CROP SCIENCES (CPSC)

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

Courses

**CPSC 102 Foundational Skills in Crop Sciences** credit: 2 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/102)
Introduces students to opportunities and topics to prepare for success in crop sciences: basic quantitative and writing skills; research opportunities in the department; basic research skills including ethics and safety. Prerequisite: Restricted to Crop Sciences majors, Computer Sciences + Crop Sciences majors, and ACES Undeclared majors only; restricted to first time freshmen and first time transfer students.

**CPSC 103 Sustainable Agriculture** credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/103)
Introductory course in sustainable and organic agriculture. Examine how farming evolved from the subsistence farming of indigenous cultures to today's industrial farming of the US. Learn skills to assess the risk and benefits of different agricultural systems including organic farming. Evaluate various cropping systems used in different farming systems. Explore potential future agriculture practices for a growing world population.

**CPSC 112 Introduction to Crop Sciences** credit: 4 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/112)
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. Additional fees may apply. See Class Schedule.

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

**CPSC 113 Environment, Agric, & Society** credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/113)
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. (https://courses.illinois.edu/schedule/terms/CPSC/116)
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. (https://courses.illinois.edu/schedule/terms/CPSC/117)
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. (https://courses.illinois.edu/schedule/terms/CPSC/131)
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. (https://courses.illinois.edu/schedule/terms/CPSC/180)
Same as HORT 180. See HORT 180.

**CPSC 190 African American Food Systems** credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/190)
Introduces students to the many foods commonly considered American that are in fact African in origin; explores the neglected story of how people, crops, and knowledge from Africa were transplanted into the New World; examines the historical, cultural, and agricultural roots of African American food systems; and evaluates the scientific (physical and social) and cultural aspects of these food systems to understand the origins, evolution, and contributions of African American food culture.

**CPSC 199 Special Topics** credit: 1 to 4 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/199)
Experimental course on a special topic in crop sciences. Approved for Letter and S/U grading. May be repeated if topics vary.

**CPSC 212 Introduction to Plant Protection** credit: 4 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/212)
Covers the fundamentals of weeds, plant-associated insects, and plant pathogens. Lecture and laboratory material will cover diagnosis, identification, and control strategies used to improve plant health. Emphasis will be given to those pests and pathogens affecting plant agricultural production in Illinois and the Midwest.

Information listed in this catalog is current as of 09/2020
CPSC 213 Evolution in Action credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/213)
Introduction to evolutionary theory. Examination of how domesticated species have evolved. Develops an appreciation of how agroecosystems influence 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. (https://courses.illinois.edu/schedule/terms/CPSC/215)
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 226 Introduction to Weed Science credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/226)
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 241 Intro to Applied Statistics credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/241)
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 every day 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 261 Biotechnology in Agriculture credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/261)
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 265 Genetic Engineering Lab credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/265)
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. Additional fees may apply. See Class Schedule. Prerequisite: A general biology course.

CPSC 266 Data in Biology and Agriculture credit: 4 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/266)
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 270 Applied Entomology credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/270)
Lectures, laboratory, and field trips cover the biology of insects and the recognition and management of insect pests of agricultural and urban ecosystems. Covers insect structure and physiology, classification, identification, 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 352 Plant Genetics credit: 4 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/352)
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. (https://courses.illinois.edu/schedule/terms/CPSC/382)
An overview of the structure, properties, and reactions of carbon-containing compounds relevant to biological processes and cellular structure. The chemistry of hydro carbon, 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 393 Crop Sciences Internship credit: 1 to 5 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/393)
Supervised experience in a field directly pertaining to a subject matter in crop sciences. Approved for S/U grading only. May be repeated in separate terms. Independent Study courses are limited to 12 hours total applying to a degree in ACES. For registration in this course, students should contact the Department Undergraduate Program Coordinator. Prerequisite: Sophomore standing, cumulative GPA of 2.0 or above at the time the internship is arranged, and consent of instructor.
**CPSC 395 Undergrad Research or Thesis**  

credit: 1 to 4 Hours. ([courses.illinois.edu/schedule/terms/CPSC/395](http://courses.illinois.edu/schedule/terms/CPSC/395))  

Independent research, special problems, thesis, development and/or design work under the supervision of an appropriate member of the faculty. May be repeated. Independent Study courses are limited to 12 hours total applying to a degree in ACES. Prerequisite: Cumulative GPA of 2.5 or above at the time the activity is arranged and consent of instructor.

