CROP SCIENCES

Germán A. Bollero
AW-101 Turner Hall, 1102 South Goodwin, Urbana
PH: (217) 333-3420
http://cropsiences.illinois.edu

Plant your future in the Department of Crop Sciences at the University of Illinois. Join our efforts to advance science to meet the needs of a growing world population. From plant breeding and molecular biology to sustainable food and fuel production systems, our internationally recognized faculty are prepared to educate the future leaders of our industry to use the latest advancements in science and technology to improve food and fuel production.

Our department offers students opportunities to succeed and find their niche. When our students graduate, they often have more than one lucrative job opportunity waiting. The demand for our students is high and the future looks even more promising for well-trained scientists as societal demands change. For example, by 2020, estimates say 1,430 new graduates will be needed with a master’s degree or Ph.D. in plant breeding alone.

The Bachelor of Science in Crop Sciences allows students to choose from concentrations in plant biotechnology and molecular biology, plant protection, agroecology, crop agribusiness, biological sciences, crops, and horticultural food systems. Sponsored jointly by the departments of Computer Science and Crop Sciences, the Bachelor of Science in Computer Science and Crop Sciences is a flexible program for undergraduate students who plan to pursue careers in the agricultural field that have a technology focus. This degree will prepare students for advanced study at the graduate level as well as immediate entry into the workforce. The Department of Crop Sciences also offers advanced degree programs tailored to your specific interests that will prepare you for enriching careers with a spectrum of public and private organizations in a global agricultural industry.

In order to reach our mission, we are developing and delivering educational and research programs that foster the creation and adoption of agricultural plant production systems that are profitable, environmentally sound, socially responsible and sustainable.

We are developing well educated, highly skilled and creative individuals with the potential to be national and international leaders in their field. If you are looking for a challenging, exciting career that will make a difference, I am confident our department can meet your needs.

If you are looking for a challenging, exciting career that will make a difference, I am confident our department can meet your needs. Our department offers students opportunities to succeed and find their niche. When our students graduate, they often have more than one lucrative job opportunity waiting. The demand for our students is high and the future looks even more promising for well-trained scientists as societal demands change. For example, by 2020, estimates say 1,430 new graduates will be needed with a master’s degree or Ph.D. in plant breeding alone.

The Bachelor of Science in Crop Sciences allows students to choose from concentrations in plant biotechnology and molecular biology, plant protection, agroecology, crop agribusiness, biological sciences, crops, and horticultural food systems. Sponsored jointly by the departments of Computer Science and Crop Sciences, the Bachelor of Science in Computer Science and Crop Sciences is a flexible program for undergraduate students who plan to pursue careers in the agricultural field that have a technology focus. This degree will prepare students for advanced study at the graduate level as well as immediate entry into the workforce. The Department of Crop Sciences also offers advanced degree programs tailored to your specific interests that will prepare you for enriching careers with a spectrum of public and private organizations in a global agricultural industry.

In order to reach our mission, we are developing and delivering educational and research programs that foster the creation and adoption of agricultural plant production systems that are profitable, environmentally sound, socially responsible and sustainable.

We are developing well educated, highly skilled and creative individuals with the potential to be national and international leaders in their field. If you are looking for a challenging, exciting career that will make a difference, I am confident our department can meet your needs.

Crop Sciences Courses

CPSC 111 Farming Systems credit: 2 Hours.
General introduction to the equipment and practices commonly used on Midwest farms. Classes will consist of short lectures followed by demonstrations. All classes and demonstrations will be conducted at the University of Illinois Crop Sciences Research and Education Center. Includes field trips to local production and agribusiness facilities.

CPSC 112 Introduction to Crop Sciences credit: 4 Hours.
Introductory course covering the principles and practices of crop production and sustainable agroecosystem management. Topics include plant growth and development, environmental factors influencing plant productivity, soil management, fertility, and nutrient cycling, pest control principles, and sustainability challenges facing modern crop production. Concepts are discussed in lecture and reinforced in hands-on laboratory sections.

This course satisfies the General Education Criteria for:
- Nat Sci Tech - Life Sciences

CPSC 113 Environment, Agric, & Society credit: 3 Hours.
Introduction to agriculture and the environment; examine the largest managed ecosystem and its influence on natural ecosystems; develop a working understanding of natural and agriculture ecosystems and their interaction; examine various agriculture management strategies that can be used to produce food for an increasing world population while maintaining or improving environmental quality.

This course satisfies the General Education Criteria for:
- Nat Sci Tech - Life Sciences
- Cultural Studies - Western

CPSC 116 The Global Food Production Web credit: 3 Hours.
Introduces students to the global web involved in the production of food we consume on a daily basis. Selected ecosystems of plants, people, and cultures in Asia, Africa, and Latin America will be studied based on involvement with various crops. Presents the origin and biology of plants; their evolution with humankind in various cultures; the spread and economic importance of crops around the world; and considers current hunger and environmental issues resulting from the global food web. Interactive communications with selected scientists, producers, and traders around the world through the World Wide Web and email system of the INTERNET permit students to get personal exposure to information and activities.

