DEPARTMENT OF PLANT SCIENCES

The Department of Plant Sciences is housed within the College of Agricultural and Life Sciences. We offer a B.S. degree in Plant Science within which students may focus on majors tailored to the needs of their educational and career goals in agriculture and plant sciences. The four majors include Biotechnology and Plant Genomics, Crop Management, Crop Science, and Horticulture and Urban Agriculture. At the graduate level, we offer M.S. and Ph.D. degrees in Plant Science.

Our faculty and staff are committed to help students develop skills needed for professional careers in theoretical and applied sciences necessary to increase future crop production and agricultural sustainability. In addition, we offer courses and laboratory experiences in the use of biotechnology and modern plant breeding to improve and protect the major crops in the Pacific Northwest.

Undergraduate Degree Program

B.S. Degree in Plant Science

The degree offers students broad-based preparation in crop science and management, horticulture, plant biotechnology, plant breeding and genetics, and weed science. The four majors in this degree program are:

Biotechnology and Plant Genomics

Students in this major will gain experience with the latest molecular genetic techniques to address food and energy needs of the United States and world in the 21st century. Students will learn how scientists investigate and manipulate genetic information at the molecular level in order to create and select crop plants with improved yield, nutritional value, insect and disease resistance, and temperature tolerance to address the needs of today's farmers and the challenges brought on by the ever-growing world population, competing demands for water, and threats brought on by climate change. Our students are offered numerous opportunities to participate in research projects in our plant biotechnology laboratories. This major prepares students for graduate education or for professional careers in industries that routinely employ genomics, genetic engineering, marker-assisted plant breeding, plant genetics, molecular biology, tissue culture, and molecular virology.

Crop Management

This major is new and has been prompted by a high demand for graduates that are qualified to work in applied field agronomy, production agriculture and production management, and to make business decisions that arise in local and nationwide agriculture. Future expanding food and energy needs will require crop production managers and farm managers to ensure high volume and high quality of agricultural products. Students who have an interest in management of crops should enroll in this major rather than crops sciences, which requires more science courses. In addition, students majoring in Crop Management will be educated in applied crop production and management, combined with courses in agricultural economics and farming systems. This major will be particularly attractive to students who wish to be employed in applied production agriculture. This major will provide well-rounded students who will be prepared to manage family or large corporate agro-businesses, and work as field agronomists, crop production managers, and farm managers.

Crop Science

Students in this major receive a science-based education in a wide range of disciplines aimed at solving theoretical and applied challenges relating to increasing agricultural productivity and developing systems that advance agriculture sciences into the future. Demand for increased food production is ever present and to compete, agriculture needs to develop new crop genetics and agronomic practices that maximize output while reducing crop inputs and reducing the agricultural footprint on the environment. This major combines physical and biological sciences and related subjects to develop innovative solutions to a wide range of problems that will be met by future agriculture. Courses emphasize environmental concerns, ecological relationships, and sustainability of agricultural systems. This major will prepare students for graduate education or professional careers in field agronomy, agricultural research, plant protection, agricultural consulting, plant breeding and genetics, seed production and certification, and weed science.

Horticulture and Urban Agriculture

This major is designed to provide students with a background in production of various horticultural crops in rural and urban locations or experience with care of managed landscapes including parks and sports turf. Students can tailor horticulture course selection to specialize in a particular horticulture career. Management of horticultural crops that are economically significant to Idaho and the nation are emphasized in various courses. Many facets of horticulture, including horticultural crop production, can be studied, particularly since food security and sustainable production practices are needed if graduates are to meet the challenges posed by increased urbanization and more costly resources needed for plant production. This major prepares students for graduate studies or professional careers in management and operation of commercial greenhouses, nurseries, orchards, vineyards or vegetable farms. Students also have the opportunity to focus on managing and maintaining the various components of urban landscapes including trees, shrubs, herbaceous plantings and turfgrass, or urban food production.

Our degree offerings are designed to prepare students – upon graduation – to enter into rewarding careers in public or private enterprises or for entrance into graduate or professional programs. We offer students the opportunity to work closely with faculty in classroom, laboratory 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 future careers. In addition, we coordinate closely with the Departments Soil and Water Systems, Entomology, Plant Pathology and Nematology, Animal and Veterinary Science, and Agricultural Economics and Rural Sociology to broaden education offerings for our students.