**CPSC 396 Undergrad Honors Res or Thesis**  

credit: 1 to 4 Hours. ([courses.illinois.edu/schedule/terms/CPSC/396](http://courses.illinois.edu/schedule/terms/CPSC/396))  

Individual research, special problems, thesis, development and/or design work under the direction of the Honors advisor. May be repeated. Independent Study courses are limited to 12 hours total applying to a degree in ACES. Prerequisite: Junior standing, admission to the ACES Honors Program, and consent of instructor.

**CPSC 407 Diseases of Field Crops**  

credit: 3 Hours. ([courses.illinois.edu/schedule/terms/CPSC/407](http://courses.illinois.edu/schedule/terms/CPSC/407))  

Same as PLPA 407. See PLPA 407.

**CPSC 408 Integrated Pest Management**  

credit: 3 Hours. ([courses.illinois.edu/schedule/terms/CPSC/408](http://courses.illinois.edu/schedule/terms/CPSC/408))  

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 Production**  

credit: 3 Hours. ([courses.illinois.edu/schedule/terms/CPSC/412](http://courses.illinois.edu/schedule/terms/CPSC/412))  

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. 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. ([courses.illinois.edu/schedule/terms/CPSC/413](http://courses.illinois.edu/schedule/terms/CPSC/413))  

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 natural 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.

**CPSC 414 Forage Crops & Pasture Ecology**  

credit: 3 Hours. ([courses.illinois.edu/schedule/terms/CPSC/414](http://courses.illinois.edu/schedule/terms/CPSC/414))  

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. ([courses.illinois.edu/schedule/terms/CPSC/415](http://courses.illinois.edu/schedule/terms/CPSC/415))  

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, Pollinators, & Food Ecosystems**  

credit: 3 Hours. ([courses.illinois.edu/schedule/terms/CPSC/416](http://courses.illinois.edu/schedule/terms/CPSC/416))  

Introduction to herbaceous native and non-native plants cultivated for landscape applications - conservation, uses, benefits for pollinators, significance for local biodiversity, and contribution to food production. Learn to: identify plants, establish and maintain plantings, and to enhance the interaction between beneficial insects and food crops. 3 undergraduate hours. 3 graduate hours. Credit is not given for CPSC 416 if credit for NRES 415 or HORT 344 has been earned. Prerequisite: HORT 100, IB 103, or basic Plant Biology course.

**CPSC 417 Water and Agriculture in the 21st Century**  

credit: 3 Hours. ([courses.illinois.edu/schedule/terms/CPSC/417](http://courses.illinois.edu/schedule/terms/CPSC/417))  

Professionals well-trained in the confluence of agriculture, water, and conservation practices are required to meet crop production goals while keeping waters clean. Sources and mechanisms of nutrient loss to water from agricultural systems will be discussed. Students will be able to make recommendations for appropriate conservation practices as well as design water quality monitoring systems and analyze agricultural water quality data. 3 undergraduate hours. 3 graduate hours. Prerequisite: Successful completion of at least one course in agricultural, environmental, or soil sciences at the 300-level or above is required.

**CPSC 418 Crop Growth and Management**  

credit: 3 Hours. ([courses.illinois.edu/schedule/terms/CPSC/418](http://courses.illinois.edu/schedule/terms/CPSC/418))  

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. ([courses.illinois.edu/schedule/terms/CPSC/419](http://courses.illinois.edu/schedule/terms/CPSC/419))  

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. ([courses.illinois.edu/schedule/terms/CPSC/426](http://courses.illinois.edu/schedule/terms/CPSC/426))  

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. Additional fees may apply. See Class Schedule. 3 undergraduate hours. 3 graduate hours. Prerequisite: CPSC 226 or consent of instructor.