This course satisfies the General Education Criteria for:
- Cultural Studies - Non-West

CPSC 117 Agriculture and Science of Coffee credit: 3 Hours.
The growth and production of coffee and its impact on society and culture. The botanical aspects of coffee, coffee varieties/cultivars, and technologies for coffee growth, harvesting, post-harvest processing, and roasting will be discussed. The wide variety of coffee beverages, coffee flavor evaluation, coffee chemistry, coffee economics, and the physiological effects of coffee will also be examined.

CPSC 131 Agriculture in Mythology credit: 3 Hours.
Compare and contrast the role agriculture and plant sciences played in the development of ancient cultures. Study agricultural references in ancient global mythology. Develop an appreciation of how agricultural diversity of various ancient cultures influenced mythology in the cultures in different regions.

This course satisfies the General Education Criteria for:
- Cultural Studies - Non-West

CPSC 180 Medicinal Plants and Herbology credit: 3 Hours.
Same as HORT 180. See HORT 180.
CPSC 213 Evolution in Action credit: 2 Hours. Introduction to evolutionary theory. Examination of how domesticated species have evolved. Develops an appreciation of how agroecosystems have influenced evolution of adjacent natural ecosystems. Elucidation of evolutionary mechanisms necessary for agricultural species to adapt to global climate change.

CPSC 215 The Prairie and Bioenergy credit: 3 Hours. Designed for students who are interested in bioenergy and its production from prairie land. Instructors will provide information on the global trend of bioenergy production and consumption, importance of bioenergy, the role of Illinois prairie land in bioenergy production, potential U.S. bioenergy production, biofuels from plants, and socio-environmental benefits of bioenergy.

CPSC 225 Introduction to Weed Science credit: 3 Hours. Fundamentals of weed biology, ecology, and management. Emphasis is placed on basic principles and specific management strategies that are relevant to both crop and non-crop ecosystems. Includes a laboratory/discussion. Same as HORT 226. Prerequisite: CPSC 112 or HORT 100 or IB 103.

CPSC 266 Data in Biology and Agriculture credit: 4 Hours. This course focuses on the use of computing and data analysis to solve problems in biology and agriculture and includes an overview of computer methods and limitations of current computer, network and storage hardware for big data sets. The nature, use and future potential of different types of computer hardware and software in biology and agriculture (e.g. mobile applications, high performance computing, wireless networking) will be discussed. Examples of computing-related and computing-limited problems in biology and agriculture, such as image analysis, remote sensing and genetic analysis will be used as case studies. The potential of computing to improve the food system, medicine and other applications will be presented.

CPSC 268 Intro to Applied Statistics credit: 3 Hours. Introduces fundamental statistical procedures used to analyze and interpret data. General principles of descriptive and inferential statistics, measures of central tendency and dispersion, probability, correlation and regression, and tests of hypotheses are covered. An emphasis is placed on biological, environmental, and agricultural sciences, but numerous examples from other areas are discussed. Course content enhances students' ability to critically assess statistical information encountered in professional and everyday activities. Credit is not given for both CPSC 241 and STAT 100 or ACE 261.

This course satisfies the General Education Criteria for: Quantitative Reasoning I

CPSC 269 Undergraduate Open Seminar credit: 0 to 5 Hours. Experimental course on a special topic in crop sciences. Topic may not be repeated except in accordance with the Code. Approved for Letter and S/U grading. May be repeated up to a maximum of 12 hours in separate terms if topics vary.

CPSC 270 Applied Entomology credit: 3 Hours. Lectures, laboratory, and field trips cover the biology of insects and the recognition and management of insect pests of agricultural, forest, and urban ecosystems. Covers insect structure and physiology, classification, life histories, behavior, and pest management. Same as IB 220 and NRES 270. This course satisfies the General Education Criteria for: Nat Sci Tech - Life Sciences

CPSC 271 Biotechnology in Agriculture credit: 3 Hours. Basic introduction to the techniques and application of biotechnology to a wide range of agricultural areas, and specific examples are given. May serve as either a terminal course explaining the techniques or as an introductory base for future studies. Same as HORT 261. Prerequisite: Any 100-level course in a biosciences discipline.

This course satisfies the General Education Criteria for: Nat Sci Tech - Life Sciences

CPSC 285 Genetic Engineering Lab credit: 3 Hours. Laboratory/discussion course that provides a hands-on introduction to the techniques and principles of genetic engineering, recombinant DNA and the impact of molecular genetics on society. Students will isolate DNA from plants and clone specific genes into bacterial plasmids, perform polymerase chain reactions, DNA restriction analysis and DNA blotting, and discuss the relevance of these techniques to both medicine and agriculture. Prerequisite: A general biology course.

CPSC 286 Off-Campus Crop Sci Internship credit: 1 to 5 Hours. Supervised, off-campus experience in a field directly pertaining to a subject matter in crop sciences. Approved for S/U grading only. May be repeated to a maximum of 10 hours. For registration in this course, students should contact the Department Teaching Coordinator.

CPSC 293 On-Campus Crop Sci Internship credit: 1 to 5 Hours. Supervised, on-campus learning experience with faculty engaged in research. Approved for S/U grading only. May be repeated to a maximum of 10 hours. For registration in this course, students should contact the Department Teaching Coordinator.

