECON 100 Intermediate Microeconomic Theory	4
Elective	4
Semester Units	**15**

SEMESTER 4	
Introductory SCS course outside emphasis	4
ECON 10 Analysis of Economic Data or PSY 10 Analysis of Psychological Data	4
POL 1 Introduction to Political Science	4
Elective	4
Semester Units	**15**

SEMESTER 5	
PUPB 100 Political Process and Institutions	4
Upper Division GE course outside Public Policy	4
ECON 130 Econometrics or PSY 105 Research Methods in Psychology	4
Elective	4
Semester Units	**16**

SEMESTER 6	
CORE 100 The World at Home	4
Upper Division PUBP course	4
Upper Division GE course outside Public Policy	4
Elective	4
Semester Units	**16**

SEMESTER 7	
Upper Division PUBP course	4
Upper Division GE course outside Public Policy	4
Directed Research in Public Policy[1]	4
Elective	4
Semester Units	**16**

SEMESTER 8	
Upper Division PUBP course	4
Upper Division GE course outside Public Policy	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.

[1] *This can be satisfied by either PUBP 196 or PUBP 199*

WORLD CULTURES AND HISTORY PROGRAM

The undergraduate major in World Cultures and History invites students to study questions of society and culture in a comparative context. It will address such questions as: What constitutes a society and a culture, and how are they formed? How and why do societies and cultures sometimes come into conflict? What happens at the crossroads of culture—for example, California and the San Joaquin Valley—when people from many different backgrounds come into contact?

These questions can best be understood through the prism of the humanities and arts, assisted by the natural and social sciences. Thus, this major brings together a variety of disciplines previously thought of as dissimilar— including anthropology, history and political science, language and literature, music and performance studies, philosophy and religious studies, and area and ethnic studies.

In UC Merced's opening years, the World Cultures and History major will particularly examine the interaction of nations and cultures from both a literary and an historical perspective. Within both these fields, lively scholarly debates on the subject of culture abound. This major will appeal to students who are interested in learning the methods and tools of history, literature and allied fields to understand how societies and cultures have developed and continue to evolve. A special feature of this major will give students the opportunity to apply their classroom learning to relevant and contemporary research problems outside the classroom, where students may contribute to expanding public knowledge and awareness of cultural issues.

During their undergraduate careers, World Cultures and History majors will have a variety of opportunities to apply what they are learning. Possibilities include undergraduate research with individual faculty; community or regional internships in a variety of cross-cultural settings; and enrichment experiences through the World Cultures Institute. The rich and diverse historical experiences and cultural heritages of California and the San Joaquin Valley offer an excellent living laboratory for this research.

A unique part of the World Cultures and History major is the public research project that enables students to use their research and communication skills either individually or as part of a team to educate and inform the public. Students might work, for example, on researching and writing an interpretative account linking the environmental and human histories of nearby Yosemite or Sequoia National Park; or on representations through the arts of a San Joaquin Valley cultural group at a Valley museum; or on an aspect of irrigation history and water policy for a public agency in the Valley. The final product might be in the form of an interpretive web site that combines written and oral texts with visual material, an interpretive text for the public or a written and oral report to a sponsoring agency. Extensive writing is a keystone of the World Cultures and History major and a requirement of any public research project.

World Cultures and History majors may also elect to study overseas through the University of California Education Abroad Program (EAP) or participate in the University of California programs in Washington DC (UCDC) or Sacramento (UC-SAC). To fulfill the public research project requirement, the EAP, UCDC or (UC-SAC) experience would need to be planned under UCM faculty supervision and lead to completion of a final written report (for EAP students: in English or in the language of the EAP country) addressed to a well-defined public audience.

Students will also complete a two-semester senior proseminar in which they will explore connections among the World Cultures and History courses they have completed and write a senior thesis. The proseminar will require students to demonstrate their skills in communicating effectively both orally and in writing with an audience in their emphasis field. Semester one will focus on directed research in preparation for writing a senior thesis; semester two will be devoted to completing the thesis.

World Cultures and History students will be well-prepared to enter advanced study programs in law, education, journalism, diplomacy, library science and management, as well as graduate study in their field of emphasis. Career opportunities will be found in academe, business, publishing, public service, non-governmental organizations and at museums and archives. Public as well as private agencies seeking employees with strong cross-cultural communication skills and understanding should find graduates from this program especially appealing.

Two emphases have been developed within the initial program: History and Literature. Students will select one of these emphases and receive a notation to that effect on their transcript and diploma. Other emphases will be developed as the faculty and program enrollments grow.

The History emphasis prepares students to understand and use the methods by which historians examine society and culture, through historical research and writing. Students will learn to locate, evaluate and interpret evidence, and then use that evidence to construct an argument or develop a thesis, using both historical case studies and comparative studies. Students will explore history as a field, including the examination in depth of issues concerning world, national or state and local history. Initially, the history emphasis will focus on world history, United States history and the history of science and technology.

The Literature emphasis prepares students in the multiple perspectives from which literature as a product of culture is read. Students will learn how to interpret texts by applying different critical methods and hone their own interpretive skills through analysis and writing. Students will have the opportunity to take courses on a national tradition, transnational movements, historical periods, cultural analysis, literary genres, women's and ethnic literatures, regional literatures, environmental writings and children's literature. Students will use this study to build written, oral and other communication skills. They will develop the ability to create well-crafted analyses for specialists in their field, as well as to interpret the results of their research and analyses for a non-specialist public.

REQUIREMENTS FOR THE WORLD CULTURES AND HISTORY (WCH) 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 World Cultures and History at UC Merced are:

History Emphasis:

The World Cultures and History major with a History emphasis requires 65 – 68 units (some of which 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. 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 World Cultures and History major with a History emphasis must maintain a 2.0 grade point average in all major coursework.

Required courses include:

Lower Division Major Requirements (32 units):

- A two-semester lower division introductory sequence 8 units

  (Please choose one of the following combinations):

  - Introduction to World History to 1500 (HIST 10) and Introduction to World History Since 1500 (HIST 11)
  - The Forging of the United States, 1607-1877 (HIST 16) and The Modern United States, 1877-Present (HIST 17)
  - Early European History (HIST 30) and Modern European History (HIST 31)

  (Additional introductory region/nation sequence courses in History may be taken to meet the this requirement as they 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 Years of College-level Courses in a Language other than English . . . . . .16 units

  (Students must take two years of the same language. Can be satisfied through alternative means such as proficiency testing and/or prior college-level course work.)

- Two introductory WCH courses selected from the student's non-emphasis area . . . . . .8 units

  (Approved lower division courses with prefix ANTH, ARTS, LIT, PHIL or WCH. It is recommended that students satisfy this requirement by completing related sequences, for example, LIT 30 and 31. Please consult a SSHA advisor and/or visit SSHA's web site for a list of approved courses. Students may petition to substitute a suitable course in place of taking a course from the list included here.)

Upper Division Major Requirements (33-36 units):

- The Historian's Craft (HIST 100) (must be taken in junior year) . . . . . .4 units
- Five additional upper division History (HIST) elective courses (one of which must be non-U.S. History) . . .20 units
- World Cultures and History Proseminar: Research (WCH 190) . . . . . .4 units
- World Cultures and History Proseminar: Senior Thesis (WCH 191) . . . . . .4 units
- Public Research Project in World Cultures and History (WCH 192) . . . . . 1-4 units

Literature Emphasis:

The World Cultures and History major with a Literature emphasis requires 65 - 68 units (some of which 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. 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 World Cultures and History major with a Literature emphasis must maintain a 2.0 grade point average in all major coursework

Required courses include:

Lower Division Major Requirements (32 units):

- A two-semester lower division introductory sequence . . . . .8 units

  (Please choose one of the following combinations):

  - Introduction to World Culture and Literature I and II (LIT 20 and LIT 21)
  - Introduction to American Literature I and II (LIT 30 and LIT 31)
  - Introduction to British Literature I and II (LIT 40 and LIT 41)
  - ntroduction to Hispanic Literature I and II (LIT 50 and LIT 51)

- Two Years of College-level Courses in a Language other than English . . . . . .16 units

  (Students must take two years of the same language. Can be satisfied through alternative means such as proficiency testing and/or prior college-level course work.)

- Two introductory WCH courses selected from the student's non-emphasis area . . . . . .8 units

  (Approved lower division courses with prefix ANTH, ARTS, HIST, PHIL or WCH. It is recommended that students satisfy this requirement by completing related sequences, for example, HIST 16 and 17. Please consult a SSHA advisor and/or visit SSHA's web site for a list of approved courses. Students may petition to substitute a suitable course in place of taking a course from the list included here.)

Upper Division Major Requirements [33-36 units]:

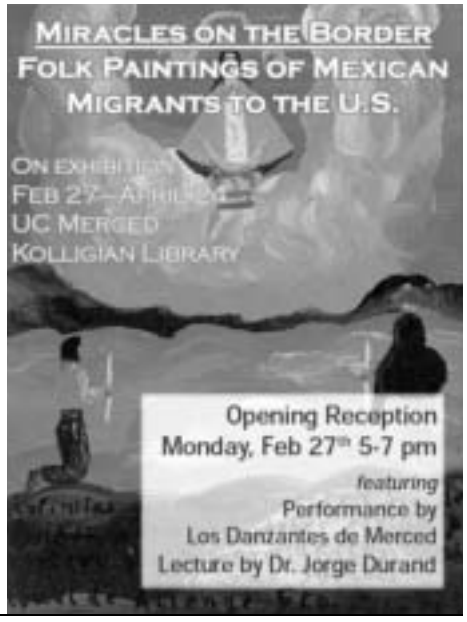
- Engaging Texts: Introduction to Critical Practice (LIT 100) (must be taken in junior year) . . . . . .4 units
- Three upper division courses, one from each of the following areas: . . . . . .12 units
  - Area A: Literatures and cultures of the Spanish-speaking world
  - Area B: Literatures and cultures of the Americas
  - Area C: Literatures and cultures of the English-speaking world

  (SPAN 101 and 102 may be used to meet requirements in either Area A or B.)
- Two additional upper division Literature (LIT) elective courses . . . . . .8 units
- World Cultures and History Proseminar: Research (WCH 190) . . . . . .4 units
- World Cultures and History Proseminar: Senior Thesis (WCH 191) . . . . . .4 units
- Public Research Project in World Cultures and History (WCH 192) . . . . . .1-4 units

Transfer Students. Transfer students who wish to major in World Cultures and History 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 emphasis track, either history or literature. Please consult www.assist.org for suggested course equivalencies.

I love being at UCM not only because of the wonderful scenery but also because of intimate relationships that are formed between my peers and me as a result of the small campus community.

SONIA SALAZAR,
UNDERGRADUATE



SAMPLE PLAN OF STUDY FOR WCH DEGREE – HISTORY EMPHASIS

SEMESTER 1	
CORE 1 The World at Home	4
Quantitative Reasoning Course[1]	4
WRI 10 College Reading & Composition	4
Introductory History Sequence I	4
Semester Units	**16**

SEMESTER 2	
Nat Sci/Engineering Intro course w/ Lab, Field Work or Studio	4
Elective[2]	4
Elective	4
Introductory History Sequence II	4
Freshman Seminar	1
Semester Units	**17**

SEMESTER 3	
Introductory WCH or Arts course outside of History	4
Natural Science/Engineering course	4
Introductory SCS Course	4
Elective[2]	4
Semester Units	**16**

SEMESTER 4	
Introductory WCH or Arts course outside of History	4
Elective[2]	4
Elective	4
Elective	4
Semester Units	**16**

SEMESTER 5	
HIST 100 The Historian's Craft	4
Upper Division non-US HIST course	4
Upper Division GE course outside History course	4
LIT or WCH Upper Division Course Elective	4
Semester Units	**16**

SEMESTER 6	
CORE 100 The World at Home	4
Upper Division HIST course	4
WCH 192 Public Research Project	4
Upper Division GE course outside History	4
Semester Units	**16**

SEMESTER 7	
WCH 190 Proseminar in World Cultures and History: Research	4
Upper Division HIST course	4
Elective	4
Upper Division GE course outside History	4
Semester Units	**16**

SEMESTER 8	
WCH 191 Proseminar in World Cultures and History: Senior Thesis	4
Upper Division HIST course	4
Upper Division HIST course	4
Upper Division GE course outside History	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.

[1] Students who need to fulfill the foreign language requirement can take a foreign language course in Semester 1 and postpone the quantitative reasoning course until Semester 3.

[2] Students who need to fulfill the foreign language requirement can take a foreign language course in place of an elective in Semesters 2, 3 and/or 4.

SAMPLE PLAN OF STUDY FOR WCH DEGREE – LITERATURE EMPHASIS

SEMESTER 1	
CORE 1 The World at Home	4
Quantitative Reasoning Course[1]	4
WRI 10 College Reading & Composition	4
Introductory Literature Sequence I	4
Semester Units	**16**

SEMESTER 2	
Nat Sci/Engineering Intro course w/ lab, Field Work or Studio	4
Elective[2]	4
Elective	4
Introductory Literature Sequence II	4
Freshman Seminar	1
Semester Units	**17**

SEMESTER 3	
Introductory WCH or Arts course outside of Literature	4
Natural Science/Engineering course	4
Introductory SCS Course	4
Elective2	4
Semester Units	**16**

SEMESTER 4	
Introductory WCH or Arts course outside of Literature	4
Elective[2]	4
Elective	4
Elective	4
Semester Units	**16**

SEMESTER 5	
LIT 100 Engaging Texts: Intro to Critical Practice	4
Literature Area A course	4
Upper Division GE course outside Literature	4
Elective	4
Semester Units	**16**

SEMESTER 6	
CORE 100 The World at Home	4
WCH 192 Public Research Project	4
Literature Area B course	4
Upper Division GE course outside Literature	4
Semester Units	**16**

SEMESTER 7	
WCH 190 Proseminar in World Cultures and History: Research	4
Literature Area C course	4
Upper Division LIT Course	4
Upper Division GE course outside Literature	4
Semester Units	**16**

SEMESTER 8	
WCH 191 Proseminar in World Cultures and History: Senior Thesis	4
Elective	4
Upper Division LIT course	4
Upper Division GE course outside Literature	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.

[1] Students who need to fulfill the foreign language requirement can take a foreign language course in Semester 1 and postpone the quantitative reasoning course until Semester 3.

[2] Students who need to fulfill the foreign language requirement can take a foreign language course in place of an elective in Semesters 2, 3 and/or 4.

SSHA PROGRAMS

THE ARTS

"….whatever we say a thing is - it isn't. First of all, whatever we say is words, and what we want to talk about is generally not words. Second, whatever we mean by what we say is not what the thing actually is, though it may be similar. For the thing is always more than what we mean and is never exhausted by our concepts. And the thing is also different from what we mean, if only because no thought can be absolutely correct when it is extended indefinitely. The fact that a thing has qualities going beyond whatever we think and say about it is behind our notion of objective reality. Different kinds of thought and different kinds of abstractions may together give a better reflection of reality. Each is limited in its own way, but together they extend our grasp of reality further than is possible with one way alone……theory is a kind of a map of the universe , and like any other map, it is a limited abstraction and not entirely accurate."

DAVID BOHM DESCRIBING THE WORK OF ALFRED KORZYBSKI, AN AMERICAN PHILOSOPHER, TO DAVID F. PEAT IN SCIENCE, ORDER AND CREATIVITY (BANTAM BOOKS, 1987), PP. 8-9

UNDERLYING PRINCIPLES

Art in its many forms appears from the very dawn of human existence. Art, when given proper fully-extended consideration, has the potential to illuminate all aspects of life. For that reason it has the latent power to form interdisciplinary channels. As a form of creativity, art is distinguished by its metaphoric attributes. Art has an immense capability to transform and transcend. It is characterized by being difficult to contain within structures and institutions. Its very life depends on fluidity. In fact, it often seems that the greatest disservice we can do art is to try to define it, to pin it down. Yet, we must continue to do so. This is because the effort itself, though futile, teaches us how to have a better, richer life.

THE UC MERCED PLAN FOR THE ARTS PROPOSES:

- that all undergraduate and graduate students, regardless of the major or minor they have chosen to pursue, should have the opportunity to experience the full range of enrichment that all forms of art have the potential to provide. This mission should be realized at the curriculum level as well as at the extracurricular level in a truly balanced way.
- that as much as possible students should be provided with opportunities to come in touch with and to experience actual works of art.
- that students should be introduced to the most lasting artistic achievements in the thousands of years of human history. Students should be taught to appreciate the work of artists from all world cultures.
- that students should be able to recognize the positive effect that art can have on their lives. It proposes to help them understand how they can integrate the arts into their lives.

UC Merced Plan for the Arts will support and originate interdisciplinary curriculum.

The Merced Writing Program

The 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).

In each Merced Writing Program course, students learn the ethical and practical applications of the art and craft of writing, and its relationship to liberal ideals of education—to becoming thoughtful, articulate individuals who can make immediate and long-term contributions to society. In each writing course students craft their written expression in a variety of ways by addressing audiences and issues of our world today. As they come to understand the ways in which their language reflects and shapes everyday life, they cultivate personal investment in their college education and explore applications to all their studies.

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. Beginning Fall 2006, the School of Social Sciences, Humanities and Arts will offer three foreign languages for UC Merced students: French, Japanese and Spanish.

Courses in French and Japanese will be 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 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. In addition, the knowledge of Spanish is useful for traveling, business and research in many parts of the world, especially Europe and Latin America. 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 heritage students who already speak the language but would like to improve their oral, writing and reading skills. All lower division courses are content-based, learner-oriented and follow the communicative learning approach. The main objective of these courses is to allow students to develop working knowledge of Spanish to communicate at an introductory and intermediate level. The courses also promote cultural awareness by exposing students to the cultures of the Hispanic communities within the United States and in Hispanic countries throughout the world.

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.

To ensure appropriate placement in our foreign language courses, students are encouraged to take a placement exam for the language

they would like to study. For information about the placement exam please go to orientation.ucmerced.edu or speak to a UC Merced academic advisor.

THE MINORS

In the 2006 – 2007 Academic Year, the School of Social Sciences, Humanities and Arts introduces ten new minors: American Studies, Arts, Cognitive Science, Economics, History, Philosophy, Psychology, Services Science, Spanish and Writing.

Common to each SSHA minor are the following guidelines:

- 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.

  (For Arts, the minimum GPA 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.
- Work for the minor must be completed within the 130-unit maximum limit for graduation.
- 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 traditional model 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:

- HIST 16 or 17 or LIT 30 or 31
- One upper division American history course
- One upper division American literature course
- One upper division non-HIST/LIT course on American topics *(Please check with the SSHA Advising Office for appropriate courses.)*
- One upper division course in American ethnicity, race or gender, either from HIST, LIT or another area. Choose one from:
  - HIST 133 (Topics in the History of Migration and Immigration)
  - LIT 120 (Topics in the Literature of Difference)
  - SCS 145 (Second Language Learning and Bilingualism)

  (More course options may be added to this list over time. Please check with the SSHA Advising Office for updates.)

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 mediums within their context and purpose), theory (concentrating on research) and practice (artists in residence, performance and cognitive skills courses).

