

Crop, Soil and Environmental Sciences (CSES)

Courses

CSES 10101. Introduction to Crop, Soil, and Environmental Science. 1 Hour.

An introduction to the CSES department and majors in Environmental Soil and Water Sciences and Crop Management. Emphasis will be placed on issues and opportunities within these disciplines and orienting students to the department and University of Arkansas. Required of all department majors with less than 24 semester credit hours. Offered second eight weeks of the semester. Prerequisite: Freshman and sophomore standing only. (Typically offered: Fall)

CSES 12003. Introduction to Plant Sciences. 3 Hours.

An introduction to basics of agricultural crop plant structure, growth, and production. (Typically offered: Fall and Spring)

CSES 20103. Pest Management. 3 Hours.

Introduction to basic principles of pest management as they relate to vertebrate animals, insects, plant disease and weeds. Selected pests are studied with emphasis on current management approaches and alternative pest control. (Typically offered: Spring)

CSES 21001. Crop Science Laboratory. 1 Hour.

A series of laboratory experiments designed to reinforce principles of plant growth and development, reproduction, classification, and the utilization of plant products. Emphasis is placed on major crop plant species. Experiments are conducted by individuals or by teams. Laboratory consists of a single, 2-hour period each week. Required for Crop Management majors. Corequisite: CSES 21033. (Typically offered: Spring)

CSES 21033. Crop Science. 3 Hours.

Principles of crop growth, development, and utilization and how these principles relate to production. Emphasis on major agronomic crop species. Lecture 3 hours per week. (Typically offered: Spring)

CSES 22001. Soil Science Laboratory. 1 Hour.

Field and laboratory exercises related to the study of the physical, chemical, and biological properties of soils. Laboratory mandatory for all crop management and environmental, soil, and water science majors and optional for others. Laboratory 2 hours per week. Pre- or Corequisite: CSES 22003. (Typically offered: Fall and Spring)

CSES 22003. Soil Science. 3 Hours.

Origin, classification, and physical, chemical, and biological properties of soils. Lecture 3 hours, discussion 1 hour per week. Corequisite: Drill component. Prerequisite: MATH 11003 or higher (to include MATH 12003, MATH 13004, MATH 15104, MATH 22103, MATH 22003, MATH 20503, MATH 24005, MATH 25104, MATH 24004, MATH 25004, or MATH 26004) and CHEM 14103 or CHEM 12103. (Typically offered: Fall and Spring)

CSES 23002. Professional Development in Crop, Soil, and Environmental Sciences. 2 Hours.

This course is designed to prepare students majoring in Crop Science or Environmental, Soil, and Water Sciences to enter a career in a related field or begin graduate school after completing their undergraduate degree. Topics covered include creating a job application, professional behavior, interview skills, writing a scientific literature review, and delivering a professional presentation related to crop, soil, or environmental science. (Typically offered: Fall)

CSES 30203. Crop, Soil, and Environmental Sciences Colloquium. 3 Hours.

A communication-intensive course covering topics in agronomy and environmental, soil, and water science with particular emphasis on spoken communication but also including written communication, group activities, professionalism, ethics, problem solving, and information retrieval. A student-oriented class with collaborative participation. Colloquium workshop: 3 hours per week. Prerequisite: SPCH 10003 and Junior or Senior standing only. (Typically offered: Fall)

CSES 32104. Soil Resources and Nutrient Cycles. 4 Hours.

Integration of the fundamental concepts of the biological, chemical, and physical properties of soil systems and their roles in managing soil resources. Lecture 3 hours, laboratory 3 hours per week. Pre- or Corequisite: BIOL 20003 and BIOL 20001. Corequisite: Lab component. Prerequisite: CSES 22003. (Typically offered: Spring Odd Years)

CSES 33102. Cotton Production. 2 Hours.

Principles and techniques associated with production of cotton. Recitation 2 hours per week. Prerequisite: CSES 12003 or CSES 21033. (Typically offered: Fall Even Years)

CSES 33202. Soybean Production. 2 Hours.

An overview of the history and utilization of soybean as well as the physiological and environmental basis for the development of economical soybean production practices. Recitation 2 hours per week. Prerequisite: CSES 12003 or CSES 21033. (Typically offered: Spring Odd Years)

CSES 33302. Rice Production. 2 Hours.

