

DEPARTMENT OF PLANT, SOIL AND ENTOMOLOGICAL SCIENCES

Paul McDaniel, Dept. Head (Ag. Sci. Bldg. Room 242, 875 Perimeter Drive MS 2339, Moscow, ID 83844-2339; phone (208) 885-7012; paulm@uidaho.edu). Entomology Division: Division Chair, Sanford D. Eigenbrode. James D. Barbour, Edward J. Bechinski, Nilsa A. Bosque-Perez, Steve Cook, Sanford D. Eigenbrode, James B. Johnson, Arash Rashed, Mark Schwarzlaender and Erik Wenninger. Plant Science Division: Division Chairs, Michael Thornton (south) and Robert R. Tripepi (north). Jack Brown, Allan Caplan, Jianli Chen, Esmaeil Fallahi, Saad L. Hafez, Zonglie Hong, Pamela J.S. Hutchinson, Alexander Karasev, Joseph C. Kuhl, Stephen L. Love, Juliet Marshall, S. Krishna Mohan, Don W. Morishita, Phillip Nolte, Nora L. Olsen, Timothy S. Prather, Bahman Shafii, Glenn E. Shewmaker, Kurtis Schroeder, Shree P. Singh, Jeffrey C. Stark, Donald C. Thill, Michael Thornton, Robert R. Tripepi, Phillip S. Wharton and Fangming Xiao. Soil and Land Resources Division: Division Chair, Robert L. Mahler. John Hammel, Robert Heinse, Jodi L. Johnson-Maynard, Guy R. Knudsen, Robert L. Mahler, Paul A. McDaniel, Amber Moore, Matthew J. Morra and Daniel G. Strawn.

The Department of Plant, Soil and Entomological Sciences is within the College of Agricultural and Life Sciences. We offer a B.S. degree in Agricultural and Life Sciences with our Sustainable Crop and Landscape Systems major. We offer M.S. and Ph.D. degrees in Entomology, Plant Science, and Soil and Land Resources.

We offer degree programs that focus on the earth's biological and physical resources. This allows students to pursue graduate education or careers in agriculture, horticulture, environmental science, or an array of biological sciences. Students in agriculture and horticulture develop skills needed for professional careers in crop production, plant maintenance, pest control, biotechnology, and biological control of insects, weeds and diseases. Students in soil and land resources are prepared for careers relevant to environmental quality and the protection, restoration and sustainable use of soil and water resources. Specialization in entomology or more basic areas of plant sciences, e.g. molecular biology, prepares students for continuing education or employment in many fields of biology.

Undergraduate Degree Program:

The multidisciplinary **Sustainable Crop and Landscape Systems** major offers students broad-based preparation in agricultural, horticultural, biological and ecological sciences. There are five areas of emphasis:

The **insects and society** emphasis area addresses basic and applied aspects of the study of insects and how they influence human activities. The program provides a broad entomological education with opportunities to specialize in such areas as agricultural and aquatic entomology, biological control, host plant resistance, insect ecology, insect physiology and insect-plant relations. The curriculum is designed for students pursuing professional careers in the basic and applied fields of entomology, or for those interested in continuing their education at the graduate level.

Under the **sustainable cropping systems** emphasis area, students may study crop management, plant protection and fundamental aspects of plant sciences. Many courses emphasize environmental concerns, ecological relationships and sustainability of agricultural systems. Students interested in crop management gain the necessary background to be successful in a wide range of crop-related careers in agriculture. They may tailor their academic program in the basic and applied aspects of crop science to suit their individual interests and career goals. Our crop and weed science offerings will prepare students for graduate education or professional careers in cropping systems management, plant protection, agricultural consulting, plant biotechnology, plant breeding and genetics, seed production and certification and weed science.

The **environmental horticulture** emphasis area is designed to provide students with a background in production of various horticultural crops and/or urban landscape management. Students may select courses to help them specialize in a particular career path. An internship is also available, which will provide insight into professional horticulture careers. Students may learn about many facets of horticulture, including horticultural crop production (floral crops, woody landscape plants, fruits or vegetables), by enrolling in courses on production and management of horti-

cultural crops that are economically significant to Idaho and the nation. Students enrolled in this emphasis area may prepare for careers in management and operation of commercial greenhouses, nurseries, orchards, vineyards and vegetable farms. Students have the opportunity to focus on managing and maintaining the various components of urban landscapes including trees, shrubs, herbaceous plantings and turf grass, or organic farming techniques. Courses in plant science, soils, biology and entomology further enhance the knowledge needed for a professional career in horticulture. This emphasis area is flexible enough to enable students to pursue science-oriented careers or advanced degree studies.

The undergraduate **soil and land use** emphasis area is offered for students who are interested in working as a soil scientist for businesses, industry, or government agencies. Graduates may work as environmental or agricultural consultants. Many businesses and industries employ graduates with training in soil science to work in various fields related to agriculture; soil fertility, precision farming, crop and forage production, and use and management of agri-chemicals. Consultants with soil science training work on projects related to environmental quality and restoration. Government agencies use soil scientists to inventory and develop conservation plans designed to identify and protect soil resources and maintain environmental quality on agricultural, range, and forest lands.

