

**293. Topics in Marketing (3)**

Seminar—3 hours. Prerequisite: completion of all first-year graduate courses at the Graduate School of Management or the equivalent. Advanced topics in marketing, which may include marketing research, new product development, brand management, pricing, distribution management, service marketing, hi-tech marketing, advertising, sales promotions, marketing through the Web. May be repeated for credit.—I. (I.)

**294. Topics in Accounting (3)**

Seminar—3 hours. Prerequisite: completion of all first-year graduate courses at the Graduate School of Management or the equivalent. Contemporary and emerging issues in financial management accounting. Application of modern techniques of evaluation and analysis of financial information. Use of appropriate electronic database and research techniques. May be repeated for credit.—I. (I.)

**295. Topics in Information Technology (3)**

Seminar—3 hours. Prerequisite: completion of all first-year graduate courses at the Graduate School of Management or the equivalent. Applications of information technology to management and management of information technology. Adaptation to the dynamic nature of the field. May be repeated for credit.—I. (I.)

**296. Topics in Technology Management (3)**

Seminar—3 hours. Prerequisite: completion of all first-year graduate courses at the Graduate School of Management or the equivalent. Cyclical nature of innovation and technological change, features of innovative firms and industries, national innovation systems, and impact of information technologies on innovation processes. May be repeated for credit.—I. (I.)

**297. Topics in International Management (3)**

Seminar—3 hours. Prerequisite: completion of all first-year graduate courses at the Graduate School of Management or the equivalent. The broader environment in which U.S. firms and their foreign competitors operate. Integration of material from other topics courses (marketing, strategy, finance, accounting, information technology, technology management) into the international setting. May be repeated for credit.—I. (I.)

**298. Directed Group Study (1-5)**

Prerequisite: consent of instructor.

**299. Individual Study (1-12)**

Prerequisite: consent of instructor. (S/U grading only.)

## Managerial Economics

(College of Agricultural and Environmental Sciences)

### The Major Program

The major in managerial economics (formerly agricultural and managerial economics) teaches students to apply economics and quantitative principles to problems in agricultural production, management, marketing, finance, trade, futures and options, environment and development.

**The Program.** Each student must specialize in at least one of three options: agricultural economics, which focuses on topics related to the production and marketing of foods and fibers; environmental and resource economics, which focuses on issues related to use of resources and environmental quality; or managerial economics, which focuses on topics related to evaluating, financing, and managing business activities.

**Internships and Career Alternatives.** Students in managerial economics have opportunities to gain additional career information and preparation through internships in a variety of private business and governmental agencies. Graduates qualify for supervisory and management training positions in

farm and ranch production, food and agricultural processing, agricultural sales and service, banking, finance, commodity and stock brokerages in the private sector, and a variety of agency career positions in local, state, and federal government. Students who desire additional training are well qualified to enter graduate programs in agricultural and resource economics, economics, business administration, or law. For more information, see <http://icc.ucdavis.edu>.

**Major Entrance Requirements.** Students may enter the Pre-Managerial Economics major while completing the major preparatory requirements.

Acceptance into the pre-major does not guarantee automatic admission into the major. Before declaring a major in Managerial Economics, a student must complete the following courses with a combined grade point average (GPA) of at least 2.800. All of these courses must be taken for a letter grade. In determining admission to major status, the Department of Agricultural and Resource Economics counts only the first repeat of any pre-major course.

Economics 1A and 1B ..... 8 units  
 Statistics 13 ..... 4 units  
 Mathematics 16A and 16B  
 or 21A and 21B ..... 6-8 units  
 If a student has taken Agricultural and Resource Economics (ARE) 100A and/or Economics (ECN)101 before applying for admission to our major, ARE 100A will take the place of ECN 1A and ECN 101 will take the place of ECN 1B for calculation of the student's entrance GPA.

### B.S. Major Requirements:

UNITS

**English Composition Requirement ..... 4-12**

At least 8 units from the following list:  
 English 3, University Writing Program 1, 18, 19, 101, 102A, 102B, 102C, 102D, 102E, 102F, 102G, 104A, 104F  
 Remaining 4 units from above list or from Comparative Literature 1, 2, 3, 4, Native American Studies 5, Communication 1

**Preparatory Subject Matter ..... 72-75**

Management 11A-11B ..... 8  
 Agricultural Management and Rangeland Resources 21, Computer Science  
 Engineering 10, 15 or 30 ..... 3-4  
 Economics 1A-1B ..... 8  
 Mathematics 16A-16B-16C or 21A-21B ..... 8-9  
 Statistics 13, 103 ..... 8  
 Social Science, Natural Science, Agricultural Science ..... 37-38  
 See major breadth requirement checklist in department Advising office or at <http://www.agecon.ucdavis.edu> for a complete list of courses.