Minimum Requirements

- One course from each of the three areas within the Arts Curriculum:
  - History, A Linear Approach:

    ARTS 101 (History of Clothing, Costume and Fashion: Euro-centric Pre-History to 1800)

    ARTS 102 (History of Clothing, Costume and Fashion: Euro-centric 1800 to 1980)
  - Critical Studies (Theory), A Holistic Approach:

    ARTS 10 (Substances of Art)

    ARTS 11 (Substance of Music)

    ARTS 71 (Techniques of Interdisciplinary Research in Arts)

    ARTS 171 (Techniques of Interdisciplinary Research in Arts)
  - Practice, A Laboratory Approach:

    ARTS 1 (Learning to See: Drawing)

    ARTS 3 (Learning to See: Painting)

    ARTS 4 (Learning to See in Third Dimension)

    ARTS 5 (Learning to Listen: Beginner Music)

    ARTS 70 (Techniques of Contemporary Artists)

    (More course options may be added to this list over time. Please check with the SSHA Advising Office for updates.)
- A minimum of three additional 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 will increase students' knowledge of the mind and how it is studied from various perspectives, and will help them to acquire critical skills in scientific research and formal areas such as computer science and mathematics. Students will be 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.

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. Student in the economics minor will 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 (Analysis of Economic Data)
- A minimum of four upper division ECON courses.

Minor in History

Students will 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 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 has an applied and interdisciplinary emphasis, and students will be 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. Pre-approval should be sought from PHIL faculty).

Minor in Psychology

Arts Professor Dunya Ramicova.

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):

    PSY 120 (Physiological Psychology)

    PSY 121 (Cognitive Psychology)

    Any upper division COGS course
  - Group B (Social-Personality, Development):

    PSY 130 (Developmental Psychology)

    PSY 131 (Social Psychology)

    PSY 132 (Personality)

    PSY 133 (Abnormal Psychology)
- Group C (Applied Psychology):

  PSY 140 (Clinical Psychology)

  PSY 141 (Industrial and Organizational Psychology)

  PSY 145 (Human Sexuality)

  PSY 146 (Alcohol, Drugs and Behavior)

  PSY 150 (Psychological Perspectives on Cultural, Racial and Ethnic Diversity)

  SCS 140 (Psychology and Economics)

  SCS 145 (Second Language Learning and Bilingualism)

  (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-values 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): COGS, ECON, CSE

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 100 (Spanish Composition and Conversation)
- Four additional courses from the following list (at least three must be upper division):
  - SPAN 101 (Hispanic Cultures I)
  - SPAN 102 (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)
  - 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)

  (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. Within the writing minor courses, students demonstrate individual responsibility for the production of written work and are able to recognize the parameters of intellectual property and the seriousness of their endeavors as writers. 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:

Students can follow one of two tracks in the minor, focusing either on Professional Writing or Creative Writing.

- One lower-division course from the following list:
  - WRI 25 (Introduction to Creative Writing)
  - WRI 30 (Introduction to Professional Writing)
- WRI 100 (Advanced Writing)
- Three additional upper division courses from the following list:
  - WRI 105 (Language and Style)
  - WRI 110 (Tutor Training)
  - WRI 115 (Science Writing)
  - WRI 125 (Topics in Creative Writing)
  - WRI 130 (Topics in Professional Writing)
  - SPAN 100 (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.

WELCOME FROM THE DEAN

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 both a world-class faculty and world-class partnerships with Yosemite and Sequoia/Kings Canyon National Parks and with Lawrence Livermore National Laboratory. These 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 can offer our founding graduate students the matchless experience of being there 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.

Keith Alley
Dean, Graduate Division

SOLVING SOCIETY'S CHALLENGES

Society's most intractable problems are broad based and multifaceted. Viable solutions to these problems require a scope of 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. The research interests of our faculty reach across the spectrum of modern science and scholarship. Research interests among UC Merced's faculty include:

- History of the Cold War and nuclear armament
- Immigration, health services, border controls, patterns of immigrant naturalization and implications for policy of migration patterns
- 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 will be 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.

Professor David Ojcius with Quantitative and Systems Biology student Cristiane Cruz

Our programs are designed to prepare students for careers in academia, industry, government or private research organizations. UC Merced will offer an individually tailored graduate program in the following emphasis areas:

- Applied Mathematics
- Atomic and Molecular Science and Engineering
- Computer and Information Systems
- Environmental Systems
- Social and Cognitive Sciences
- World Cultures
- Quantitative and Systems Biology

Graduate students will 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 course work. In addition to your undergraduate transcripts and an application, you will need to 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 program 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 at 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 will reserve 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 place 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.

PROGRAMS OF STUDY

UC Merced will offer the Master of Science (M.S.), Master of Arts (M.A.) and Doctor of Philosophy (Ph.D.) degrees. New students will be assigned a faculty advisor and committee that will 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 will involve 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 Council to take it at a specific 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 their 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 will be advanced to candidacy when they have done the following:

- 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 that transcend normal disciplinary boundaries. Information about each of the areas of study and faculty research interests can be found on the Graduate Division web site at gradstudies.ucmerced.edu. We offer the following seven graduate studies emphases:

APPLIED MATHEMATICS

Applied Mathematics at UC Merced explores the applications of mathematics in the development of natural sciences, engineering and social sciences. The Applied Mathematics graduate emphasis offers a multidisciplinary research and training program for Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) students. Course work will provide training in the fundamental tools of applied mathematics, including ordinary and partial differential equations, asymptotics and perturbation methods, numerical analysis and scientific computing. The Applied Mathematics graduate emphasis will offer opportunities for students interested in multidisciplinary mathematics projects at the interface with life sciences, physical sciences, engineering and social sciences.

Applied mathematical sciences involves the use of analytical and computational mathematics to solve real-world problems. Its core is made up of modeling, analysis and scientific computing. Using that core, applied mathematical scientists study a spectrum of problems across many disciplines. In fact, applied mathematicians are connected more closely through their shared approach and attitude toward interdisciplinary research than through a shared interest in any particular set of problems. Moreover, 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.

Research and education in applied mathematical sciences involve four stages. The first stage is finding an interesting problem that may benefit from mathematical analysis. The second stage is developing an abstract model (i.e., a mathematical model) that describes salient features of the problem. The third stage is applying existing analytical and computational methods or developing new methods to solve the mathematical model. The fourth stage is determining what insight the mathematical model has provided into the original problem.

Applied mathematical sciences is inherently interdisciplinary. Applied mathematicians collaborate with other scientists and engineers to learn where they can make contributions. The lack of disciplinary barriers at UC Merced is an ideal environment for multidisciplinary research and education. We invite applications from a wide variety of undergraduate majors including, but not

limited to, mathematics, engineering, physics and chemistry. Applicants from non-English speaking countries must achieve scores of at least 580 on the written or 230 on the computer version of the TOEFL (Test of English as a Foreign Language) and 45 on the TSE (Test of Spoken English)

Initial faculty members participating in the Applied Mathematics graduate emphasis include:

Core Faculty:

- **BOAZ ILAN,** Assistant Professor of Natural Sciences
- **ARNOLD KIM,** Associate Professor of Natural Sciences
- **KEVIN MITCHELL,** Assistant Professor of Natural Sciences
- **MICHAEL SPRAGUE,** Assistant Professor of Natural Sciences
- **MAYYA TOKMAN,** Assistant Professor of Natural Sciences

Affiliate Faculty:

- **ALBERTO CERPA,** Assistant Professor of Engineering
- **THOMAS HARMON,** Professor of Engineering
- **MARCELLO KALLMAN,** Assistant Professor of Engineering
- **SHAWN NEWSAM,** Assistant Professor of Engineering
- **KATIE WINDER,** Assistant Professor of Social Sciences, Humanities and Arts
- **JEFFREY YOSHIMI,** Assistant Professor of Social Sciences, Humanities and Arts

ATOMIC AND MOLECULAR SCIENCE AND ENGINEERING

The optical, electrical, magnetic and mechanical properties of materials, as well as their biological activity and chemical reactivity, are consequences of the fundamental properties of their constituent molecules and the manner in which those molecules are assembled and interact. Research in the Atomic and Molecular Science and Engineering program is directed toward understanding the physical and chemical behavior of individual molecules, nano- and meso-scale molecular assemblies, and macroscopic materials, and utilizing this knowledge to design new molecules and materials for applications including biology and medicine, energy conversion, optics, information storage and transmittal, and structural materials. Activities of this program include chemical synthesis; characterization through a broad range of optical, spectroscopic, microscopic, diffraction, thermal and imaging methods; kinetic studies; and computer simulations and modeling. Research in this emphasis area spans the traditional disciplines of chemistry and physics through materials science and engineering.

Natural Sciences graduate students Sandra Villamizar, Gyami Shrestha and Alicia Blancas

The Atomic and Molecular Science and Engineering Graduate Group program at UC Merced offers individualized, research-based courses of study leading to the Ph.D. degree. While the M.S. degree is also offered, admission will usually be granted only to students who intend to pursue the Ph.D. Interdisciplinary projects are highly encouraged, as are interactions with faculty members or senior scientists outside UC Merced as collaborators, graduate committee members or co-advisors. We invite applications from a wide variety of undergraduate majors including chemistry; physics; biochemistry; materials science; and biomedical, chemical, materials, mechanical, electrical and environmental engineering.

Initial faculty members participating in the Atomic and Molecular Science and Engineering graduate emphasis include:

- **ANNE MYERS KELLEY,** Professor of Natural Sciences
- **DAVID F. KELLEY,** Professor of Natural Sciences
- **VALERIE LEPPERT,** Associate Professor of Engineering
- **MATTHEW MEYER,** Assistant Professor of Natural Sciences
- **KEVIN MITCHELL,** Assistant Professor of Natural Sciences
- **CHRISTOPHER VINEY,** Professor of Engineering
- **ROLAND WINSTON,** Professor of Natural Sciences and Engineering

COMPUTER AND INFORMATION SYSTEMS

Graduate studies in Computer and Information Systems offers individualized, strongly research-oriented courses of study leading to the M.S. and Ph.D. degrees. The program is organized to allow students to pursue cutting edge research in modern fields of computer science. Current research topics include: digital information processing and informatics, database design and development, mobile ad-hoc and sensor networks, distributed computation, algorithm design and testing, artificial intelligence and robotics, computer graphics and animation, and image processing and analysis.

Computer and Information Systems 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.

A core group of faculty is already actively conducting research on the signature topics. This nascent Graduate Group in Computer and Information Systems is expected to experience substantial growth in the upcoming years.

Participating faculty:

- **ALBERTO CERPA,** Assistant Professor of Engineering
- **QINGHUA GUO,** Assistant Professor of Engineering
- **MARCELO KALLMANN,** Assistant Professor of Engineering
- **SHAWN NEWSAM,** Assistant Professor of Engineering
- **JEFF WRIGHT,** Professor of Engineering

ENVIRONMENTAL SYSTEMS

The Environmental Systems program offers individualized, research-based courses of study leading to the M.S. and Ph.D. It 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. This understanding is gained through the systematic study of the biological, chemical and physical processes. Courses are designed to provide the scientific principles underlying the function and sustainability of natural and engineered ecosystems. The program places the principles of natural science and engineering in the context of pollution prevention, treatment and ecosystem restoration as well as integrating physical, chemical and biological cycles in environmental systems. Participating faculty are affiliated with the Schools of Natural Science and Engineering.

Programs of study emphasize laboratory, field and modeling studies of the natural and engineered environments from the perspective of biological, chemical and physical processes. In addition to research efforts at UC Merced, Environmental Systems faculty members are collaborating on interdisciplinary research topics with other University of California investigators as well as with scientists at Lawrence Livermore National Laboratory, Lawrence Berkeley National Laboratory, the National Park Service at Yosemite and Sequoia/Kings Canyon, the U.S. Geological Survey and others.

Initial faculty members participating in the Environmental Systems graduate emphasis include:

- **ROGER BALES,** Professor of Engineering
- **MARTHA CONKLIN,** Professor of Engineering
- **JESSICA GREEN,** Assistant Professor of Natural Sciences
- **QINGHUA GUO,** Assistant Professor of Engineering
- **THOMAS HARMON,** Professor of Engineering
- **VALERIE LEPPERT,** Associate Professor of Engineering
- **PEGGY O'DAY,** Professor of Natural Sciences
- **SAMUEL TRAINA,** Professor of Natural Sciences and Engineering
- **ROLAND WINSTON,** Professor of Engineering and Natural Sciences
- **JEFF WRIGHT,** Dean of Engineering

QUANTITATIVE AND SYSTEMS BIOLOGY

The life sciences are undergoing a vast and fundamental metamorphosis from a discipline based on qualitative observation and description into a quantitative science based on comprehensive datasets and predictive models. Graduate study in Quantitative and Systems Biology at UC Merced offers individualized, research-based courses of study leading to M.S. and Ph.D. degrees. Research projects are available on topics ranging from intercellular signaling to computational molecular biology, and course work will provide a

At the Opening Day Ceremony.

background in the tools of modern biology, including computational biology, genomics and advanced instrumentation. The Quantitative and Systems Biology program also offers opportunities for students interested in multidisciplinary projects at the interface of biology, computer science and bioengineering. More information on our faculty and research opportunities can be found at the QSB web site, qsb.ucmerced.edu. Applicants from non-English speaking countries must achieve scores of at least 580 on the written or 230 on the computer version of the TOEFL (Test of English as a Foreign Language) and 45 on the TSE (Test of Spoken English).

Initial faculty members participating in the Quantitative and Systems Biology graduate emphasis include:

- **KEITH ALLEY,** Professor of Natural Sciences
- **MIRIAM BARLOW,** Assistant Professor of Natural Sciences
- **WEI-CHUN CHIN,** Assistant Professor of Engineering
- **JINAH CHOI,** Assistant Professor of Natural Sciences
- **MICHAEL E. COLVIN,** Professor of Natural Sciences
- **HENRY J. FORMAN,** Professor of Natural Sciences
- **MARCOS GARCIA-OJEDA,** Assistant Professor of Natural Sciences
- **JESSICA GREEN,** Assistant Professor of Natural Sciences
- **MICHELLE KHINE,** Assistant Professor of Engineering
- **VALERIE LEPPERT,** Associate Professor of Engineering
- **JENNIFER MANILAY,** Assistant Professor of Natural Sciences
- **KARA MCCLOSKEY,** Assistant Professor of Engineerin
- **MONICA MEDINA,** Assistant Professor of Natural Sciences
- **MATTHEW MEYER,** Assistant Professor of Natural Sciences
- **DAVID OJCIUS,** Professor of Natural Sciences
- **RUDY ORTIZ,** Assistant Professor of Natural Sciences
- **MARIA PALLAVICINI,** Professor of Natural Sciences
- **CHRISTOPHER VINEY,** Professor of Engineering

SOCIAL AND COGNITIVE SCIENCES

The graduate program 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 as four tracks: cognitive science, economics, public policy and psychology. Planned future areas include political science and sociology. Graduate study at UC Merced will involve working closely with one or more faculty, so prospective applicants should consult the Graduate Division web site for additional information on the Group's faculty and their research interests. Initial faculty members participating in the Social and Cognitive Sciences graduate emphasis include:

- **MICHELLE CHOUINARD,** Assistant Professor of Social Sciences, Humanities and Arts (Psychology and Cognitive Science)
- **EVAN HEIT,** Professor of Social Sciences, Humanities and Arts (Psychology and Cognitive Science)
- **SHAWN KANTOR,** Professor of Social Sciences, Humanities and Arts (Economics)
- **TEENIE MATLOCK,** Assistant Professor of Social Sciences, Humanities and Arts (Psychology and Cognitive Science)
- **BELINDA REYES,** Assistant Professor of Social Sciences, Humanities and Arts (Public Policy)
- **WILLIAM SHADISH,** Professor of Social Sciences, Humanities and Arts (Psychology)
- **CAROL TOMLINSON-KEASEY,** Professor of Social Sciences, Humanities and Arts (Psychology)
- **KATIE WINDER,** Assistant Professor of Social Sciences, Humanities and Arts (Economics),
- **JEFFREY YOSHIMI,** Assistant Professor of Social Sciences, Humanities and Arts (Philosophy and Cognitive Science)

WORLD CULTURES

A graduate group in World Cultures will offer individualized, research-based courses of study leading to M.A. and Ph.D. degrees. The program will explore the rich cultural and historical heritage of California, the San Joaquin Valley and the Sierra Nevada as a starting point for understanding world cultures in their historical, political and cultural contexts, and the effects of immigration and migration on society and culture. Students will gain a professional knowledge of the methods by which historians, artists, philosophers, literary scholars and other humanists and social scientists examine societies and cultures. The program will focus on four main areas: Public History and Cultural Preservation Studies, Literatures and Cultures of the Spanish-Speaking World, Literatures and Cultures of the Americas, and Literatures and Cultures of the English-Speaking World. These are conceived as overlapping areas that would permit students to concentrate on one particular area of research while exploring wider implications of their research. Since proximity to the Sierra Nevada and the other splendid natural features of California has significantly influenced literature and the development of the arts in the State, students will also benefit from the intersections of interest between the World Cultures Institute and the Sierra Nevada Research Institute, particularly in the area of the cultural understanding of wilderness and the environment. The construction of the faculty for the World Cultures graduate group is currently ongoing; please consult the Graduate Division web site on the Group's faculty and their research interests.

Initial faculty members participating in the World Cultures graduate emphasis include:

- **VIRGINIA M. ADAN-LIFANTE,** Lecturer, Social Sciences, Humanities and Arts (Spanish)
- **JAN E. GOGGANS,** Assistant Professor of Social Sciences, Humanities and Arts (Literature)
- **GREGG HERKEN,** Professor of Social Sciences, Humanities and Arts (History)
- **SEAN MALLOY,** Assistant Professor of Social Sciences, Humanities and Arts (History)
- **MANUEL M. MARTIN-RODRIGUEZ,** Professor of Social Sciences, Humanities and Arts (Literature)
- **RUTH MOSTERN,** Assistant Professor of Social Sciences, Humanities and Arts (History)
- **CRISTIAN H. RICCI,** Assistant Professor of Social Sciences, Humanities and Arts (Literature)
- **JEFFREY YOSHIMI,** Assistant Professor of Social Sciences, Humanities and Arts (Philosophy)

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.

IMPORTANT CONTACT INFORMATION

Graduate Division
gradstudies.ucmerced.edu
graddiv@ucmerced.edu
5200 N. Lake Road – Ste. 108D
Merced, CA 95343

Callale Cierra, Director of Graduate Admissions and Recruitment
ccierra@ucmerced.edu
(209) 228-4723

Financial Aid
finaid@ucmerced.edu
(209) 228-4243

Free Application for Federal Student Aid (FAFSA):
www.fafsa.ed.gov

Graduate Record Exam (GRE):
www.ets.org

Test of English as a Foreign Language (TOEFL):
www.toefl.org

International English Language Testing Service (IELTS):
www.ielets.org

GOVERNANCE OF GRADUATE EDUCATION

Graduate study is administered by the Graduate Council, a committee of the Academic Senate, and by the Dean of the Graduate Division. The Coordinating Committee on Graduate Affairs is a systemwide body that assures coordination between the campuses and develops general policies that govern graduate education throughout the University of California.

FINANCIAL SUPPORT

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 are engaged in learning how to teach and 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

To be considered for fellowships and loans: 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 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 Money Matters web site at gradstudies.ucmerced.edu for additional information and assistance.