CPSC 295 Undergrad Research or Thesis credit: 1 to 4 Hours. Individual research, special problems, thesis, development and/or design work under the supervision of an appropriate member of the faculty. May be repeated in the same or subsequent terms. No more than 12 hours of special problems, research, thesis and/or individual studies may be counted toward degree. Prerequisite: Junior standing, cumulative GPA of 2.5 or above at the time the internship is arranged, and consent of instructor.

CPSC 336 Tomorrow's Environment credit: 3 Hours. Introduction to interdisciplinary methods of analysis of environmental problems in a finite world; examination of the concept of the limits to growth; development of a working understanding of natural systems and environmental economics; and examination of various management strategies (technical, economic, and social) that can be used to improve environmental quality. Same as CHLH 336, and ENVS 336. Prerequisite: One course in the life sciences and one course in the social sciences, or consent of instructor.

CPSC 352 Plant Genetics credit: 4 Hours. The principles of heredity in relation to plant improvement. Same as NRES 352. Prerequisite: IB 103 or IB 104.
CPSC 382 Organic Chem of Biol Processes credit: 4 Hours. An overview of the structure, properties, and reactions of carbon-containing compounds relevant to biological processes and cellular structure. The chemistry of hydrocarbon, aromatic, as well as oxygen-, nitrogen-, phosphorus-, and sulfur-containing compounds will be examined. Macromolecular structures including biological membranes, carbohydrates, proteins and nucleic acids will also be discussed. Prerequisites: CHEM 102 and CHEM 104 or CHEM 202 and CHEM 204.

CPSC 396 Undergrad Honors Res or Thesis credit: 1 to 4 Hours. Individual research, special problems, thesis, development and/or design work under the direction of the Honors advisor. May be repeated in the same or subsequent terms. No more than 12 hours of special problems, research, thesis and/or individual studies may be counted toward degree. Prerequisite: Junior standing, admission to the ACES Honors Program, and consent of instructor.

CPSC 407 Diseases of Field Crops credit: 3 Hours. Same as PLPA 407. See PLPA 407.

CPSC 408 Integrated Pest Management credit: 3 Hours. Examination of fundamental concepts of pest management including a historical review of pests and pest management; an overview of major pests (insects, weeds, plant diseases and vertebrate) in a variety of settings (agronomic, specialty crops, urban and structural); management options (area-wide, chemical, biological, cultural and physical); regulatory issues; and topics of current interest. 3 undergraduate hours. 3 graduate hours. Prerequisite: CPSC 226 or CPSC 270 or equivalent, both are preferred but only 1 is required.

CPSC 412 Principles of Crop Advising credit: 3 Hours. Fundamentals in crop development and management, soil structure, management, and fertility, and how crops and soils interact are examined. Students learn how to diagnose real-world problems in fields and field crops grown in the Midwestern US, and to develop practical solutions to such problems. Prepares students to be competitive in careers within commercial crop agriculture and to pass the Certified Crop Adviser examination. 3 undergraduate hours. 3 graduate hours. Prerequisite: CPSC 112 and NRES 201, or equivalent, or consent of instructor.

CPSC 413 Agriculture, Food, and the Environment credit: 2 Hours. Advanced course in the complex interactions of food production resulting from different agricultural systems and the environment. Develop an appreciation of the intricacies of producing food for a growing world population while minimizing the impact on the environment. Understand the implementation of new technology and strategies for future food production. 2 undergraduate hours. 2 graduate hours. Prerequisite: CPSC 112 or CPSC 113 or equivalent course or consent of instructor. For Online MS Program.

CPSC 414 Forage Crops and Pasture Eco credit: 3 Hours. Forages, their plant characteristics, ecology, and production; grasslands of farm and range as related to animal production and soil conservation. 3 undergraduate hours. 3 graduate hours. Offered in alternate years. Prerequisite: An introductory class in biology.

CPSC 415 Bioenergy Crops credit: 3 Hours. Provides an overview and understanding of biomass feedstock production systems for sustainable biofuels production. 3 undergraduate hours. 3 graduate hours. Prerequisite: CPSC 112 or consent of instructor.

CPSC 416 Native Plants and Agroecosystems credit: 4 Hours. Introduction to native plants and to their conservation use and agronomic benefit. Topics include learning to identify native plants using a regional flora, knowing the different ecological niches in the state of Illinois and which plants inhabit them, and choosing appropriate native plants to enhance the interaction between agronomic crops and natives. 4 undergraduate hours. 4 graduate hours. Credit is not given for CPSC 416 if credit for NRES 415 has been earned. Prerequisite: HORT 100 or IB 103.

CPSC 418 Crop Growth and Management credit: 3 Hours. Crop physiology and management as influenced by environment, plant species, and cropping system; relates plant growth processes to crop production practices based on current research. 3 undergraduate hours. 3 graduate hours. Prerequisite: IB 103 or CPSC 112 or equivalent, or consent of instructor.

CPSC 419 Midwest Agricultural Practices credit: 1 Hour. Introduces agronomic production practices in the Midwest and economics of the crop production value chain. Specifically designed for beginning graduate students in crop genetic improvement from non-agricultural backgrounds. 1 undergraduate hour. 1 graduate hour.