Our students have access to the Lambert-Erickson Weed Herbarium that houses one of the nation’s outstanding weed collections with all life stages of weeds represented. We have a state-of-the-art biotechnology facility with specially-equipped laboratories for histology, anatomy, and physiology, as well as greenhouse laboratory units with controlled temperature and light-programmed rooms and growth chambers. All these facilities can become part of each student’s educational experiences. 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 Plant Sciences programs. Prospective students may contact us by email at plantsciences@uidaho.edu, or by telephone at 208-885-2122.

Vacant, Dept. Head (Ag.Sci. Bldg. Room 242, 875 Perimeter Drive MS 2333, Moscow, ID 83844-2333; phone 208-885-2122; plantsciences@uidaho.edu).

BOCKELMAN, Harold E; 1987; Adjunct Assistant Professor in Plant Sciences; Ph.D.; 1974; University of California Davis.

BREGITZER, Phillip; 1990; Adjunct Assistant Professor in Plant Sciences; Ph.D.; 1989; University of Minnesota.

*BROWN, Jack; 1992; Professor in Plant Sciences; Ph.D.; 1988; St Andrews.

*CAPLAN, Allan B; 1992; Associate Professor in Plant Sciences; Affiliate Associate Professor of Environmental Science; Ph.D.; 1980; University of Iowa.

*CHEN, Jianli; 2007; Research Associate Professor in Plant Sciences; Ph.D.; 2005; Virginia Polytechnic Institute.

CRYDER-WILSON, Cathy; 2016; Adjunct Faculty in Plant Sciences; Ph.D.; 1988; New Mexico State University.

CUSHMAN, Samuel A; 2011; Adjunct Professor of Plant, Soil and Entomological Sciences; Ph.D.; 2003; University of Massachusetts.

DE CLERCK-FLOATE, Rosemarie; Adjunct Associate Professor of Plant, Soil and Entomological Sciences; Ph.D.; 1991; Northern Arizona University.

*FALLAH, Esmaeil; 1990; Professor in Plant Sciences; Ph.D.; 1983; Oregon State University.

FU, Daolin; 2016; Research Assistant Professor in Plant Sciences; Ph.D.; 2003; Kansas State University.

*HONG, Zonglie; 2005; Associate Professor in Plant Sciences; Ph.D.; 1990; University of Novi Sad.

HU, Gongshe; 2006; Adjunct Assistant Professor in Plant Sciences; Ph.D.; 1995; Kansas State University.

*HUTCHINSON, Pamela J; 1999; Associate Professor in Plant Sciences; Ph.D.; 1991; University of Nebraska.

*KUHL, Joseph C; 2009; Research Associate Professor in Plant Sciences; Ph.D.; 2000; University of Wisconsin.

*LIANG, Xi; 2014; Research Assistant Professor in Plant Sciences; Ph.D.; 2013; University of Florida.

*LOVE, Stephen L; 1985; Professor in Plant Sciences; Ph.D.; 1984; Clemson University.

*MA, Rong (Rachel); 2017; Research Assistant Professor in Plant Sciences; Ph.D.; 2014; University of Illinois.

MIKLAS, Phillip N; 2006; Adjunct Professor of Plant Sciences; Ph.D.; 1990; North Dakota State University.

MILLER, Jeffrey S; 2008; Adjunct Associate Professor in Plant Sciences; Ph.D.; 1998; Washington State University.

*MORISHITA, Don W; 1990; Extension Professor in Plant Sciences; Superintendent, Kimberly Research and Extension Center; Ph.D.; 1986; University of Idaho.

NEHER, Oliver; 2016; Adjunct Faculty in Plant Sciences; Ph.D.; 2008; Montana State University.

*NELSON, Nora Lynn Olsen; 1998; Associate Extension Professor of Plant Science; Ph.D.; 1998; Washington State University.

*NOVY, Richard G; 2000; Adjunct Assistant Professor in Plant Sciences; Ph.D.; 1992; University of Wisconsin.

OLSEN, Nora; 1999; Professor in Plant Sciences; Ph.D.; 1998; Washington State University.

*PRATHER, Timothy S; Timothy; Professor in Plant Sciences; Ph.D.; 1993; University of Idaho.

ROGERS, Chris W; 2014; Research Assistant Professor in Plant Sciences; Ph.D.; 2014; University of Arkansas.