**Breadth/General Education ..... 6-24**

Note: Approved General Education courses may be used to simultaneously satisfy Social, Natural, and Agricultural Science courses as defined in the Preparatory Subject Matter for the major and the campus General Education requirement.

**Depth Subject Matter ..... 20**

Students graduating with this major are required to attain at least a C average (2.000) in all upper division courses taken at the University in the depth subject matter.

Agricultural and Resource Economics 100A, 100B, 106, 155 ..... 16  
 Economics 101 ..... 4

**Restricted Electives ..... 32**

Choose at least one of the options below:

**Agricultural Economics option**

Choose at least 15 units from Agricultural and Resource Economics 120, 130, 132, 138, 139, 140, 145, 150. Select the remaining 17 units from the aforementioned courses, Agricultural and Resource Economics 18, or

upper division courses in Agricultural and Resource Economics and/or Economics

**Environmental and Resource Economics option**

Agricultural and Resource Economics 175, 176 ..... 8  
 Choose at least 18 units from Agricultural and Resource Economics 15, 120, 138, 145, 146, 150, 156, Economics 123, 125, 130, Environmental Science and Policy 168A, 168B, 178. Select the remaining 6 units from the aforementioned courses or upper division courses in Agricultural and Resource Economics and/or Economics, Environmental Science and Policy 160, 161, 163, 165, 166, 167, 171, 172, 173, Environmental Toxicology 138

**Managerial Economics option**

Agricultural and Resource Economics 18 ..... 4  
 Choose at least 12 units from Agricultural and Resource Economics 112, 118, 136, 157, 171A, 171B. Select the remaining 16 units from the aforementioned courses or from Agricultural and Resource Economics 115A, 120, 130, 132, 138, 139, 140, 143, 144, 145, 146, 150, 156, 175, 176, 194HA-194HB, Economics 115A, 121A, 121B, 151A, 151B, 160A, 160B

**Unrestricted Electives ..... 41-44**

**Total Units for the Degree ..... 180**

**Advising Center** for the major is in 1176 Social Sciences and Humanities Building (530) 754-9536.

**Major Adviser.** Hoy F. Carman (*Agricultural and Resource Economics*)

### Minor Program Requirements:

Before declaring a minor in Managerial Economics, a student must complete the following courses with a combined grade point average (GPA) of at least 2.800. All of these courses must be taken for a letter grade. In determining admission to minor status, the Department of Agricultural and Resource Economics counts only the first repeat of any pre-minor course.

Economics 1A and 1B ..... 8 units  
 Mathematics 16A-16B or 21A-21B 6-8 units  
 Statistics 13 ..... 4 units

The Department of Agricultural and Resource Economics offers four minor emphases open to students majoring in other disciplines who wish to complement their study programs with a minor in Managerial Economics. Each emphasis requires Agricultural and Resource Economics 100A, which has prerequisites of Economics 1A-1B and Mathematics 16A-16B. For some courses, Statistics 13 and 103 may be required. Variable-unit courses and lower division courses are not accepted for any emphasis.

UNITS

**Managerial Economics ..... 18**

**General emphasis**

Agricultural and Resource Economics 100A or the equivalent ..... 4  
 Additional upper division courses in Agricultural and Resource Economics ..... 14

**Agricultural Economics emphasis**

Agricultural and Resource Economics 100A or the equivalent ..... 4  
 Additional upper division courses in Agricultural and Resource Economics ..... 14  
 Select 9 or more units from Agricultural and Resource Economics 120, 130, 132, 138, 139, 140, 145, 150.

Select additional upper division Agricultural and Resource Economics courses to complete the 18-unit total for the minor.

**Environmental and Natural Resource Economics emphasis**

Agricultural and Resource Economics 100A or the equivalent ..... 4

Additional upper division courses in Agricultural and Resource Economics..... 14  
 Select 9 or more units from Agricultural and Resource Economics 175 and 176, and either 100B or 120.  
 Select additional upper division Agricultural and Resource Economics courses to complete the 18-unit total for the minor.