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 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 undergraduate 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 science, engineering and social science.
- 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 will serve 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. The World Cultures Institute affirms:

- Public Culture: Socially conscious scholarship, activism and art that engages questions about the well-being of all people. The Institute aims to make a positive impact on Merced's surroundings and to serve as a model for sustained campus engagement with diverse communities.
- Dichotomies and Relationships: Research that links the global and the local, the personal and the collective, the historical and contemporary, and the infinite and the limited. The most exciting cultural criticism considers particularity in the context of entire systems.

The World Cultures Institute focuses on the following themes:

- Transnational, Global and Local Worlds,
- Museums, Arts and Parks in Context,
- Science, Technology and Media.

The Institute's proposed inaugural project, The Central Valley Digital Atlas and Data Center, embodies this vision, supporting both researchers and the community. This project combines

- Interactive digital mapping of the historical and modern Valley and its global context,
- A database of contemporary and historical demographic information about the Valley's peoples and their migrations, and
- A registry of Valley cultural institutions and their collections that can create a virtual museum of Central Valley cultural heritage.

As a unique feature, this project will include training in digital technologies and statistical analyses for those involved.

BIOMEDICAL AND SYSTEMS BIOLOGY RESEARCH INSTITUTE (BSBR)

Systems biology is 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.

UC Merced plans to create the Biomedical and Systems Biology Research Institute to form 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 new Institute will also provide a collaborative forum for community partners interested in biomedical and health sciences.

The new Institute particularly 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 will be 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.

CENTER FOR NONIMAGING OPTICS: INNOVATIONS IN SOLAR HEATING, COOLING AND LIGHTING

UC Merced has launched the Center for Nonimaging Optics, which will conduct cutting edge research, unique technical education and continuing engineering education in areas of new and sustainable energy technologies. UC Merced faculty researchers are aggressively engaged in developing close linkages throughout the solar technologies community in general, and nonimaging optics professionals and proponents in particular, then expanding this program 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 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 daylighting technologies. A major emphasis throughout this work will be to promote and develop strong international collaborations and entrepreneurial partnerships.

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.

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 who have completed at least 12 units of upper division work basic to the subject matter of the course may enroll with the approval of the instructor in charge of the course.

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 Natural Science 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.)

ANTHROPOLOGY

Lower Division Courses

ANTH 1: Cultural Anthropology [4]
Introduction to human culture and cultural diversity, including the methods by which anthropology seeks to understand human culture.

ANTH 2: Physical Anthropology [4]
Introduction to human evolution, primate evolution, fossil man and evolution of the mind.

ANTH 90X: Freshman Seminar [1]
Examination of a topic in Anthropology.

ANTH 95: Lower Division Undergraduate Research [1-5]
Supervised research. *Permission of instructor required.*

ANTH 98: Lower Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

ANTH 99: Lower Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

ARTS

Lower Division Courses

ARTS 1: Learning to See: Drawing [4]
Development of the cognitive skill of drawing by teaching the ability to see accurately. Not limited to skills required for becoming an artist. Anyone interested in sharpening one's perceptions and in opening up one's creative capabilities will find this course useful. This is a studio class that will include drawing from nature.

ARTS 3: Learning to See: Painting [4]
Development of the skill of painting in watercolor to develop the complex process of color vision to enhance one's perceptive powers. The use of this skill is not limited to those planning to be artists. This is a studio class that will include drawing and painting from nature.

ARTS 4: Learning to See in Third Dimension [4]
Development of the skill of seeing objects in relationship to space in third dimension to enhance perceptive powers. The use of this skill is not limited to those planning to be artists. This is a studio class that will include creation of three-dimensional objects such as sculpture and models.

ARTS 5: Beginner Music [4]
Development of the 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 10: Substances of Art [4]
Introduction to substances characteristic of the arts, with emphasis on cultural and social significance. The aim is to give each student the tools to develop one's own understanding of what art is, what makes individual works of art important and how to experience art as a source of enrichment in one's life. Two methods of inquiry will be utilized, historical and theoretical. Essential characteristics of the practice of art will also be examined. Course work includes research, writing and attendance at an art event.

ARTS 11: Substances of Music [4]
Introduction 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.

ARTS 12: Substances of Architecture [4]
Introduction 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. Course emphasizes the interrelatedness of architecture and socio-economic history.

ARTS 70: Techniques of Contemporary Artists [4]
Opportunity to learn how to acquire technique. Students work with a practicing contemporary artist. Emphasis on process instead of on result. Thus this course is opened to any student who is interested in learning how technique supports creative processes, a skill that can be translated into use in all areas of life. Techniques will vary depending on the instructor artist's medium of expression. *Prerequisites: Consent of Instructor.*

ARTS 71: Techniques of Interdisciplinary Research in Arts [4]
Exploration of differences between research conducted by artists and by academics. How artists process information, as well as how various forms of artistic expression influence content and meaning. The role of cliché and stereotypical representation in the creation of works of art is also explored. *Cross-listed with ARTS 171.*

ARTS 90X: Freshman Seminar [1]
Examination of a topic in the Arts.

ARTS 95: Lower Division Undergraduate Research [1-5]
Supervised research. *Permission of instructor required.*

ARTS 98: Lower Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

ARTS 99: Lower Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

Upper Division Courses

ARTS 100: History of World Art [4]
Introduces students to significant examples of world art through analysis of selected works from a number of 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. *Prerequisites: ARTS 10 or Consent of Instructor.*

ARTS 101: History of Clothing, Costume and Fashion: Euro-centric Pre- History to 1800 [4]
A survey of European and Euro-centric history of clothing, costumes and fashion spanning from the earliest evidence of clothing worn by humans in pre-history to 1800. Course emphasizes how intrinsically connected to all aspects of human existence clothing is, from political, economic, social and cultural history to geography, agriculture and climate, as well as psychology and art. Students will be able to pick research topics connected to their chosen area of study such as psychology or economics. May be used as an upper division elective as well as count towards a minor and major in arts.

ARTS 102: History of Clothing, Costume and Fashion: Euro-centric 1800 to 1980 [4]
A survey of European and Euro-centric history of clothing, costumes and fashion from 1800 to 1980. Course emphasizes how intrinsically connected to all aspects of human existence clothing is, from political, economic, social and cultural history to geography, agriculture and climate, as well as psychology and art. Students will be able to pick research topics connected to their chosen area of study such as psychology or economics. May be used as an upper division elective as well as counting towards a minor and major in arts.

ARTS 120: Music of the 20th Century [4]
Major forms of American music of the twentieth century: classical music, opera, musical theatre, African American music, folk music and others. Emphasis on connection between musical forms and cultural and social trends. Course work includes research, writing, and may include creative work. *Prerequisites: ARTS 11 or Consent of Instructor.*

ARTS 130: History of World Architecture [4]
Introduction to significant examples of world architecture, concentrating on characteristics of structure, materials, and use. Course work includes research and writing. *Prerequisites: ARTS 12 or Consent of Instructor.*

ARTS 171: Techniques of Interdisciplinary Research in Arts [4]
Exploration of differences between research conducted by artists and by academics. How artists process information, as well as how various forms of artistic expression influence content and meaning. The role of cliché and stereotypical representation in the creation of works of art is also explored. Cross-listed with ARTS 71.

ARTS 195: Upper Division Undergraduate Research [1-4]
Supervised research. *Permission of instructor required.*

ARTS 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

ARTS 199: Upper Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

ATOMIC AND MOLECULAR SCIENCE AND ENGINEERING

Graduate Courses

AMSE 212: Molecular and Solid State Quantum Chemistry [3]
Theory and practical application of molecular quantum mechanics. Schrödinger 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. *Prerequisites: Graduate standing; CHEM 10, MATH 25, PHYS 9 or equivalent.*

AMSE 213: 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. Modern experimental and theoretical methods in kinetics. Graduate requirements include a computer laboratory and a computational project. *Prerequisites: Graduate standing; CHEM 112 or AMSE 212 or equivalent.*

AMSE 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. *Prerequisites: Graduate standing; CHEM 112 or AMSE 212 or equivalent cross-listed with CHEM 131.*

AMSE 250: Material Characterization Techniques [3]
Introduction to techniques appropriate to the characterization of materials at molecular and larger scales, including spectroscopies, light scattering, thermal analysis, diffraction and microscopies. Designed to guide participants in the selection of techniques best suited to addressing particular questions about the structure, shape and arrangement of molecules. *Prerequisite: Graduate standing.*

AMSE 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. *Prerequisite: Graduate standing.*

AMSE 290: Current Topics in Molecular Science and Engineering [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 will be determined by the instructor and will change each semester. *Prerequisite: Graduate standing in Atomic Molecular Science and Engineering group.*

AMSE 295: Graduate Research [1-6]
Supervised research. *Prerequisites: Graduate standing and consent of instructor. S/U grading only.*

AMSE 298: Directed Group Study [1-6]
Group project under faculty supervision. *Prerequisites: Graduate standing and consent of instructor. S/U grading only.*

AMSE 299: Directed Independent Study [1-6]
Independent project under faculty supervision. *Prerequisites: Graduate standing and consent of instructor. S/U grading only.*

BIOENGINEERING

Lower Division Courses

BIOE 30: 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) will be provided. Discussion of current frontiers and future direction of bioengineering, with an emphasis on information technology and nanotechnology. *Prerequisites: ICP 1A and ICP 1B (or equivalent), BIS 1, CHEM 2 (may be taken concurrently).*

BIOE 90X: Freshman Seminar [1]
Examination of a topic in bioengineering.

BIOE 95: Lower Division Undergraduate Research [1-5]
Supervised research. *Permission of instructor required.*

BIOE 98: Lower Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

BIOE 99: Lower Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

Upper Division Courses

BIOE 100: Physiology for Engineers [4]
Use of 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. *Prerequisites: BIS 100, ICP 1A and ICP 1B (or equivalent).*

BIOE 101: Modeling Nanoscale Processes 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. *Prerequisites: BIS 1, ICP 1A and ICP 1B (or equivalent), MATH 23, MATH 24 (recommended).*

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. This course cannot be taken after obtaining credit for BIOE 103. *Prerequisites: BIS 1, ICP 1A and ICP 1B (or equivalent).*

BIOE 103: Biosensors and Bioinstrumentation [4]
The first half of this course will cover the study and design of biosensors for detection of metabolites, toxins, pathogens and cancer including nanoprobes and DNA chips. The second half of the course will cover instrumentation useful in characterizing biomolecules and biological or tissue structures. Instrumentation will also include various imaging techniques and control technologies for devices. This course cannot be taken after obtaining credit for BIOE 102 or 113. *Prerequisites: BIS 1, ICP 1A and ICP 1B (or equivalent).*

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. *Prerequisites: BIS 100, ICP 1A and ICP 1B (or equivalent).*

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. *Prerequisites: BIS 100, ICP 1A and ICP 1B (or equivalent).*

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. *Prerequisites: BIS 100, ENGR 45, ICP 1A and ICP 1B (or equivalent).*

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. This course cannot be taken after obtaining credit for BIOE 103. *Prerequisites: BIS 1, ICP 1A and ICP 1B (or equivalent).*

BIOE 114: Tissue Engineering Design [3]
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 will also cover current case studies and issues for FDA approval of tissue engineered products. *Prerequisites: BIS 100, ICP 1A and ICP 1B (or equivalent).*

BIOE 150: Bioengineering Design [3]
Student will work in teams on bioengineering problems requiring design solutions. Students will define the problem, propose a viable solution, acquire approval for the design, and build and test the designed device. *Prerequisites: BIS 100, CHEM 8, ENGR 45, ENGR 120, ENGR 130, ICP 1A and ICP 1B (or equivalent).*

BIOE 195: Undergraduate Research [1-5]
Research credit is designed to give credit to students that elect to conduct research in a laboratory on campus.

BIOE 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

BIOE 199: Upper Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

BIOLOGICAL SCIENCES

Lower Division Courses

BIS 1: 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.

BIS 2: 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.

BIS 3: 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.

BIS 10: Genetics, Stem Cells and Development [4]
Issues associated with genes, stem cells and embryonic development increasingly impact our lives. This course integrates an overview of biologic topics such as genetic testing, stem cells and the use of animal models with their bioethical considerations. It will place science in the context of personal decisions and ethics.

BIS 50: Human Development [4]
Male and female reproductive systems, hormonal control of egg-sperm interactions, fertilization, venereal disease, embryonic development, fetal physiology.

BIS 51: 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.

BIS 60: Nutrition [4]
Introduction to nutrition science that integrates basic concepts of nutrients, human physiology, microbiology, biochemistry and the psychology of wellness.

BIS 90X: Freshman Seminar [1]
Examination of a topic in the biological sciences.

BIS 95: Lower Division Undergraduate Research [1-6]
Supervised research. *Permission of instructor required.*

BIS 98: Lower Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

BIS 99: Lower Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

Upper Division Courses

BIS 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. *Prerequisites: BIS 1, CHEM 8. Cross-listed with CHEM 110.*

BIS 101: Biochemistry [4]
Advanced course on metabolic pathways and regulation of biochemical functions in living organisms. *Prerequisite: BIS 100, CHEM 8. Cross-listed with CHEM 111.*

BIS 101L: Biochemistry Laboratory [1]
Laboratory experiments demonstrating and reinforcing topics covered in BIS 101. *Prerequisites: BIS 101 or CHEM 111. Cross-listed with CHEM 111L.*

BIS 102: Advanced Molecular Biology of the Gene [4]
Advanced course on the mechanisms of nucleic acid replication, transcription and translation as well as gene regulation and expression. *Prerequisite: BIS 100.*

BIS 102L: Molecular Biology Laboratory [1]
Laboratory experiments demonstrating and reinforcing topics covered in BIS 102. *Prerequisites: BIS 100, BIS 102 must be taken concurrently.*

BIS 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. *Prerequisites: BIS 100, CHEM 10 or ENGR130 and consent of instructor.*

BIS 104 L: Biophysics Laboratory [1]
Laboratory experiments demonstrating and reinforcing topics covered in BIS 104. *Prerequisite: BIS 104 must be taken concurrently.*

BIS 105: Enzymology [4]
Advanced course on enzyme mechanisms and regulation. *Prerequisite: CHEM 10, BIS 100*

BIS 105 L: Enzymology Laboratory [1]
Laboratory experiments demonstrating and reinforcing topics covered in BIS 105. *Prerequisite: BIS 105 must be taken concurrently.*

BIS 106: Introduction to Molecular and Cell Biology [4]
Introduction to the chemical processes underlying life and the structure and function of cells. *Prerequisite: BIS 1.*

BIS 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. *Prerequisites: BIS 100.*

BIS 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 extra-cellular components of the primary tissues and their compilation into the major organic systems will be covered. Emphasis on understanding the link between cellular architectures and organ function. *Prerequisites: BIS 110.*

BIS 112: 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. *Prerequisites: BIS 110.*

BIS 120: General Microbiology (4)
Molecular basis for diversity in bacteria and archae. Significance of molecular diversity in microbial biology; genetic, physiologic and structure-function relationships that underlie the remarkable ability of these organisms to adapt to the environment. *Prerequisites: BIS 110.*

BIS 120L: General Microbiology Laboratory (1)
Laboratory experiments demonstrating and reinforcing topics covered in BIS 120. *Prerequisites: BIS 120 must be taken concurrently.*

BIS 122: Microbial Pathogenesis (4)
Genetic and biochemical features of infectious agents, including identification and characterization of pathogens and the epidemiology of infectious diseases. *Prerequisite: BIS 120*

BIS 123: Human Parasitology (4)
Introduction to protozoan, worm and insect parasitism in animals and humans, and resultant diseases. Emphasis will be on epidemiology, diagnosis and immunology of parasitic infections. *Prerequisite: BIS 120.*

BIS 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. *Prerequisites: BIS 110.*

BIS 125: Emerging Public Health Threats (4)
Multidisciplinary course that covers 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: BIS 120.*

BIS 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. Prerequisites: BIS 110.

BIS 140: Genetics (4)
Includes concepts of inheritance, structure and function of genes and genomes, recombination, genetic mapping, gene regulation, mutations and recombinant DNA technology. Labs and discussions. *Prerequisites: BIS 100.*

BIS 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. Labs and discussion. *Prerequisite: BIS 140.*

BIS 142: Comparative Genomics (4)
Introduction to the concepts behind comparative genomics and a detailed overview of the many tools and data bases used in comparative genomics. Specific topics include comparative approaches to the identification of genes and regulator regions in DNA sequences, the use of phylogenetic analyses to understand gene function and evolution, and methods for analysis of the organization and evolution of large genomes. *Prerequisite: BIS 141.*

BIS 142L: Comparative Genomics Laboratory (1)
Laboratory experiments demonstrating and reinforcing topics covered in BIS 142. *Prerequisites: BIS 142 must be taken concurrently.*

BIS 143: Biodiversity and the Tree of Life (4)
Focus on the current debates in the study of biodiversity such as Linnaean vs. phylogenetic nomenclature, DNA barcoding and anthropogenic effects on species diversity. Overview of major domains of the Tree of Life and approaches currently being used to resolve different branches of the tree. *Prerequisites: BIS 1.*

BIS 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 as well as the comparative method. Case studies will be examined in the complementary laboratory session. *Prerequisites: BIS 140, MATH 32.*

BIS 144L: Phylogenetics Laboratory (1)
Laboratory experiments demonstrating and reinforcing topics covered in BIS 144. *Prerequisites: BIS 144 must be taken concurrently.*

BIS 145: Introduction to Population and Community Ecology (4)
Comprehensive introduction to the ecology of populations, communities and ecosystems. Dynamics of single-species populations and species interactions including competition, predation, parasitism and mutualism. Structure and dynamics of entire communities and food webs will also be examined. Course will discuss conservation biology applications throughout. *Prerequisites: BIS 1, MATH 21.*

BIS 146: Paleobiology (4)
Introduction to the major geological factors that have affected the evolution and the diversity of organisms. 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: BIS 141.*

BIS 148: Introduction to Ecology (4)
Introduction to principles of Ecology ranging from the ecosystem to the population level. *Prerequisite: BIS 1.*

BIS 150: Embryos, Genes and Development (4)
Principles of developmental biology as revealed through analysis of invertebrate and vertebrate systems. Animal models will be used to examine the molecular and cellular mechanisms that influence cell fate. Cell signaling will be studied in the context of embryonic pattern formation and the development of body plans and organ systems. *Prerequisite: BIS 110.*

BIS 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: BIS 110.*

BIS 151 L: Molecular Immunology Laboratory (1)
Laboratory experiments demonstrating and reinforcing topics covered in BIS 151. *Prerequisite: BIS 151 must be taken concurrently.*

BIS 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: BIS 110.*

BIS 153: Evolution and Development [4]
This course compares and contrasts 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 will be investigated. *Prerequisites: BIS 141, BIS 150.*

BIS 160: Comparative Physiology [4]
Covers the function of the major organ systems by studying species-specific adaptations across the vertebrate subphylum. Emphasis on physiological adaptations to environmental challenges. Locomotion, reproduction, cardio-vascular, renal and pulmonary function will serve as the models for assessing the cellular basis for physiologic adaptation across the spectrum of vertebrates. *Prerequisite: BIS 100.*

BIS 160 L: Comparative Physiology Laboratory [1]
Laboratory experiments demonstrating and reinforcing topics covered in BIS 160. *Prerequisite: BIS 160 must be taken concurrently.*

BIS 161: Human Physiology [4]
The mechanisms underlying function of major human organs. Emphasis includes cells and membranes; cardiovascular, renal and gastrointestinal physiology; metabolism; endocrinology; and reproduction. *Prerequisite: BIS 100 and PHYS 9 or PHYS19.*

BIS 161L: Human Physiology Laboratory [1]
Laboratory experiments demonstrating and reinforcing topics covered in BIS 161 with an emphasis on scientific method. BIS 161 must be taken concurrently.

