

# Master of Science in Agriculture

2007-09 Cal Poly Catalog

[College of Agriculture](#)

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## MS Agriculture with Specializations in:

Agricultural Education  
Agricultural Engineering Technology  
Animal Science  
Crop Science  
Dairy Products Technology  
Environmental Horticultural Science  
Food Science and Nutrition  
Irrigation  
Plant Protection Science  
Recreation, Parks, and Tourism Management  
Soil Science

## General Characteristics

Graduate studies in the College of Agriculture, Food and Environmental Sciences allow the student to pursue either a professional program designed to enhance the competencies of agricultural educators, or an academic program of graduate-level scholarly activities and research in one of several specializations. Graduates are prepared for:

- \* professional-level positions with business and industry, government, and foreign service in agriculture and related fields;
- \* agricultural teaching in secondary schools or community colleges;
- \* continued graduate work at other institutions.

## When to Apply

Master's applicants may file an application for admission at any time. In order to be considered for admission in the "targeted" quarter, the portfolio must be completed by the dates provided at the following websites:

Deadlines for graduate programs are available at [www.ess.calpoly.edu/\\_admiss/grad/regular.htm](http://www.ess.calpoly.edu/_admiss/grad/regular.htm).

## Prerequisites

Consideration for admission to this program as a classified graduate student requires a minimum grade point average of 2.75 in the last 90 quarter units attempted. An applicant not meeting these academic standards, but who meets the basic university standard of a grade point average of 2.5 in the last 90 quarter units attempted may be considered for admission as a postbaccalaureate student; such admission does not constitute admission to graduate degree standing (refer to page 71). A change from postbaccalaureate status

to graduate status requires application and additional processing through the university's admissions office.

An applicant meeting the grade point requirement for classified graduate status, but who is deficient in background courses in agriculture and/or related support disciplines, may be considered for admission as a conditionally classified graduate student. Before such a student is advanced to classified graduate status, deficiencies in prerequisites must be removed and satisfactory academic performance in a graduate program must be demonstrated by the completion of no fewer than 12 units of specified courses with a minimum grade point average of 3.0. Courses taken to remove deficiencies in prerequisites do not count toward the unit requirement for the degree.

All applicants who do not speak and write English as their primary language are required to complete the Test of English as a Foreign Language (TOEFL), with a minimum score of 550, and the Test of Written English (TWE), with a minimum score of 4.5.

## Programs of Study

There are three MS degrees in the college: MS in Agribusiness (see page 93), MS in Forestry Sciences (see page 127), and the MS in Agriculture. The MS Agriculture program includes the following specializations: Agricultural Education, Agricultural Engineering Technology, Animal Science, Crop Science, Dairy Products Technology, Environmental Horticultural Science, Food Science and Nutrition, Irrigation, Plant Protection Science, Recreation, Parks, and Tourism Management, and Soil Science. Although the program offers several specializations, there is a single degree; students may not earn more than one Master of Science degree in the College of Agriculture, Food and Environmental Sciences.

## The Thesis

The thesis is based on independent, supervised research. Students should contact individual departments to determine the availability of funding support for their research. The final copy of the thesis must meet the standards explained in the "Manual of Instructions for the Preparation and Submission of the Master's Thesis or Master's Project" available from the Cal Poly Research and Graduate Programs Office. At least one course in statistical methods and/or experimental design is required of students in a thesis based curriculum.

### Formal Study Plan

Graduate students must file the formal study plan for the degree with the Graduate Coordinator of the College of Agriculture, Food and Environmental Sciences no later than the end of the quarter in which the 12th unit of approved courses is completed. The formal program of study must include at least 45 units of committee-approved graduate coursework; at least half of the units required by the committee as reflected on the formal study plan must be at the 500 level.

Students should refer to the course descriptions in this catalog for credit limitations of individual courses; for example, total credit for AG 500, Individual Study, is limited to six units.

All candidates must meet the current Graduation Writing Requirement; see page 77. All students are required to pass an oral comprehensive examination which is normally given during the final quarter of the program of study. A written comprehensive exam may also be required by the master's degree committee, but this is optional. For students in a thesis program the final oral comprehensive examination includes, but is not necessarily limited to, a defense of the thesis.

### MS Agriculture, Specialization in AGRICULTURAL EDUCATION

Provides students with the opportunity to focus their graduate study in Agricultural Education, and is generally taken concurrently with the credential program.

#### Required Courses

AGED 539 Internship .....	6
AGED 520 Program Develop/Agric Education .....	3
AGED 522 Instructional Prog/Agric Mechanics.....	3
<b>Restricted electives</b> .....	33

Any 400- and 500-level courses approved by the student's graduate committee. At least half of all units required by the committee as reflected on the formal study plan must be at the 500 level. Students are required to complete one year of successful teaching or graduate level internship prior to the written and oral examinations.

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### MS Agriculture, Specialization in AGRICULTURAL ENGINEERING TECHNOLOGY

Students have the opportunity to focus their program on the application of engineering technologies and management to solve agriculturally related problems.