CPSC 426 Weed Mgt in Agronomic Crops credit: 3 Hours. Principles of weed ecology and biology, and their application to weed management. Herbicides and their use in corn, soybeans and other agronomic crops. Specialized topics include weed management in reduced tillage, herbicide tolerant crops and management of problem weeds. 3 undergraduate hours. 3 graduate hours. Prerequisite: CPSC 226 or consent of instructor.

CPSC 428 Weed Science Practicum credit: 2 Hours. Intensive course on field diagnostic skills in weed science. Topics include weed and weed seed identification, sprayer calibration, herbicide application, herbicide injury symptomatology, and field diagnostics. Students who complete the course will be encouraged to enter the North Central Weed Science Society weeds contest, which occurs during the summer. 2 undergraduate hours. 2 graduate hours. Prerequisite: CPSC 226 or CPSC 426 or consent of instructor.

CPSC 431 Plants and Global Change credit: 3 Hours. The science of global atmospheric and climate change in the 21st Century. Understanding of how plants, including crops, will respond and may be adapted to these changes. Using plants to ameliorate predicted climate change. Same as IB 440 and NRES 431. 3 undergraduate hours. 3 graduate hours. Offered in alternate years. Prerequisite: CPSC 112 or IB 103.

CPSC 433 Basic Toxicology credit: 3 Hours. Same as CB 449, ENVS 480 and FSHN 480. See FSHN 480.


CPSC 437 Principles of Agroecology credit: 3 Hours. Examines the dynamics and function of agricultural ecosystems and reviews fundamental concepts of ecology. Agricultural systems will be compared on the basis of energy flow, nutrient cycling, diversity, stability and required inputs. 3 undergraduate hours. 3 graduate hours. Offered in alternate years. Prerequisite: IB 100 or IB 103 or equivalent.

CPSC 438 Soil Nutrient Cycling credit: 3 Hours. Same as NRES 438. See NRES 438.

CPSC 439 Env and Sustainable Dev credit: 3 Hours. Same as NRES 439. See NRES 439.
CPSC 440  Applied Statistical Methods I  credit: 4 Hours.
Statistical methods involving relationships between populations and samples; collection, organization, and analysis of data; and techniques in testing hypotheses with an introduction to regression, correlation, and analysis of variance limited to the completely randomized design and the randomized complete-block design. Same as ABE 440, ANSC 440, FSHN 440, and NRES 440. 4 undergraduate hours. 4 graduate hours. Prerequisite: MATH 112 or equivalent.

CPSC 448 Biological Modeling  credit: 3 or 4 Hours.
Same as ANSC 449, GEOG 468, and IB 491. See GEOG 468.

CPSC 452 Advanced Plant Genetics  credit: 3 Hours.
Survey of selected contemporary topics in plant genetics and genomics. Topics include the nature of genes and genomes, crop domestication, selection, allelic diversity in populations, and genetics mapping. Serves as an introduction to functional genomics, population genetics, transmission genetics, quantitative genetics, and bioinformatics. Same as IB 478. 3 undergraduate hours. 3 graduate hours. Prerequisite: CPSC 352 or IB 204, or consent of instructor.

CPSC 453 Principles of Plant Breeding  credit: 4 Hours.
Principles, concepts and tools used in plant breeding. Includes methods and breeding schemes used with different plant species. Same as HORT 453. 4 undergraduate hours. 4 graduate hours. Prerequisite: IB 103; CPSC 352 or equivalent.

CPSC 454 Plant Breeding Methods  credit: 2 Hours.
Discussion of the application of current scientific tools and methods available to plant breeders for improving plants; emphasis on actual use of plant breeding methods and production of high quality seed. 2 undergraduate hours. 2 graduate hours. Offered summer only in alternate years. Prerequisite: CPSC 453.

CPSC 462 Plant Molecular Biology  credit: 1 Hour.
Same as IB 472. See IB 472.

CPSC 466 Genomics for Plant Improvement  credit: 2 Hours.
An overview of applying the methods of genomics to discover variation in genes and their expression, creating new genetic variation, and applying this information to the improvement of economically important plants. Emphasis is on recent advances in genomic science and activities where functional genomics information is used to efficiently create and manipulate desirable phenotypes. Same as IB 477. 2 undergraduate hours. 2 graduate hours. Prerequisite: CPSC 352 or a similar course, or consent of instructor.

CPSC 467 Plant Genomics  credit: 1 Hour.
Same as IB 473. See IB 473.

CPSC 468 Plant Proteomics-Metabolomics  credit: 2 Hours.
Same as IB 474. See IB 474.

CPSC 473 Mgmt of Field Crop Insects  credit: 3 Hours.
Ecological principles of insect populations in agroecosystems including: sampling insect populations, threshold development, bioeconomics and decision-making, population regulation, designing management strategies for field crop insect pests, and deployment of transgenic crops for management of insect pests. Case studies describing various pest management programs in field-crop settings will be provided. 3 undergraduate hours. 3 graduate hours. Prerequisite: CPSC 270 or an equivalent course, or consent of instructor.

CPSC 475 Insect Pathology  credit: 3 Hours.
Same as IB 483. See IB 483.