*SCHROEDER, Kurtis L; 2013; Assistant Professor in Plant Sciences; Ph.D.; 2004; Washington State University.

SHELLIE, Krista C; 2001; Adjunct Associate Professor in Plant Sciences; Ph.D.; 1990; Michigan State University.

*SHEWMAKER, Glenn E; 1999; Professor in Plant Sciences; Ph.D.; 1998; Utah State University.

*STARK, Jeffrey C; 1981; Research Professor in Plant Sciences; Superintendent, Aberdeen Research and Extension Center; Ph.D.; 1981; University of California Riverside.

STRAUSBAUGH, Carl; 2014; Adjunct Faculty in Plant Sciences; Ph.D.; 1988; Washington State University.

*THORNTON, Michael K; 1993; Research Professor, Extension Specialist in Plant Sciences; Ph.D.; 1990; University of Idaho.

*TRIPEPI, Robert R; 1984; Professor in Plant Sciences; Chair, Plant Science North Division; Ph.D.; 1984; Purdue University.

*WALSH, Olga; 2014; Research Assistant Professor in Plant Sciences; Ph.D.; 2009; Oklahoma State University.

WHITWORTH, Jonathan L; 1997; Adjunct Assistant Professor in Plant Sciences; Ph.D.; 1993; Oregon State University.

*XIAO, Fangming; 2008; Associate Professor in Plant Sciences; Ph.D.; 2002; Kansas State University.

*XIAO, Fangming; 2008; Associate Professor in Plant Sciences; Ph.D.; 2002; Kansas State University.

ZEMETRA, Bob; 2012; Adjunct Faculty in Plant Sciences; Ph.D.; 1983; Colorado State University.

ZEMETRA, Bob; 2012; Adjunct Faculty in Plant Sciences; Ph.D.; 1983; Colorado State University.

Majors


Minors

Plant Sciences Graduate 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 (https://catalog.uidaho.edu/colleges-related-units/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.

- Plant Science (M.S.) (https://catalog.uidaho.edu/colleges-related-units/agricultural-life-sciences/plant-sciences/plant-science-ms)
- Plant Science (Ph.D.) (https://catalog.uidaho.edu/colleges-related-units/agricultural-life-sciences/plant-sciences/plant-science-phd)

Plant Science
PLSC 100 Survey/Plant & Soil Sciences
1-3 credits, 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)

PLSC 102 The Science of Plants in Agriculture
3 credits
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 lecture and one 2-hr lab a week.

PLSC 201 Principles of Horticulture
3 credits
An introduction to the production and management of edible and ornamental horticultural crops and the maintenance of plants and turf in urban landscapes. Two lecture and two hours of lab a week; two field trips. (Spring, alt/yr)
Prereq: PLSC 102.

PLSC 204 (s) Special Topics
Credit arranged.

PLSC 205 General Botany
4 credits
Growth, development and ecology of plants, fungi, and protists in relation to their environments. Recommended Preparation: CHEM 101 and PLSC 102. (Spring only)
Prereq: BIOL 114 or 115.

PLSC 207 Introduction to Biotechnology
3 credits
Cross-listed with GENE 207
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/yr)

PLSC 212 Master Gardener
1-3 credits, 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 P/F. Field trips.

PLSC 300 Plant Propagation
3 credits
Sexual and asexual propagation techniques of herbaceous and woody ornamental plants; propagation methods covered including seed, cuttings, layering, grafting, and cloning/tissue culture. Two lectures and one 3-hour lab a week. (Alt/yr)
Prereq: PLSC 102, 201, or BIOL 115.

PLSC 338 Weed Control
4 credits
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 lectures and one 3-hour lab a week. Recommended Preparation: PLSC 102 or equivalent.

PLSC 340 Nursery Management
3 credits
Management of commercial nurseries from plant propagation through sale of the plants. Cooperative: open to WSU degree-seeking students. (Alt/yr)

PLSC 341 Nursery Management Laboratory
1 credit
Lab study relevant to PLSC 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: PLSC 340.

PLSC 398 (s) Internship
1-6 credits, max 6
Graded P/F.
Prereq: Permission of department.
PLSC 400 (s) Seminar
1 credit.