#### Required Courses

AG 599 Thesis .....	6
SS 501 Research Planning .....	4
STAT 512 Statistical Methods .....	4
<b>Restricted electives</b> .....	31

Any 400 and 500 level courses approved by the student's graduate committee. At least half of all units required by the committee as reflected on the formal study plan must be at the 500 level.

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### MS Agriculture, Specialization in ANIMAL SCIENCE

*Additional prerequisites:* Prospective students are required to: (1) submit a cover letter identifying interests, goals and experience relevant to the MS program, (2) take the general portion of the GRE and submit scores, and (3) submit a resume.

The program provides students with an interdisciplinary, science-based program, where students develop basic scientific knowledge, apply that knowledge to a research project, then write and defend a thesis. An individual's coursework and research project is focused based upon his or her interests and goals in Animal Science, and under the guidance of the advisor and thesis committee.

#### Required Courses

ASCI 581 Graduate Seminar .....	3
AG 581 Graduate Seminar.....	1
STAT 512 Statistical Methods .....	4
STAT 513 Applied Experimental Design and Regression Models .....	4
AG 599 Thesis .....	6
<b>Select 16 units from the following</b> .....	16

- AG 500 Individual Study in Agriculture (6)
- ASCI 403 Applied Biotech in Animal Science (5)
- ASCI 405 Domestic Livestock Endocrinology (4)
- ASCI 406 Applied Animal Embryology (5)
- ASCI 415 HACCP for Meat and Poultry Ops (3)
- ASCI 420 Animal Nutrition (3)
- ASCI 450 Computer Apps in Animal Science:  
Spreadsheet Analysis (4)
- ASCI 500 Individual Study in Animal Science (6)
- ASCI 503 Adv Molecular Tech in Animal Sci (4)
- VS/ASCI 438 Systemic Animal Physiology (4)
- VS/ASCI 440 Immunology and Diseases of  
Animals (4) *or* VS/ASCI 540 Advanced  
Immunology and Diseases of Animals (4)
- AGED 438 Instructional Processes in Agric Ed (4)
- BIO 431 General and Cellular Physiology (4)
- BIO 501 Molecular and Cellular Biology (4)
- BIO 524 Developmental Biology (4)
- CHEM 528 Nutritional Biochemistry (3)
- FNR 532 Apps in Biometrics and Econometrics (4)

**Restricted electives** .....

Any 400 and 500 level courses approved by the student's graduate committee. At least half of all units required by the committee as reflected on the formal study plan must be at the 500 level.

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### MS Agriculture, Specialization in CROP SCIENCE

For students with undergraduate preparation in plant agriculture. Research currently is focused primarily in postharvest technology, viticulture, and integrated pest management, with additional work being done in other areas, including agronomy, horticulture, and precision farming.

#### Required Courses

CRSC 445 Cropping Systems .....	4
CRSC 581 Graduate Seminar.....	3
CRSC 599 Thesis .....	6
HCS 511 Ecological Biometrics.....	4
SS 501 Research Planning .....	4

#### Restricted electives..... 24

Any 400- and 500-level courses, approved by the student's graduate committee. At least half of all units required by the committee as reflected on the formal study plan must be at the 500 level.

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### MS Agriculture, Specialization in DAIRY PRODUCTS TECHNOLOGY

An applied program for students who desire to use their academic preparation in food science and nutrition, dairy science, microbiology, chemistry, engineering, biochemistry and related fields to address applied research questions of impact to the field of dairy science and technology. The program requires the demonstration of strong analytical thinking, effective oral and written communication, and project management. Coursework and thesis experience are designed with flexibility to enhance and increase proficiency in scientific methods while enriching students' overall preparation to enter the workforce. Graduates enter research and development positions with major food companies, leadership positions in dairy food processing and other allied areas, or further graduate study for the Ph.D. Students have opportunity to work on funded research projects of the Dairy Products Technology Center and interact with multidisciplinary teams of scientists from throughout the world. International students are encouraged to apply.

#### Required Courses

DSCI 401 Physical and Chemical Properties of Dairy Products .....	4
DSCI 444 Dairy Microbiology.....	4
DSCI 570 Selected Topics in Dairy Science .....	3
DSCI 571 Selected Adv. Lab in Dairy Science.....	3
DSCI 581 Graduate Seminar in Dairy Science .....	3
DSCI 599 Thesis .....	6
STAT 523 Design and Analysis of Experiments .....	4

#### Restricted electives..... 18

Any 400- and 500-level courses, approved by the student's graduate committee. At least half of all units required by the committee as reflected on the formal study plan must be at the 500 level.

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### MS Agriculture, Specialization in ENVIRONMENTAL HORTICULTURAL SCIENCE

For students interested in careers in teaching, applied research positions in industry, or to students planning on continuing on for a Ph.D. It would also appeal to foreign students interested in an American graduate degree, particularly since California is internationally famous for its horticulture industry.

