CROP SCIENCES (CPSC)

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

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:
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 199  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. May be repeated up to a maximum of 12 hours in separate terms if topics vary.

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 influences 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 226  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 241  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 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.
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

Information listed in this catalog is current as of 07/2017
CPSC 265 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 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 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 293 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. Prerequisite: Sophomore standing, cumulative GPA of 2.0 or above at the time the internship is arranged, and consent of instructor.

CPSC 294 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. Prerequisite: Sophomore standing, 2.0 GPA, consent of the advisor, and consent of 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 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 307 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 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. 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.
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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 Develpmnt 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.

CPSC 501 Programming for Genomics credit: 4 Hours.
Same as IB 501. See IB 501.

CPSC 505 Research Methods in Plant Sci credit: 4 Hours.
Lectures, discussions, demonstrations, and laboratory exercises dealing with methods and apparatus used in plant sciences research. 4 graduate hours. No professional credit.

CPSC 518 Crop Growth and Development credit: 4 Hours.
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.
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 538 Environmental Plant Physiology credit: 4 Hours.
Same as IB 542. See IB 542.

CPSC 541 Regression Analysis credit: 5 Hours.
The application of regression methods to problems in agriculture and natural resources. Topics include simple linear, multiple linear, and nonlinear regression analysis and correlation analysis. Emphasis is placed on predictor variable selection, diagnostics and remedial measures and validation. Both quantitative and qualitative predictor variables are examined. The SAS system is used for all analyses. Same as ANSC 541. Prerequisite: CPSC 440 or equivalent.

CPSC 542 Applied Statistical Methods II credit: 5 Hours.
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.
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.
Same as ANSC 545 and IB 507. See ANSC 545.

CPSC 553 Advanced Plant Breeding credit: 3 Hours.
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.
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.
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.
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.

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CPSC 563 Chromosomes credit: 3 Hours. 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. 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. 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. 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. 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 505. Prerequisite: Graduate level status or consent of instructor.

CPSC 569 Applied Bioinformatics credit: 4 Hours. Same as ANSC 542 and IB 506. See ANSC 542.

CPSC 588 Plant Biochemistry credit: 4 Hours. 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 590 Professionalism and Ethics credit: 2 Hours. Topics related to professional activities of agricultural and natural resource scientists, including scientific writing and publishing, grantsmanship and money management, oral presentation skills, finding and keeping a job, and mentoring and teaching are discussed. Ethical dimensions of these areas are explored through case studies. Same as NRES 590.

CPSC 591 Grad Bioinformatics Seminar credit: 1 to 2 Hours. Same as INFO 591 and IS 583. See INFO 591.

CPSC 593 Adv Studies in Crop Sciences credit: 1 to 8 Hours. 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. 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. 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. 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. Approved for S/U grading only. May be repeated to a maximum of 16 hours if topics vary.