**CPSC 428 Weed Science Practicum**  

credit: 2 Hours. ([courses.illinois.edu/schedule/terms/CPSC/428](http://courses.illinois.edu/schedule/terms/CPSC/428))  

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. Additional fees may apply. See Class Schedule. 2 undergraduate hours. 2 graduate hours. Prerequisite: CPSC 226 or CPSC 426 or consent of instructor.
CPSC 448 Biological Modeling credit: 3 or 4 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/448)
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. 4 graduate hours. Offered in alternate years. Prerequisite: CPSC 112 or IB 103.

CPSC 454 Plant Breeding Methods credit: 2 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/454)
Principles, concepts and tools used in plant breeding. Includes methods and breeding schemes used with different plant species. Same as HORT 453. Additional fees may apply. See Class Schedule. Prerequisite: IB 103; CPSC 352 or IB 473. 2 undergraduate hours. 2 graduate hours. Prerequisite: CPSC 352 or a similar course, or consent of instructor.

CPSC 455 Advanced Plant Genetics credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/455)
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 462 Plant Molecular Biology credit: 1 Hour. (https://courses.illinois.edu/schedule/terms/CPSC/462)
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 466 Genomics for Plant Improvement credit: 2 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/466)
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 genomics 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. (https://courses.illinois.edu/schedule/terms/CPSC/467)
An introduction to functional genomics, population genetics, transmission genetics, quantitative genetics, and bioinformatics. Same as IB 478. 3 undergraduate hours. 3 graduate hours. Prerequisite: IB 103; CPSC 453 or equivalent.

CPSC 473 Mgmt of Field Crop Insects credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/473)
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. (https://courses.illinois.edu/schedule/terms/CPSC/475)
Same as IB 483. See IB 483.

CPSC 479 Insect Pest Management credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/479)
Same as IB 482. See IB 482.
CPSC 484 Plant Physiology credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/484)
Same as IB 420. See IB 420.

CPSC 486 Plant Growth and Development credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/486)
Plant growth and development is a complex and highly regulated process that occurs over various spatiotemporal scales. This advanced interdisciplinary course integrates genetic, molecular, cellular, biochemical, anatomical, and physiological information in order to explore the life of a plant from its embryonic origins to its final death.
Same as IB 479. 3 undergraduate hours. 3 graduate hours. Prerequisite: IB 103; CPSC 352 or IB 204, or equivalent.

CPSC 488 Soil Fertility and Fertilizers credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/488)
Same as NRES 488. See NRES 488.

CPSC 489 Photosynthesis credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/489)
Same as BIOP 432 and IB 421. See IB 421.

CPSC 491 Ugrad Bioinformatics Seminar credit: 0 to 2 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/491)
Same as INFO 491. See INFO 491.

CPSC 498 Crop Sci Professional Develpmnt credit: 1 Hour. (https://courses.illinois.edu/schedule/terms/CPSC/498)
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 Advanced Special Topics credit: 1 to 4 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/499)
Advanced experimental course on a special topic in crop sciences. 1 to 4 undergraduate hours. 1 to 4 graduate hours. Approved for Letter and S/U grading. May be repeated if topics vary.

CPSC 501 Programming for Genomics credit: 4 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/501)
Same as IB 501. See IB 501.

CPSC 505 Research Methods in Crop Sciences credit: 4 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/505)
Lectures, discussions, and seminars dealing with research in crop sciences. 4 graduate hours. No professional credit.

CPSC 518 Crop Growth and Development credit: 4 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/518)
Study of the physiological processes involved in growth and development of crop plants and the interaction of these processes with the environment that influences productivity. Prerequisite: CPSC 418 or CPSC 484.

CPSC 526 Herbicide Action in Plants credit: 4 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/526)
Study of various chemicals used to inhibit plant growth, including their uptake, translocation, mode of action, metabolism and resistance mechanisms in plants; and the relationship of chemical structure to the environmental fate of herbicides. Offered in alternate years. Prerequisite: CPSC 426 and CPSC 484.

CPSC 527 Weed Science and Management credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/527)
Advanced course on the biological and practical aspects of weeds and their management within Midwest agricultural systems. Includes discussions of current scientific literature to understand the latest advancements in weed science and management. 3 graduate hours. No professional credit. Prerequisite: CPSC 226. For Crop Sciences Online MS students only.

CPSC 538 Environmental Plant Physiology credit: 4 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/538)
Same as IB 542. See IB 542.