#### Managerial Economics emphasis

Agricultural and Resource Economics 100A or the equivalent ..... 4  
 Additional upper division courses in Agricultural and Resource Economics..... 14  
 Select 9 or more units from Agricultural and Resource Economics 112, 118, 136, 157, 171A, 171B.  
 Select additional upper division Agricultural and Resource Economics courses to complete the 18-unit total for the minor.

**Graduate Study.** See *Graduate Studies*, on page 97, in this catalog.

## Master of Education (M.Ed.) (A Graduate Group)

The Master of Education (M.Ed.) program is no longer admitting students; admissions are suspended.

## Maternal and Child Nutrition (Department of Nutrition)

Carl L. Keen, Ph.D., Chairperson of the Department

**Department Office.** 3135 Meyer Hall  
 (530) 752-4630;  
<http://www.extension.ucdavis.edu/macnutrition/>

#### Faculty

Faculty members are listed on the Web site.

**Graduate Study.** The Nutrition Department offers the degree of M.A.S. in Maternal and Child Nutrition. This program consist of three required six-unit core courses (Nutrition During Pregnancy, Lactation and Infant Nutrition, and Child and Adolescent Nutrition), six to eight units of special topics seminars, four to six units of electives, and a six-unit student project (produced in consultation with a three-member guidance committee) for a total of 36 units. Each of the core courses will comprise 10 weeks of in-class instruction twice per week for two-and-a-half hours per meeting. Classes will also include online discussion of related material and readings.

Each student will be assigned a three-member guidance committee consisting of two members of the teaching faculty and an additional qualified faculty member to advise the student in choosing electives and identifying a student project.

**Preparation.** Admission to the program requires a bachelor's degree with prior course work that includes (or is comparable to): one year of general chemistry, two quarters of organic chemistry, a course in statistics, one course in general physiology, and two quarters of the biochemistry of nutrition. A limited number of deficiencies in preparatory courses may be made up after admission to the program, though the courses will not count toward graduate unit requirements.

**Graduate Advisors.** Kathryn G. Dewey, Ph.D., Professor (*Nutrition*), Jane Heinig, Ph.D., Academic Administrator (*Nutrition*)

**Courses in Maternal and Child Nutrition.** See courses under *Nutrition*, on page 398.

## Mathematical and Physical Sciences

(College of Letters and Science)

Louise H. Kellogg, Ph.D. (*Geology*), Program Director

**Program Office.** 1201 Social Sciences and Humanities Building

#### Committee in Charge

Andreas J. Albrecht, Ph.D. (*Physics*)  
 Rudolph Beran, Ph.D. (*Statistics*)  
 R. David Britt, Ph.D. (*Chemistry*)  
 Shirley Chiang, Ph.D. (*Physics*)  
 Mark J. Kurth, Ph.D. (*Chemistry*)  
 Isabel P. Montañez, Ph.D. (*Geology*)  
 Motohico Mulase, Ph.D. (*Mathematics*)  
 Bruno L. Nachtergaele, Ph.D. (*Mathematics*)  
 Robert H. Shumway, Ph.D. (*Statistics*)

#### The Program of Study

The Division of Mathematical and Physical Sciences teaches students to use experimental studies and the analytical analyses to find solutions to real world problems. Students learn to address issues such as cleaning up the environment, preserving natural resources and creating innovative materials for the future. From the study of atoms to the examination of distant galaxies, from abstract number theory to the development of new chemical compounds, the division provides students with the skills to build the world of tomorrow.

The program in Mathematical and Physical Sciences provides an organizational structure within the College of Letters and Science for facilitating the development of innovative curricular initiatives across the mathematical and physical sciences, including offering broadly conceived, integrative undergraduate and graduate-level courses. The program also may house resident faculty pursuing interdepartmental research and teaching in this area of inquiry.

#### Courses in Mathematical and Physical Sciences (MPS)

##### Lower Division Course

##### 1. General Science: Science in the News (4)

Lecture—3 hours; laboratory/discussion—1 hour.  
 Prerequisite: lower division standing. Basic principles in science including numeracy, scale, energy, and time; the scientific method; good and bad science. Emphasis on science topics recently in the news. GE credit: SciEng.—III. Rustad

##### 11A-11B. Mathematical and Physical Sciences Seminar (2-2)

Lecture—2 hours. Prerequisite: mentorship for undergraduate research participants in the physical and mathematical sciences. Research and writing in the mathematical and physical sciences. Presentations by various science faculty members.—II. (II.)