CPSC 479 Insect Pest Management  credit: 3 Hours.
Same as IB 482. See IB 482.

CPSC 482 Plant Tissue Culture  credit: 4 Hours.
Same as HORT 482. See HORT 482.

CPSC 483 Outreach Education Skills  credit: 3 Hours.
Provides graduate and undergraduate students interested in outreach and extension education programs with opportunities to develop their skills and effectiveness in development and presentation of outreach and extension programs. Same as ANSC 483. 3 undergraduate hours. 3 graduate hours. Prerequisite: Senior or graduate student status.

CPSC 484 Plant Physiology  credit: 3 Hours.
Same as IB 420. See IB 420.

CPSC 488 Soil Fertility and Fertilizers  credit: 3 Hours.
Same as NRES 488. See NRES 488.

CPSC 489 Photosynthesis  credit: 3 Hours.
Same as BIOP 432 and IB 421. See IB 421.

CPSC 491 Ugrad Bioinformatics Seminar  credit: 0 to 2 Hours.
Same as INFO 491 and IS 483. See INFO 491.

CPSC 498 Crop Sci Professional Develpmt  credit: 1 Hour.
Topics related to professional development including resumes, interview skills, business etiquette, ethics, and presentations on opportunities in crop sciences and horticulture. 1 undergraduate hour. No graduate credit. Prerequisite: Junior standing in Crop Sciences or Horticulture.

CPSC 499 Seminar  credit: 1 to 4 Hours.
Group discussion or an experimental course on a special topic in crop sciences. Approved for both letter and S/U grading. May be repeated to a maximum of 12 hours.

HORT Class Schedule (https://courses.illinois.edu/schedule/DEFAULT/HORT)

Horticulture Courses

HORT 100 Introduction to Horticulture  credit: 3 Hours.
Basic principles of plant growth and development as they apply to the production, marketing, and utilization of fruits, vegetables, and ornamental plants.

HORT 105 Vegetable Gardening  credit: 3 Hours.
The science and art of growing vegetables and the connection between gardening and food. Topics include nutrient and pest management, history, folklore, growing requirements, and quality characteristics of vegetables. Lecture and laboratory. Additional fees may apply. See Class Schedule. Credit is not given to horticulture majors.

HORT 106 The Sustainable Home Garden  credit: 3 Hours.
Create inviting and sustainable indoor and outdoor living spaces with plants, whether your landscape is several acres or a few containers on an urban balcony. This blended-format class meets 1 hour per week for lecture and discussion with additional instruction presented through independent learning activities including virtual field trips, on-line lectures, and instructional videos. Learn the fundamentals of environmentally sound resource use when designing with and maintaining flowering, fruit and vegetable plants, lawns, trees and shrubs around your home. Become a savvy horticultural consumer and develop a healthy lifestyle that supports positive physical and mental well-being by including greenspace activities in your daily life. Prerequisite: Not open to students in the Horticulture curriculum.

HORT 107 Introduction to Floral Design  credit: 2 Hours.
Introduces the art of arranging flowers, foliage, and accessories according to the principles of design. Additional fees may apply. See Class Schedule.
HORT 180 Medicinal Plants and Herbology credit: 3 Hours.
The use of cultivated and wild plants in medicines and health products according to Eastern and Western medical traditions. Consideration of herbal medicine use from ancient times to the present, important medicinal chemicals produced by plants, and the evaluation of plant chemical products as potential human medicines. Same as CPSC 180.

HORT 199 Undergraduate Open Seminar credit: 1 to 5 Hours.
Experimental course on a special topic in horticulture. Topic may not be repeated except in accordance with the Code. May be repeated in the same or subsequent terms. No more than 12 hours may be counted toward graduation.

HORT 205 Local Food Networks credit: 3 Hours.
Prepares students to be leaders and facilitators in local food networks. The focus is on providing the knowledge and skills to initiate and manage community food gardens, school gardens and curricula, institutional buying programs, farmers markets, community supported agriculture, and urban farm networks. Requires a group food network project and an experience with a local food organization. Prerequisite: An introductory course in HORT or CPSC or consent of instructor.

HORT 226 Introduction to Weed Science credit: 3 Hours.
Same as CPSC 226. See CPSC 226.

HORT 240 Plant Propagation credit: 3 Hours.
Examines theories and methods employed in propagation of plants, emphasizing anatomical, physiological, and ecological principles involved in sexual propagation (seeds) and asexual propagation (division, cuttings, budding, grafting, tissue culture, etc.) Prerequisite: IB 103.

HORT 246 Floral Design I credit: 3 Hours.
Applies principles of design to the composition and decorative use of flowers, foliage, and accessories. Additional fees may apply. See Class Schedule. Prerequisite: Enrollment in Horticulture, Human and Community Development, or Hospitality Management.

HORT 255 Multifunctional Landscapes credit: 3 Hours.
Introduction to research and technology in sustainable and multifunctional landscapes, within the context of plant science. Topics covered include: site inventory/analysis, plant biodiversity, stormwater management, green roofs, sustainable construction materials, and urban agriculture. This is a project-based course; students will develop sustainable solutions to landscape problems using multimedia applications, graphic design, written text, and video presentation.