PLSC 401 Plant Physiology
3 credits
Application of physiological principles to the management of plants in agronomic, horticultural and forest systems. (Spring, alt even yrs)
Prereq: PLSC 205 or BIOL 115 and BIOL 115L or Permission.

PLSC 402 Undergraduate Research in Plant Science
1-6 credits, 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: PLSC 205.

PLSC 404 (s) Special Topics
Credit arranged.

PLSC 405 (s) Professional Development
Credit arranged.

PLSC 407 Field Crop Production
3 credits
Management and use of crops in Idaho and the Northwest.

PLSC 408 Cereal Science
3 credits
Crop history and biology of major cereal crops, emphasizing cool season cereals. Recommended Preparations: PLSC 202.

PLSC 410 Invasive Plant Biology
3 credits
Joint-listed with PLSC 510
Biological, ecological, and physiological principles of weeds with emphasis on crop and weed interactions. Requirements for grad cr include comprehensive term paper and class presentation on weed-crop interaction. Two lec and one 3-hr lab a wk. PLSC 410 is a cooperative course available to WSU degree-seeking students. (Alt yrs)

PLSC 419 Plant Community Restoration Methods
2 credits
Students will participate in classroom discussions surrounding topics that are important to modification and implementation of a restoration plan. Students will also participate in practical, hands-on activities during laboratory periods. Those activities include operation of equipment for cultivation and seeding, calibration of herbicide sprayers, calibration of drills, transplanting techniques, monitoring and evaluation of restoration projects and visits to restoration projects.
Prereq: REM 221, equivalent or permission.

PLSC 433 Plant Tissue Culture Techniques
3 credits
Joint-listed with PLSC 533
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: PLSC 202. PLSC 533 is a cooperative course available to WSU degree-seeking students. (Alt yrs)

PLSC 438 Pesticides in the Environment
3 credits
Gen Ed: Senior Experience
Cross-listed with ENT 438 and SOIL 438
Principles of pesticide fate in soil, water, and air; pesticide metabolism in plants, pesticide toxicity, 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.

PLSC 440 Advanced Laboratory Techniques
4 credits
Cross-listed with GENE 440
Intensive hypothesis-driven laboratory course that will prepare the student for research in molecular biology; emphasis on areas of microbial physiology, microbial genetics, immunology, and pathogenic microbiology. (Spring only)
Prereq: BIOL 250.

PLSC 446 Plant Breeding
3 credits
Joint-listed with PLSC 546
Application of genetic principles to improvement of crop plants. Grad students reqd to complete additional term paper. PLSC 546 is a cooperative course available to WSU degree-seeking students. (Alt yrs)
Prereq: PLSC 102 or equivalent.

PLSC 451 Vegetable Crops
3 credits
Joint-listed with PLSC 551
Production, physiology, storage, and marketing of major and minor vegetable, herb, and spice crops from a worldwide perspective. Recommended preparation: PLSC 201, PLSC 205, PLSC 300 or equivalents. This is a cooperative course available to WSU degree-seeking students. (Alt yrs)
Prereq: PLSC 102 or equivalent.

PLSC 476 Cell Biology
3 credits
Joint-listed with PLSC 576
Introduction to the organization and function of the major components of the eukaryotic cell; emphasis on the composition of cells, the structures and assembly processes of molecules that make up cells, diversity of cell types found in multicellular organisms, and how common interacting processes are coordinately controlled. Extra oral and/or written assignments reqd for graduate credit. (Spring, Alt yrs)
Prereq: BIOL 115 and either BIOL 300 or BIOL 380.

PLSC 480 Field Trip
1 credit, max 3
Three-day field trip to production areas.
Prereq: Permission.
PLSC 486 Plant Biochemistry
3 credits
Joint-listed with PLSC 586
An in-depth introduction to metabolic processes carried out by plants, some fungi, and some algae with emphasis on cell wall synthesis, hormone synthesis, and photosynthesis. Extra oral and/or written assignments reqd for grad cr. (Spring, alt/years)
Prereq: BIOL 300 or BIOL 380.

PLSC 488 Genetic Engineering
3 credits
Joint-listed with PLSC 588, Cross-listed with GENE 488
Techniques and theory underlying practical genetic modifications of plants, microbes, and animals. Extra oral and/or written assignments required for graduate credit. Recommended Preparation: BIOL 380. (Fall only)
Prereq: GENE 314 or BIOL 310.