BIS 162: Biomechanics [4]
Introduction to the materials upon which evolution acts. Study of the structure of animals, the materials from which living organisms are made and the limitations that those materials impose upon evolution. *Prerequisite: BIS 160.*

BIS 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. *Prerequisites: BIS 110, CHEM 8 or equivalent, BIS 160 or approval of instructor.*

BIS 163L: Endocrinology Lab [1]
Laboratory experiments demonstrating and reinforcing topics covered in BIS 163 with an emphasis on analytical techniques in endocrinology. *Prerequisites: BIS 163 must be taken concurrently. May be taken for course credit by graduate students lacking training in endocrinology.*

BIS 170: Neurobiology [4]
Examination of the general operations of the central and peripheral nervous system. 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: BIS 110.*

BIS 170 L: Neurobiology Laboratory [1]
Laboratory experiments demonstrating and reinforcing topics covered in BIS 170. *Prerequisite: BIS 170 must be taken concurrently.*

BIS 175: Biostatistics [4]
Advances in statistical techniques to investigate experimental data generated in molecular, cellular and evolutionary biology, and health sciences research. *Prerequisites: MATH 32, ICP 1A and 1B (or equivalent), or MATH 22.*

BIS 180: Mathematical Modeling for Biology [4]
Introduction to basic modeling and data-analysis skills for life science students through hands-on computational laboratories. Focus on the use of computational tools in the analysis of biological data to formulate hypotheses and develop models. Data reduction, model fitting and data visualization; standard software packages; and programming languages. *Prerequisite: BIS 1.*

BIS 181: Survey of Computational Biology [4]
Introduction to the principles and application of computational simulations and modeling in biology, ranging from bioinformatics to computational cell biology. Genome sequence analysis and annotation, phylogenic analysis, protein structure prediction, molecular modeling, and docking and simulations of metabolic and regulatory networks. *Prerequisite: BIS 180.*

BIS 182: Bioinformatics [4]
Detailed introduction to the tools, algorithms and databases used in the field of bioinformatics. Sequence assembly and alignment algorithms, gene finding, protein structure prediction, analysis of gene expression data and methods for genome analysis. Heavily based on hands-on computer laboratories. *Prerequisite: BIS 181.*

BIS 183: Population Genetics [4]
Study of the various factors that affect gene flow and frequency within a population. Theories of selection, drift, hitchhiking, isolation, in-breeding and selfish genetic elements, along with statistical tests and experimental methods for detecting these forces. *Prerequisites: BIS 140, Math 21*

BIS 185: Biomedical Ethics [3]
Ethical issues associated with contemporary biology and the complex relationships among medicine, science and society. Genetic engineering, cloning and stem cell research. *Prerequisite: BIS 1 or BIS 3.*

BIS 190: Research Seminar [1]
Student-led presentations of current topics in biological sciences, including independent research presentations. *Prerequisite: Upper division standing and consent of instructor.*

BIS 195: Research Projects in Biological Sciences [1 -6]
Group or individual research projects in the biological sciences under the direction of a BIS faculty member. *Prerequisites: Upper division standing and consent of instructor*.

BIS 198: Directed Group Study in Biological Sciences [1 - 6]
Group directed study in the biological sciences under the guidance of a BIS faculty member. *Prerequisites: Upper division standing and consent of instructor. P/NP grading only.*

BIS 199: Directed Independent Study in Biological Sciences [1 - 5]
Independent study in the biological sciences under the direction of a BIS faculty member. *Prerequisites: Upper division standing and consent of instructor. P/NP grading only.*

CHEMISTRY

Lower Division Courses

CHEM 1: 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.*

CHEM 2: General Chemistry [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. *Prerequisites: Passing score on chemistry placement exam OR score of 3 or better on chemistry AP exam or CHEM 1*

CHEM 8: Principles of Organic Chemistry [4]
Molecular shapes and change distributions; resonance; electron delocalization; organic structures, nomenclature and isomerism, stereochemistry; optical activity; organic reactions; combinatorial synthesis; spin and NMR spectroscopy; intermolecular forces; amino acids, nucleotides, carbohydrates, fatty acids; biopolymers; 3D structure of biomolecules. Laboratories emphasize "green chemistry" concepts, using environmentally benign reagents and minimizing waste. *Prerequisite: CHEM 2.*

CHEM 10: Principles of Physical Chemistry [4]
Gas properties; entropy; free energy; chemical kinetics: rate laws, temperature dependence, catalysis, enzymes; diffusion and transport; oxidation-reduction and electrochemistry; 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 2.*

CHEM 90X: Freshman Seminar [1]
Examination of a topic in chemistry.

CHEM 95: Lower Division Undergraduate Research [1-5]
Supervised research. *Permission of instructor required.*

CHEM 98: Lower Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

CHEM 99: Lower Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

Upper Division Courses

CHEM 100: Organic Synthesis and Mechanism [3]
Reactions, syntheses, purification and characterization of all the major classes of organic compounds. Includes reaction mechanisms, multistep syntheses and combinatorial methods. *Prerequisites: CHEM 8, CHEM 10.*

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 [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 [may be taken concurrently].*

CHEM 110: Molecular Machinary of Life [4]
Introduction to the chemical processes underlying life, covering the structure and properties of biological macromolecules, metabolism, regulation and energy transduction. *Prerequisites: CHEM 8, BIS 1, ICP1A or MATH 21, ICP 1B or PHYS 8. Cross-listed with BIS 100.*

CHEM 111: Biochemistry [4]
Advanced course on metabolic pathways and regulation of biochemical functions in living organisms. *Prerequisite: CHEM 8, BIS 100. Cross-listed with BIS 101.*

CHEM 111L: Biochemistry Lab [1]
Laboratory experiments demonstrating and reinforcing topics covered in CHEM 111. *Prerequisite: CHEM 111 or BIS 101 [must be taken concurrently]. Cross-listed with BIS 101L.*

CHEM 112: Quantum Chemistry and Spectroscopy [3]
Theory and practical application of molecular quantum mechanics. Schrödinger 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. *Prerequisites: CHEM 10, MATH 24, PHYS 9 (or equivalent).*

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.*

CHEM 114L: Physical Chemistry and Instrumental Analysis Laboratory [2]
Laboratory experiments in spectroscopy, electrochemistry, separations and kinetics, including biochemical and biophysical applications. *Prerequisite: CHEM 115 [may be taken concurrently].*

CHEM 115: Instrumental Analysis and Bioanalytical Chemistry [3]
Spectroscopic, electrochemical and separation methods of chemical analysis including bioanalytical techniques. *Prerequisites: CHEM 8, CHEM 10.*

CHEM 120: Inorganic Chemistry [3]
Descriptive inorganic chemistry, reactivity, inorganic spectroscopy, group theory and crystallography. *Prerequisites: CHEM 8, CHEM 10.*

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.*

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.*

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. *Prerequisites: CHEM 111 or BIS 101, CHEM 113.*

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. *Prerequisites: CHEM 100, 113, 120 [all may be taken concurrently].*

CHEM 145: Applied and BiomolecularSpectroscopy [3]
Application and interpretation of spectroscopic methods to problems in chemical structure and analysis with a particular emphasis on biomolecules. Topics include UV/visible absorption, fluorescence, infrared absorption, Raman scattering, nuclear magnetic resonance, electron spin resonance, circular dichroism, mass spectrometry, microspectroscopic and single-molecule techniques. *Prerequisite: CHEM 115.*

CHEM 147: Materials Chemistry Laboratory [3]
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. *Prerequisites: CHEM 100L; 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. *Prerequisite: Consent of instructor.*

CHEM 195: Upper Division Undergraduate Research [1-4]
Supervised research. *Permission of instructor required.*

CHEM 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

CHEM 199: Upper Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

COGNITIVE SCIENCE

Lower Division Courses

COGS 1: 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 5: 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 90X: Freshman Seminar [1]
Examination of a topic in the cognitive sciences.

COGS 95: Lower Division Undergraduate Research [1-5]
Supervised research. *Permission of instructor required.*

COGS 98: Lower Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

COGS 99: Lower Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

Upper Division Courses

COGS 101: Mind, Brain and Computation [4]
A course that 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 1.*

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.] will be assumed. Symbolic artificial intelligence, neural networks, genetic algorithms and computer graphics. *Prerequisites: COGS 1, one course in computer programming.*

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 1 or permission of instructor. Recommended: One course in computer programming.*

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. *Prerequisites: PHIL 1, COGS 1 or consent of instructor. Cross-listed with PHIL 110.*

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. *Prerequisites: COGS 1 or PSY 1. Cross-listed with PSY 121.*

COGS 125: Introduction to Artificial Intelligence [4]
This course 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. The course includes practical experimentation of algorithms in computer labs. *Prerequisites: CSE 20 and CSE 21 (or appropriate sequence of introductory programming course) or consent of instructor. COGS 1 encouraged but not required.*

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. Conversational language, gesture, speech disfluencies, figurative language, spatial language, child- parent interaction, speech recognition and human-computer processing. The course integrates research from psychology, linguistics, sociolinguistics and human-computer interaction. Research project required. *Prerequisites: COGS 1, COGS 5.*

COGS 155: Language Acquisition [4]
A comprehensive survey of the theories, methods and findings on first and second language acquisition. *Prerequisites: COGS 1, COGS 5.*

COGS 180: Topics in Cognitive Science [4]
A variety of topics in cognitive science are offered. *Prerequisite: COGS 1.*

COGS 195: Upper Division Undergraduate Research [1-5]
Supervised research. *Permission of instructor required.*

COGS 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

COGS 199: Upper Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

Graduate Courses

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. 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. *Prerequisites: Graduate Standing. S/U grading only.*

COLLEGE ONE CORE COURSES

Lower Division Courses

CORE 1: The World at Home – Planning for the Future in a Complex World I [4]
This course provides a foundation for 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. Study of how individuals and societies can make the best choices in preparing for an uncertain future. The unifying theme is contemporary California which will act 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 is brought to bear on the course topics. *Prerequisite: Satisfaction of University of California Entry Level Writing Requirement.*

CORE 90X: College One Core Freshman Seminar [1-2]
Examination of an academic topic.

Upper Division Courses

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. Upper-division level quantitative literacy skills and writing ability are expected. *Prerequisite: Junior standing.*

COMPUTER SCIENCE AND ENGINEERING

Lower Division Courses

CSE 1: Programming I [3]
Fundamentals of computer programming, including basic algorithms, programming styles, program validation and debugging. Major compound data types including arrays, queues, tuples, stacks, binary trees and linked lists.

CSE 2: Programming II [3]
Intermediate computer programming, including concepts of recursion, functional and object- oriented programming. Classes and objects, abstraction, inheritance, operator overloading and data localization. *Prerequisite: CSE 1.*

CSE 20: Introduction to Computing I [2]
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.

CSE 21: Introduction to Computing II [2]
Continuation of CSE 20. Intermediate computer programming, including concepts of recursion, functional and object-oriented programming. Classes and objects, abstraction, inheritance, operator overloading, data localization, interfaces, trees and linked lists. *Prerequisite: CSE 20.*

CSE 30: Introduction to Computer Science and Engineering I [4]
Overview of the diverse field of computer science and engineering. In-depth analysis of several key inventions in the field that have been instrumental in advancing CSE and driving worldwide technical growth.

CSE 31: Introduction to Computer Science and Engineering II [4]
Overview of the diverse field of computer science and engineering. In-depth analysis of several key inventions in the field that have been instrumental in advancing CSE and driving worldwide technical growth. *Prerequisite: CSE 21.*

CSE 90X: Freshman Seminar [1]
Examination of a topic in computer science and engineering.

CSE 95: Lower Division Undergraduate Research [1-5]
Supervised research. *Permission of instructor required.*

CSE 98: Lower Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

CSE 99: Lower Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

Upper Division Courses

CSE 100: Algorithm Design and Analysis [4]
Introduction to the design and analysis of computer algorithms. Theoretical models of computation, concepts of algorithm complexity, computability and NP-completeness. Major algorithms and data structures for searching, sorting, parsing and memory management. *Prerequisite: CSE 21.*

CSE 106: Exploratory Computing [4]
Our ability to manipulate data depends on and is limited by our familiarity with computing technologies. Study of tools for exploratory computing, emphasizing programming and scripting languages over point-and-click interfaces. 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.

CSE 111: Database Systems [4]
Principles of database design and operation. Major types of databases, including flat-file, hierarchical, relational and object-oriented. Database-querying languages, database security and special issues related to the www-based database systems. *Prerequisite: CSE 100.*

CSE 120: Software Engineering [4]
Modern engineering techniques for developing reliable, efficient, reusable and maintainable computer software. Primary software design models, including functional, structured and object-oriented programming. Software validation, revision control, project management and documentation. *Prerequisite: CSE 100.*

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. Diversity of contemporary computer designs. *Prerequisite: CSE 21.*

CSE 150: Introduction to Operating Systems [4]
Concepts of computer operating systems including memory management, file systems, multitasking, performance analysis and security. *Prerequisite: CSE 21.*

CSE 160: Networking [4]
Design concepts and implementation features of computer networks. Network robustness, scalability, addressing, routing and security. Several contemporary networking protocols will be analyzed. *Prerequisite: CSE 150.*

CSE 195: Upper Division Undergraduate Research [1-5]
Supervised research. *Permission of instructor required.*

CSE 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

CSE 199: Upper Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

EARTH SYSTEMS SCIENCE

Lower Division Courses

ESS 1: 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 5: 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 10: Earth and Society [4]
We are users and changers of our planet. This course discusses the materials and resources our planet supplies to human society, the impact of natural disasters on human history, and anthropogenic influences on climate, land use and sustainable resources.

ESS 20: Fundamentals of Earth Processes [4]
Fundamentals of Earth science with focus on terrestrial, marine and atmospheric systems through time; surface geological processes (plate tectonics, lithosphere cycling, weathering, erosion, sedimentation, landscape and soil formation); material and heat transport in atmosphere-ocean-lithosphere systems; paleoclimatic and paleoenvironmental dynamics and their relation to tectonic processes. *Prerequisites: ESS 1 or ESS 5 or BIS 1; CSE 21; ICP 1A and 1B (or equivalent).*

ESS 25: 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. *Prerequisites: ESS 1 or ESS 5 or BIS 1; ICP 1A and 1B (or equivalent).*

ESS 40: 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 50: 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 unique California habitats.

ESS 60: 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 70: Soil Foundations of Terrestrial Ecosystems [4]
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 on the quantitative descriptions of energy nutrient and contaminant fluxes into, out of and through soils. *Prerequisites: ESS 1 or BIS 1; CHEM 8.*

ESS 90X: Freshman Seminar [1]
Examination of a topic in Earth systems science.

ESS 95: Lower Division Undergraduate Research [1-5]
Supervised research. *Permission of instructor required.*

ESS 98: Lower Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

ESS 99: Lower Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

Upper Division Courses

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. *Prerequisites: CHEM 8, ICP 1A and 1B (or equivalent). Cross-listed with ENVE 100.*

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/ESS 100.*

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/ESS 100.*

ESS 104: Organic Geochemistry [3]
Focus on organic chemical reactions in soils and sedimentary environments. Formation and weathering of natural organic matter and reactions of natural organic matter with pollutants. *Prerequisite: ENVE/ESS 100.*

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. *Prerequisites: ENVE/ESS 100, ENVE/ESS 110.*

ESS 106: Spectroscopic and Microscopic Methods [3]
Application of advanced spectroscopic and microscopic methods to the study of Earth materials, aqueous systems and aqueous-solid interfaces. *Prerequisite: ENVE/ESS 100.*

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/ESS 100.*

ESS 109: 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. *Prerequisites: ENVE/ESS 100 or CHEM 10.*

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 20 or ESS 20. Cross-listed with ENVE 110.*

ESS 120: Geomicrobiology [4]
Fundamentals of microbiology related to Earth systems, including biogeochemical cycling, microbial metabolism and biodiversity, soil food webs and genomics. *Prerequisites: CHEM 8, ICP 1A and 1B (or equivalent).*

ESS 124: Ecology and Ecosystems [4]
Ecology and ecological principles; organization, dynamics and mathematical models of population and communities; biodiversity; environmental scaling; and spatial analysis. *Prerequisite: ESS 20 or ESS 25.*

ESS 125: Microbial Ecology [4]
Advanced course in microbiological systems and techniques. *Prerequisite: ESS 120.*

ESS 126: Environmental Genomics [4]
Introduction to the principles and methods of genomics as applied to the understanding of ecosystems. Population genetics, adaptation to environmental change and genomic analysis of environmental microbial communities; experimental and computational methods relevant to environmental genomics. *Prerequisite: BIS 141 or ESS 120.*

ESS 128: Theoretical Ecology [4]
Advanced course on the application of theoretical and quantitative methods for the analysis and interpretation of populations, communities and ecosystems. *Prerequisites: ESS 20 or ESS 25.*

ESS 131: Atmospheric Chemistry and Physics [4]
Chemistry and physics of the troposphere and stratosphere, including atmospheric aerosols. *Prerequisite: ESS 20 or ENVE 20.*

ESS 132: Climatology [3]
The global and surface energy balance; the hydrologic cycle; the influence on climate of the atmospheric and oceanic circulation; climate history, sensitivity, modeling and natural and anthropogenic change. *Prerequisite: ENVE/ESS 110.*

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 20 or ENVE 20.*

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. *Prerequisites: CHEM 8, ICP 1A and 1B (or equivalent).*

ESS 190: Undergraduate Seminar [1]
Weekly seminar of current topics in earth and environmental systems. *Prerequisite: Upper division standing.*

ESS 192: Topics in Environmental Systems [2-4]
Treatment of a special topic or theme in Environmental Systems. May be repeated for credit in a different subject area. *Prerequisites: Upper division standing or consent of instructor. Cross-listed with ES 292.*

ESS 195: Upper Division Undergraduate Research [1-5]
Supervised research. *Permission of instructor required.*

ESS 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

ESS 199: Upper Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

ECONOMICS

Lower Division Courses

ECON 1: 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 10: Analysis of Economic Data [4]
Introduction to observation, estimation and hypothesis testing in economics; use of linear regression models. *Prerequisite: ECON 1.*

ECON 11: History of Economic Thought [4]
A survey of the theories of major economists from Adam Smith to Keynes. *Prerequisite: ECON 1.*

ECON 90X: Freshman Seminar [1]
Examination of a topic in economics.