CPSC 541 Regression Analysis credit: 5 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/541)
The application of regression methods to problems in the agricultural, biological, and life sciences. Topics include simple linear, multiple linear, nonlinear, and logistic regression analysis and correlation analysis. Emphasis is placed on predictor variable selection, diagnostics, model selection and validation, and remedial measures, including ridge regression, weighted least squares regression, and the use of autoregressive models. Both quantitative and qualitative predictor variables are examined. SAS and R will be used. Same as ANSC 541. 5 graduate hours. No professional credit. Prerequisite: CPSC 440 or equivalent.

CPSC 542 Applied Statistical Methods II credit: 5 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/542)
Statistical methods as tools for research. Principles of designing experiments and methods of analysis for various kinds of designs, experimental (completely randomized, randomized complete block, split plots, Latin square) and treatment (complete factorial); covariate analysis; use of SAS for all analyses. Prerequisite: CPSC 440 or equivalent.

CPSC 543 Appl. Multivariate Statistics credit: 4 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/543)
This class introduces students to statistical methods that consider several variables at once. Emphasis will be given to the applications of multivariate methods to data sets in biology and ecology. Students will develop good knowledge as to how multivariate methods work, they will be able to apply these methods using SAS and R and they will be able to make inferences on the results of the analyses for subsequent scientific publication. Same as STAT 543. Prerequisites: CPSC 440 or equivalent or consent of instructor.

CPSC 545 Statistical Genomics credit: 3 or 4 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/545)
Same as ANSC 545 and IB 507. See ANSC 545.

CPSC 553 Advanced Plant Breeding credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/553)
A practical application of plant breeding, genetics, and statistics to devise effective approaches to meet particular breeding goals. Highlighting real life situations and key decisions facing the plant breeder, the course builds upon knowledge of plant breeding methods and quantitative genetic theory. Four specific functional areas, which reflect divisions of labor in the seed industry are addressed: population development, population evaluation, trait integration, and product commercialization and supply. Offered in alternate years. Prerequisite: CPSC 453 or equivalent; CPSC 558 or equivalent, CPSC 542 or equivalent.
CPSC 555  Crop Germplasm Resources  credit: 2 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/555)
In this course students will explore the use, curation and collection of germplasm resources to facilitate crop improvement. Genetic diversity is the foundational resource that plant breeders use for the benefit of society; however, it is often challenging to identify, access, and use desirable genes from relatives of crop plants. Strategies and methods employed by plant breeders, curators and collectors will be discussed. Topics will include using distant relatives in breeding program, selecting a subset of accessions for evaluations when large collections are available, circumventing breeding barriers to obtain wide-cross progenies, navigating intellectual property issues, and writing a successful plant exploration proposal. 2 graduate hours. No professional credit. Prerequisite: Introductory courses in genetics (e.g. CPSC 352) and plant breeding (e.g. CPSC 453) or equivalent.

CPSC 556  Plant Breeding Literature  credit: 1 Hour. (https://courses.illinois.edu/schedule/terms/CPSC/556)
Students will read a diverse group of plant breeding journal articles, will learn skills involved in evaluating a scientific paper, and will discuss articles with plant breeding faculty members. Approved for S/U grading only. May be repeated in separate terms to a maximum of 5 hours. Prerequisite: Graduate student status.

CPSC 558  Quantitative Plant Breeding  credit: 4 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/558)
Studies the theoretical bases for plant breeding procedures with special emphasis on the relationship between type and source of genetic variability, mode of reproduction, and effectiveness of different selection procedures. Offered in alternate years. Prerequisite: CPSC 453 or equivalent.

CPSC 563  Chromosomes  credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/563)
Includes cytogenetic analysis of eukaryotic organisms, the role of chromosomes in genome organization and evolution, and introduction to molecular cytogenetic laboratory techniques such as mitotic analysis, chromosome banding, flow cytogenetics, somatic cell genetics, chromosomal length polymorphisms, fluorescent microscopy and in situ hybridization. 3 graduate hours. No professional credit. Prerequisite: CPSC 352 or consent of instructor.