The **plant biotechnology** emphasis area will interest students who want to work with plants using the latest molecular genetic techniques to address the food and energy needs of the United States and the world in the 21st century. Students will learn how to understand, manipulate and use the genetic information of plants at the molecular level to create and select crop plants with improved traits (e.g. yield; nutritional value; insect, disease or temperature tolerance) to address the challenges brought on by increasing world population, decreasing availability of water for irrigation, and temperature changes brought on by global warming. In addition, students will learn how to modify plant genes to improve crop plant potential for use in biofuel production. Hands-on experience is possible by conducting undergraduate research in our plant biotechnology laboratories. The plant biotechnology emphasis will prepare students for graduate education or professional careers in academia or industry in such areas as genomics, genetic engineering, marker-assisted plant breeding, plant genetics, molecular biology, tissue culture and molecular virology.

Our degree offerings are designed to prepare students for graduate school and a variety of rewarding career opportunities. All of our programs are based on curricula designed to prepare students for present and future employment. We offer students the opportunity to work closely with faculty in classroom and field situations. Our faculty members care about our students' individual needs and interests, and offer additional specialization through directed study, special topics, seminars and other courses as needed. An internship program is available to provide students with practical job experience and to open doors for career opportunities. Additionally, we coordinate closely with the Departments of Entomology, Crop and Soil Sciences, Horticulture and Landscape Architecture, and Plant Pathology at Washington State University (eight miles away) to enhance our offerings.

We offer many opportunities to conduct advanced, in-depth studies with our important scientific collections and cutting-edge facilities. The William F. Barr Entomology Museum contains 1 million specimens. The Lambert-Erickson Weed Herbarium houses one of the nation's outstanding collections with all life stages of weeds represented. The Maynard A. Fosberg Monolith collection is one of the largest in the world with 232 monoliths. We have a state-of-the-art biotechnology facility to accommodate faculty, staff and students. We also offer specially-equipped laboratories for histology, anatomy, and physiology, as well as greenhouse laboratory units with controlled temperature and light-programmed rooms and growth chambers. The University has 1,145 acres located close to campus for field crops, orchards and livestock. Excellent field and laboratory facilities are also available at our research and extension centers at Aberdeen, Parma and Twin Falls.

We welcome questions regarding our programs. Prospective students may contact us by email at pses@uidaho.edu, or by telephone at 208/885-6274.

Courses

See the course description section for courses in Entomology (Ent), Plant Science (PISc), and Soils (Soil).

Plant, Soil and Entomological Sciences Undergraduate Curricular Requirements

Sustainable Crop and Landscape Systems (B.S.Ag.L.S.)

Required course work includes the university requirements (see regulation J-3) and:

Agricultural and Life Science Core

AgEd 406 Exploring International Agriculture (3 cr)
Soil 205, Soil 206 The Soil Ecosystem and Lab (4 cr)
Stat 251 Statistical Methods (3 cr)

One of the following (2-3cr):

ASM 305 GPS and Precision Agriculture (3 cr)
ASM 412 Agricultural Safety and Health (2 cr)
PISc 207 Introduction to Biotechnology (3 cr)

One of the following (4cr):

Chem 101 Introduction to Chemistry I (4 cr)
Chem 111 Principles of Chemistry I (4 cr)

One of the following (3-4cr):

Comm 101 Fundamentals of Public Speaking (2 cr)
Engl 207 Persuasive Writing (3 cr)
Engl 313 Business Writing (3cr)
Engl 316 Environmental Writing (3 cr)
Engl 317 Technical Writing (3 cr)

One of the following (3-4cr):

Math 143 Pre-calculus Algebra and Analytic Geometry (3 cr)
Math 160 Survey of Calculus (4 cr)
Math 170 Analytic Geometry and Calculus I (4 cr)

Sustainable Crop and Landscape Systems Courses

Biol 115 Cells and the Evolution of Life (4 cr)
Ent 322 General and Applied Entomology (4 cr)
PISc 102 The Science of Plants in Agriculture (3 cr)
PISc 400 (s) Seminar (1 cr)
PISc 415 Plant Pathology (3 cr)
PISc 438 Pesticides in the Environment (3 cr)

One of the following (4 cr):

Biol 213 Principles of Biological Structure and Function (4 cr)
PISc 205 General Botany (4 cr)

One of the following (3 cr):

Chem 275 Carbon Compounds (3 cr)
Chem 277 Organic Chemistry I (3 cr)

One of the following (3-5 cr)

Biol 250, Biol 255 General Microbiology and Lab (5 cr)
Biol 300 Survey of Biochemistry (3 cr)
Chem 253, Chem 254 Quantitative Analysis and Lab (5 cr)
MMBB 154, MMBB 155 Introductory Microbiology and Lab (4 cr)

And one of the following emphases:**A. Insects and Society**

Biol 116 Organisms and Environments (4 cr)
Biol 312 Molecular and Cellular Biology (3 cr)
Biol 313 Molecular and Cellular Laboratory (1 cr)
Biol 314 Ecology and Population Biology (4 cr)
Chem 112 Principles of Chemistry II (5 cr)
Ent 440 Insect Identification (4 cr)
Ent 441 Insect Ecology (3 cr)

One of the following (3-4 cr):

Biol 310, Biol 315 Genetics and Lab (4 cr)
Gene 314 General Genetics (3 cr)