ECON 95: Lower Division Undergraduate Research [1-5]
Supervised research. *Permission of instructor required.*

ECON 98: Lower Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

ECON 99: Lower Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

Upper Division Courses

ECON 100: Intermediate Microeconomic Theory [4]
Price determination and resource distribution theory under conditions of perfect and imperfect competition. General equilibrium and welfare economics. *Prerequisites: ECON 1, MATH 21 or equivalent, or consent of instructor.*

ECON 101: Intermediate Macroeconomic Theory [4]
Analysis of output, employment, interest rates and the price level. Effects of these on changes in monetary and fiscal variables. *Prerequisites: ECON 1, MATH 21 or equivalent or consent of instructor.*

ECON 111: American Economic History [4]
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.*

ECON 115: Economics of Industrial Organization [4]
The organization and structure of industrial production in the United States economy. *Prerequisite: ECON 100.*

ECON 120: Economics of the Environment [4]
Analysis of public policy measures that pertain to human environments. *Prerequisite: ECON 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. *Prerequisites: ECON 10, MATH 21 or equivalent.*

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.*

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.*

ECON 150: Economic Development [4]
Problems of underdevelopment and poverty, policy issues and development strategy. *Prerequisite: ECON 100.*

ECON 151: Public Economics [4]
Influence of governmental revenue and expenditure decisions on economic performance. Issues such as public goods and externalities, as well as specific expenditure and taxation programs. *Prerequisite: ECON 100.*

ECON 152: Law and Economics [4]
Economic analysis of legal rules and institutions, including property, contract and tort law. Also, issues surrounding crime and punishment. *Prerequisite: ECON 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.*

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.*

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*.

ECON 162: Financial Economics [4]
The course explores 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.*

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. *Prerequisites: ECON 1, junior or senior standing, major in SCS in the economics track or consent of instructor.*

ECON 191: Fieldwork in Economics [1-4]
Supervised field studies in economics. *Prerequisites: ECON 1; junior or senior standing; major in SCS in the economics track or consent of instructor.*

ECON 195: Upper Division Undergraduate Research [1-5]
Supervised research. *Permission of instructor required.*

ECON 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

ECON 199: Upper Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

EDUCATION

Lower Division Courses

EDUC 10: 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 will be on California's education system, with comparative perspectives from other states and countries.

EDUC 90X: Freshman Seminar [1]
Examination of a topic in Education.

ENGINEERING

Lower Division Courses

ENGR 45: Introduction to Materials [4]
Relationships of the structure, processing, properties and performance of materials. Application of physical and chemical principles in the context of engineering materials: atomic bonding, crystal structure, defects, thermodynamics and kinetics. *Prerequisites: ICP 1A and 1B (or equivalent), CHEM 2 or consent of instructor.*

ENGR 50: Statics [2]
Vector operations, forces and couples, free body diagrams, equilibrium of a particle and of rigid bodies. Friction. Distributed forces. Centers of gravity and centroids. *Prerequisite: ICP 1A and 1B (or equivalent).*

ENGR 52: 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. *Prerequisites: CSE 1, MATH 32.*

ENGR 53: Materials and the Environment [4]
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. *Prerequisites: ICP 1A and 1B (or equivalent), CHEM 2 or consent of instructor.*

ENGR 57: 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: ICP 1A and ICP 1B (or equivalent).*

ENGR 90X: Freshman Seminar [1]
Examination of a topic in engineering.

ENGR 95: Lower Division Undergraduate Research [1-5]
Supervised research. *Permission of instructor required.*

ENGR 97: 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] levels. *Prerequisite: Completion of first freshman semester. Permission of instructor required.*

ENGR 98: Lower Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

ENGR 99: Lower Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

Upper Division Courses

ENGR 120: Fluid Mechanics [4]
Introduction to and application of principles of mechanics to flow of compressible and incompressible fluids. Includes laboratory work. *Prerequisite: ICP 1A and ICP 1B (or equivalent).*

ENGR 130: Thermodynamics [3]
Fundamentals of equilibrium, temperature, energy and entropy. Equations of state and thermodynamic properties, with engineering applications. *Prerequisites: ICP 1A and ICP 1B (or equivalent), CHEM 2.*

ENGR 135: Heat Transfer [3]
Study of conduction, convection and radiation heat transfer, with applications to engineering problems. Includes laboratory work. *Prerequisite: ENGR 130.*

ENGR 140: Introduction to Object Oriented Programming [3]
Object and database principles, including data models, access control, database systems architecture, functional data manipulation, database organizational design, indexing and performance analysis. *Prerequisites: CSE 1, MATH 32.*

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: ICP 1A and ICP 1B (or equivalent).*

ENGR 155: Engineering Economics Analysis [3]
Microeconomic principles and methods. Time value of money, interest and equivalence, analysis of economic alternatives, depreciation, inflation and taxes, estimates of demand, cost and risk, decision theory.

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. *Prerequisites: CSE 21, ICP 1A and 1B (or equivalent).*

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 24.*

ENGR 170: Introduction to Electron Microscopy [3]
Principles and techniques of electron microscopy used in the study of materials. Emphasis upon practical applications. *Prerequisites: ICP 1A and ICP 1B (or equivalent) or PHYS 9, introductory level knowledge of crystallography. Concurrent enrollment in ENGR 170 L is strongly encouraged.*

ENGR 170L: Introduction to Electron Microscopy – Laboratory [1]
Laboratory for principles and techniques of electron microscopy used in the study of materials. *Prerequisites: ICP 1A and 1B (or equivalent) or PHYS 9, introductory level knowledge of crystallography. Concurrent enrollment in ENGR 170 is strongly encouraged.*

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. *Prerequisites: CSE 21, MATH 32.*

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: Permission of instructor required.*

ENGR 195: Upper Division Undergraduate Research [1-4]
Supervised research. *Permission of instructor required.*

ENGR 197: Service Learning: Engineering Projects in Community Service [1]
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] levels. *Prerequisite: Permission of instructor required.*

ENGR 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

ENGR 199: Upper Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

Graduate Courses

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. *Prerequisites: ICP 1A and 1B (or equivalent) or PHYS 9, introductory-level knowledge of crystallography. Concurrent enrollment in ENGR 270L is strongly encouraged. Cross-listed with ENGR 170.*

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. *Prerequisites: ICP 1A and 1B (or equivalent) or PHYS 9, introductory-level knowledge of crystallography. Concurrent enrollment in ENGR 270 is strongly encouraged. Cross-listed with ENGR 170L.*

ENGR 295: Graduate Research [1-6]
Supervised research in engineering. *Prerequisites: Graduate standing and consent instructor. S/U grading only.*

ENGR 298: Directed Group Study [1-6]
Group project under faculty supervision. *Prerequisites: Graduate standing and consent instructor.* S/U grading only.

ENGR 299: Directed Independent Study [1-6]
Independent project under faculty supervision. *Prerequisites: Graduate standing and consent instructor.* S/U grading only.

ENVIRONMENTAL ENGINEERING

Lower Division Courses

ENVE 10: 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.

ENVE 20: 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. *Prerequisites: CSE 21; MATH 32 [may be taken concurrently]; CHEM 2; ICP 1A and 1B (or equivalent).*

ENVE 90X: Freshman Seminar [1]
Examination of a topic in environmental engineering.

ENVE 95: Lower Division Undergraduate Research [1-5]
Supervised research. *Permission of instructor required.*

ENVE 98: Lower Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

ENVE 99: Lower Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

Upper Division Courses

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. *Prerequisites: CHEM 8, ICP 1A and 1B (or equivalent). Cross-listed with ESS 100.*

ENVE 105: Environmental Data Analysis [3]
Probabilistic and statistical methods to analyze environmental data. Emphasis on 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. *Prerequisites: ICP 1A and ICP 1B (or equivalent).*

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 20 or ESS 20. Cross-listed with ESS 110.*

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 groundwater flow and transport modeling, with emphasis on model construction and simulation. *Prerequisite: ENVE/ESS 110.*

ENVE 114: Mountain Hydrology of the Western United States [4]
Principles of snow formation, occurrence and measurement; components of evapo-transpiration; runoff generation; ground-water recharge processes; water resource assessments; and resource management. Focus on California and the southwestern U.S. Design project. *Prerequisite: ENVE/ESS 100.*

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 2.*

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. *Prerequisites: BIS 1, ENVE 20.*

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; air pollution control strategies. *Prerequisite: ENVE 20 or ESS 20.*

ENVE 132: Air Pollution Control [3]
Topics will 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 will be addressed in the context of case studies. *Prerequisite: ENVE 130.*

ENVE 140: 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. *Prerequisites: ENVE 20, ENGR 155.*

ENVE 152: 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. *Prerequisite: ENVE 20 or ESS 20.*

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 20 or ESS 20.*

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. *Prerequisites: ENGR 135, ENGR 160, ENVE 160.*

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. Modeling of environmentally important compounds, photochemical reactions, natural organic matter, sorption phenomena. *Prerequisite: ENVE/ESS 100.*

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. *Prerequisites: ENVE 20, ENVE/ESS 100, ENGR 120.*

ENVE 181: Field Methods in Snow Hydrology [1-3]
Properties and measurement of snow. Principles of snow metamorphism and melting. Field workshops. *Prerequisite: ENVE/ESS 110.*

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/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.*

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/ESS 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. *Prerequisite: Permission of instructor required.*

ENVE 192: Topics in Environmental Systems [2-4]
Treatment of a special topic or theme in Environmental Systems. May be repeated for credit in a different subject area. *Prerequisites: Upper division standing or consent of instructor*

ENVE 195: Upper Division Undergraduate Research [1-5]
Supervised research. *Permission of instructor required.*

ENVE 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

ENVE 199: Upper Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

ENVIRONMENTAL SYSTEMS

Graduate Courses

ES 200: Environmental Systems [3]
Exploration of linkages in environmental systems and tools to evaluate important features of those systems. Examination of the characteristics of different Earth compartments (pedosphere, lithosphere, biosphere, atmosphere and hydrosphere) in terms of mass and energy balance, residence times and interactions. Examination of how each of these compartments interacts with the global water cycle. *Prerequisite: Graduate standing.*

ES 202: Chemistry and Mineralogy of Soils [3]
Thermodynamics and kinetics of chemical process in soil systems. Formation and identification of common minerals, adsorption/desorption, precipitation/dissolution, electrochemical reactions in soils. Graduate requirements include individual additional exercises and preparation of a research paper. *Prerequisite: Graduate standing.*

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. *Prerequisite: Graduate standing.*

ES 204: Organic Geochemistry [3]
Focus on organic chemical reactions in soils and sedimentary environments. 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. *Prerequisite: Graduate standing.*

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. *Prerequisite: Graduate standing.*

ES 206: Spectroscopic and Microscopic Methods [3]
Application of advanced spectroscopic and microscopic methods to the study of Earth materials, aqueous systems and aqueous-solid interfaces. Graduate requirements include individual additional exercises and preparation of a research paper. *Prerequisite: Graduate standing.*

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. *Prerequisite: Graduate standing.*

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: Graduate Standing.*

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 groundwater 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. *Prerequisite: Graduate standing.*

ES 214: Mountain Hydrology of the Western U.S. [4]
Principles of snow formation, occurrence and measurement; components of evapotranspiration; runoff generation; ground-water recharge processes; water resource assessments; and resource management. Focus on California and the southwestern U.S. Design project. Graduate requirements include more in-depth investigation of one or more topics and preparation of paper. *Prerequisite: Graduate standing.*

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. *Prerequisite: Graduate standing.*

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. *Prerequisite: Graduate standing.*

ES 225: Microbial Ecology [4]
Advanced course in microbiological systems and techniques. Graduate requirements include additional exercises and preparation of a research paper. *Prerequisite: Graduate standing.*

ES 226: Environmental Genomics [4]
Introduction to the principles and methods of genomics as applied to the understanding of ecosystems. Population genetics, adaptation to environmental change, 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. *Prerequisite: Graduate standing.*

ES 228: Ecological Modeling [3]
Advanced course on modeling population dynamics and the flow of energy and matter in ecosystems. Graduate requirements include additional exercises and preparation of a research paper. *Prerequisite: Graduate standing.*

ES 232: Climatology [3]
The global and surface energy balance; the hydrologic cycle; the influence on climate of the atmospheric and oceanic circulation; climate history, sensitivity, modeling, and natural and anthropogenic change. *Prerequisite: Graduate Standing.*

ES 234: Air Pollution and Resources [3]
Chemistry and physics of atmospheric pollutants, urban air pollution, visibility, mitigation and resource economics. *Prerequisite: Graduate Standing.*

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. *Prerequisite: Graduate standing.*

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. *Prerequisite: Graduate standing.*

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. *Prerequisite: Graduate standing.*

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. *Prerequisite: Graduate standing.*

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. *Prerequisite: Graduate standing.*

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. Modeling of environmentally important compounds, photochemical reactions, natural organic matter, sorption phenomena. Graduate-level requirements include preparation of a detailed case analysis. *Prerequisite: Graduate standing.*

ES 291: Environmental Systems Seminar [1-3]
Seminar on advanced engineering and science topics, environmental systems research and relevant case studies. *Prerequisite: Graduate standing. S/U grading only.*

ESS 292: Topics in Environmental Systems [2-4]
Treatment of a special topic or theme in environmental systems. May be repeated for credit in a different subject area. *Prerequisite: Graduate Standing.*

ES 295: Graduate Research [1-6]
Supervised research in environmental systems. *Prerequisites: Graduate standing and consent instructor.* S/U grading only.

ES 298: Directed Group Study [1-6]
Group project under faculty supervision. *Prerequisites: Graduate standing and consent instructor.* S/U grading only.

ES 299: Directed Independent Study [1-6]
Independent project under faculty supervision. *Prerequisites: Graduate standing and consent instructor.* S/U grading only.

FRENCH

Lower Division Courses

FRE 1: Elementary French I [4]
Introduction to speaking, reading, writing and understanding French. Classes conducted in French.

FRE 2: Elementary French II [4]
Introduction to speaking, reading, writing and understanding French. Classes conducted in French. *Prerequisite: FRE 1 or appropriate score on French placement test or equivalent.*

FRE 3: Intermediate French I [4]
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 2 or appropriate score on French placement test or equivalent.*

FRE 4: Intermediate French II [4]
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 3 or appropriate score on French placement test or equivalent.*

FRE 95: Lower Division Undergraduate Research [1-5]
Supervised research. *Permission of instructor required.*

FRE 98: Lower Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

FRE 99: Lower Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

HISTORY

Lower Division Courses

HIST 10: 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.

HIST 11: 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: Students not completing HIST 10, must consult with instructor before registering.*

HIST 16: The 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 17: 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 20: History of the American West, 1500-1849 [4]
Focus on the age of discovery, the idea of the frontier and the impact of westward expansion upon the indigenous people of the West.

HIST 21: History of the American West, 1850-2000 [4]
Major topics will include the settlement, exploitation and promise of the West, from Gold Rush-era California to the present day. *Prerequisite: HIST 20.*

HIST 30: 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 31: 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 90X: Freshman Seminar [1]
Examination of a topic in history.

HIST 95: Lower Division Undergraduate Research [1-5]
Supervised research. *Permission of instructor required.*

HIST 98: Lower Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

HIST 99: Lower Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

Upper Division Courses

HIST 100: The Historian's Craft [4]
Focus will be 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 in the major, or permission of the instructor. Required of all History emphasis students in the WCH major.*

HIST 130: Topics in World History: 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 10 and/or HIST 11 or equivalent, or permission of the instructor.*

HIST 131: Topics in National History [4]
In-depth study of a particular topic in the history of a nation. Possible topics include the social, cultural, economic or political history of that nation. *Prerequisites: HIST 10 and 11 or HIST 16 and 17, or the equivalent of a two- semester lower division history survey; and HIST 100 [may be taken concurrently]; or permission of the instructor. May be repeated for credit up to three times with different topics.*

HIST 132: Topics in Regional and 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. *Prerequisites: HIST 10 and 11 or HIST 16 and 17, or the equivalent of a two-semester lower division history survey; and WCH 100 [may be taken concurrently]; or permission of the instructor. May be repeated for credit up to three times with different topics.*

HIST 133: 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 on the experiences of European, Native, African, Chicano/Latino and Asian Americans. *Prerequisites: HIST 10 and 11 or HIST 16 and 17, or the equivalent of a two-semester lower division history survey; and WCH 100 [may be taken concurrently]; or permission of the instructor. May be repeated for credit up to three times with different topics.*

HIST 134: Topics in the History of Science and Technology: History of Cartography [4]
This highly visual course covers the 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. *Prerequisites: HIST 10 and HIST 11 or equivalent, or permission of the instructor.*

HIST 135: 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." *Prerequisites: HIST 10 and 11 or HIST 16 and 17, or the equivalent of a two-semester lower division history survey; and HIST 100 [may be taken concurrently]; or permission of the instructor. May be repeated for credit up to three times with different topics.*

HIST 136: Essence of Decision: Case Studies in History [4]
The art and science of decision-making with specific examples from historical case studies. Focus on the historical determinates of both successful and unsuccessful decisions, and upon decisions that had both foreign policy and domestic implications. *Prerequisites: History 16 or 17 or consent of instructor.*

HIST 137: 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. *Prerequisites: HIST 10 and 11 or HIST 30 and 31 or consent of instructor.*

HIST 150: 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. *Prerequisites: HIST 16 and 17 or equivalent, or permission of the Instructor.*

HIST 195: Upper Division Undergraduate Research [1-5]
Supervised research. *Permission of instructor required.*

HIST 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

HIST 199: Upper Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

HUMAN BIOLOGY

Upper Division Courses

HBIO 190: Research Seminar [1]
Student-led presentations of current topics in human biology, including independent research presentations. *Prerequisites: Upper division standing and consent of instructor.*

HBIO 195: Research Projects in Human Biology [1-5]
Group or individual research projects in human biology under the direction of a BIS faculty member and a faculty member from the School of Social Sciences, Humanities and Arts. *Prerequisites: Upper division standing and consent of instructor.*

HBIO 198: Directed Group Study in Human Biology [1 - 6]
Group directed study in human biology under the direction of a BIS faculty member and a faculty member from the School of Social Sciences, Humanities and Arts. *Prerequisites: Upper division standing and consent of instructor. P/NP grading only.*

HBIO 199: Directed Independent Study in Human Biology [1 - 5]
Independent study in human biology under the direction of a BIS faculty member and a faculty member from the School of Social Sciences, Humanities and Arts. Prerequisites: Upper division standing and consent of instructor. *P/NP grading only.*

INTEGRATED CALCULUS AND PHYSICS

Lower Division Courses

ICP 1A: 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, this course covers 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 will receive a separate grade for the calculus component (ICP 1A) and the physics component (ICP 1B). *Prerequisite: Pass calculus placement exam. Co-requisite: ICP 1B. ICP 1A and ICP 1B replaces ICP 1.*

ICP 1B: 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, this course covers 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 will receive a separate grade for the calculus component (ICP 1A) and the physics component (ICP 1B). *Prerequisite: Pass calculus placement exam. Co-requisite: ICP 1A. ICP 1A and ICP 1B replaces ICP 1.*

JAPANESE

Lower Division Courses

JAPA 1: Elementary Japanese I [4]
Introduction to speaking, reading, writing and understanding modern Japanese.

JAPA 2: Elementary Japanese II [4]
Introduction to speaking, reading, writing and understanding modern Japanese. *Prerequisite: JAPA 1 or appropriate score on Japanese placement test or equivalent.*

JAPA 3: Intermediate Japanese I [4]
Continuation of elementary Japanese emphasizing 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: JAPA 2 or appropriate score on Japanese placement test or equivalent.*

JAPA 4: Intermediate Japanese II [4]
Continuation of elementary Japanese and Japanese 3 emphasizing 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: JAPA 3 or appropriate score on Japanese placement test or equivalent.*

JAPA 95: Lower Division Undergraduate Research [1-5]
Supervised research. *Permission of instructor required.*

JAPA 98: Lower Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

JAPA 99: Lower Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

LITERATURE

Lower Division Courses

LIT 20: 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. Master works of world literature in their cultural contexts, through comparative analysis.