#### Required Courses

CRSC 581 or EHS 581 Graduate Seminar.....	3
HCS 500 Individual Study .....	3
HCS 511 Ecological Biometrics .....	4
HCS 570/571 Selected Topics/Lab.....	3
SS 501 Research Planning .....	4
EHS 599 Thesis .....	6

#### Restricted electives ..... 22

Any 400- and 500-level courses approved by the student's graduate committee. At least half of all units required by the committee as reflected on the formal study plan must be at the 500 level.

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### MS Agriculture, Specialization in FOOD SCIENCE AND NUTRITION

For students with undergraduate preparation in food science, nutrition, or other science-based curricula. A thesis is required. Research areas vary with faculty expertise and interest; refer to Food Science and Nutrition Department and College of Agriculture, Food and Environmental Sciences web pages for more information on faculty research. Graduates are prepared for further study in doctoral programs or for responsible positions in nutrition and food industries.

#### Required Courses

FSN 581 Graduate Seminar .....	3
FSN 599 Thesis .....	6
SS 501 Research Planning <i>or</i> other 400-500 level research methods course .....	2-4
STAT 512 Statistical Methods .....	4

#### Advisor approved electives

(400–500 level courses) ..... 28-30

At least half of all units required by the committee as reflected on the formal study plan must be at the 500 level.

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## MS Agriculture, Specialization in IRRIGATION

Prerequisite: B.S. or B.A. with proficiency in basic chemistry and math. Students must have successfully completed at least one undergraduate class in general irrigation, soil science, crop science, calculus, and hydraulics, plus be familiar with spreadsheets. Students may complete prerequisite courses at Cal Poly if necessary.

### Required Courses

BRAE 405 Chemigation .....	1
BRAE 414 Irrigation Engineering.....	4
BRAE 435 Drainage <i>or</i>	
BRAE 440 Agricultural Irrigation Systems.....	4
BRAE 438 Drip/Micro Irrigation <i>or</i> BRAE 439	
Vineyard Irrigation .....	4
BRAE 532 Water Wells and Pumps .....	4
BRAE 500 Individual Study .....	3
BRAE 533 Irrigation Project Design .....	4
BRAE 599 Thesis.....	6
400-500 level research methods or statistics course	3
<b>Electives</b> .....	12

400-500 level courses approved by the student's graduate committee. At least half of all units required by the committee as reflected on the formal study plan must be at the 500 level.

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## MS Agriculture, Specialization in PLANT PROTECTION SCIENCE

Provides research experience at the graduate level; provides the opportunity to conduct field and/or laboratory research programs with corporate stakeholders for career enhancement; allows students to develop more diverse or specialized skill sets for post-graduation employment; provides opportunity to obtain required coursework for state licensing.

### Required Courses

CRSC/EHS 581 Graduate Seminar .....	3
AG 581 Graduate Seminar .....	1-3
HCS 511 Ecological Biometrics.....	4
PPSC 599 Thesis .....	6
SS 501 Research Planning .....	4
PPSC 521 Plant-Pest Interactions .....	4

### Select 8 units from the following .....

PPSC 405 Advanced Weed Management (4)	
PPSC 414 Grape Pest Management (4)	
PPSC 427 Disease and Pest Control Systems for Ornamental Plants (4)	
PPSC 431 Insect Pest Management (4)	
PPSC 441 Biological Control of Insects (4)	

### Electives .....

13-15  
400-500 level courses approved by the graduate committee. At least half of all units required by the committee as reflected on the formal study plan must be at the 500 level.

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## MS Agriculture, Specialization in RECREATION, PARKS, AND TOURISM MANAGEMENT

Prerequisite: In order to develop an academic background in this discipline, students who have not completed a BS/BA degree in Recreation, Parks and Tourism Administration are required to take the following undergraduate courses: REC 101, REC 210, REC 360, and STAT 217/218.

### Required Courses

REC 527 Leisure Behavior and Theory .....	4
REC 581 Graduate Seminar (1) (1).....	2
REC 599 Thesis .....	9
SS 501 Research Planning .....	4
STAT 513 Applied Experimental Design and	
Regression Models .....	4
<b>Electives</b> .....	22

400-500 level courses approved by the graduate committee. At least half of all units required by the committee as reflected on the formal study plan must be at the 500 level.

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## MS Agriculture, Specialization in SOIL SCIENCE

Prerequisite: B.S. degree in soil science, geo-science, or physical or biological sciences, or a B.A. degree with proficiency in the basic sciences (chemistry, physics, botany, biology, and statistics). A computer science or computer applications course is required. Students may complete prerequisite courses at Cal Poly if necessary.

### Required Courses

SS 501 Research Planning .....	4
SS 508 Environmental Assessment for Erosion	
Control .....	3
SS 522 Advanced Soil Fertility .....	3
SS 581 Graduate Seminar in Soil Science .....	3
SS 582 Advanced Land Management .....	3
SS 599 Thesis .....	6
<b>Electives</b> .....	23

400-500 level courses approved by the graduate committee. At least 6 units of electives must be from outside of the College of Agriculture, Food and Environmental Sciences. At least half of all units required by the committee as reflected on the formal study plan must be at the 500 level.

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