Biotechnology Electives (3 cr)

Entomology Electives (5 cr)
Life Science Electives (6 cr)
Mathematics Electives (4 cr)
Physics Electives (4 cr)

Courses to total 128 credits for this degree

B. Soil and Land Use

Chem 112 Principles of Chemistry II (5 cr)
Geol 101, Geol 101L Physical Geology and Lab or 101L
Geol 111, Geol 111L Physical Geology for Science Majors and Lab (4 cr)
Phys 111, Phys 111L General Physics I and Lab (4 cr)
Phys 112, Phys 112L General Physics II and Lab (4 cr)
Soil 415 Soil and Environmental Physics (3 cr)
Soil 422 Environmental Soil Chemistry (3 cr)
Soil 425 or MMBB 425 Microbial Ecology (3 cr)
Soil 446 Soil Fertility (3 cr)
Soil 454 Pedology (3 cr)
Soil 499 Directed Study (1 cr)

One of the following (3 cr):

CS 101 Introduction to Computer Science (3 cr)
CS 112 Introduction to Problem Solving and Programming (3 cr)

Courses to total 128 credits for this degree

C. Sustainable Cropping Systems

Gene 314 General Genetics (3 cr)
PISc 338 Weed Control (3 cr)
PISc 401 Plant Physiology (3 cr)
PISc 407 Field Crop Production (3 cr)
PISc 446 Plant Breeding (3 cr)
PISc 480 Field Trip (1 cr)
Soil 446 Soil Fertility (3 cr)

One of the following (1 cr):

Chem 276 Carbon Compounds Lab (1 cr)
Chem 278 Organic Chemistry I: Lab (1 cr)

One of the following (3 cr):

PISc 398 Internship (3 cr)
PISc 499 Directed Study (3 cr)

Professional Support Electives (9 cr):

Accounting
Animal and Veterinary Sciences
Agricultural Economics
Biology
Business
Business Law
Chemistry
Computer Science
Economics
Entomology
Foreign Languages (max 4 credits)
Forest Resources
Landscape Architecture
Microbiology, Molecular Biology and Biochemistry
Physics
Plant Science
Rangeland Ecology and Management
Renewable Materials
Soils

Sustainable Cropping Systems Electives (17 cr):

PISc 408 Cereal Science (3 cr)
PISc 410 Invasive Plant Biology (3 cr)
PISc 433 Plant Tissue Culture Techniques (3 cr)
PISc 490 Potato Science (3 cr)
Stat 431 Statistical Analysis (3 cr)

Courses to total 128 credits for this degree

D. Environmental Horticulture

Gene 314 General Genetics (3 cr)
PISc 201 Principles of Horticulture (3 cr)
PISc 300 Plant Propagation (3 cr)
PISc 338 Weed Control (3 cr)
PISc 401 Plant Physiology (3 cr)
Soil 446 Soil Fertility (3 cr)

One of the following (1 cr):

Chem 276 Carbon Compounds Lab (1 cr)
Chem 278 Organic Chemistry I: Lab (1 cr)

One of the following (3 cr):

PISc 398 Internship (3 cr)
PISc 499 Directed Study (3 cr)

Professional Support Electives (9 cr):

Accounting
Animal and Veterinary Sciences
Agricultural Economics
Biology
Business
Business Law
Chemistry
Computer Science
Economics
Entomology
Foreign Languages (max 4 credits)
Forest Resources
Landscape Architecture
Microbiology, Molecular Biology and Biochemistry
Physics
Plant Science
Rangeland Ecology and Management
Renewable Materials
Soils

Environmental Horticulture Electives (15 cr):

PISc 340 Nursery Management (3 cr)
PISc 341 Nursery Management Laboratory (1 cr)
PISc 433 Plant Tissue Culture Techniques (3 cr)
PISc 451 Vegetable Crops (3 cr)
PISc 464 Landscape Maintenance (3 cr)
PISc 490 Potato Science (3 cr)

Courses to total 128 credits for this degree

E. Plant Biotechnology

Chem 112 Principles of Chemistry II (5 cr)
Chem 278 Organic Chemistry I: Lab (1 cr)
Gene 314 General Genetics (3 cr)
MMBB 486 Plant Biochemistry (3 cr)
MMBB 488 Genetic Engineering (3 cr)
PISc 401 Plant Physiology (3 cr)
PISc 433 Plant Tissue Culture Techniques (3 cr)
PISc 440 Advanced Laboratory Techniques (4 cr)
PISc 446 Plant Breeding (3 cr)

One of the following (3-4 cr):

Biol 300 Survey of Biochemistry (3 cr)
Biol 380 Biochemistry I (4 cr)

One of the following (3 cr):

PISc 398 Internship (3 cr)
PISc 402 Undergraduate Research in Plant Science (3 cr)
PISc 499 Directed Study (3 cr)

Professional Support Electives (5 cr):

Accounting
Animal and Veterinary Sciences
Agricultural Economics
Biology
Business
Business Law
Chemistry
Computer Science
Economics
Entomology
Foreign Languages (max 4 credits)
Forest Resources
Landscape Architecture
Microbiology, Molecular Biology and Biochemistry
Physics
Plant Science
Rangeland Ecology and Management
Renewable Materials
Soils