LIT 21: 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. Master works of world literature in their cultural contexts, through comparative analysis. *Prerequisite: LIT 20.*

LIT 30: 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.

LIT 31: 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.

LIT 32: 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. *Prerequisites: WRI 10.*

LIT 40: 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.

LIT 41: 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: LIT 40.*

LIT 42: British Women Writers [4]
Selected works of British women writers including a variety of texts, from early religious treatises through the birth of the British novel and beyond. Economic, social and cultural constraints and the relationship between historical context and artistic production of women writers. *Prerequisite: WRI 10.*

LIT 50: Introduction to Hispanic Literature I [4]
Survey of the history and major works of Peninsular, Latin America and Latino literatures from the nineteenth century. Course will be conducted in Spanish. *Prerequisites: Completion of SPAN 4, SPAN 11 or equivalent.*

LIT 51: Introduction to Hispanic Literature II [4]
Survey of the history and major works of Peninsular, Latin America and Latino literatures since the nineteenth century. Course will be conducted in Spanish. *Prerequisite: SPAN 4, SPAN 11 (or equivalent).*

LIT 55: Introduction to Portuguese and Brazilian Literature and Culture [4]
May be taught in Portuguese or Spanish. 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. Focus on Portugal, Azores, Portuguese Africa, the Portuguese in the United States and Brazil. *Prerequisite: LIT 51.*

LIT 61: Hispanic/Latino Children's Literature and Film [4]
Explores Latino/Hispanic children's literature and film from theoretical and cultural perspectives. Texts, contexts, illustrations, traditions, as well as issues related to production, reception, publishing and marketing. Special attention to linguistic issues, including bilingualism and translation, and to visual forms of representation, including comic books.

LIT 63: Hispanic Film and Popular Culture [4]
Theoretical and historical overview of Hispanic film and popular culture, including music, performing arts, traditional storytelling and mass entertainment, among others. Particular attention will be paid to connections with the arts and literature. Course, films and readings are given in Spanish. *Prerequisite: SPAN 105.*

LIT 67: Multicultural Children's Literature [4]
Exploration of 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. The course will cover texts, contexts, illustrations, traditions, as well as issues related to publishing and marketing.

LIT 69: U.S. Latino Literature [4]
Representative overview of U.S. Latino literature, from its colonial and pre-colonial origins to the present. A socio-historical framework situates 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.

LIT 90X: Freshman Seminar [1]
Examination of a topic in literature.

LIT 95: Lower Division Undergraduate Research [1-5]
Supervised research. *Permission of instructor required.*

LIT 98: Lower Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

LIT 99: Lower Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

Upper Division Courses

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 in the major.*

LIT 110: Topics in World Literature [4]
Topics may include literature of one country or region of the world or comparisons of multiple literatures. *Prerequisites: LIT 20 and 21 or the equivalent of a two-semester lower division Literature survey; and LIT 100 [may be taken concurrently]; or permission of the instructor. May be repeated for credit up to three times with different topics.*

LIT 111: Empire, Postcolonial and Representation: Reading East and West [4]
Study though literature, film and mass media of emancipatory uprisings and post-colonial 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 21.*

LIT 112: Literature and History [4]
Course emphasizes historical contextualization of literature, including theoretical approaches such as Marxism, Postcolonialism, Intellectual and Social Historicism. Course explores ways in which literary histories are written. Course may focus on a specific historical period in order to under- stand the distinct relationship among literature, history and cultural production. *Prerequisite: LIT 21.*

LIT 120: Topics in the Literature of Difference [4]
In-depth study of a literature of difference. Possible topics include African-American literature, Asian-American literature, Chicano/Chicana literature, Native American literature, women's literature. *Prerequisites: LIT 20 and 21, LIT 30 and 31, LIT 40 and 41, or LIT 50 and 51 or the equivalent of a two-semester lower division Literature survey; and LIT 100 [may be taken concurrently]; or permission of the instructor. May be repeated for credit up to three times with different topics.*

LIT 125: Literary Genres [4]
Exploration of how individual literary genres articulate larger cultural, aesthetic and social issues. In addition, the course analyzes literary genres alongside other media in which those issues are also articulated, exploring differences and similarities in their treatment of those matters. *Prerequisites: LIT 21, LIT 31, LIT 41, or LIT 51.*

LIT 130: Topics in American Literature [4]
In-depth study of a period, theme, et al. in American literature. *Prerequisites: LIT 20 and 21, LIT 30 and 31, LIT 40 and 41, or LIT 50 and 51 or the equivalent of a two-semester lower division Literature survey; and LIT 100 [may be taken concurrently]; or permission of the instructor. May be repeated for credit up to three times with different topics.*

LIT 131: American Literature of the Expanding Nation [4]
Focuses on the many narratives by which America constructed its "manifest destiny." Featured writers or works include: Bradford, Bradstreet, Edwards, early Native American texts, colonial captivity narratives and early exploration narratives, such as Cabeza de Vaca. Course examines writers who justified and critiqued westward expansion, from Twain to Steinbeck to Kingston.

LIT 133: New Voices in American Fiction and Poetry [4]
Exploration of contemporary practices in the field of American literature. 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 31 or 32.*

LIT 135: Literature and Culture of African Americans [4]
American literature from the slavery period through the Harlem Renaissance and into the present. Emphasis on 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 21 or LIT 31.*

LIT 140: Topics in British Literature [4]
In-depth study of a period, theme, et al. in British literature. *Prerequisites: LIT 20 and 21, LIT 30 and 31, LIT 40 and 41, or LIT 50 and 51 or the equivalent of a two-semester lower division Literature survey; and LIT 100 [may be taken concurrently]; or permission of the instructor. May be repeated for credit up to three times with different topics.*

LIT 141: British Literature of the Expanding Empire [4]
British colonial literature, from early travel narratives such as Behn's Oroonoko to Forster, Orwell and current writers. Emphasis is on understanding the processes by 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 41.*

LIT 143: New Voices in British Fiction and Poetry [4]
Exploration of contemporary practices in the field of British literature. 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 41.*

LIT 145: Plays and Poetry of Shakespeare [4]
Introduction to and analysis of Shakespeare's major plays and poetry. *Prerequisites: LIT 20 and 21, LIT 30 and 31, LIT 40 and 41, or LIT 50 and 51 or the equivalent of a two-semester lower division Literature survey; and LIT 100 [may be taken concurrently]; or permission of the instructor.*

LIT 146: Shakespeare: Early Works [4]
Selected work from Shakespeare's early period up to the middle works, between 1599 and 1604. *Prerequisite: LIT 40. Suggested: LIT 145.*

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 40. Suggested: LIT 145.*

LIT 150: Topics in Hispanic Literature [4]
In-depth study of Spanish literature of a single country, one or more countries in a comparative context, a period, et al. *Prerequisites: LIT 20 and 21, LIT 30 and 31, LIT 40 and 41, or LIT 50 and 51 or the equivalent of a two-semester lower division Literature survey; and LIT 100 [may be taken concurrently]; or permission of the instructor. May be repeated for credit up to three times 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 will be conducted in Spanish.

LIT 152: The Transatlantic Baroque [4]
Transatlantic exploration of Golden Age Spain and colonial Latin America. Special attention 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 will be conducted in Spanish. *Prerequisite: LIT 51.*

LIT 153: Spanish Literature from the Generation of '98 to the Present [4]
Survey from the Generation of '98, through Generation of '27, the Civil War, Francoist and Post-Francoist literature, to contemporary voices. A critical look at the constructions of Spain and "Spanishness," seeking to build a more complex understanding of its cultures. Course will be conducted in Spanish. *Prerequisite: LIT 51.*

LIT 155: Latin American Colonial Literature [4]
Selected readings on chronicles, poetry and theater from Columbus travel narratives to Ferná ndez 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. Course will be conducted in Spanish. *Prerequisite: LIT 51.*

LIT 156: Latin American Literature Since the Independence [4]
Concentration on Romantic poetry; Indigenist, Anti-slavery and Indianist novel: Martí, Rubén Darío and Modernismo; Rodó and the essayist of the early twentieth 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 will be included. Course will be conducted in Spanish. *Prerequisite: LIT 51.*

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. Exploration of multiple cultural substrata (e.g. Spanish, African, Anglo-American, Native) as well as their current presence in the Caribbean islands. Course and readings will be conducted in Spanish. *Prerequisite: LIT 51.*

LIT 158: Transatlantic Modernismo [4]
Study through poetry, novel, essay and chronicle of principal characteristics of Spanish-American and Peninsular Modernismo. The course will examine the issue of the influence of Latin American writers in Spain (e.g. Rubén Darío, Gómez 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 Ramón Jiménez, Valle-Inclán, Unamuno). Course will be conducted in Spanish.

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 1970's and 1980'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. Course is conducted in Spanish.

LIT 165: Great Writers [4]
In-depth examination of the works of a single writer, read in the original language of that writer. *Prerequisites: LIT 21, LIT 31, LIT 41, or LIT 51 or the equivalent of a two-semester lower division literature survey, or permission of the instructor.*

LIT 170: Topics in Language and Linguistics [4]
Topics may include linguistic theories, history of the English language. *Prerequisites: LIT 20 and 21, LIT 30 and 31, LIT 40 and 41, or LIT 50 and 51 or the equivalent of a two-semester lower division Literature survey; and LIT 100 [may be taken concurrently]; or permission of the instructor. May be repeated for credit up to three times with different topics.*

LIT 195: Upper Division Undergraduate Research [1-5]
Supervised research. *Permission of instructor required.*

LIT 198:Upper Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

LIT 199: Upper Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

MANAGEMENT

Lower Division Courses

MGMT 2: Case Study Seminar on Business and Management [1]
This seminar course surveys the field of business management. Invited speakers from local companies and public organizations will cover 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 1.*

MGMT 25: Introduction to Finance and Accounting I [3]
A broad introduction to finance and accounting. Students will be equipped to draw up and interpret accounts and introduced to some key ideas of finance and auditing. The student will learn fundamental accounting concepts and how to apply them; record accounting entries, prepare accounts for different business entities and understand the differences between them and basic principles of auditing. *Prerequisite: ECON 1.*

MGMT 26: Introduction to Finance and Accounting II [3]
Continuation of MGMT 25. The course also covers the basic principles of capital project evaluation, working capital management and taxation. Students must enroll in this course in the semester following the one during which MGMT 25 is taken. *Prerequisite: MGMT 25.*

MGMT 90X: Freshman Seminar [1]
Examination of a topic in management.

MGMT 95: Lower Division Undergraduate Research [1-5]
Supervised research. *Permission of instructor required.*

MGMT 98: Lower Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

MGMT 99: Lower Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

Upper Division Courses

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. Focus on how to align people and technology effectively to generate value through case studies of businesses and scientific studies of people in real service settings. *Prerequisite: ECON 1.*

MGMT 195: Upper Division Undergraduate Research [1-4]
Supervised research. *Permission of instructor required.*

MGMT 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

MGMT 199: Upper Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

MATERIALS SCIENCE AND ENGINEERING

Upper Division Courses

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. *Prerequisites: ICP 1A and ICP 1B (or equivalent), CHEM 2 (or equivalent), ENGR 45 (or consent of instructor). Upper division standing required.*

MSE 111: Materials Processing [4]
Thermodynamics of solid 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. *Prerequisites: ICP 1A and ICP 1B (or equivalent), CHEM 2 (or equivalent), ENGR 45 (or consent of instructor). Upper division standing required.*

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. *Prerequisites: MSE 110, MSE 111. Upper division standing required.*

MSE 113: Materials Characterization [4]
Characterization of materials structure and properties. Interactions between electomagnetic 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. *Prerequisites: ICP 1A and ICP 1B (or equivalent) and PHYS 9 (or equivalent). Upper division standing required.*

MSE 114: Polymeric Materials [4]
Relationships between configuration, conformation, molecular order, microstructure and properties of polymeric materials; concepts relevant to tailoring polymer molecules and microstructures for specific applications. Polymers in electronic devices. Interactions between polymers and their in-service environment. Polymer characterization and processing techniques. Inorganic polymers. Biological polymers. *Prerequisites: ICP 1A and ICP 1B (or equivalent), PHYS 9 (or equivalent), ENGR 45 (or consent of instructor). Upper division standing required.*

MSE 115: Ceramic Materials [3]
Crystallography of inorganic compounds; packing and connectivity of co-ordination polyhedra. 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. *Prerequisites: ICP 1A and ICP 1B (or equivalent), PHYS 9 (or equivalent), ENGR 45 (or consent of instructor). Upper division standing required.*

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. *Prerequisites: ICP 1A and ICP 1B (or equivalent), PHYS 9 (or equivalent), ENGR 45 (or consent of instructor). Upper division standing required.*

MSE 117: New Materials [3]
Materials requirments 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 bio-inspired materials. Biomedical materials. *Prerequisites: ICP 1A and ICP 1B (or equivalent), PHYS 9 (or equivalent), ENGR 45 (or consent of instructor). Upper division standing required.*

MSE 118: Introduction to Nanotechnology and Nanoscience [3]
An introductory course 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. *Prerequisites: ICP 1A and ICP 1B, CHEM 2 (or equivalent).*

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. *Prerequisites: ICP 1A and ICP 1B (or equivalent), PHYS 9 (or equivalent), MATH 23, MATH 24. Upper division standing required.*

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. *Prerequisites: MSE 112, MSE 113. Senior standing required.*

MSE 195: Upper Division Undergraduate Research [1-4]
Supervised research. *Permission of instructor required.*

MSE 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

MSE 199: Upper Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

MATHEMATICS

Lower Division Courses

MATH 5: Preparatory Calculus [4]
Preparation for MATH 21 (Calculus of a Single Variable I). Analyzing data by means of functions (linear, quadradic, polynomial, logarithmic, exponential and trigonometric) and graphs with an emphasis on mathematical modeling of real-world applications. *No student may take Math 5 for credit once they have taken Math 21.*

MATH 15: 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 tools, scripting languages and high-level mathematical languages. *Co-requisite: MATH 5. This course is not for students in the School of Engineering.*

MATH 21: 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: Pass calculus placement examination.*

MATH 22: Calculus of a Single Variable II [4]
A continuation of MATH 21. Analytical and numerical techniques for integration with applications, sequences and series, first-order differential equations. *Prerequisite: MATH 21 or ICP 1A (or equivalent).*

MATH 23: Multi-Variable Calculus [4]
Calculus of several variables. 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 22.*

MATH 24: Introduction to 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. *Prerequisites: MATH 22. Replaces MATH 25.*

MATH 30: Mathematical Biology [4]
A version of Math 022 for students majoring in the life sciences. Analytical and numerical techniques of integration, first-order ordinary differential equations and methods in discrete math with applications to questions from biology and medicine. *Prerequisite: ICP 1A (or equivalent) or MATH 21.*

MATH 32: 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 21 or ICP 1A (or equivalent). Replaces MATH 10.*

MATH 90X: Freshman Seminar [1]
Examination of a topic in mathematics.

MATH 95: Lower Division Undergraduate Research [1-5]
Supervised research. *Permission of instructor required.*

MATH 98: Lower Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

MATH 99: Lower Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

Upper Division Courses

MATH 121: Applied Mathematical Methods I: Fourier Analysis and Boundary Value Problems [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 series, Fourier integrals and general eigenfunction expansions. *Prerequisites: MATH 23, MATH 24. Replaces MATH 126.*

MATH 122: Applied Mathematical Methods II: Complex Variables and Applications [4]
Introduction to complex variables, contour integration and theory of residues. Solving partial differential equations by Fourier and Laplace transform methods. Introduction to the theory of distributions and Green's functions. *Prerequisites: MATH 121. Replaces MATH 127.*

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. *Prerequisites: MATH 24. Replaces MATH 133.*

MATH 132: Numerical Analysis II [4]
A continuation of MATH 131. Initial-value problems for ordinary differential equations, iterative 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. *Prerequisites: MATH 121 and MATH 131.*

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 23 or MATH 24*

MATH 195: Upper Division Undergraduate Research [1-5]
Supervised research. *Permission of instructor required.*

MATH 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

MATH 199: Upper Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

MECHANICAL ENGINEERING

Upper Division Courses

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 will develop a 2D plane-stress finite element program. Topics in nonlinear finite-element analysis, heat transfer and fluid dynamics will be introduced as time permits. *Prerequisite: MATH 131.*

ME 137: Computer aided engineering [4]
Introduction to the use of modern computational tools used for design and analysis. Primary focus will be 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 will also be covered. *Prerequisite: ME 135.*

ME 140: Vibrations and controls [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 24.*

ME 142: Mechatronics [4]
Introduction to electro-mechanical systems controlled by microcontroller technology. Theory, design and construction of smart systems; closely coupled and fully integrated products and systems; the synergistic integration of sensors, interfaces, actuators, microcontrollers, control and information technology. *Prerequisites: ENGR 57 and ENGR 165.*

ME 170: Mechanical Engineering Capstone Design [4]
Design project will be selected and approved; project feasibility study and outline of the design project will be completed; design methodology, optimization, product reliability and liability, economics, use of ASME codes. A final presentation is given at the end of the semester. *Prerequisites: ME 137 and Senior Standing.*

ME 195: Upper Division Undergraduate Research [1-4]
Supervised research. *Permission of instructor required.*

ME 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

ME 199: Upper Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

PHILOSOPHY

Lower Division Courses

PHIL 1: 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 5: 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 9: Phenomenology and Existentialism [4]
Consideration of central themes in phenomenology and existentialism and their philosophical origins in 19th century philosophy. Readings from such figures as Nietzsche, Husserl, Sartre, Freud, Merleau-Ponty and Heidegger.

PHIL 90X: Freshman Seminar [1]
Examination of a topic in philosophy.

PHIL 95: Lower Division Undergraduate Research [1-5]
Supervised research. *Permission of instructor required.*

PHIL 98: Lower Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

PHIL 99: Lower Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

Upper Division Courses

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. *Prerequisite: One course in philosophy 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. *Prerequisites: PHIL 1, COGS 1 or consent of instructor. Cross-listed with COGS 110.*

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. *Prerequisites: One course in philosophy or consent of instructor.*

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, intersubjectivity and the life-world, as well as application of phenomenological methods to themes in natural science, social science, art and literature. *Prerequisite: PHIL 1 or consent of instructor. May be repeated twice for credit with different topics.*

PHIL 195: Upper Division Undergraduate Research [1-5]
Supervised research. *Permission of instructor required.*

PHIL 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

PHIL 199: Upper Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

PHYSICS

Lower Division Courses

PHYS 5: Energy and the Environment [3]
Introduction to energy and the environment. Types of renewable and nonrenewable energy sources and the environmental effects of using these energy resources.. Environmental, economic and sustainability considerations associated with fossil fuels and alternative energy sources.