A study of the principles and practices involved in rice culture worldwide with major emphasis on the United States. Recitation 2 hours per week. Prerequisite: CSES 12003 or CSES 21033. (Typically offered: Fall Odd Years)

CSES 33402. Cereal Grain Production. 2 Hours.

An overview of the botany, production, cultural practices, soil & climatic adaptation and utilization of the major cereal grain crops. Prerequisite: CSES 12003 or CSES 21033. (Typically offered: Spring Even Years)

CSES 35501. Soil Profile Description. 1 Hour.

Training for soil profile description writing and membership of judging teams. (Typically offered: Fall) May be repeated for up to 8 hours of degree credit.

CSES 37003. Precision Agriculture for Crops. 3 Hours.

This course will provide students with a practical understanding of precision agriculture and crop/ecosystem monitoring with remote and proximal sensing technology. Prerequisite: MATH 11003 and CSES 12003. (Typically offered: Spring)

CSES 4000V. Special Problems. 1-6 Hour.

Work on special problems in crop, soil and environmental sciences or related field. (Typically offered: Fall, Spring and Summer) May be repeated for up to 6 hours of degree credit.

CSES 40133. Advanced Crop Science. 3 Hours.

Fundamental concepts of crop physiology, crop improvement, seed science, and crop production systems. Recitation 3 hours per week. Prerequisite: CSES 21033 and CSES 22003. (Typically offered: Spring)

CSES 4020V. Special Topics. 1-3 Hour.

Studies of selected topics in crop, soil and environmental sciences not available in other courses. (Typically offered: Irregular) May be repeated for up to 12 hours of degree credit.

CSES 41003. Plant Breeding. 3 Hours.

This course aims to provide students with an extensive background in plant breeding applied to cultivar development, including but not limited to understanding the foundations of plant breeding, modes of reproduction in plants, various breeding methods, and introduction to quantitative genetics. Prerequisite: ANSC 31203 or BIOL 23373. (Typically offered: Fall)

CSES 41303. Ecology and Morphology of Weedy and Invasive Plants. 3 Hours.

Study of weeds as economic pests occurring in both agricultural and nonagricultural situations and including poisonous plants and other specific weed problems. Gross morphological plant family characteristics which aid identification, habitat of growth and distribution, ecology, competition, and allelopathy are discussed. Lecture 2 hours, laboratory 2 hours a week. Corequisite: Lab component. Prerequisite: CSES 21033 or HORT 20003. (Typically offered: Fall)

CSES 41403. Principles of Weed Control. 3 Hours.

Advanced concepts and technology used in modern weed control practices and study of the chemistry and specific activity of herbicides in current usage. Lecture 2 hours, laboratory 2 hours per week. Corequisite: Lab component. Prerequisite: CHEM 12103 and CHEM 12101. (Typically offered: Spring)

CSES 42204. Soil Fertility. 4 Hours.

Study of the soil's chemical, biological and physical properties, and human modification of these properties, as they influence the uptake and utilization of the essential nutrients by plants. Lecture 3 hours, laboratory 2 hours per week. Pre- or Corequisite: CHEM 14203 and CHEM 14201 or (CHEM 12103 and CHEM 12101 and CHEM 26103 and CHEM 26101). Corequisite: Lab component. Prerequisite: CSES 22001 and CSES 22003. (Typically offered: Fall)

CSES 42503. Soil Classification and Genesis. 3 Hours.

Lecture and field evaluation of soil properties and their relation to soil genesis and soil classification with emphasis on soils of Arkansas. Lecture 2 hours, laboratory 2 hours per week. Corequisite: Lab component. Prerequisite: CSES 22003 and CSES 22001. (Typically offered: Fall Odd Years)

CSES 45503. Wetland Soils. 3 Hours.

This course explains the chemical, physical, and morphological characteristics of wetland soils and describes the techniques for identifying wetland soils using field indicators and monitoring equipment. This course also explains principles of wetland creation, restoration, and mitigation - all key components in assuring the sustainability of valuable wetland resources. Prerequisite: (CSES 22003 and CSES 22001) or CSES 35501. (Typically offered: Spring Odd Years)

CSES 4620V. Internship. 1-6 Hour.

Supervised practical work experience in agronomy and environmental science to develop and demonstrate professional competence. Faculty approval of project proposal prior to enrollment and written and oral reports after the project is complete are required. Prerequisite: Instructor consent. (Typically offered: Fall, Spring and Summer) May be repeated for up to 6 hours of degree credit.