Plant Biotechnology Electives (12 cr):

Biol 250 General Microbiology (3 cr)
Biol 255 General Microbiology Lab (2 cr)

Biol 312 Molecular and Cellular Biology (3 cr)
Biol 313 Molecular and Cellular Laboratory (1 cr)
Biol 382 Biochemistry I Laboratory (2 cr)
Biol 444 Genomics (3 cr)
MMBB 409 Immunology (3 cr)
MMBB 485 Prokaryotic Molecular Biology (3 cr)
MMBB 487 Eukaryotic Molecular Genetics (3 cr)
PISc 338 Weed Control (3 cr)
PISc 407 Field Crop Production (3 cr)
PISc 451 Vegetable Crops (3 cr)
PISc 490 Potato Science (3 cr)
Soil 446 Soil Fertility (3 cr)

Courses to total 128 credits for this degree

Plant, Soil and Entomological Sciences Academic Minor Requirements

Crop Science Minor

Ent 322 General and Applied Entomology (4 cr)
PISc 102 The Science of Plants in Agriculture (3 cr)
PISc 338 Weed Control (3 cr)
PISc 407 Field Crop Production (3 cr)
PISc 415 Plant Pathology (3 cr)
Soil 205 The Soil Ecosystem (3 cr)

Two of the following courses (6 credits):

PISc 408 Cereal Science (3 cr)
PISc 438 Pesticides in the environment (3 cr)
PISc 446 Plant Breeding (3 cr)
Soil 446 Soil Fertility (1-3 cr, max 3)

Courses to total 20 credits for this minor

Entomology Minor

Ent 322 General and Applied Entomology (4 cr)
Entomology electives (16 cr)

Courses to total 20 credits for this minor

Horticulture Minor

PISc 102 The Science of Plants in Agriculture (3 cr)
PISc 201 Principles of Horticulture (3 cr)

Three of the following courses (9 cr):

PISc 300 Plant Propagation (3 cr)
PISc 340 Nursery Management (3 cr)
PISc 433 Plant Tissue Culture (3 cr)
PISc 464 Landscape Maintenance (3 cr)

Two of the following courses (6 cr):

LArc 288 Planting Design Studio 1 (3 cr)
Soil 205 The Soil Ecosystem (3 cr)

Courses to total 20 credits for this minor

Plant Protection Minor

Ent 322 General and Applied Entomology (4 cr)
PISc 338 Weed Control (3 cr)
PISc 415 Plant Pathology (3 cr)

Courses selected from the following (9 cr):

Ent 446 Host Plant Resistance to Insects and Pathogens (3 cr)
Ent 472 Aquatic Entomology (3 cr)
PISc 410 Invasive Plant Biology (3 cr)
PISc 438 Pesticides in the Environment (3 cr)

Courses to total 20 credits for this minor

Soil Science Minor

Soil 205, The Soil Ecosystem and Lab (4 cr)
Soil 206
Soil 415 Soil Physics (3 cr)
Soil 422 Environmental Soil Chemistry (3 cr)
Soil 438 Pesticides in the Environment (3 cr)
Soil 446 Soil Fertility (3 cr)
Soil 454 Soil Development and Classification (3 cr)

Courses selected from the following to total at least 20 credits for this minor:

Soil 417 Market Garden Practicum (1-6 cr)
Soil 425 Microbial Ecology (3 cr)

Courses to total 20 credits for this minor

Plant, Soil and Entomological Sciences Graduate Degree Programs

Candidates must fulfill the requirements of the College of Graduate Studies and of the Department of Plant, Soil, and Entomological Sciences. See the College of Graduate Studies section for general requirements applicable to each degree.

Master and Doctoral students will choose a major professor with the concurrence of the faculty member involved. This choice is based upon the availability of the faculty member and the compatibility of the student's research interests with those of the professor.

Master of Science, Major in Entomology. Thesis and non-thesis options are offered. Admission to graduate programs in entomology requires an undergraduate degree, usually in some field of biology. Specific requirements for each degree are determined by the student's graduate committee. Candidates for the M.S. with zoology or entomology course deficiencies in their undergraduate program may be required to list those courses as deficiencies on their M.S. program.

Master of Science, Major in Plant Science or Soils (Thesis Option). General M.S. requirements apply. These requirements include a formal program of at least 30 semester hours to be chosen in consultation with the major professor and approved by the student's supervisory committee. Candidates for this degree must complete an independent research project and submit an acceptable thesis as well as pass a final oral examination.

Master of Science, Major in Plant Science or Soils (Non-thesis Option). General M.S. non-thesis requirements apply.

Doctor of Philosophy, Major in Entomology, Plant Science, or Soils. University Ph.D. requirements apply. Additional specific requirements are determined by the student's graduate committee.

ENTOMOLOGY COURSES

Paul McDaniel, Dept. Head (Ag. Sci. Bldg. Room 242, 875 Perimeter Drive MS 2339, Moscow, ID 83844-2339; phone (208) 885-7012; paulm@uidaho.edu).

Ent 322 General and Applied Entomology (4 cr)

Identification, biology, and importance of insects and related arthropods to humans and agriculture; basic principles of arthropod pest management. Three lec and one 3-hr lab a wk.

Ent 398 Internship (1-6 cr, max 6)

Graded P/F.

