

Crop Science (CPSC)

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Opportunities for employment and post-graduate study are numerous for graduates of the Department of Crop, Soil, and Environmental Sciences. Crop Science graduates become involved in crop production or find employment in public agencies providing support services for agriculture (e.g., Extension Service, State Plant Board, Natural Resources Conservation Service), or as consultants serving production agriculture, in the agrichemical and seed industries, and in agricultural research programs.

The crop science major includes courses in crop management, production agriculture, plant breeding and genetics, crop and forage production, pest management (weeds, insects, and plant diseases), and soil fertility.

Requirements for a Major in Crop Science (CPSC)

State minimum core (<http://catalog.uark.edu/undergraduatecatalog/gened/stateminimum/>) and discipline specific general education requirements (<http://catalog.uark.edu/undergraduatecatalog/gened/generaleducation/>).

(Course work that meets state minimum core requirements is in bold.)

University Requirements	1
UNIV 1001 University Perspectives ¹	
Communications	12
ENGL 1013 Composition I (ACTS Equivalency = ENGL 1013)	
ENGL 1023 Composition II (ACTS Equivalency = ENGL 1023)	
COMM 1313 Public Speaking (ACTS Equivalency = SPCH 1003)	
CSES 3023 Crop, Soil, and Environmental Sciences Colloquium	
U.S. History or Government ²	3
Select 3 hours US History or Government State Minimum Core	
Mathematics and Computer Science	6
MATH 1203 College Algebra (ACTS Equivalency = MATH 1103) (or higher level MATH)	
ASTM 2903 Agricultural and Human Environmental Sciences Applications of Microcomputers or STAT 230 Principles of Statistics (ACTS Equivalency = MATH 2103)	
Physical and Biological Sciences	15-19
BIOL 1543 Principles of Biology (ACTS Equivalency = BIOL & BIOL 1541L 1014 Lecture) and Principles of Biology Laboratory (ACTS Equivalency = BIOL 1014 Lab)	
CHEM 2613 Organic Physiological Chemistry (ACTS & CHEM 2611L Equivalency = CHEM 1224 Lecture) and Organic Physiological Chemistry Laboratory (ACTS Equivalency = CHEM 1224 Lab)	
ANSC 3123 Principles of Genetics or POSC 31: Principles of Genetics or BIOL 232: General Genetics	

Select one CHEM group (4-8 hours)

CHEM 1073 Fundamentals of Chemistry (ACTS Equivalency = & CHEM 1071L CHEM 1214 Lecture)
and Fundamentals of Chemistry Laboratory (ACTS Equivalency = CHEM 1214 Lab)

CHEM 1103 University Chemistry I (ACTS Equivalency = & CHEM 1101L CHEM 1414 Lecture)
& CHEM 1123 and University Chemistry I Laboratory (ACTS & CHEM 1121L Equivalency = CHEM 1414 Lab)
and University Chemistry II (ACTS Equivalency = CHEM 1424 Lecture)
and University Chemistry II Laboratory (ACTS Equivalency = CHEM 1424 Lab)

Fine Arts and Humanities ²	6
Select 3 hours from Fine Arts State Minimum Core	
Select 3 hours from Humanities State Minimum Core	
Social Sciences ²	9
AGEC 1103 Principles of Agricultural Microeconomics	
Select 6 hours from Social Sciences State Minimum Core	
Crop Science Core	27
CSES 1203 Introduction to Plant Sciences	
CSES 2103 Crop Science & CSES 2101L and Crop Science Laboratory	
CSES 2203 Soil Science & CSES 2201L and Soil Science Laboratory	
CSES 4013 Advanced Crop Science	
CSES 4224 Soil Fertility	
CSES 4143 Principles of Weed Control	
ENTO 3013 Introduction to Entomology	
PLPA 3003 Principles of Plant Pathology	
Crop Science Electives ³	21
Select Twenty-One (21) hours from the following:	
CSES 3214 Soil Resources and Nutrient Cycles	
CSES 3312 Cotton Production	
CSES 3322 Soybean Production	
CSES 3332 Rice Production	
CSES 3342 Cereal Grain Production	
CSES 3703 Precision Agriculture for Crops	
ENSC 3003 Introduction to Water Science	
ENSC 3263 Soil and Water Conservation	
ENSC 3603 GIS for Environmental Science	
CSES 4103 Plant Breeding	
CSES 4133 Ecology and Morphology of Weedy and Invasive Plants or CSES 4143 Principles of Weed Control	
ENTO 4123 Insect Pest Management	
PLPA 4223 Plant Disease Control	
PLPA 4333 Biotechnology in Agriculture	
CSES 462V Internship (3 hours)	
CSES 400V Special Problems (3 hours)	
General Electives	16-20
Total Hours	120

¹ UNIV 1001 University Perspectives is required for new freshmen or transfers with less than 24 hours.