PHYS 6: 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; the concepts of matter and energy; and the formation of the Universe, galaxies, stars and the Solar System. Our physical connection and dependence the Cosmos will be illustrated using new discoveries in astrophysics, astrochemistry and astrobiology. *Prerequisite: High School Level Algebra and Geometry.*

PHYS 8: Introductory Physics I [4]
Introduction to classical and contemporary physics. Intended for students with preparation in calculus and algebra. Topics primarily cover Newtonian mechanics and include kinematics, dynamics, forces, energy, gravitation and fluids. Experiments integrated into the course content. *Co-requisite: MATH 21.*

PHYS 9: Introductory Physics II [4]
Continuation of classical and contemporary physics. Topics include introduction to electricity, magnetism, optics, and waves. Experiments are integrated into the course content. *Prerequisite: PHYS 8 and MATH 21 or ICP 1A and ICP 1B. Co-requisite: Math 22 or equivalent.*

PHYS 10: 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 9.*

PHYS 12: 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 19: 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. *Prerequisites: MATH 21 and PHYS 8 or ICP 1A and ICP 1B (or equivalent).*

PHYS 90X: Freshman Seminar [1]
Examination of a topic in physics.

PHYS 95: Lower Division Undergraduate Research [1-5]
Supervised research. *Permission of instructor required.*

PHYS 98: Lower Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

PHYS 99: Lower Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

Upper Division Courses

PHYS 105: Analytic Mechanics [3]
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; Hamiltonian method; and rigid body dynamics. *Prerequisites: MATH 24 [may be taken concurrently], PHYS 9 or equivalent*

PHYS 108: Modern Optics [3]
Geometrical optics, radiative transfer, partial coherence, lasers, quantum optics. *Prerequisite: PHYS 111.*

PHYS 110: Electromagnetics I [3]
Charges and currents; electric and magnetic fields; dielectric, conducting and magnetic media; special relativity; Maxwell's equations. *Prerequisites: MATH 24 [may be taken concurrently], PHYS 9 or equivalent.*

PHYS 111: Electromagnetics II [3]
Wave propagation in media, radiation and scattering; Fourier optics; interference and diffraction; ray optics and applications. *Prerequisite: PHYS 110.*

PHYS 112: Introduction to Statistical and Thermal Physics [3]
Basic concepts of statistical mechanics, microscopic basis of thermodynamics and applications to macroscopic systems, condensed states, phase transformations, quantum distributions, elementary kinetic theory of transport processes, fluctuation phenomena. *Prerequisites: MATH 24 [may be taken concurrently], PHYS 9 or equivalent.*

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. *Prerequisites: PHYS 9, CHEM 112.*

PHYS 129: Particle Physics [3]
Tools of particle and nuclear physics. Properties, classification and interaction of particles including the quark-gluon constituents of hadrons. High-energy phenomena analyzed by quantum mechanical methods. Quantum number determination of resonances, hadron structure functions, introductory electro-weak theory with Dirac matrices, Standard Model (overview), grand unified theories. *Prerequisite: PHYS 136.*

PHYS 136: Quantum Mechanics I [3]
Introduction to the methods of quantum mechanics. Schrödinger's equation, Heisenberg uncertainty principle, quantum numbers, harmonic oscillator. *Prerequisites: PHYS 105, PHYS 110, PHYS 111 [may be taken concurrently].*

PHYS 137: Quantum Mechanics II [3]
The hydrogen atom, scattering and applications to atomic physics, molecular physics, condensed matter physics, nuclear physics and elementary particle physics. *Prerequisite: PHYS 136.*

PHYS 138: Modern Atomic Physics [3]
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 137.*

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 resonances. *Prerequisite: PHYS 137.*

PHYS 150: Energy Sources [3]
Fossil energy resources, nuclear energy, solar energy and other renewable energy sources (wind, hydro, geothermal.) *Prerequisite: ICP 1A and 1B (or equivalent).*

PHYS 151: Solar Energy [3]
The solar energy resource, modeling and simulation, thermal collectors, photovoltaics, solar energy systems, special applications (solar lasers, material processing). *Prerequisite: ICP 1A and 1B (or equivalent).*

PHYS 160: Modern Physics Lab [4]
Provides a rigorous foundation in physics laboratory techniques, with an emphasis on hands-on laboratory training. Experiments 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 10.*

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. *Prerequisites: MATH 22 and PHYS 9 or equivalent.*

PHYS 195: Upper Division Undergraduate Research [1-5]
Supervised research. *Permission of instructor required.*

PHYS 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

PHYS 199: Upper Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

POLITICAL SCIENCE

Lower Division Courses

POLI 1: Introduction to Political Science [4]
A general introduction to the American political system (the Constitution, political culture, parties, elections, and the executive, legislative and judicial branches) and to comparative politics (application of political analysis to a variety of international political systems).

POLI 90X: Freshman Seminar [1]
Examination of a topic in political science.

POLI 95: Lower Division Undergraduate Research [1-5]
Supervised research. *Permission of instructor required.*

POLI 98: Lower Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

POLI 99: Lower Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

Upper Division Courses

POLI 100: Political Process and Institutions [4]
The political and government context of policy, from agenda setting to evaluations. Examines constitutional, federal and local context of policy, the process by which government institutions make decision (and the interaction among institutions), and approaches for understanding and anticipating policy decision-making. Required of all Public Policy students. *Prerequisite: POLI 1.*

POLI 190: Topics in Political Science [4]
Intensive treatment of a special topic or problem in political science. May be repeated for credit. *Prerequisite: junior or senior standing in SCS major or consent of instructor.*

POLI 195: Upper Division Undergraduate Research [1-5]
Supervised research. *Permission of instructor required.*

POLI 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

POLI 199: Upper Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

PSYCHOLOGY

Lower Division Courses

PSY 1: 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 10: 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 emphasis must take this course before taking any upper division psychology courses. *Prerequisite: PSY 1.*

PSY 15: Research Methods in Psychology [4]
Survey of common methodological approaches in psychological research. *Prerequisite: PSY 10.*

PSY 90X: Freshman Seminar [1]
Examination of a topic in psychology.

PSY 95: Lower Division Undergraduate Research [1-5]
Supervised research. *Permission of instructor required.*

PSY 98: Lower Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

PSY 99: Lower Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

Upper Division Courses

PSY 105: Research Methods in Psychology [4]
Survey of common methodological approaches in psychological research. *Prerequisite: PSY 10.*

PSY 110: History of Psychology [4]
Development of the scientific study of human and animal behavior, both in specific subject areas and in general. *Prerequisite: PSY 1.*

PSY 120: 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 1.*

PSY 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 1 or COGS 1. Cross-listed with COGS 121.*

PSY 130: Developmental Psychology [4]
Ontogenetic account of human behavior from conception through adolescence with focus on motor skills, mental abilities, motivation and social interaction. *Prerequisite: PSY 1.*

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 1.

PSY 132: Personality [4]
Theories of Freud, Erikson and other major contemporary approaches to personality. *Prerequisite: PSY 1.*

PSY 133: Abnormal Psychology [4]
Descriptive and functional account of behavioral disorders, with primary consideration given to neurotic and psychotic behavior. *Prerequisite: PSY 1.*

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 1.*

PSY 141: Industrial and Organizational Psychology [4]
Survey of interrelationships among psychological processes, interpersonal dynamics and organizational forms. Topics include motivation, communication, decision-making, leadership, personnel selection and training, stress and conflict, career development, organizational development and organization-community relations. *Prerequisite: PSY 1.*

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 1.*

PSY 146: 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; review of prominent strategies for prevention, intervention and treatment. *Prerequisite: PSY 1.*

PSY 147: Health Psychology [4]
Survey of topics in health psychology, behavioral medicine, and pediatric health psychology. *Prerequisite: PSY 1.*

PSY 148: 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 1.*

PSY 150: Psychological Perspectives on Cultural, Racial and 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 1.*

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. *Prerequisites: PSY 1; junior or senior standing; major in SCS in the psychology emphasis or consent of instructor.*

PSY 191: Fieldwork in Psychology [1-4]
Supervised experience off and on campus, in community and institutional settings. *Letter grading only*

PSY 195: Upper Division Undergraduate Research [1-5]
Supervised research. *Permission of instructor required.*

PSY 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

PSY 199: Upper Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

Graduate Courses

PSY 200 Professional Seminar for First-Year Ph.D. Graduate Students (4)
The first course in a two course sequence that is required of and limited to first-year Ph.D. students in Psychology. Survey of major issues in contemporary psychology with their historical backgrounds.

PSY 201 Professional Seminar for First-Year Ph.D. Graduate Students (4)
The second course in a two course sequence that is required of and limited to first-year Ph.D. students in Psychology. Survey of major issues in contemporary psychology with their historical backgrounds.

PSY 202. Advanced Psychological Statistics (4)
Review of fundamental concepts. Basic statistical techniques as applied to design and interpretation of experimental and observational research.

PSY 203. Advanced Psychological Statistics (4)
Advanced experimental design and planning of investigations.

PSY 204. Research Design and Methodology (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.

PSY 205. Measurement Theory and Psychometrics (4)
Classical test theory, factor analysis, generalizability theory, item response theory, inter-rater reliability, fundamental measurement theory.

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.

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 non-experimental data.

PSY 208. 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.

PSY 209. 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.

PSY 210. 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.

PSY 211. Computer Programming for the 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.

PSY 212. Special Problems in Psychological Statistics (4)
Special problems in psychological statistics and data analysis.

PSY 220. Social Psychology (4)
Designed for graduate psychology students. Intensive consideration of concepts, theories and major problems in social psychology.

PSY 240. Developmental Psychology (4)
Consideration of variables influencing cognitive, social and emotional development of the human organism from conception through adolescence. Emphasis on research methodology and research base for current theories of development.

PSY 260. 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?

PSY 261. Neural Networks (4)
Overview of classical neural network architectures, algorithms and applications to psychology will be followed by the development of a student project. *Prerequisites: Some ability in computer programming.*

PSY 262. Cognitive Modeling (4)
Projects-based seminar in cognitive modeling. Students will be required to a complete a project applying some form of computer model (neural network, symbolic, statistical, genetic algorithm) to the study of cognitive phenomena.

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.

PSY 264. Language, Mind and Brain (4)
Language and linguistic representation from various angles and disciplines, including psychology, linguistics, philosophy and neuroscience. Topics: sentence processing, word meaning, neurolinguistic deficits, language learning, artificial intelligence (natural language processing) and the interaction of language with other cognitive processes.

PSY 269. Seminar in Cognitive Science (4)
Seminar on a specific topic in cognitive science. *May be repeated for credit on a different topic.*

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. *S/U 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 included. *S/U grading only.*

PSY 289. Psychology Colloquium (1)
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 discussions. Course may be repeated for credit. *Prerequisites: Graduate standing or consent of instructor. S/U 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 Psychology courses. *S/U grading only.*

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. *S/U grading only.*

PSY 296. Research Topics in Psychology. (1)
Research group meeting. 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. *S/U grading only.*

PSY 297. Research for Ph.D. Dissertation (2-12)
Preparation: successful completion of qualifying examinations. At least one 297 course is required during each year following completion of qualifying examinations. *S/U grading only.*

PSY 299. Directed Independent Research/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. *S/U grading only.*

PUBLIC POLICY

Lower Division Courses

PUBP 1: 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. *Required of all Public Policy students.*

PUBP 95: Lower Division Undergraduate Research [1-5]
Supervised research. *Permission of instructor required.*

PUBP 98: Lower Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

PUBP 99: Lower Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

Upper Division Courses

PUBP 100: Political Process and Institutions [4]
Political and governmental context of policy, from agenda setting to evaluation. Examines the context for setting constitutional, federal and local policy, as well as processes by which governmental institutions make decisions. Also examines interactions between institutions and approaches that further policy decision-making. *Prerequisites: PUBP 1 or POLI 1.*

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. Discussion of current policy issues and policy debates surrounding poverty and inequality. *Prerequisites: PUBP 1, PUBP 100, ECON 100 and PSY 105 or ECON 130.*

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. Concentration 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. *Prerequisites: PUBP 1, PUBP 100, ECON 100 and PSY 105 or ECON 130.*

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. *Prerequisites: PUBP 1, PUBP 100, ECON 100 and PSY 105 or ECON 130.*

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. Social and economic forces behind immigration, the impact of immigrants and their process of integration. Various debates on immigrant and immigration policy. *Prerequisites: PUBP 1, PUBP 100, ECON 100 and PSY 105 or ECON 130.*

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, issues of inequality in the labor market, segregation, discrimination, environmental justice, health care access and social and *political inequality. Prerequisites: PUBP 1, PUBP 100, ECON 100 and PSY 105 or ECON 130.*

PUBP 195: Upper Division Undergraduate Research [1-4]
Supervised research. *Permission of instructor required.*

PUBP 196: Individual Internship [1-4]
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. *Prerequisites: PUBP 100, ECON 100 and PSY 105 or ECON 130, or permission from instructor. Course may be repeated twice.*

PUBP 198: Upper Division Directed Group Study [1-5]
Permission of instructor required.

PUBP 199: Directed Independent Study in Public Policy [4]
Capstone course taken in the senior year. Summer internship and/or and independent research project. Under the supervision of a faculty member, students in the internship program or the independent studies program are required to write an original policy research paper. *Prerequisites: PUBP 1, PUBP 100, ECON 100 and PSY 105 or ECON 130.*

QUANTITATIVE AND SYSTEMS BIOLOGY

Graduate Courses

QSB 212: Advanced Signal Transduction and Growth Control [3]
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. *Prerequisites: BIS 100, BIS 110 or equivalent, or consent of instructor.*

QSB 214: Tissue Engineering Design [3]
Fundamental topics will 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 will also cover current case studies and issues for FDA approval of tissue engineered products. *Prerequisistes: ICP 1A and 1B (or equivalent), BIS 100, or consent of instructor.*

QSB 227: Virology [3]
Overview of viruses, focusing on structure, infective cycle, interactions with host, transmission and methods of detection and control. *Prerequisites: QSB 290.*

QSB 241: Advanced Genomic Biology [3]
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. *Prerequisites: Graduate standing and consent of instructor.*

QSB 250: Embryos, Genes and Development [3]
Principles of developmental biology as revealed through analysis of invertebrate and vertebrate systems. Animal models will be used to examine the molecular and cellular mechanisms that influence cell fate. Cell signaling will be studied in the context of embryonic pattern formation and the development of body plans and organ systems. Graduate requirement includes an advanced discussion section involving research methodology and data interpretation led by the instructor. *Prerequisites: Graduate standing or consent of instructor.*

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. *Prerequisite: Graduate standing or consent of instructor.*

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. Genome sequence analysis and annotation, phylogenic analysis, protein structure prediction, molecular modeling, docking and simulations of metabolic and regulatory networks. Graduate requirements include advanced discussion section led by instructor and computational biology project. *Prerequisites: Graduate standing or consent of instructor.*

QSB 290: Current Topics in Quantitative and Systems Biology [3]
Three hours of discussion per week and significant out-of-class reading and study of current, cutting-edge research directions in the field. Emphasis on student-led presentation, analysis and discussion of reading assignments from the current and recent scientific literature. *Prerequisite: Graduate standing. Letter grading only.*

QSB 291: Seminar [1]
Seminar series covering various topics in quantitative and systems biology presented by QSB Graduate Group faculty and visiting speakers. *Prerequisites: Graduate standing or consent of instructor.*

QSB 292: Group Meeting [1]
Meetings to describe current progress and research plans lead by individual QSBGG faculty. *Prerequisites: Graduate standing or consent of instructor.*

QSB 293: Journal Club [1]
Student-led presentation, analysis and discussion of reading assignments from the scientific literature. *Prerequisite: QSB 290.*

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.

QSB 295: Graduate Research [1-12]
Supervised research. *Prerequisites: Graduate standing and consent of instructor.*

QSB 298: Directed Group Study [1-6]
Group project under faculty supervision. *Prerequisites: Graduate standing and consent of instructor.*

QSB 299: Directed Independent Study [1-6]
Independent project under faculty supervision. *Prerequisites: Graduate standing and consent of instructor.*

SOCIAL AND COGNITIVE SCIENCE

Lower Division Courses

SCS 90X: Freshman Seminar [1]
Examination of a topic in the social, behavioral and cognitive sciences.

SCS 95: Lower Division Undergraduate Research [1-5]
Supervised research. *Permission of instructor required.*

SCS 98: Lower Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

SCS 99: Lower Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

Upper Division Courses

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 will be explored. *Prerequisites: PSY 1, ECON 1.*

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 and language maintenance or shift, with particular focus on the North American context. *Prerequisite: PSY 1.*

SCS 192: Integrative Topics [4]
Special topics that integrate theory or research from more than one discipline in the social and behavioral sciences. *Prerequisites: PSY 1, ECON 1, SOC 1 or POLI 1; permission of the instructor. May be repeated for credit with a different topic.*

SCS 195: Upper Division Undergraduate Research [1-5]
Supervised research. *Permission of instructor required.*

SCS 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

SCS 199: Upper Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

SOCIOLOGY

Lower Division Courses

SOC 1: Introduction to Sociology [4]
The study of groups, culture, collective behavior, classes and caste, community and ecology, role, status and personality.

SOC 90X: Freshman Seminar [1]
Examination of a topic in sociology.

SOC 95: Lower Division Undergraduate Research [1-5]
Supervised research. *Permission of instructor required.*

SOC 98: Lower Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

SOC 99: Lower Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

Upper Division Courses

SOC 190: Topics in Sociology [4]
Intensive treatment of a special topic or problem in sociology. May be repeated for credit in different subject area. *Prerequisites: SOC 1; junior or senior standing; major in SBCS or consent of instructor.*

SOC 195: Upper Division Undergraduate Research [1-5]
Supervised research. *Permission of instructor required.*

SOC 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

SOC 199: Upper Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

SPANISH

Lower Division Courses

SPAN 1: Elementary Spanish I [4]
Introduction to speaking, reading, writing and understanding Spanish. Classes conducted in Spanish.

SPAN 2: Elementary Spanish II [4]
Introduction to speaking, reading, writing and understanding Spanish. Classes conducted in Spanish. *Prerequisite: SPAN 1 or appropriate score on Spanish placement exam.*

SPAN 3: 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 2 or appropriate score on Spanish placement exam.*

SPAN 4: 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 3 or appropriate score on Spanish placement exam.*

SPAN 10: Spanish for Heritage Speakers II [4]
For native speakers with limited experience in grammar and composition. Emphasis on formal language study and writing. Classes and discussion conducted in Spanish. *Prerequisites: Native Speaker proficiency; appropriate score on Spanish placement test.*

SPAN 11: Spanish for Heritage Speakers II [4]
For native speakers with limited experience in grammar and composition. Emphasis on formal language study and writing. Classes and discussion conducted in Spanish. *Prerequisites: SPAN 10 or appropriate score on Spanish placement test.*

SPAN 90X: Freshman Seminar [1]
Examination of a topic in Spanish.