Prereq: Ent 322 or Permission

Ent 400 (s) Seminar (cr arr)

Ent 404 (s) Special Topics (cr arr)

Ent 438 Pesticides in the Environment (3 cr)

See Soil 438.

Ent J440/J540 Insect Identification (4 cr)

Survey of approximately 200 major families; collecting and preservation techniques. For grad cr, an additional 50 families and selected subfamilies and genera will be covered and a term paper is reqd. Two lec and two 2-hr labs a wk; two 1-day field trips. Cooperative: open to WSU degree-seeking students. (Alt/yrs)

Prereq: Ent 322 or Permission

Ent J441/J541 Insect Ecology (3 cr)

Population and community dynamics set in a systems framework; theory and applications in natural and altered systems. Requirements for graduate credit include a longer (10 vs. 5 pages), more synthetic term paper, and each 500-level student will lead a web-based or in-class discussion on a research paper of their choice. Two 1-day field trips. Recommended Preparation: General ecology. Cooperative: open to WSU degree-seeking students.

Prereq: Ent 322 or Permission

Ent J446/J546 Host Plant Resistance to Insects and Pathogens (3 cr)

Principles and methodologies for developing pest-resistant crop varieties. Requirements for graduate credit include preparation of grant proposal, classroom presentation. Field trips. Cooperative: open to WSU degree-seeking students. (Alt/yrs)

Prereq: Ent 322 or Permission

Ent 469 Introduction to Forest Insects (2 cr)

Roles and impacts of insects within forest ecosystems. Current management techniques of arthropod pests (insects and mites) in natural and managed forest systems. Interactions of arthropods with other agents of forest disturbance (fire and fungi). Identification of some common arthropod pests of Rocky Mountain forests.

Prereq: For 221 or REM 221

Ent J472/J572 Aquatic Entomology (3 cr)

Identification and biology of insects associated with aquatic and sub-aquatic environments. Additional projects/assignments required for graduate credit. One lec and two 3-hr labs a wk; two 1-day field trips. Cooperative: open to WSU degree-seeking students. (Spring, alt/yrs)

Ent J490/J590 Special Topics in Entomology (1-4 cr, max 4)

Cooperative: open to WSU degree-seeking students.

Ent 499 (s) Directed Study (cr arr)

Ent 500 Master's Research and Thesis (cr arr)

Ent 501 (s) Seminar (cr arr)

Ent 502 (s) Directed Study (cr arr)

Ent 504 (s) Special Topics (cr arr)

Ent 540 Insect Identification (4 cr)

See Ent J440/J540.

Ent 541 Advanced Insect Ecology (3 cr)

See Ent J441/J541.

Ent 546 Host Plant Resistance to Insects and Pathogens (3 cr)

See Ent J446/J546.

Ent 549 Insect-Plant Interactions (3 cr)

Ecology, evolution, and mechanisms of the interactions between insects and plants. Requirements for graduate credit include formal report of field study, term paper. Cooperative: open to WSU degree-seeking students. (Alt/yrs)

Prereq: Ent 322 or Permission

Ent 551 Applied Biological Control: Weeds (1 cr)

Principles and methodologies in biological control of weeds. Requirements for graduate credit include leading a classroom presentation and discussion session. Recommended Preparation: one ecology course, Principles of Biological Control. Cooperative: open to WSU degree-seeking students. (Alt/yrs)

Ent 569 Advanced Forest Entomology (3 cr)

Methods and applications of biological and economic evaluation and control strategies of forest insect populations in relation to pest management programs. Recommended preparation: Ent 469. (Fall, alt/yrs)

Ent 572 Aquatic Entomology (3 cr)

See Ent J472/J572.

Ent 584 Insect Anatomy and Physiology (3 cr)

Organ systems of insects and their functions. A comprehensive term paper and research project reqd for grad cr. Three lec and one 3-hr lab a wk. Cooperative: open to WSU degree-seeking students. (Alt/yrs)

Prereq: Permission

Ent 590 Special Topics in Entomology (1-4 cr, max 4)

Ent 597 (s) Practicum (cr arr)

Ent 598 (s) Internship (cr arr)

Prereq: Ent 322 or Permission

Ent 599 (s) Non-thesis Master's Research (cr arr)

Research not directly related to a thesis or dissertation.

Prereq: Permission

Ent 600 Doctoral Research and Dissertation (cr arr)

PLANT SCIENCE COURSES

Paul McDaniel, Dept. Head (Ag. Sci. Bldg. Room 242, 875 Perimeter Drive MS 2339, Moscow, ID 83844-2339; phone (208) 885-7012; paulm@uidaho.edu).

PISc 100 Survey of Plant and Soil Sciences (1-3 cr, max 3)

This course is designed to introduce students to a scientific examination of the soil and plant relationships that affect the production and propagation of field crops and landscape plants. Topics include soils, irrigation, crop and weed identification, diseases, insects and plant growth regulators. (Spring only)

PISc 102 The Science of Plants in Agriculture (3 cr)

Principles of structure, biology, and management of agronomic and horticultural crops; interaction of crop plants and cropping systems with environment; current issues related to plant science. Two lec and one 2-hr lab a wk.