HORT 261 Biotechnology in Agriculture credit: 3 Hours.
Same as CPSC 261. See CPSC 261.
This course satisfies the General Education Criteria for: Nat Sci Tech - Life Sciences

HORT 293 Professional Internship credit: 1 to 4 Hours.
Off-campus experience in a field directly pertaining to a subject matter in horticulture. Approved for S/U grading only. May be repeated to a maximum of 4 hours.

HORT 294 Resident Internship credit: 1 to 4 Hours.
Supervised, on-campus, learning experience with faculty engaged in research. Approved for S/U grading only. May be repeated to a maximum of 4 hours. For registration in this course, students should contact the Department Teaching Coordinator.

HORT 295 Undergrad Research or Thesis credit: 1 to 4 Hours.
Individual research, special problems, thesis, development and/or design work under the supervision of an appropriate member of the faculty. May be repeated in the same or subsequent terms. No more than 12 hours of special problems, research, thesis and/or individual studies may be counted toward degree. Prerequisite: Junior standing, cumulative GPA of 2.5 or above at the time the activity is arranged, and consent of instructor.

HORT 298 Undergraduate Seminar credit: 1 to 3 Hours.
Group discussion on a special topic in a field of study directly pertaining to subject matter in horticulture. May be repeated to a maximum of 12 hours. Prerequisite: Junior standing.

HORT 301 Woody Landscape Plants I credit: 4 Hours.
Systematic approach to the identification, ornamental characters, culture, and use of woody landscape deciduous trees and shrubs with special emphasis on cultivated varieties. Prerequisite: IB 103.

HORT 316 Landscaping with Native Plants credit: 4 Hours.
Herbaceous native plants suitable for home and commercial landscapes. Emphasis on native plant identification, landscape use, and culture. Prerequisite: HORT 100 or IB 103.

HORT 341 Greenhouse Mgmt and Production credit: 4 Hours.
The course focuses on how controlled environments can be managed to obtain optimal plant growth. Lectures cover greenhouse operations, management, and production, including: greenhouse design, location, glazing, heating, cooling, environmental control, irrigation systems, light control, root media, fertilization, watering, integrated pest management, and automation. The course also has a large laboratory component, in which students conduct experiments in the greenhouse. A required all-day field trip to nearby greenhouse operations rounds out the course experience. Additional fees may apply. See Class Schedule. Prerequisite: NRES 201 and HORT 100.

HORT 343 Herbaceous Plants I credit: 3 Hours.
Course includes identification, culture, and landscape use of herbaceous, frost-tender ornamental plants. Emphasis on flowering annuals, tropical foliage plants used for outdoor displays, and foliage plants used for interiorscaping. Elements of design will be addressed; design projects will integrate concepts. Prerequisite: IB 103.

HORT 344 Planting for Biodiversity and Aesthetics credit: 3 Hours.
As the demand for food increases, plants in ornamental landscapes will need to provide not only beauty but also species biodiversity critical for supporting sustainable food production. Course emphasizes species identification (predominantly herbaceous perennials), management, and planting design principles. Designing for multiple contexts, such as residential and community gardens, and large scale production sites, to provide multiple ecosystem services, especially supporting human aesthetic preferences, and habitat for pollinators. Prerequisite: IB 103.

HORT 355 Landscape Graphics & Design credit: 4 Hours.
Focuses on the development of graphic skills to represent the landscape, using both hand-drawn (pencil and color rendering) and introductory digital methods (e.g., AutoCAD and Photoshop). Students will learn basic principles for organizing space and designing for function, using plant materials that are appropriate for site conditions. A variety of drafting tools and access to specific design software programs are required. AutoCAD and Photoshop will be available for students to use in the classroom.
HORT 360  Vegetable Crop Production  credit: 3 Hours.
Instruction on the commercial production of vegetable crops. The first part of the class focuses on broad issues important to all crops including methods of vegetable production, basic soil and nutritional management, irrigation, and weed, insect, and disease management. Both organic and conventional production are discussed with a focus on sustainability. Basic farm and business management topics, including postharvest handling, food safety, crop and farm budgets, business structures, marketing, insurance, and regulations are also discussed. The second part of the class focuses on specific crops, emphasizing their origin, production, growth and development, insects, and diseases as well as harvesting and postharvest handling. Prerequisite: HORT 100 or equivalent.

HORT 361  Small Fruit Production  credit: 2 Hours.
Technological application of biological principles to the culture of strawberry, grape, blueberry, raspberry, blackberry, currant, gooseberry, and miscellaneous small fruits. Prerequisite: HORT 100 or IB 103.

HORT 362  Tree Fruit Production  credit: 2 Hours.
Examines biological principles and cultural practices involved in the growth and production of apple, pear, peach, cherry, plum, apricot, almond, and miscellaneous citrus and nut crops. Offered every fall semester. Prerequisite: HORT 100 or IB 103.

HORT 363  Postharvest Handling Hort Crop  credit: 2 Hours.
Provides theoretical and practical experience in the principles and practices of postharvest handling of cut flowers, ornamentals, fruits, and vegetables, emphasizing factors that impact quality, shelf-life, and safety. Requires two field trips, one to a local produce warehouse and the other to local supermarkets. Offered every fall semester. Prerequisite: HORT 100, CHEM 102, CHEM 103, IB 103.