SPAN 95: Lower Division Undergraduate Research [1-5]
Supervised research. *Permission of instructor required.*

SPAN 98: Lower Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

SPAN 99: Lower Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

Upper Division Courses

SPAN 103: Spanish Composition and Conversation [4]
Emphasis on the importance of the interaction between writer, reader, purpose and message in order to develop a student's abilities to communicate in spoken and written Spanish. Focus on the four major modes of writing: description, narration, exposition and argumentation. Oral practice a major component. *Prerequisites: SPAN 4 or SPAN 11 or equivalent or appropriate score on Spanish placement exam.*

SPAN 105: Hispanic Cultures I [4]
The study of the cultures of the Hispanic world from an interdisciplinary perspective, covering the period ending in the nineteenth century. Emphasis on conversation and composition. *Prerequisites: SPAN 103 or appropriate score on Spanish placement exam or consent of instructor. Replaces SPAN 100.*

SPAN 106: Hispanic Cultures II [4]
Hispanic cultural manifestations since the nineteenth century to the present, from an interdisciplinary perspective. Emphasis on conversation and composition. *Prerequisites: SPAN 105 or consent of instructor. Replaces SPAN 101.*

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. *Prerequisites: SPAN 103 or consent of instructor.*

SPAN 141: Spanish for Health Professionals [4]
The study of specialized Spanish vocabulary and expressions that health-care professionals need to communicate with Hispanic patients and to carry out research in that language. The course includes the reading of medical essays and composition. *Prerequisites: SPAN 4 or SPAN 11 or equivalent or appropriate score on Spanish placement test.*

SPAN 142: Spanish for Business and Management [4]
The study of the specialized Spanish vocabulary and expressions used to carry out business with Hispanic individuals or companies. Addresses cultural awareness and includes the reading of topical essays. Students will learn how to write professional letters and other documents in Spanish. *Prerequisites: SPAN 4 or SPAN 11 or equivalent or appropriate score on Spanish placement test.*

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. *Prerequisites: SPAN 103 or appropriate score in placement test or consent of instructor.*

SPAN 195: Upper Division Undergraduate Research [1-5]
Supervised research. *Permission of instructor required.*

SPAN 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

SPAN 199: Upper Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

WORLD CULTURES AND HISTORY

Upper Division Courses

WCH 100: Topics in Area Studies [4]
In-depth study of the history and cultural, political and economic systems of a region. *Prerequisites: Completion of lower division requirements for either World Cultures and History or Social, Behavioral and Cognitive Sciences, or permission of instructor. May be repeated for credit up to three times with different topics.*

WCH 190: World Cultures and History Proseminar: Research [4]
Capstone course for majors. Extensive writing required. Students conduct research under faculty supervision to culminate in a senior thesis. Required of all World Cultures and History majors. *Prerequisite: Senior standing in WCH major.* Letter 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. *Prerequisites: WCH 190 and Senior standing in WCH major.* Letter grading 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, et al. Extensive writing will be 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 grading only.*

WCH 195: Upper Division Undergraduate Research [1-4]
Supervised research. *Permission of instructor required.*

WCH 198: Upper Division Directed Group Study [2-4]
Directed group study and research under the direction of WCH faculty. *Open to students who have completed at least 12 upper division units in WCH. Prerequisites: Permission of instructor and school required. May be repeated with different topics up to three times.*

WCH 199: Upper Division Individual Study [1-4]
Directed individual study and research, under the direction of WCH faculty, in area not normally covered in the WCH curriculum. *Open to students who have completed at least 12 upper division units in WCH. Permission of instructor and School required.*

Graduate Courses

WCH 200: The University as an Institution [4]
Development of the capacity to critically analyze the university as an institution embedded in American society. Addresses issues such as the corporate funding of university research, the relationship between academia and foreign policy, and what happens when professors write controversial books. *Prerequisites: Required of all graduate students in the WCH graduate program. Letter grading only.*

WCH 201: Research Proseminar [4]
Graduate-level introduction to the different methods of research employed in the disciplines represented in World Cultures and History. Students will work on specific topics pertaining to their research, using a variety of those methods. *Prerequisites: Approval of graduate committee. Letter grading only.*

WCH 202: Theories and Methods [4]
This seminar will introduce graduate students to the wide variety of theories and methods employed in the disciplines represented in World Cultures and History. It will also serve to prepare students for their Comprehensive Examination. Students will work with members of the Examination Committee to compose reading lists tailored to their research interests. *Prerequisite: WCH 200. Letter grading only.*

WCH 203: The Historian's Craft [4]
Focus on 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. *Prerequisites: Required of all graduate students in the WCH graduate program. Letter grading only.*

WCH 210: Topics in California Studies: Constructing California [4]
Study of 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. *Prerequisites: Approval of graduate committee. Letter grading only.*

WCH 220: Chicano/a Literature [4]
Multidisciplinary analysis of Chicano/a literature. Topics 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. *Graduate Standing required. Cross-listed with LIT 120. Letter grading only.*

WCH 225: Philosophy and Theory [4]
Exploration of 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, complemented by a practical application of these theories to selected literary texts. *Prerequisites: Graduate Standing. Letter grading only.*

WCH 230: Topics in Humanities and New Media [4]
Examination of how emerging technologies are used to record, analyze and communicate information about history and culture; reading of critical theory in order to understand the characteristics of text, image, and interactive media; and survey of the future challenges and prospects for new media in the humanities. *Prerequisites: Approval of graduate committee. Letter grading only.*

WCH 231: The Great Depression in History and Literature [4]
Focusing on the turbulent decade of the 1930s, this team-taught course uses the lens of history and literature to explore how events from 1929-1941 helped shape modern America. Particular attention will be paid to the impact of these years upon California and the West. *Prerequisites: Approval of WCH Graduate Committee. Letter grading only.*

WCH 240: Topics in U.S. Social and Cultural History [4]
Selected topics in U.S. social and cultural history explored through a reading of both classic and newer studies in areas such as race, ethnicity, class and gender. Study of theoretical approaches to these issues as well as monograph case studies. *Prerequisites: Graduate Standing. Letter grading 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. *Prerequisites: Approval of WCH Graduate Committee. Letter grading only.*

WCH 280: American Nature Writing and Literature of the Environment [4]
This course 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 will be given to historical and political movements and texts. *Prerequisite: Graduate Standing. Letter grading only.*

WCH 290: Teaching Pedagogy and Practice [4]
Designed for graduate student teaching assistants. Focus on pedagogical issues such as grading, syllabus design and assignments, as well as on classroom practices. Frequent meetings with professors in their areas of expertise and as a group. *Co-requisite: Must be assigned a teaching assistantship. Graduate Standing required. S/U grading only.*

WCH 298: Directed Group Study [1-6]
Group project under faculty supervision. *Prerequisites: Graduate standing and consent instructor.* S/U grading only.

WCH 299: Directed Independent Study [1-6]
Independent project under faculty supervision. *Prerequisites: Graduate standing and consent instructor. S/U grading only.*

WRITING

Lower Division Courses

WRI 1: 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. Prerequisite: Not open to students who have scored 8 or higher on the University of California Entry Level Writing Requirement Examination.*

WRI 10: 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: Satisfaction of the University of California Entry Level Writing Requirement Examination.*

WRI 25: Introduction to Creative Writing [4]
Introduction to the craft of writing poetry, fiction and creative non-fiction. Students will study literary devices and style by considering a variety of texts by published authors. In addition, Students will explore their own imaginative participation in the world around them. They will also compose poems, short stories, and literary essays. *Prerequisite: WRI 10.*

WRI 30: Introduction to Professional Writing [4]
Students will develop proficiency in forms of written communication typical in academic and professional settings and will perform critical analyses of texts within a variety of rhetorical modes. Assignments in this course will emphasize responsible and ethical practices in writing to communicate in the professional world. *Prerequisite: WRI 10.*

WRI 95: Lower Division Undergraduate Research [1-5]
Supervised research. *Permission of instructor required.*

WRI 98: Lower Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

WRI 99: Lower Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

Upper Division Courses

WRI 100: Advanced Writing [4]
Pre-professional writing course with an interdisciplinary emphasis, which includes readings and writing in creative non-fiction as well as writing for popular and academic periodicals. Emphasis on development of style, voice and syntax. *Prerequisite: WRI 25 or WRI 30.*

WRI 105: Language and Style [4]
Introduction to basic principles of language study, including the key distinction between classifying and explaining linguistic forms and functions. Building on these principles, students will 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 100.*

WRI 110: Tutor Training [4]
Students will 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.*

WRI 115: Topics in Science Writing [4]
To better understand the difficult process of explaining technical information in clear, accessible, non-technical language, students will 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 will complement various writing tasks. With permission of the instructor, this course may be repeated for credit. *Prerequisite: WRI 100.*

WRI 116: Science Writing in Natural Sciences [4]
To improve their command of scientific discourse, students in the School of Natural Sciences will 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 will complement various writing tasks. *Prerequisite: WRI 10. Permission of instructor required for non-science majors.*

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. *Prerequisites: WRI 25 or WRI 30 and WRI 100 (or equivalent). Letter grading only.*

WRI 125: Topics in Creative Writing [4]
Advanced work in creative writing. Each section will focus 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.*

WRI 130: Topics in Professional Writing [4]
Specialized instruction in one aspect of professional writing. Topics include Journalism, Technical Writing, Copy-Editing, Writing for the Internet and Research for Writers. 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.*

WRI 195: Upper Division Undergraduate Research [1-4]
Supervised research. *Permission of instructor required.*

WRI 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. P/NP grading only.

WRI 199: Upper Division Individual Study [1-5]
Permission of instructor required. P/NP grading only.

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Lieutenant Governor

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President of the Alumni Associations of the University of California

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(ONE-YEAR TERM EXPIRES JUNE 30, 2006)

Eric G. Juline
Vice President of the Alumni Associations of the University of California

Staff Advisor to The Regents
(ONE-YEAR TERM)

Lynda Brewer, UCI

Robert C. Dynes
President of the University

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(TERM EXPIRES ON MARCH 1 OF YEAR INDICATED UNLESS OTHERWISE NOTED)

Maria Ledesma
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Richard C. Blum *(2014)*
Russell Gould *(2017)*
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Eddie Island *(2017)*
Odessa P. Johnson *(2012)*
Joanne C. Kozberg *(2010)*
Sherry L. Lansing *(2010)*
David S. Lee *(2006)*
Monica C. Lozano *(2013)*
George M. Marcus *(2012)*
John J. Moores *(2009)*
Gerald L. Parsky *(2008)*
Norman J. Pattiz *(2014)*
Peter Preuss *(2008)*
Frederick Ruiz *(2016)*
Tom Sayles *(2006)*
Leslie Tan Schilling *(2017)*
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(TERM ENDS SEPTEMBER 1, 2007)

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San Francisco

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Chancellor

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Mary E. Miller
Vice Chancellor – Administration

Samuel Traina
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Janet E. Young
Assistant Chancellor and Chief of Staff

Deans, Assistant Deans and Institute Directors

Sam Traina
Interim Dean – Graduate Studies
Director – Sierra Nevada Research Institute

Hans Bjornsson
Interim Dean – School of Social Sciences, Humanities and Arts

Maria Pallavicini
Dean – School of Natural Sciences

Jeff R. Wright
Dean – School of Engineering
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James R. Ortez
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Marna Cooper
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Associate Vice Chancellor-University Relations

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Charles Nies
Assistant Vice Chancellor – Student Affairs

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University Librarian

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Director – Center for Educational Partnerships and Special Assistant to the Chancellor

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Assistant University Librarian

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Callale Cierra
Director – Graduate Admissions

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Executive Director – Academic Senate

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Director – Purchasing

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Director – Recreation and Athletics

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Director – Communications

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Kent Kuo
Registrar and Associate CIO for Student Services

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Controller

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Jan Mendenhall
Executive Director – University Relations

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Director – Student Business Services

Denis Nepveu
Director – Budget

Brandy Ramos Nikaido
Director (interim) – UC Merced Centers

Nancy Ochsner
Director - Institutional Planning and Analysis

Diana M. Ralls
Director – Financial Aid and Scholarships

Chris Rosander
Director – Small Business Development Center Regional Network

Encarnación Ruíz
Director – Undergraduate Admissions and Relations with Schools & Colleges

Leslie Santos
Director – Housing and Residence Life

Pauline Sahakian
Director – UC Merced Writing Project

Larry Salinas
Director – Governmental Relations

Rita Spaur
Chief of Police

Thea Vicari
Director – Sponsored Projects

Thomas Welton
Director – Dining and Retail Services

Mary Willis
Director – Career Services Center

John O. White
Director – Capital Planning

VIRGINIA ADAN-LIFANTE,
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Licenciatura., Universidad de Sevilla; Ph.D., University of California, Santa Barbara
Second language acquisition, Hispanic women literature, Hispanic culture, Puerto Rican literature and culture

KEITH E. ALLEY,
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Developmental neuroscience focusing on cellular mechanisms that assure scaling of neuronal populations with the targets they innervate, neuromuscular maturation and plasticity

DAVID B. ASHLEY,
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Development and implementation of risk analysis techniques appropriate for project management and construction-engineering decisions, determination of factors leading to construction project success, predictive models of project performance, assessment of project change consequential effects, project scope modeling and definition, conceptual estimating, innovative project financing approaches

ROGER C. BALES,
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B.S., Purdue University; M.S., University of California, Berkeley; M.S., Ph.D., California Institute of Technology
Hydrology, snow and ice, hydrochemistry, climate impacts on water resources, climate changes over polar ice sheets

MIRIAM BARLOW,
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Evolution of bacteria, predicting the evolution of antibiotic resistance, testing evolutionary theory

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Analyzing risk in construction projects, researching the use of information technology in construction, understanding decisions on investments in information technology

ALBERTO E. CERPA,
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Computer networking and distributed systems, wireless sensor networks with emphasis in network self-configuration, topology control, wireless radio channel measurement and characterization, programming models, development of wireless testbeds, Internet protocols, operating systems issues

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Experimental and theoretical studies of nonlinear and quantum optics, including experiments on faster-than-light optical phenomena, gravitational radiation, nonlinear parametric effects, general relativity, the interaction of matter waves with gravity waves

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Cellular signaling, cellular engineering, polymer gel assembly, biopolymer gels

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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 including ribavirin, cytokines, alcohol and receive oxygen species

MICHELLE M. CHOUINARD,
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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, the roles of positive and negative evidence in language acquisition, word learning, label extension in language acquisition

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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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Energy conversion systems, dynamic simulation and control of thermal systems, adaptive thermal networks, absorption chillers and heat pumps, vapor compression systems with alternate refrigerants, microchannel heat exchangers, artificial neural networks and genetic algorithm for optimization of thermal components

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U.S. national popular culture, African American music cultures (primarily jazz), Asian American popular culture, Pacific Island/ Hawaiian studies

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Signal transduction, antioxidants and redox signaling, lung disease

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Stem cell research, cell biology, immunology, biotechniques, virology

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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

JESSICA LEE GREEN,
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Community ecology, scaling and spatial phenomena in ecology, theoretical ecology, conservation biology, microbial diversity

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Methodological aspects of geographical information science including geocomputation, remote sensing techniques, and spatial analysis; applied aspects of geographical information science including the application of geospatial techniques in solving large-scale ecological and geographical problems, with emphasis on the effects of invasive species, climate change, human disturbance on terrestrial ecosystems

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Contaminant transport in aquatic systems, soil and groundwater remediation, development and use of environmental sensors

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Categorization, inductive reasoning, recognition memory, computer simulation and mathematical modeling, intuitive statistical judgment

GREGG HERKEN,
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History, American diplomatic history, nuclear history, history of Cold War

BOAZ ILAN,
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B.S.c., 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, which employs modeling physical problems in terms of ordinary and partial differential equations and obtains detailed studies using functional analytic, asymptotic and perturbation analysis, and numerical computation

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Geometric modeling, computer graphics, computer animation, autonomous agents, robotics, artificial intelligence

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Political economy, law and economics, U.S. economic history, economic development, public economics

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Resonance Raman spectroscopy and microscopy, molecular photochemistry and photophysics, organic materials for nonlinear optics, modeling of spectroscopic data

DAVID F. KELLEY,
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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

MICHELLE KHINE,
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Micro-Electro-Mechanical System design, cellular biology, electroporation, impedance spectroscopy, cell mechanics, automation

ARNOLD D. KIM,
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Wave propagation in random media, light propagation in tissues, wireless communications, scientific computing, asymptotic and perturbation methods

VALERIE J. LEPPERT,
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B.A. (2), California State University, Sonoma; Ph.D., Northwestern University
Electron microscopy, nanomaterials for application in technology and the environment

SEAN MALLOY,
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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, including identity formation, globalization and transnationalism, border studies, textual recovery, intra-cultural difference, the Hispanic context of Chicano/Chicana literature, popular culture and the mass media

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, focusing on deriving pure populations from stem cells in vitro, characterizing these cells and comparing their function with mature cells derived in vivo, then using these cells towards regenerative medicine applications including tissue engineering and cell theory approaches; particular interest in cardiovascular cell lineage, with plans to expand into other cell systems long-term

MONICA MEDINA,
Assistant Professor, School of Natural Sciences
B.S., Universidad de Los Andes, Bogota, Columbia; 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,
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Nonlinear dynamics and classical/quantum chaos with applications to atomic and molecular physics, semi-classical phase-space techniques, topological and geometric methods for low-dimensional systems, the geometric/Berry phase and gauge theory

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,
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B.A., Miami University; Ph.D., University of Arizona
Applied microeconomics, industrial organization, labor economics/program evaluation, economic history

SHAWN D. NEWSAM,
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Image processing, computer vision, pattern recognition, machine learning, content-based information retrieval, digital libraries, data mining, knowledge discovery in spatiotemporal, multi-media and scientific datasets

ROBERT S. OCHSNER,
Director of Writing and Lecturer, UC Merced Writing Program
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,
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Aqueous, surface and environmental geochemistry, biogeochemistry and transport of inorganic contaminants in natural systems, geochemical applications of spectroscopy and microscopy, chemistry in hydrothermal systems

DAVID M. OJCIUS,
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,
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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

BELINDA I. REYES,
Assistant Professor, School of Social Sciences, Humanities and Arts
B.S., University of Illinois, Urbana-Champaign; Ph.D., University of California, Berkeley
Demography, immigration, immigration policy, immigrant adaptation, race and ethnicity, urban economics, social and economic progress of race/ethnic minorities

CRISTIAN H. RICCI,
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B.A., California State University, Los Angeles; M.A., Ph.D., University of California, Santa Barbara
19th-and 20th-century Spanish literature, 19th-and 20th-century Spanish-American literature, Portuguese literature, Golden Age and Colonial literature.

WILLIAM R. SHADISH,
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B.A., Santa Clara University; M.S., Ph.D., Purdue University
Clinical psychology, experimental and quasiexperimental design, meta-analysis, program evaluation, psychology of science

MICHAEL A. SPRAGUE,
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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

MAYYA TOKMAN,
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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,
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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,
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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

CHRISTOPHER VINEY,
Professor, School of Engineering
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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)

ALEXANDER WHALLEY,
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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,
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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,
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B.S., M.S., Ph.D., University of Chicago
Solar power and renewable energy, elementary particle physics, non-imaging optics

J. ARTHUR WOODWARD,
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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
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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

JEFFREY YOSHIMI,
Assistant Professor, School of Social Sciences, Humanities and Arts
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Philosophy of mind, philosophy of cognitive science, phenomenology (especially Husserl), neural networks

ADJUNCT PROFESSORS

PHILIP B. DUFFY,
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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; Doctoral degree, 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

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

ACCREDITATION

The University of California, Merced is in the candidacy stage seeking regional accreditation by the Accrediting Commission for Senior Colleges and Universities of the Western Association of Schools and Colleges, 985 Atlantic Avenue, Suite 100, Alameda, CA 94501. Application for candidacy was initiated in December 2005.

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 per- forming 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 non-public 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 recordkeeping 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 dates of your assignment to the state.

2. Spouse, Registered Domestic Partner or Other Dependents of Military Personnel

   You are exempt from payment of the non- resident 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.


CAMPUS MAP
Revised March 2006
not to scale

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