Crop, Soil and Environmental Sciences (CSES)

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Crop, Soil and Environmental Sciences Website (http://catalog.uark.edu/undergraduatecatalog/collegesandschools/ dalebumperscollegeofagriculturalfoodandlifesciences/ cropsoilandenvironmentalsciencesces%20http://ces.uark.edu)

Courses in the Department of Crop, Soil and Environmental Sciences provide fundamental and applied studies in two majors:

• Crop Science (http://catalog.uark.edu/ undergraduatecatalog/collegesandschools/ dalebumperscollegeofagriculturalfoodandlifesciences/ cropmanagementcpmg)
• Environmental, Soil and Water Science (http:// catalog.uark.edu/undergraduatecatalog/collegesandschools/ dalebumperscollegeofagriculturalfoodandlifesciences/ environmentalsoilandwatersciencesws)

Areas studied within the Crop Science major include crop science, production agriculture, plant breeding and genetics, crop and forage production, pest management (weeds, insects, and plant diseases), and soil fertility. The Environmental, Soil and Water Science major includes courses in areas such as environmental science, water quality, soil science, soil and water conservation, and the sustainable productivity of natural resources.

Many graduates from both majors also choose to continue their education in graduate programs in a wide variety of disciplines both related and complementary to the B.S.A. degrees.

Faculty
Bacon, Robert Keith, Ph.D. (Purdue University), M.S., B.S.A., (University of Arkansas), Professor, 1984.
Barber, Thomas, Ph.D., M.S., B.S. (University of Arkansas), Professor, 2007.
Bartlett, Andrew, Ph.D., M.S. (University of Georgia), M.S. (College of Charleston), B.S. (Coastal Carolina University), Clinical Assistant Professor, 2016.
Bourland, Fred, Ph.D. (Texas A&M University), M.S., B.S.A. (University of Arkansas), Professor, 1988.
Burgos, Nilda Roma, Ph.D., M.S. (University of Arkansas), B.S. (Visayas State College of Agriculture-Philippines), Professor, 1998.
Counce, Paul Allen, Ph.D. (University of Georgia), M.S. (Purdue University), B.S. (University of Tennessee-Martin), Professor, 1983.
Daniels, Michael B., Ph.D., M.S. (University of Arkansas), B.S. (Pennsylvania State University), Professor, 1996.
Espinoza, Leonel A., Ph.D., M.S. (University of Florida), B.S. (Iowa State University), Associate Professor, 2003.

Gbur, Edward E., Ph.D., M.S. (The Ohio State University), B.S. (Saint Francis University), Professor, 1987.
Hardke, Jarrod T., Ph.D. (Louisiana State University), B.S.A. (University of Arkansas), Associate Professor, 2013.
Kelley, Jason, Ph.D., M.S. (Oklahoma State University), B.S. (Kansas State University), Associate Professor, 2003.
Lee, Jung Ae, Ph.D., M.S. (University of Georgia), M.A., B.A., (Ewha Womans University), Assistant Professor, 2016.
Mason, Richard Esten, Ph.D., B.A. (Texas A&M University), Associate Professor, 2010.
Mauroumoustakos, Andy, Ph.D., M.S. (Oklahoma State University), B.S. (Oral Roberts University), Professor, 1988.
Miller, David M., Ph.D. (University of Georgia), M.S., B.S. (Purdue University), Professor, 1988.
Moldenhauer, Karen Ann-Kuenzel, Ph.D. (Iowa State University), M.S. (North Carolina State University), B.S. (Iowa State University), Professor, 1982.
Mozaffari, Morteza, Ph.D. (University of Delaware), M.S., B.S. (University of Massachusetts), Assistant Professor, 2002.
Mozzoni, Leandro, Ph.D. (University of Arkansas), M.S. B.S. (Rosario National University), Associate Professor, 2017.
Norman, Richard J., Ph.D. (University of Illinois-Urbana-Champaign), M.S., B.S. (University of Missouri), Professor, 1983.
Norsworthy, Jason Keith, Ph.D., M.S. (University of Arkansas), B.S. (Louisiana Tech University), Professor, 2006.
Perera, Andy, Ph.D. (Iowa State University), M.S. (Indian Agricultural Research Institute, India), B.Sc.Ag. (Govind Ballabh Pant University of Agriculture and Technology, India), Professor, 2011.
Purcell, Larry C., Ph.D. (University of Florida), M.S., B.S. (University of Georgia), Distinguished Professor, 1993.
Roberts, Trenton L., Ph.D. (University of Arkansas), M.S. (University of Arizona), B.S. (Oklahoma State University), Associate Professor, 2010.
Robertson, Bill, Ph.D., M.S. (Texas A&M University), B.S. (West Texas State University), Professor, 2014.
Ross, Jeremy, Ph.D., M.S., B.S. (University of Arkansas), Professor, 1996.
Savin, Mary Cathleen, Ph.D., M.S. (University of Rhode Island), B.S. (University of Notre Dame), Professor, 2002.
Scott, Robert C., Ph.D. (Mississippi State University), M.S., B.S. (Oklahoma State University), Professor, 2002.
Sha, Xueyan, Ph.D. (Louisiana State University), Professor, 2012.
Shakiba, Ehsan, Ph.D., M.S. (University of Arkansas), M.S., B.S. (Azad University, Iran), Assistant Professor, 2015.
Sharpley, Andrew N., Ph.D. (Massey University, New Zealand), B.S. (University College of North Wales), Distinguished Professor, 2006.
Skinner, Jerral V., Ph.D. (University of Arkansas), Lecturer, 1990.
Slaton, Nathan A., Ph.D., M.S. (University of Arkansas), B.S. (Murray State University), Professor, 2001.
Srivastava, Vibha, Ph.D. (Jawaharlal Nehru University, New Delhi), M.S. (Govind Ballabh Pant University of Agriculture and Technology), B.S. (D.E.I University), Professor, 2001.
Willett, Cammy, Ph.D., M.S. (University of Missouri), B.S. (Evangel University), Assistant Professor, 2016.
Wilson, Charles E., Ph.D., M.S. (University of Arkansas), B.S. (Arkansas State University), Professor, 2011.
Wood, Lisa S., Ph.D., M.S., B.S. (University of Arkansas), Clinical Assistant Professor, 2012.
Courses