² See student degree audit for approved course list.

³ One three (3) hour study abroad course may be used in fulfilling three (3) hours of Crop Science Electives.

Crop Science B.S.A. Eight-Semester Degree Program

See more about the Eight-Semester Degree Policy (<http://catalog.uark.edu/undergradcatalog/academicregulations/eightsemesterdegreecompletionpolicy/>) for university requirements of the program.

First Year	Units	
	Fall	Spring
ENGL 1013 Composition I (ACTS Equivalency = ENGL 1013) (Satisfies General Education Outcome 1.1)	3	
MATH 1203 College Algebra (ACTS Equivalency = MATH 1103) (or higher level MATH (Satisfies General Education Outcome 2.1))	3	
Satisfies General Education Outcome 3.4:		
BIOL 1543 Principles of Biology (ACTS Equivalency = BIOL 1014 Lecture) & BIOL 1541L Principles of Biology Laboratory (ACTS Equivalency = BIOL 1014 Lab)	4	
CSES 1203 Introduction to Plant Sciences	3	
UNIV 1001 University Perspectives	1	
CSES 2103 Crop Science & CSES 2101L Crop Science Laboratory		4
ENGL 1023 Composition II (ACTS Equivalency = ENGL 1023) (If exempt, see adviser for communication courses.) (Satisfies General Education Outcome 1.1)		3
COMM 1313 Public Speaking (ACTS Equivalency = SPCH 1003) (Satisfies General Education Outcomes 1.2 and 5.1)		3
AGEC 1103 Principles of Agricultural Microeconomics (Satisfies General Education Outcome 3.3)		3
U.S. History or Government Core Elective (Satisfies General Education Outcome 4.2) ⁵		3
Year Total:	14	16

Second Year	Units	
	Fall	Spring
Satisfies General Education Outcome 3.4:		
CHEM 1103 University Chemistry I (ACTS Equivalency = CHEM 1414 Lecture) & CHEM 1101L University Chemistry I Laboratory (ACTS Equivalency = CHEM 1414 Lab) or CHEM 1073 and CHEM 1071L	4	
Social Sciences State Minimum Core Elective (Satisfies General Education Outcome 3.3) ⁴	3	
Fine Arts or Humanities State Minimum Core Elective (Satisfies General Education Outcome 3.1 or 3.2) ^{1,2}	3	
Crop Science Elective ^{4,5}		3
Crop Science Elective ^{4,5}		2-3

CHEM 1123 University Chemistry II (ACTS Equivalency = CHEM 1424 Lecture) & CHEM 1121L University Chemistry II Laboratory (ACTS Equivalency = CHEM 1424 Lab) or CHEM 2613 and CHEM 2611L		4
ASTM 2903 Agricultural and Human Environmental Sciences Applications of Microcomputers or STAT 2303 Principles of Statistics (ACTS Equivalency = MATH 2103)		3
Social Sciences State Minimum Core Elective (Satisfies General Education Outcomes 3.3 and 4.1) ⁴		3
Fine Arts or Humanities State Minimum Core Elective (Satisfies General Education Outcome 3.1 or 3.2) ^{1,2}		3
Crop Science Elective ^{4,5}		2-3
Year Total:	15	16

Third Year	Units	
	Fall	Spring
CHEM 2613 Organic Physiological Chemistry (ACTS Equivalency = CHEM 1224 Lecture) & CHEM 2611L Organic Physiological Chemistry Laboratory (ACTS Equivalency = CHEM 1224 Lab) or CHEM 1123 and CHEM 1121L	4	
PLPA 3003 Principles of Plant Pathology	3	
ENTO 3013 Introduction to Entomology	3	
General Elective ⁴	3	
CSES 2203 Soil Science & CSES 2201L Soil Science Laboratory	4	
ANSC 3123 Principles of Genetics or POSC 3123 Principles of Genetics or BIOL 2323 General Genetics		3
Crop Science Elective ^{4,5}		2-3
Crop Science Elective ^{4,5}		3
General Elective ⁴		6
Year Total:	17	14