PISc 201 Principles of Horticulture (3 cr)

An introduction to the production and management of edible and ornamental horticultural crops and the maintenance of plants and turf in urban landscapes. Two lec and two hours of lab a wk; two field trips. (Spring, alt/yrs)

Prereq: PISc 102

PISc 205 General Botany (4 cr)

Growth, development and ecology of plants, fungi, and protists in relation to their environments. Recommended Preparation: Chem 101 and PISc 102. (Spring only)

Prereq: Biol 115

PISc 207 Introduction to Biotechnology (3 cr)

Offers an overview of modern biotechnology, focusing on basic concepts and applications of biotechnology with regards to plants, animals, environment and microorganisms, and medicine. Recommended preparation: Chem 101 or Chem 111. (Fall, alt even/yrs)

PISc 212 Master Gardener (1-3 cr, max 3)

Basic horticultural skills required for home gardeners and landscapers, including soil, water, and fertility management, composting, pest and disease identification and management, vegetable and fruit culture, ornamentals, plant propagation, and lawn care. Graded Pass/Fail. Field trips.

PISc 300 Plant Propagation (3 cr)

Sexual and asexual propagation techniques of herbaceous and woody ornamental plants; propagation methods covered including seed, cuttings, layering, grafting, and cloning/tissue culture. Two lec and one 3-hr lab a wk. (Alt/yrs)

Prereq: PISc 102, 201, or Biol 115

PISc 338 Weed Control (3 cr)

Nature and scope of weed problems, identification and biology of weeds, principles, theory, and practice of mechanical, chemical, and biological control of weeds; legal considerations; integration of methods into functional management systems. Two lec and one 2-hr lab a wk. Recommended Preparation: PISc 102 or equivalent.

PISc 340 Nursery Management (3 cr)

Management of commercial nurseries from plant propagation through sale of the plants. Cooperative: open to WSU degree-seeking students. (Alt/yrs)

PISc 341 Nursery Management Laboratory (1 cr)

Lab study relevant to PISc 340. Experiments on and demonstrations of different practices used in nurseries. One 2-hr lab a wk; one 1-day field trip. Cooperative: open to WSU degree-seeking students.

Coreq: PISc 340

PISc 398 Internship (1-6 cr, max 6)

Graded Pass/Fail.

Prereq: Permission of department

PISc 399 (s) Directed Study (1-2 cr, max 2)

PISc 400 (s) Seminar (1 cr)

PISc 401 Plant Physiology (3 cr)

Application of physiological principles to the management of plants in agronomic, horticultural and forest systems. (Spring, alt even/yrs)

Prereq: PISc 205

PISc 402 Undergraduate Research in Plant Science (1-6 cr, max 6)

This course offers credits to students interested in gaining first-hand experience in today's plant research. Each student will acquire research skills by conducting laboratory or field research on a well-defined topic agreed to by the student and by a faculty supervisor. Students must receive permission from that supervisor prior to enrolling. This course is open to all undergraduates, and may be taken multiple times.

Prereq: PISc 205

PISc 404 (s) Special Topics (cr arr)

PISc 407 Field Crop Production (3 cr)

Management and use of crops in Idaho and the Northwest.

PISc 408 Cereal Science (3 cr)

Crop history and biology of major cereal crops, emphasizing cool season cereals. Recommended Preparation: Biol 115.

PISc J410/J510 Invasive Plant Biology (3 cr)

Biology, ecology, and physiology of weeds with emphasis on crop and weed interactions. Requirements for graduate credit include comprehensive term paper and class presentation on weed-crop interaction. Two lec and one 3-hr lab a wk. PISc 510 is a cooperative course available to WSU degree-seeking students. (Alt/yrs)

PISc 415 Plant Pathology (3 cr)

Biology of diseases and disorders of crop, forest, and ornamental plants, with emphasis on plant-microbe interactions and on disease cause, development, diagnosis, and control. Three 1-hr lectures. (Fall only)

Prereq: PISc 102, and MMBB 154, 155 or Biol 250 (or permission)

PISc J433/J533 Plant Tissue Culture Techniques (3 cr)

Laboratory-oriented course involving tissue culture techniques with an emphasis on regenerating herbaceous and woody plant species from organs or tissues. Requirements for grad cr include completion of a special project and report. One lec and 5 hrs of lab a wk. Recommended Preparation: PISc 300. PISc 533 is a cooperative course available to WSU degree-seeking students. (Alt/yrs)

PISc 438 Pesticides in the Environment (3 cr)

See Soil 438.

PISc 440 Advanced Laboratory Techniques (4 cr)

See MMBB 440.

PISc J446/J546 Plant Breeding (3 cr)

Application of genetic principles to improvement of crop plants. Grad students reqd to complete additional term paper. PISc 546 is a cooperative course available to WSU degree-seeking students. (Alt/yrs)

Prereq: Gene 314 or Equivalent

PISc J451/J551 Vegetable Crops (3 cr)

Production, physiology, storage, and marketing of major and minor vegetable, herb, and spice crops from a worldwide perspective. Recommended preparation: PISc 201, PISc 205, PISc 300 or equivalents. PISc 451 is a cooperative course available to WSU degree-seeking students.