CSES 1011. 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. Recitation 1 hour 20 minutes per week for the first eight weeks of the semester. Prerequisite: Freshman and sophomore standing only.

CSES 1203. Introduction to Plant Sciences. 3 Hours.
An introduction to basics of agricultural crop plant structure, growth, and production.

CSES 2003. Introduction to Weed Science. 3 Hours.
Fundamental, practical concepts of weed control and weed biology; equipment and techniques used in modern weed control practices; and basic recommendations and systems for specific agronomic and horticultural crops. Lecture 2 hours, laboratory 2 hours per week. Corequisite: Lab component. Prerequisite: CSES 1203 or CSES 2103 or HORT 2003.

CSES 2012. Introduction to Organic Crop Production. 2 Hours.
An introduction to the principles of organic agriculture and ecology and the regulations defining organic production and certification. Additional topics include crop rotations for pest management and for increasing soil organic matter, feeding the soil and plant nutrition, soil health, and green manuring, corporate agriculture and genetically modified organisms.

CSES 2013. 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.

CSES 2101L. 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 2103.

CSES 2103. 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.

CSES 2201L. 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 2203.

CSES 2203. 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 1203 and CHEM 1103 or CHEM 1073.

CSES 3023. 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: COMM 1313 and Junior or Senior standing only.

CSES 3112. Forage Management. 2 Hours.
Forage crops for pasture, hay, and silage with reference to growth and development, production, nutritional quality, and grazing systems. Lecture 2 hours per week. Prerequisite: CSES 1203 or CSES 2103.

CSES 3214. 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 2013 and BIOL 2011L. Corequisite: Lab component. Prerequisite: CSES 2203.

CSES 3312. Cotton Production. 2 Hours.
Principles and techniques associated with production of cotton. Recitation 2 hours per week. Prerequisite: CSES 1203 or CSES 2103.

CSES 3322. 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 1203 or CSES 2103.

CSES 3332. 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 1203 or CSES 2103.

CSES 3342. 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 1203 or CSES 2103.

CSES 355V. Soil Profile Description. 1-2 Hour.
Training for soil profile description writing and membership of judging teams. May be repeated for up to 8 hours of degree credit.

CSES 3603. Metrics for Sustainable Agricultural Systems. 3 Hours.
Analysis of productive agricultural systems necessary to meet expanding demand worldwide for food, feed, fiber and fuel while preserving critical ecosystem services to avoid future catastrophic failures of the biosphere. Characterization of sustainable systems using well-defined metrics, indicators and indices, including reference to sustainability certifications. Metrics for soil, water, atmosphere and biodiversity. Applications in crop and animal production with scales from field to watershed to eco-region. Examining the process and methodologies of integrating metrics into indices to support sustainable supply chain decisions. Discussion of life cycle analyses and current initiatives toward approaching agricultural systems sustainability. Technical course intended for students in agriculture, biology, business, engineering, and environmental sciences. This course is cross-listed with BENG 3603.

CSES 400V. Special Problems. 1-6 Hour.
Work on special problems in crop, soil and environmental sciences or related field. May be repeated for up to 6 hours of degree credit.

CSES 4013. 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 2103 and CSES 2203.

CSES 402V. Special Topics. 1-3 Hour.
Studies of selected topics in crop, soil and environmental sciences not available in other courses. May be repeated for up to 12 hours of degree credit.

CSES 4103. Plant Breeding. 3 Hours.
Basic principles involved in plant breeding programs to improve crop plants and seed programs. Lecture 2 hours, laboratory 2 hours per week. Corequisite: Lab component. Prerequisite: ANSC 3123 or BIOL 2323.

CSES 4133. 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 2103 or HORT 2003.
CSES 4143. 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 1073 and CHEM 1071L.

CSES 4224. 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 1123 and CHEM 1121L or (CHEM 1073 and CHEM 1071L and CHEM 2613 and CHEM 2611L). Corequisite: Lab component. Prerequisite: CSES 2201L and CSES 2203.

CSES 4253. 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 2203 and CSES 2201L.

CSES 4303. Bioenergy Feedstock Production. 3 Hours.
Overview of production and characteristics of cultivated crops, perennial grasses, and woody species as feedstocks for bioenergy. Fundamentals of plant growth factors, culture, harvest and storage, quality and improvement, and introduction to environmental impact, modeling, and resource utilization. Prerequisite: MATH 1203 and BIOL 1543 or CSES 1203. Courses in introductory chemistry or soil science are preferred.

CSES 4553. 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 2203 and CSES 2201L or CSES 355V.

CSES 462V. 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. May be repeated for up to 6 hours of degree credit.