## Mathematics

See *Mathematics*; and *Applied Mathematics (A Graduate Group)*, on page 145.

## Mathematics

(College of Letters and Science)

\_\_\_\_\_, Chairperson

**Department Office.** 1130 Mathematical Sciences Bldg.

(530) 752-0827;

[studentservices@math.ucdavis.edu](mailto:studentservices@math.ucdavis.edu);  
[studentservices@math.ucdavis.edu](mailto:studentservices@math.ucdavis.edu);

<http://www.math.ucdavis.edu> [http://](http://www.math.ucdavis.edu)

[www.math.ucdavis.edu](http://www.math.ucdavis.edu)

#### Faculty

Zhaojun Bai, Ph.D., Professor (*Computer Science*)

Craig Benham, Ph.D., Professor

Joseph Biello, Ph.D., Assistant Professor

Angela Y. Cheer, Ph.D., Professor

Jesus De Loera, Ph.D., Professor

C. Albert Fanfani, Ph.D., Professor

Roland Freund, Ph.D., Professor

Dmitry B. Fuchs, Ph.D., Professor

Janko Gravner, Ph.D., Professor

Joel Hass, Ph.D., Professor

John K. Hunter, Ph.D., Professor

Michael Kapovich, Ph.D., Professor

Gregory J. Kuperberg, Ph.D., Professor

Timothy Lewis, Ph.D., Associate Professor

E. O. Milton, Ph.D., Professor,  
*Academic Senate Distinguished Teaching Award*

Ben Morris, Ph.D., Associate Professor

Alexander I. Mogilner, Ph.D., Professor

Motohico Mulase, Ph.D., Professor

Bruno L. Nachtergaele, Ph.D., Professor

E. Gerry Puckett, Ph.D., Professor

Eric Rains, Ph.D., Professor

Naoki Saito, Ph.D., Professor

Anne Schilling, Ph.D., Associate Professor

Jennifer Schultens, Ph.D., Associate Professor

Albert Schwarz, Ph.D., Professor

Steve Shkoller, Ph.D., Professor

Alexander Soshnikov, Ph.D., Professor

Thomas Strohm, Ph.D., Professor

J. Blake Temple, Ph.D., Professor

Abigail Thompson, Ph.D., Professor

Craig A. Tracy, Ph.D., Professor

Monica Vazirani, Ph.D., Associate Professor

Roman Vershynin, Ph.D., Associate Professor

Andrew Waldron, Ph.D., Associate Professor

Roger J-B Wets, Ph.D., Professor

Qinglan Xia, Ph.D., Assistant Professor

Hong Xiao, Ph.D., Assistant Professor

#### Emeriti Faculty

David Barnette, Ph.D., Professor Emeritus

Donald C. Benson, Ph.D., Professor Emeritus

Carlos R. Borges, Ph.D., Professor Emeritus

Robert J. Buck, Professor Emeritus

Gulbank D. Chakerian, Ph.D., Professor Emeritus,  
*Academic Senate Distinguished Teaching Award*

Doyle O. Cutler, Ph.D., Professor Emeritus

James R. Diederich, Ph.D., Professor Emeritus

Allan L. Edelson, Ph.D., Professor Emeritus

Robert D. Glauz, Ph.D., Professor Emeritus

Shirley A. Goldman, M.S., Lecturer Emerita

Charles A. Hayes, Jr., Ph.D., Professor Emeritus

Kurt Kreith, Ph.D., Professor Emeritus

Arthur J. Krener, Ph.D., Professor

Melven R. Krom, Ph.D., Professor Emeritus

Gary J. Kurowski, Ph.D., Professor Emeritus

David G. Mead, Ph.D., Professor Emeritus, *Academic Senate Distinguished Teaching Award*

Donald A. Norton, Ph.D., Professor Emeritus

Washek F. Pfeffer, Ph.D., Professor Emeritus

G. Thomas Sallee, Ph.D., Professor,  
*Academic Senate Distinguished Teaching Award*

Sherman K. Stein, Litt.D. (hon.), Ph.D., Professor

Emeritus, *Academic Senate Distinguished Teaching Award*

Robert W. Stringall, Ph.D., Professor Emeritus

Takayuki Tamura, D.Sc., Professor Emeritus

Howard J. Weiner, Ph.D., Professor Emeritus

#### Affiliated Faculty

John Chuchel, Ph.D., Lecturer