CSES 50001. Weed Science Practicum. 1 Hour.

Training for membership on weed team, through participation. Prerequisite: Graduate standing. (Typically offered: Summer)

CSES 50103. Crop Physiology. 3 Hours.

Understanding and quantitative measurement of physiological processes, plant responses, and environmental parameters in relation to the production of crops. (Typically offered: Spring Even Years)

CSES 50203. Physiology of Herbicide and Plant Interaction. 3 Hours.

The reproduction, growth, and development of weeds and the ecological factors affecting these processes; development and mechanisms of herbicide resistance, flow of herbicide-resistance genes; and development of herbicide-resistant crops. Corequisite: Lab component. Prerequisite: CSES 41403 or CSES 51403 (formerly CSES 41403) and CHEM 58103. (Typically offered: Spring Odd Years)

CSES 5023V. Graduate Special Problems. 1-6 Hour.

Original investigations on assigned problems in agronomy or graduate teaching practicum. Prerequisite: Graduate standing. (Typically offered: Fall, Spring and Summer)

CSES 50303. Advanced Soil Fertility and Plant Nutrition. 3 Hours.

Study of water uptake, ion absorption, translocation and metabolism in higher plants. Lecture 3 hours per week. Prerequisite: CHEM 26103 and CHEM 26101. (Typically offered: Spring Even Years)

CSES 5040V. Special Topics. 1-4 Hour.

Topics not covered in other courses or a more intensive study of specific topics in agronomy. Prerequisite: Graduate standing. (Typically offered: Irregular) May be repeated for degree credit.

CSES 50703. Advanced Crop Science. 3 Hours.

Fundamental concepts of crop physiology, crop improvement, seed science, and crop production systems. Recitation 3 hours per week. Graduate degree credit will not be given for both CSES 40133 and CSES 50703. (Typically offered: Fall)

CSES 50803. The Business of Plant Breeding. 3 Hours.

Students will gain knowledge and develop skills in five areas central to successful execution of plant breeding in private and public environments: 1) breeding industry, 2) breeding goals, new product development and marketing, 3) breeding budgets and finance, 4) regulations of the breeding industry, and 5) leadership basics. (Typically offered: Fall Odd Years)

CSES 50903. Plant Breeding. 3 Hours.

This course aims to provide students with an extensive background in plant breeding applied to cultivar development, including but not limited to understanding the foundations of plant breeding, modes of reproduction in plants, various breeding methods, and introduction to quantitative genetics. Graduate degree credit will not be given for both CSES 41003 and CSES 50903. Prerequisite: ANSC 31203 or BIOL 23373. (Typically offered: Fall)

CSES 51003. Scientific Presentations. 3 Hours.

Experience in procedures required for professional presentations of scientific papers, seminars, posters; and research findings at meetings in conferences, and with discussion groups. Instruction in organization of materials, visual aids, and good speaking habits. Lecture 3 hours per week. Prerequisite: Graduate standing. (Typically offered: Fall)

CSES 51104. Soil Fertility. 4 Hours.

Study of the soil's chemical, biological and physical properties, and human modification of these properties, as they influence the uptake and utilization of the essential nutrients by plants. Lecture 3 hours, laboratory 2 hours per week. Graduate degree credit will not be given for both CSES 42204 and CSES 51104. Corequisite: Lab component. (Typically offered: Fall)

CSES 51303. Ecology and Morphology of Weedy and Invasive Plants. 3 Hours.

Study of weeds as economic pests occurring in both agricultural and nonagricultural situations and including poisonous plants and other specific weed problems. Gross morphological plant family characteristics which aid identification, habitat of growth and distribution, ecology, competition, and allelopathy are discussed. Lecture 2 hours, laboratory 2 hours a week. Graduate degree credit will not be given for both CSES 41303 and CSES 51303. Corequisite: Lab component. Prerequisite: CSES 21033 or HORT 20003. (Typically offered: Fall)

CSES 51403. Principles of Weed Control. 3 Hours.

Advanced concepts and technology used in modern weed control practices and study of the chemistry and specific activity of herbicides in current usage. Lecture 2 hours, laboratory 2 hours per week. Graduate degree credit will not be given for both CSES 41403 and CSES 51403. Corequisite: Lab component. Prerequisite: CHEM 12103 and CHEM 12101. (Typically offered: Spring)

CSES 52104. Analytical Research Techniques in Agronomy. 4 Hours.