Fourth Year	Units	
	Fall	Spring
CSES 3023 Crop, Soil, and Environmental Sciences Colloquium (Satisfies General Education Outcome 6.1)	3	
CSES 4224 Soil Fertility	4	
Crop Science Elective ^{4,5}	3	
Crop Science Elective ^{4,5}	2-3	
Crop Science Elective ^{4,5}	3	
CSES 4013 Advanced Crop Science		3
CSES 4143 Principles of Weed Control		3
Crop Science Electives OR General Electives ²		0-7
Year Total:	16	12

Total Units in Sequence: 120

¹ The Fine Arts Elective courses which satisfy General Education Outcome 3.1 include: ARCH 1003, ARHS 1003, COMM 1003,

DANC 1003, LARC 1003, MLIT 1003, MLIT 1003H, MLIT 1013, MLIT 1013H, MLIT 1333, THTR 1003, THTR 1013, or THTR 1013H.

- ² The Humanities Elective courses which satisfy General Education Outcome 3.2 include: AAST 2023, ANTH 1033, ARCH 1013, CLST 1003, CLST 1003H, CLST 1013, COMM 1233, DANC 1003, ENGL 1213, GNST 2003, HIST 1113, HIST 1113H, HIST 1123, HIST 1123H, HIST 2013, HUMN 1124H, HUMN 2213, LALS 2013, MRST 2013, MUSY 2003, MUSY 2003H, PHIL 2003, PHIL 2003C, PHIL 2003H, PHIL 2103, PHIL 2103C, PHIL 2303, THTR 1003, THTR 1013, THTR 1013H, WLIT 1113, WLIT 1123, or intermediate-level world language (usually 2003-level).
- ³ The Social Science Elective courses which satisfy General Education Outcomes 3.3 and 4.1 include: ANTH 1023, COMM 1023, HDFS 1403, HDFS 2413, HIST 1113, HIST 1113H, HIST 1123, HIST 1123H, HIST 2093, HUMN 1114H, HUMN 2114H, INST 2813, INST 2813H, PLSC 2013, PLSC 2813, PLSC 2813H, RESM 2853, SOCI 2013, SOCI 2013H, or SOCI 2033.
- ⁴ Students must complete 40 hours of upper division courses (3000-4000 level). It is recommended that students consult with their academic adviser when making course selections.
- ⁵ See student degree audit for approved course list.

Minor in Crop Science (CPSC-M)

A student planning to minor in Crop Science must notify the program adviser for consultation and more detailed information. The Crop Science Minor consists of 18 semester hours of 2000-level courses or above, including the following:

CSES 2103	Crop Science	3
CSES 2203	Soil Science	3
Select 12 hours with at least 4 hours coming from Group A:		12
Group A		
CSES 3312	Cotton Production	
CSES 3322	Soybean Production	
CSES 3332	Rice Production	
CSES 3342	Cereal Grain Production	
Group B		
CSES 3214	Soil Resources and Nutrient Cycles	
CSES 4013	Advanced Crop Science	
CSES 4103	Plant Breeding	
CSES 4133	Ecology and Morphology of Weedy and Invasive Plants	
CSES 4143	Principles of Weed Control	
CSES 4224	Soil Fertility	
Total Hours		18

Minor in Crop Biotechnology (CPBT-M)

A student planning to minor in Crop Biotechnology must notify the program adviser for consultation and more detailed information. The Crop Biotechnology Minor consists of 16 hours of courses and to include the following:

Core Courses

PLPA 4333	Biotechnology in Agriculture	3
Genetics		
CSES 400V	Special Problems (two 2-hour courses taken in two different semesters)	4

Select one of the following: 3

BIOL 2323	General Genetics
ANSC/POSC 3123	Principles of Genetics

Controlled Electives

Select two of the following: 6

BIOL 4303	
CHEM 3813	Elements of Biochemistry
CSES 4103	Plant Breeding

Total Hours 16

Faculty

Bacon, Robert Keith, Ph.D. (Purdue University), M.S., B.S.A., (University of Arkansas), Professor, 1984, 1993.

Barber, Thomas, Ph.D., M.S., B.S. (University of Arkansas), Professor, 2007, 2016.

Bourland, Fred, Ph.D. (Texas A&M University), M.S., B.S.A. (University of Arkansas), Professor, 1988.

Brye, Kristofor R., Ph.D., M.S. (University of Wisconsin-Madison), B.S. (University of Wisconsin-Stevens Point), University Professor, 2001, 2020.