CPSC 564  Molecular Marker Data Analyses  credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/564)
Topics include QTL mapping, association mapping, genomic selection, linkage disequilibrium, estimation and control of population structure, and the analysis of genotypic datasets produced using next-generation sequencing technology. All topics will be explored using real datasets analyzed in R (www.cran.org), and each class will include a lecture/discussion followed by a computer exercise. 3 graduate hours. No professional credit. Prerequisite: Previous course work in evolutionary, population, or quantitative genetics is recommended.

CPSC 565  Perl & UNIX for Bioinformatics  credit: 2 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/565)
This intensive course is an introduction to high-throughput bioinformatics and genome data analysis. An introduction to programming with Perl and Bioperl will be given, and students will learn to write scripts relevant to their own research goals. We will also cover the use of UNIX and Perl for automating and customizing bioinformatics tools. Prerequisite: Graduate status or consent of instructor. In addition, familiarity with DNA and protein sequence data, and basic Windows computing skills are required.

CPSC 566  Plant Gene Regulation  credit: 4 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/566)
Current topics and literature on the function and regulation of higher plant genes. Topics of emphasis: transposable elements, their effect on gene expression and variation, and uses in tagging and isolating genes; the developmental, tissue specific, or environmental regulations of plant genes; the structure, synthesis, subcellular targeting, and regulation of major cereal and legume seed proteins; the use of genetic engineering to explore the regulation of plant genes or to alter traits of agricultural importance. Same as HORT 566. Prerequisite: CPSC 352, MCB 450, or consent of instructor.

CPSC 567  Bioinformatics & Systems Biol  credit: 4 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/567)
Bioinformatics and Systems Biology are emerging disciplines that address the need to manage and interpret the massive quantities of data generated by genomic research. In systems biology, advances in genomics, bioinformatics, and structural biology are used to generate global and unified views that integrate fragmentary knowledge of biological systems, their components and their interrelationships. This course is intended for students interested in the crossroads of biology and computational science and includes both lectures and hands-on experience. Same as IB 524. Prerequisite: Graduate level status or consent of instructor.

CPSC 569  Applied Bioinformatics  credit: 4 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/569)
Same as ANSC 542 and IB 506. See ANSC 542.

CPSC 588  Plant Biochemistry  credit: 4 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/588)
Enzymes and pathways involved in plant intermediary metabolism. Basic cell physiology, bioenergetics, and hormonal regulation of metabolism. Same as HORT 588 and IB 524. Prerequisite: CPSC 484 and MCB 450.

CPSC 591  Grad Bioinformatics Seminar  credit: 0 to 2 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/591)
Same as ANSC 591 and INFO 591. See INFO 591.

CPSC 593  Adv Studies in Crop Sciences  credit: 1 to 8 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/593)
Directed studies of selected problems or topics relevant to Crop Sciences. Study may be in one of the following fields: 1) Plant Breeding and Genetics; 2) Plant Molecular Biology; 3) Plant Physiology; 4) Crop Production and Ecology; 5) Biometrics; 6) Plant Pathology; 7) Entomology; and 8) Weed Science. Prerequisite: Consent of instructor.

CPSC 594  Professional Orientation CPSC  credit: 1 Hour. (https://courses.illinois.edu/schedule/terms/CPSC/594)
Discussion of the philosophy and components of graduate education in Crop Sciences including discussion of the development of methods and strategies useful in research, teaching, and extension. Students will be required to develop and submit a proposal describing planned research for a non-thesis research project, M.S. thesis or Ph.D. Dissertation. Approved for S/U grading only.

CPSC 598  Seminar  credit: 1 Hour. (https://courses.illinois.edu/schedule/terms/CPSC/598)
Current research in crops, genetic engineering, plant protection and other topics relevant to Crop Sciences. Approved for both letter and S/U grading. May be repeated to a maximum of 14 hours if topics vary. Prerequisite: Graduate standing.
CPSC 599  Thesis Research  credit: 0 to 16 Hours. (https://courses.illinois.edu/schedule/terms/CPSC/599)  
Individual research under supervision of faculty. Required of all students working toward the Master of Sciences (thesis option) or Doctor of Philosophy in Crop Sciences. 0 to 16 graduate hours. No professional credit. Approved for S/U grading only. May be repeated in separate semesters.