Prereq: PISc 102 or equivalent

PISc 464 Landscape Maintenance (3 cr)

Use and culture of landscape plants to enhance the environment. Two lec and one 2-hr lab a wk; one 1-day field trip. Recommended Preparation: Soil 205 and LArc 288. (Alt/yrs)

Prereq: PISc 102 or Biol 213 or Permission

PISc J476/J576 Cell Biology (3 cr)

See MMBB J475/J575.

PISc 480 Field Trip (1 cr, max 3)

Three-day field trip to production areas.

Prereq: Permission

PISc J486/J586 Plant Biochemistry (3 cr)

See MMBB J486/J586.

PISc J488/J588 Genetic Engineering (3 cr)

See MMBB J488/J588.

PISc J490/J590 Potato Science (3 cr)

History, botanical characteristics, seed physiology and production, plant population, physiology of growth, and pest management; factors influencing maturation, harvest, yield, grade, bruise control, storage, and quality maintenance; economics of production and research on a global basis. Requirements for grad cr include comprehensive term paper and class presentation on selected topic. Cooperative: open to WSU degree-seeking students.

PISc 499 (s) Directed Study (cr arr)**PISc 500 Master's Research and Thesis (cr arr)****PISc 501 (s) Seminar (cr arr)****PISc 502 (s) Directed Study (cr arr)****PISc 504 (s) Special Topics (cr arr)****PISc 510 Invasive Plant Biology (3 cr)**

See PISc J410/J510.

PISc 520 Plant Cytogenetic Techniques (3 cr)

Techniques to study plant genes and chromosomes. Two lec and 4 hrs of lab a wk. Cooperative: open to WSU degree-seeking students. (Alt/hrs)

Prereq: Gene 314 or Equivalent

PISc 533 Plant Tissue Culture Techniques (3 cr)

See PISc J433/J533.

PISc 542 Biochemistry (3 cr)

See MMBB 541.

PISc 546 Plant Breeding (3 cr)

See PISc J446/J546.

PISc 547 Biometrics for Plant Scientists (3 cr)

Use of biometrical techniques in research with particular emphasis on designing, analyzing, and interpreting agricultural and biological experiments; application of statistical methods to biological experiments and problems that may be encountered when applying these techniques to biological systems. Cooperative: open to WSU degree-seeking students. (Alt/hrs)

Prereq: PISc 102 and Stat 431 or Equivalent

PISc 551 Vegetable Crops (3 cr) WSU Hort 320

See PISc J451/J551.

PISc 576 Cell Biology (3 cr)

See MMBB J475/J575.

PISc 586 Plant Biochemistry (3 cr)

See MMBB J486/J586.

PISc 588 Genetic Engineering (3 cr)

See MMBB J488/J588.

PISc 590 Potato Science (3 cr)

See PISc J490/J590.

PISc 597 (s) Practicum (cr arr)**PISc 598 (s) Internship (cr arr)****PISc 599 (s) Non-thesis Master's Research (cr arr)**

Research not directly related to a thesis or dissertation.

Prereq: Permission

PISc 600 Doctoral Research and Dissertation (cr arr)

SOILS COURSES

Paul McDaniel, Dept. Head (Ag. Sci. Bldg. Room 242, 875 Perimeter Drive MS 2339, Moscow, ID 83844-2339; phone (208) 885-7012; paulm@uidaho.edu).

Soil 205 The Soil Ecosystem (3 cr)

Introduction to the physical, chemical, and biological nature of soils.

Prereq: Chem 101 or satisfy Prereq for Chem 111

Soil 206 The Soil Ecosystem Lab (1 cr)

May be used as general education credit in J-3-b. Lab study relevant to Soil 205. Experiments and demonstrations on basic and applied aspects of soil science. One 3-hr lab a wk.

Coreq: Soil 205

Soil 210 Food Systems and Healthy Lifestyles (3 cr)

Introduction to food systems including the historical development of our current global food system. Linkages among the production, marketing and transportation of food and food policy on human health will be explored. Students will complete a semester-long assessment of the local food system and its impacts on individual, school and community health and strategies to improve the food system.

Soil 398 Internship (1-6 cr, max 6)

Graded P/F.

Prereq: Permission of department

Soil 404 (s) Special Topics (cr arr)

Soil J415/J515 Soil and Environmental Physics (3 cr)

Physical properties of soils and their relationships to moisture, aeration, and temperature; plant-soil-atmospheric relationships; solute transport and soil salinity. Two lec and one 3-hr lab a wk. Recommended Preparation: Soil 205, 206, and Phys 111. Soil 415 is a cooperative course available to WSU degree-seeking students. (Alt/yrs, Fall)

Soil 416 Sustainable Small Acreage Farming and Ranching (3 cr)

Overview of small acreage production systems, evaluation of goals and resources, land evaluation, marketing options, and accessing community resources. Three field trips. Cooperative: open to WSU degree-seeking students.

Soil 417 Market Garden Practicum (1-6 cr)

Experiential learning based course that covers all aspects of running a small acreage vegetable farm. Topics include farm planning, crop rotation, soil fertility and testing, weed management and food systems. Students satisfy credit hours through participation in lecture/discussion, field work and field trips. Class meets at the Plant Science Farm. Recommended preparation: Soil 205. (Summer only)

Soil 422 Environmental Soil Chemistry (3 cr)

Chemical processes in soil environment. Recommended Preparation: Soil 205, Soil 206, and Chem 112. Cooperative: open to WSU degree-seeking students. (Alt/yrs)

Soil J425/J525 Microbial Ecology (3 cr)

See MMBB J425/J525.