HORT 396  Ug Honors Research or Thesis  credit: 1 to 4 Hours.
Individual research, special problems, thesis, development and/or design work under the direction of the Honors advisor. May be repeated in the same or subsequent terms. No more than 12 hours of special problems, research, thesis and/or individual studies may be counted toward degree. Prerequisite: Junior standing, admission to the ACES Honors Program, and consent of instructor.

HORT 421  Horticultural Physiology  credit: 4 Hours.
Horticultural crop growth is examined in relation to plant structure, environment, and cultural practices. Emphasizes environmental control of whole plant growth as influenced by the supply of the raw materials required for growth: water, carbon dioxide, radiant energy, including the influence of temperature and photoperiod on plant growth and development. The shoot and root interactions with the environment are characterized relative to cultural practices. 4 undergraduate hours. 4 graduate hours. Prerequisite: HORT 100 or IB 103 and junior standing.

HORT 434  Designing Urban Agriculture  credit: 2 Hours.
Emphasizes the design process and principles related to food production in urban environments. Lecture topics will include assessing, planning, and transforming the landscape at multiple scales from regional to neighborhood to specific site. In group discussions students will critically review readings from peer-reviewed and popular literature. Students will engage in analysis and design of an existing site to integrate multiple functions, emphasizing the permanent infrastructure and perennial vegetation. Access to a computer that can be loaded with appropriate software (Sketchup) is necessary for mapping and design projects. Online lecture/discussion course. 2 undergraduate hours. 2 graduate hours. HORT 100 or CPSC 112 or equivalent introductory course in plant science, one course in Humanities & the Arts, and one course in Social & Behavioral Sciences. Prerequisite: Junior standing required.

HORT 435  Urban Food Production  credit: 3 Hours.
Explore opportunities and challenges for maximizing the productivity and sustainability of urban food production systems, considering agricultural, environmental, energy, social, and economic issues. Students will examine the science and practice of urban agriculture through scientific and popular literature, case studies, online discussion, and service-learning opportunities. Production systems covered will include both outdoor (e.g., vacant lot urban farms) and controlled environment (e.g., hydroponics and aquaponics) agriculture. 3 undergraduate hours. 3 graduate hours. Prerequisite: HORT 100 or CPSC 112 or equivalent introductory course in plant science.

HORT 441  Floral & Nursery Crops Procductn  credit: 4 Hours.
An intensive study of specific production technologies used to commercially grow landscape and floriculture crops. Emphasis will be on the growth and development of major floral and nursery crops as influences by the environmental and cultural techniques. Field trip required. Additional fees may apply. See Class Schedule. 4 undergraduate hours. 4 graduate hours. Prerequisite: HORT 240 and HORT 341.

HORT 442  Plant Nutrition  credit: 4 Hours.
Mechanisms and factors affecting the absorption, transport, distribution, and functions of the essential elements required by higher plants. 4 undergraduate hours. 4 graduate hours. Offered in alternate years. Prerequisite: NRES 201 and IB 420.

HORT 447  Horticultural Plant Breeding  credit: 3 Hours.
Methodology, objectives, and constraints of breeding for improved cultivars of flowers, woody ornamentals, turfgrass, fruits, and vegetables. Emphasis on breeding objectives unique to horticultural commodities such as color, appearance, flavor, shelf-life, nutritional value, and other characteristics that determine product quality. 3 undergraduate hours. 3 graduate hours. Offered in alternate years. Prerequisite: CPSC 352.

HORT 453  Principles of Plant Breeding  credit: 4 Hours.
Same as CPSC 453. See CPSC 453.

HORT 456  Sustainable Landscape Design  credit: 4 Hours.
This course will allow students from different disciplines to work together developing design alternatives for a multifunctional landscape. Students will learn to work at multiple scales, considering the surrounding context, the site itself, and detailed features within the large site. For some projects, students will work in teams, since most ‘real-world’ projects require participation among multiple experts. Instructor- and student-led discussions will focus on scientific and popular literature in horticulture, urban agriculture, ecological design, and landscape ecology, and students are encouraged to synthesize and translate the material into design solutions. 4 undergraduate hours. 4 graduate hours. Prerequisite: Introductory courses in Horticulture and Design.
HORT 464  International Hort Products  credit: 3 Hours.
Survey of the international trade in and production of horticultural foods, beverages, herbs, spices, floricultural crops, interior plants, and landscape plants. Important export and import crops will be discussed. Legal and environmental issues are explored. Term project required. Additional fees may apply. See Class Schedule. 3 undergraduate hours. 3 graduate hours. Prerequisite: CPSC 112, or HORT 100 or IB 103.

HORT 466  Growth and Dev of Hort Crops  credit: 4 Hours.
Factors affecting growth, development, and quality of horticultural crops, such as photoperiodism, growth regulators, and carbon dioxide levels. 4 undergraduate hours. 4 graduate hours. Prerequisite: CHEM 104; HORT 421 or IB 420.