Burgos, Nilda Roma, Ph.D., M.S. (University of Arkansas), B.S. (Visayas State College of Agriculture-Philippines), Professor, 1998, 2010.

Butts, Thomas R., Ph.D. (University of Nebraska-Lincoln), Assistant Professor, 2019.

Counce, Paul Allen, Ph.D. (University of Georgia), M.S. (Purdue University), B.S. (University of Tennessee-Martin), Professor, 1983, 2003.

Daniels, Michael B., Ph.D., M.S. (University of Arkansas), B.S. (Pennsylvania State University), Professor, 1996, 2006.

De Guzman, Christian T., Ph.D. (Louisiana State University), B.S. (University of Philippines, Los Banos), Assistant Professor, 2020.

Espinoza, Leonel A., Ph.D., M.S. (University of Florida), B.S. (Iowa State University), Associate Professor, 2003, 2007.

Gbur, Edward E., Ph.D., M.S. (The Ohio State University), B.S. (Saint Francis University), Professor, 1987, 1998.

Hardke, Jarrod T., Ph.D. (Louisiana State University), B.S.A. (University of Arkansas), Professor, 2013, 2020.

Kelley, Jason, Ph.D., M.S. (Oklahoma State University), B.S. (Kansas State University), Professor, 2003, 2019.

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, 2016.

Mauromoustakos, Andy, Ph.D., M.S. (Oklahoma State University), B.S. (Oral Roberts University), Professor, 1989, 2002.

Miller, David M., Ph.D. (University of Georgia), M.S., B.S. (Purdue University), Professor, 1988, 2001.

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.

Norsworthy, Jason Keith, Ph.D., M.S. (University of Arkansas), B.S. (Louisiana Tech University), Distinguished Professor, 2006, 2019.

Pereira, 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, Anheuser-Busch and Arkansas Wholesalers Professorship in Molecular Genetics, 2011.

Poncet, Aurelie, Ph.D. (Auburn University), M.S. (Montpellier SupAgro, France), M.S. Minor: (AgroTIC), B.S. (Montpellier SupAgro, France), Assistant Professor, 2020.

Purcell, Larry C., Ph.D. (University of Florida), M.S., B.S. (University of Georgia), Distinguished Professor, Ben J. Altheimer Chair for Soybean Research, 1993, 2017.

Roberts, Trenton L., Ph.D. (University of Arkansas), M.S. (University of Arizona), B.S. (Oklahoma State University), Associate Professor, 2010, 2017.

Savin, Mary Cathleen, Ph.D., M.S. (University of Rhode Island), B.S. (University of Notre Dame), Professor, 2002, 2011.

Scott, Robert C., Ph.D. (Mississippi State University), M.S., B.S. (Oklahoma State University), Professor, 2002, 2008.

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.

Slaton, Nathan A., Ph.D., M.S. (University of Arkansas), B.S. (Murray State University), Professor, 2001, 2009.

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, 2012.

Thompson, Gary A., Ph.D. (Purdue University), M.S. (University of Wisconsin), Professor, 2020.

Wood, Lisa S., Ph.D., M.S., B.S. (University of Arkansas), Clinical Associate Professor, 2012, 2019.

Courses

CSES 1203. Introduction to Plant Sciences. 3 Hours.

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

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. (Typically offered: Spring)

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. (Typically offered: Spring)

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. (Typically offered: Spring)

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. (Typically offered: Fall and Spring)

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 or higher (to include MATH 1213, MATH 1284C, MATH 1514, MATH 2213, MATH 2043, MATH 2053, MATH 2445, MATH 2514, MATH 2554, MATH 2564, or MATH 2574) and CHEM 1103 or CHEM 1073. (Typically offered: Fall and Spring)

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. (Typically offered: Fall)

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. (Typically offered: Spring Odd Years)

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. (Typically offered: Fall Even Years)

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. (Typically offered: Spring Odd Years)

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. (Typically offered: Fall Odd Years)

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. (Typically offered: Spring Even Years)

CSES 355V. Soil Profile Description. 1-2 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 3703. 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 1203 and CSES 1203. (Typically offered: Spring)

CSES 400V. 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 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. (Typically offered: Spring)

CSES 402V. 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 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. (Typically offered: Fall Even Years)

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. (Typically offered: Fall)

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. (Typically offered: Spring)

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. (Typically offered: Fall)

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. (Typically offered: Fall Odd Years)

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. (Typically offered: Spring Odd Years)

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. (Typically offered: Fall, Spring and Summer) May be repeated for up to 6 hours of degree credit.