Soil J427/J527 Sustainable Food Systems (3 cr)

The purpose of this course is to help students apply systems thinking and systems methodological problem solving skills to identify and describe current and future food system issues. Through lectures, case studies and research students will explore elements and behavior of food systems that impart sustainability. Students taking the course for graduate credit will complete additional readings, research and presentations.

Prereq: For 221, REM 221, or Soil 210; or Instructor Permission

Soil 438 Pesticides in the Environment (3 cr)

Same as Ent and PISc 438. Principles of pesticide fate in soil, water, and air; pesticide metabolism in plants, pesticide toxicology, and pesticide mode-mechanism of action; pest resistance to pesticides; biotechnology in pest control; regulations and liability; equipment application technology; pesticide transport, storage, and disposal; and social and ethical considerations. Recommended Preparation: Chem 275.

Soil 446 (s) Soil Fertility (1-3 cr, max 3)

Principles of soil fertility management; availability of plant nutrients and their relationship to plant growth and fertilization practices. Recommended Preparation: Soil 205 and 206.

Soil 454 Pedology (3 cr)

Morphology, genesis, and classification of soils; distribution of soils as related to environmental processes and factors. Two lectures and one 4-hr lab a week. Recommended Preparation: Soil 205 and Soil 206. Cooperative: open to WSU degree-seeking students.

Soil 456 North Idaho Field Trip (1 cr)

Soils and land use in northern Idaho ecosystems; emphasis on soil parent materials, soil formation and morphology, and soil-plant community relationships. Graded P/F. One 3-day field trip; additional class meetings and assignments before and after field trip. Cooperative: open to WSU degree-seeking students.

Prereq: Soil 205 or Permission

Soil 458 Soil and Site Evaluation (1-2 cr, max 8)

Description and evaluation of soils; emphasis on morphological features and properties that influence land use. Graded P/F. Two-four hrs of lab a wk; one 3-day or one 6-day field trip. Recommended Preparation: Soil 205.

Soil 499 (s) Directed Study (cr arr)

Soil 500 Master's Research and Thesis (cr arr)

Soil 501 (s) Seminar (cr arr)

Soil 502 (s) Directed Study (cr arr)

Soil 504 (s) Special Topics (cr arr)

Soil 514 Environmental Geophysics (3 cr)

This course will provide an introduction to near-surface geophysical techniques. The aim is to provide a solid foundation on physical principles used to non-invasively study characteristics and properties of the earth in general, and the shallow subsurface in particular. We will discuss applications ranging from eco-hydrology, precision agriculture, and civil engineering to archeology. The course consists of two parts. Lectures will provide a conceptual understanding of the theory and methods, and a field-based case study will apply these concepts collecting integrated geophysical data that will be processed and interpreted to introduce students to practical procedures and challenges in environmental geophysics. Cooperative: open to WSU degree-seeking students.

Soil 515 Soil and Environmental Physics (3 cr)

See Soil J/415/J515.

Soil 525 Microbial Ecology (4 cr)

See MMBB J425/J525.

Soil 526 Soil Mineralogy (3 cr)

Distribution and significance of common soil minerals; weathering and general reactivity as related to mineral structures; techniques of mineral identification including x-ray diffraction, chemical dissolution procedures, optical and electron microscopy. One lec and one 3-hr lab a wk. Cooperative: open to WSU degree-seeking students. (Alt/yrs)

Prereq: Soil 422, Soil 454 or Permission

Soil 527 Sustainable Food Systems (3 cr)

See Soil J427/J527.

Soil 537 Soil Biochemistry (3 cr)

Origin, chemical structure, and significance of soil biochemical compounds. Cooperative: open to WSU degree-seeking students. (Alt/yrs)

Prereq: Soil 422, Biol 380, Biol 250 or Permission

Soil 547 (s) Soil Fertility Management (1-3 cr, max 3)

Philosophy of fertilizer recommendations based on soil and plant tissue testing; principles of fertilizer manufacture, placement, and use for improving plant growth. Recommended Preparation: Soil 446.

Soil 597 (s) Practicum (cr arr)

Soil 598 (s) Internship (cr arr)

Graded P/F

Prereq: Permission

Soil 599 (s) Non-thesis Master's Research (cr arr)

Research not directly related to a thesis or dissertation.

Prereq: Permission

Soil 600 Doctoral Research and Dissertation (cr arr)

INDEX

C

Crop Science Minor • 3

D

DEPARTMENT OF PLANT, SOIL AND ENTOMOLOGICAL SCIENCES • 1

E

Entomology Courses • 5

Entomology Minor • 3

H

Horticulture Minor • 3

P

Plant Protection Minor • 3

Plant Science Courses • 6

Plant, Soil and Entomological Sciences Academic Minor Requirements • 3

Plant, Soil and Entomological Sciences Graduate Degree Programs • 4

Plant, Soil and Entomological Sciences Undergraduate Curricular Requirements • 2

S

Soil Science Minor • 3

Soils Courses • 8

Sustainable Crop and Landscape Systems (B.S.Ag.L.S.) • 2