Preparation and analysis of plant and soil samples utilizing spectrophotometry, isotopes, and chromatographic separation methods. Additionally, measurements are made of photosyntheses, respiration, water relationships, light, and temperatures in whole plants. Lecture 2 hours, laboratory 4 hours per week. Corequisite: Lab component. Prerequisite: CHEM 26103 and CHEM 26101. (Typically offered: Fall Even Years)

CSES 52204. Soil Physics. 4 Hours.

Physical properties of soils and their relation to other soil properties, growth of plants and transport of water, oxygen, heat, and solutes such as pesticides and plant nutrients. Lecture 3 hours, laboratory 3 hours per week. Corequisite: Lab component. Prerequisite: CSES 22003 and MATH 11003. (Typically offered: Spring)

CSES 52503. Soil Classification and Genesis. 3 Hours.

Lecture and field evaluation of soil properties and their relation to soil genesis and soil classification with emphasis on soils of Arkansas. Lecture 2 hours, laboratory 2 hours per week. Graduate degree credit will not be given for both CSES 42503 and CSES 52503. Corequisite: Lab component. Prerequisite: CSES 22003 and CSES 22001. (Typically offered: Fall Odd Years)

CSES 52604. Microbial Ecology. 4 Hours.

A study of the microorganisms in soil and the biochemical processes for which they are responsible. Lecture 3 hours, laboratory 3 hours per week. Additional suggested prerequisites are BIOL 20003, CSES 22003, and ENSC 30003. Corequisite: Lab component. Prerequisite: BIOL 10103 and BIOL 38773 or ENSC 32203. (Typically offered: Fall Odd Years)

CSES 54503. Soil Chemistry. 3 Hours.

Application of the principles of chemistry to processes of agronomic and environmental importance in soils. Soil clay mineralogy, soil solution thermodynamics, structure and reactivity of humus, surface complexation and ion exchange, electro-chemical phenomena, and colloidal stability. Prerequisite: CSES 22003 and CHEM 14203 and CHEM 14201. (Typically offered: Fall Even Years)

CSES 55303. Wetland Soils. 3 Hours.

This course explains the chemical, physical, and morphological characteristics of wetland soils and describes the techniques for identifying wetland soils using field indicators and monitoring equipment. This course also explains principles of wetland creation, restoration, and mitigation - all key components in assuring the sustainability of valuable wetland resources. Graduate degree credit will not be given for both CSES 45503 and CSES 55303. Prerequisite: (CSES 22003 and CSES 22001) or CSES 35501. (Typically offered: Spring Odd Years)

CSES 55403. Plant Genomics. 3 Hours.

Plant genetics based on the study of whole genome sequence, transcriptome and proteome. Provides an overview of the principles and techniques of experimental and in silico genomics. Covers all areas of genome research including structural, comparative and functional genomics as well as proteomics. Prerequisite: CHEM 58403 or any graduate level genetics course. (Typically offered: Spring Even Years)

CSES 56503. Fate and Transport of Organic Contaminants. 3 Hours.

Fate and Transport of Organic Contaminants will present an overview of the transformation and transport processes that influence the environmental fate of organic contaminants, with an emphasis on agricultural pesticides. Biotic and abiotic factors influencing the movement and behavior of organic contaminants in soil and water will be covered extensively, with an emphasis on chemical mechanisms. Prerequisite: CHEM 14203 and CHEM 14201 and CSES 22003, or instructor consent. (Typically offered: Spring Odd Years)

CSES 57003. Precision Agriculture Data. 3 Hours.

This course will provide students with a holistic understanding of precision agriculture and crop/ecosystem monitoring with remote and proximal sensing technology. The course will also provide students with practical experience working with spatial data using GIS software in the context of precision agriculture. (Typically offered: Spring)

CSES 6000V. Master's Thesis. 1-6 Hour.

Master's Thesis. Prerequisite: Graduate standing. (Typically offered: Fall, Spring and Summer) May be repeated for degree credit.

CSES 7000V. Doctoral Dissertation. 1-18 Hour.

Doctoral Dissertation. Prerequisite: Graduate standing. (Typically offered: Fall, Spring and Summer) May be repeated for degree credit.