PLSC 490 Potato Science
3 credits
Joint-listed with PLSC 590
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 graduate credit include comprehensive term paper and class presentation on selected topic. Cooperative: open to WSU degree-seeking students.

PLSC 498 (s) Internship
Credit arranged.

PLSC 499 (s) Directed Study
Credit arranged.

PLSC 500 Master's Research and Thesis
Credit arranged.

PLSC 501 (s) Seminar
Credit arranged.

PLSC 502 (s) Directed Study
Credit arranged.

PLSC 503 (s) Workshop
Credit arranged.

PLSC 504 (s) Special Topics
Credit arranged.

PLSC 505 (s) Professional Development
Credit arranged.

PLSC 510 Invasive Plant Biology
3 credits
Joint-listed with PLSC 410
Biology, ecology, and physiology of weeds with emphasis on crop and weed interactions. Requirements for grad cr include comprehensive term paper and class presentation on weed-crop interaction. Two lec and one 3-hr lab a wk. PLSC 410 is a cooperative course available to WSU degree-seeking students. (Alt/yr)

PLSC 533 Plant Tissue Culture Techniques
3 credits
Joint-listed with PLSC 433
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: PLSC 202. PLSC 533 is a cooperative course available to WSU degree-seeking students. (Alt/yr)
Prereq: CHEM 372; BIOL 380 or Coreq: CHEM 302 or 306; or Permission.

PLSC 542 Biochemistry
3 credits
Maximum of 7 credits in any combination of BIOL 380, PLSC 542, and BIOL 554. Intermediate biochemistry; intro to metabolism and the chemical and physical properties of biomolecules. (Fall only)
Prereq: CHEM 372; BIOL 380 or Coreq: CHEM 302 or 306; or Permission.

PLSC 546 Plant Breeding
3 credits
Joint-listed with PLSC 446
Application of genetic principles to improvement of crop plants. Grad students reqd to complete additional term paper. PLSC 546 is a cooperative course available to WSU degree-seeking students. (Alt/yr)
Prereq: GENE 314 or Equivalent.

PLSC 547 Biometrics for Plant Scientists
3 credits
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/yr)
Prereq: PLSC 102 and STAT 431 or Equivalent.

PLSC 551 Vegetable Crops
3 credits
Joint-listed with PLSC 451
Production, physiology, storage, and marketing of major and minor vegetable, herb, and spice crops from a worldwide perspective. Recommended preparation: PLSc 201, PLSc 205, PLSc 300 or equivalents. This is a cooperative course available to WSU degree-seeking students.
Prereq: PLSC 102 or equivalent.

PLSC 576 Cell Biology
3 credits
Joint-listed with PLSC 476
Introduction to the organization and function of the major components of the eukaryotic cell; emphasis on the composition of cells, the structures and assembly processes of molecules that make up cells, diversity of cell types found in multicellular organisms, and how common interacting processes are coordinately controlled. Extra oral and/or written assignments reqd for graduate credit. (Spring, Alt/yr)
Prereq: BIOL 115 and either BIOL 300 or BIOL 380.

PLSC 586 Plant Biochemistry
3 credits
Joint-listed with PLSC 486
An in-depth introduction to metabolic processes carried out by plants, some fungi, and some alga with emphasis on cell wall synthesis, hormone synthesis, and photosynthesis. Extra oral and/or written assignments reqd for grad cr. (Spring, alt/yeas)
Prereq: BIOL 300 or BIOL 380.
PLSC 588 Genetic Engineering  
3 credits  
Joint-listed with PLSC 488, Cross-listed with GENE 588  
Techniques and theory underlying practical genetic modifications of plants, microbes, and animals. Extra oral and/or written assignments required for graduate credit. Recommended Preparation: BIOL 380. (Fall only)  
Prereq: GENE 314 or BIOL 310.

PLSC 590 Potato Science  
3 credits  
Joint-listed with PLSC 490  
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 graduate credit include comprehensive term paper and class presentation on selected topic. Cooperative: open to WSU degree-seeking students.

PLSC 597 (s) Practicum  
Credit arranged.

PLSC 598 (s) Internship  
Credit arranged.

PLSC 599 (s) Research  
Credit arranged  
Research not directly related to a thesis or dissertation.  
Prereq: Permission.

PLSC 600 Doctoral Research and Dissertation  
Credit arranged.