HORT 475  Permaculture & Agroforestry  credit: 3 Hours.
Lecture/discussion course covering the scientific basis and design of permaculture (permanent agriculture) and temperate agroforestry systems. Lecture topics will include: permaculture principles, site assessment, soil remediation, water management, agroforestry case studies, urban food forests, and integration of livestock, among others. Education resources will be provided from peer-reviewed literature and popular sources. Students will work on projects to critically review the principles of permaculture and to design a multifunctional agroforestry system for a temperate site. 3 undergraduate hours. 3 graduate hours. Prerequisite: HORT 100 or CPSC 112 or equivalent introductory course in plant science and one course in ecology, environmental sciences, or natural resources. Junior standing required.

HORT 482  Plant Tissue Culture  credit: 4 Hours.
Survey, description, and applications of cell and tissue culture strategies for plant research and production. Topics include culture environment, media composition, tissue manipulation, organogenesis, embryogenesis, somatic hybridization, bioreactors and use of these techniques for plant propagation and physiological and biochemical research. Independent research project is conducted by each student. Same as CPSC 482. 4 undergraduate hours. 4 graduate hours. Prerequisite: CHEM 232 and IB 103.

HORT 499  Special Topics  credit: 1 to 4 Hours.
Experimental course on a special topic in Horticulture. Approved for both letter and S/U grading. May be repeated in the same or separate terms to a maximum of 12 hours as topics vary.

PLPA Class Schedule (https://courses.illinois.edu/schedule/DEFAULT/DEFAULT/PLPA)

Plant Pathology Courses

PLPA 199  Undergraduate Open Seminar  credit: 1 to 5 Hours.
Experimental course on a special topic in plant pathology. Topic may not be repeated except in accordance with the Code. May be repeated in the same or subsequent terms. No more than 12 hours may be counted toward graduation.

PLPA 200  Plants, Pathogens, and People  credit: 3 Hours.
Plant diseases and their impact on food supplies and human history are studied in lectures, demonstrations and discussions. Issues of food production and safety, pesticide use and human health, and the environment are considered. Includes the biology of pathogens that cause plant disease. Designed for non-science and science majors. Prerequisite: RHET 105 or equivalent. This course satisfies the General Education Criteria for: Advanced Composition
Nat Sci Tech - Life Sciences

PLPA 204  Introductory Plant Pathology  credit: 3 Hours.
Concepts relating to causal agents of representative plant diseases, symptoms and diagnosis, modes of infection and spread, effects of environment on disease development, and methods of control. This course satisfies the General Education Criteria for: Nat Sci Tech - Life Sciences

PLPA 395  Undergrad Research or Thesis  credit: 1 to 4 Hours.
Individual research, special problems, thesis, development and/or design work under the supervision of an appropriate member of the faculty. May be repeated to a maximum of 12 hours.

PLPA 401  Plant Pathogenic Fungi  credit: 4 Hours.
Principles of the biology, ecology and pathogenesis of fungi that cause plant diseases; morphology, classification, and history of these pathogens. The course includes both lecture and laboratory components. 4 undergraduate hours. 4 graduate hours. Offered in alternate years. Prerequisite: One year of biology or plant biology; and plant and animal genetics; and an introductory plant pathology course; or consent of instructor.

PLPA 402  Phytoparasitic Nematodes  credit: 2 Hours.
Study of plant-pathogenic nematodes with emphasis on economically important groups; nematode morphology, identification, classification, development biology, ecology, and host-parasite relationships; interaction with fungi, bacteria and viruses in plant disease development, experimental and diagnostic techniques; and symptomology and control. 2 undergraduate hours. 2 graduate hours. Prerequisite: An introductory course in plant pathology and an introductory course in zoology, or consent of instructor.

PLPA 404  Plant Virology  credit: 2 Hours.
Current knowledge of viruses and the diseases they cause in plants studied in lectures, discussions and laboratories. Topics include virus structure, replication, expression, taxonomy and transmission and viral disease detection, diagnosis, epidemiology and management. 2 undergraduate hours. 2 graduate hours. Offered in alternate years. Prerequisite: An introductory course in plant pathology and an introductory course in genetics, or consent of instructor.

PLPA 405  Plant Disease Diagnosis & Mgmt  credit: 3 Hours.
Field and laboratory techniques in plant disease diagnosis and appraisal; identification of diseases of small grains, turf, corn, soybeans, forage crops, vegetables, fruit, forest and shade trees, and ornamentals, both on field trips and in laboratory exercises. Includes fundamentals of disease management. 3 undergraduate hours. 3 graduate hours. Prerequisite: PLPA 204 or equivalent.

PLPA 406  Phytopathology  credit: 2 Hours.
Provides up-to-date coverage of prokaryotes that cause plant diseases. Lectures, discussions, and laboratories cover taxonomy, molecular biology, etiology, detection and identification, epidemiology and management of major plant pathogenic prokaryotes. 2 undergraduate hours. 2 graduate hours. Offered in alternate years. Prerequisite: An introductory course in Plant Pathology and Microbiology, or consent of instructor.

PLPA 407  Diseases of Field Crops  credit: 3 Hours.
Studies the symptoms of major field crop diseases, life histories of causal organisms, and methods of control. Lecture and laboratory. Same as CPSC 407. 3 undergraduate hours. 3 graduate hours. Prerequisite: PLPA 204 or PLPA 401.