Crop, Soil and Environmental Sciences (CSES)

Paul DeLaune
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Crop, Soil and Environmental Sciences Website

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/environmentalsoilandwaterscienceesws/)

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.

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		**2**
UNIV 10051	University Perspectives [1]	
CSES 10101	Introduction to Crop, Soil, and Environmental Science	
Communications		**12**
ENGL 10103	Composition I (ACTS Equivalency = ENGL 1013)	
ENGL 10203	Composition II (ACTS Equivalency = ENGL 1023)	
SPCH 10003	Public Speaking (ACTS Equivalency = SPCH 1003)	
CSES 30203	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 11003	College Algebra (ACTS Equivalency = MATH 1103) (or higher level MATH)	
ASTM 29003	Agricultural and Human Environmental Sciences Applications of Microcomputers	
or MATH 21003	Principles of Statistics (ACTS Equivalency = MATH 2103)	
Physical and Biological Sciences		**15-19**
BIOL 10103 & BIOL 10101	Principles of Biology (ACTS Equivalency = BIOL 1014 Lecture) and Principles of Biology Laboratory (ACTS Equivalency = BIOL 1014 Lab)	
CHEM 26103 & CHEM 26101	Organic Physiological Chemistry (ACTS Equivalency = CHEM 1224 Lecture) and Organic Physiological Chemistry Laboratory (ACTS Equivalency = CHEM 1224 Lab)	
ANSC 31203	Principles of Genetics	
or POSC 31203	Principles of Genetics	
or BIOL 23373	General Genetics	
Select one CHEM group (4-8 hours)		
CHEM 12103 & CHEM 12101	Fundamentals of Chemistry (ACTS Equivalency = CHEM 1214 Lecture) and Fundamentals of Chemistry Laboratory (ACTS Equivalency = CHEM 1214 Lab)	
CHEM 14103 & CHEM 14101	University Chemistry I (ACTS Equivalency = CHEM 1414 Lecture) and University Chemistry I Laboratory (ACTS Equivalency = CHEM 1414 Lab)	
& CHEM 14203	and University Chemistry II (ACTS Equivalency = CHEM 1424 Lecture)	
& CHEM 14201	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 11003	Principles of Agricultural Microeconomics	
Select 6 hours from Social Sciences State Minimum Core		
Crop Science Core		**29**
CSES 23002	Professional Development in Crop, Soil, and Environmental Sciences	

CSES 12003	Introduction to Plant Sciences	
CSES 21033 & CSES 21001	Crop Science and Crop Science Laboratory	
CSES 22003 & CSES 22001	Soil Science and Soil Science Laboratory	
CSES 40133	Advanced Crop Science	
CSES 42204	Soil Fertility	
CSES 41403	Principles of Weed Control	
ENTO 30103	Introduction to Entomology	
PLPA 30003	Principles of Plant Pathology	
Crop Science Electives [3]		**21**
Select Twenty-One (21) hours from the following:		
CSES 32104	Soil Resources and Nutrient Cycles	
CSES 33102	Cotton Production	
CSES 33202	Soybean Production	
CSES 33302	Rice Production	
CSES 33402	Cereal Grain Production	
CSES 37003	Precision Agriculture for Crops	
ENSC 30003	Introduction to Water Science	
ENSC 32603	Soil and Water Conservation	
ENSC 36003	GIS for Environmental Science	
CSES 41003	Plant Breeding	
CSES 41303	Ecology and Morphology of Weedy and Invasive Plants	
ENTO 41203	Insect Pest Management	
PLPA 42203	Plant Disease Control	
PLPA 43303	Biotechnology in Agriculture	
CSES 4620V	Internship (3 hours)	
CSES 4000V	Special Problems (3 hours)	
General Electives		**13-17**
Total Hours		**120**

1 UNIV 10051 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 3-hour study abroad course may be used in fulfilling 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/undergraduatecatalog/academicregulations/eightsemesterdegreecompletionpolicy/) for university requirements of the program.

First Year	Fall	Spring
ENGL 10103 Composition I (ACTS Equivalency = ENGL 1013) (Satisfies General Education Outcome 1.1)	3	
MATH 11003 College Algebra (ACTS Equivalency = MATH 1103) (or higher level MATH (Satisfies General Education Outcome 2.1))	3	
Satisfies General Education Outcome 3.4:		
BIOL 10103 Principles of Biology (ACTS Equivalency = BIOL 1014 Lecture) & BIOL 10101 Principles of Biology Laboratory (ACTS Equivalency = BIOL 1014 Lab)	4	
CSES 12003 Introduction to Plant Sciences	3	
UNIV 10051 University Perspectives	1	
CSES 10101 Introduction to Crop, Soil, and Environmental Science	1	
CSES 21033 Crop Science & CSES 21001 Crop Science Laboratory		4
ENGL 10203 Composition II (ACTS Equivalency = ENGL 1023) (If exempt, see adviser for communication courses.) (Satisfies General Education Outcome 1.1)		3
SPCH 10003 Public Speaking (ACTS Equivalency = SPCH 1003) (Satisfies General Education Outcomes 1.2 and 5.1)		3
AGEC 11003 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:	15	16

Second Year	Fall	Spring
Satisfies General Education Outcome 3.4:		
CHEM 14103 University Chemistry I (ACTS Equivalency = CHEM 1414 Lecture) & CHEM 14101 University Chemistry I Laboratory (ACTS Equivalency = CHEM 1414 Lab) or CHEM 12103 and CHEM 12101	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	
CSES 23002 Professional Development in Crop, Soil, and Environmental Sciences	2	
CHEM 14203 University Chemistry II (ACTS Equivalency = CHEM 1424 Lecture) & CHEM 14201 University Chemistry II Laboratory (ACTS Equivalency = CHEM 1424 Lab) or CHEM 26103 and CHEM 26101		4
ASTM 29003 Agricultural and Human Environmental Sciences Applications of Microcomputers or MATH 21003 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:	17	16

Third Year	Units	
	Fall	Spring
CHEM 26103 Organic Physiological Chemistry (ACTS Equivalency = CHEM 1224 Lecture) & CHEM 26101 Organic Physiological Chemistry Laboratory (ACTS Equivalency = CHEM 1224 Lab)	4	
or CHEM 14203 and CHEM 14201		
PLPA 30003 Principles of Plant Pathology	3	
ENTO 30103 Introduction to Entomology	3	
CSES 22003 Soil Science & CSES 22001 Soil Science Laboratory	4	
ANSC 31203 Principles of Genetics or POSC 31203 Principles of Genetics or BIOL 23373 General Genetics		3
Crop Science Elective[4,5]		2-3
Crop Science Elective[4,5]		3
General Elective[4]		6
Year Total:	14	14

Fourth Year	Units	
	Fall	Spring
CSES 30203 Crop, Soil, and Environmental Sciences Colloquium (Satisfies General Education Outcome 6.1)	3	
CSES 42204 Soil Fertility	4	
Crop Science Elective[4,5]	3	
Crop Science Elective[4,5]	2-3	
Crop Science Elective[4,5]	3	
CSES 40133 Advanced Crop Science		3
CSES 41403 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 10003, ARHS 10003, COMM 10003, DANC 10003, LARC 10003, MUSC 10003, MUSC 100H3, MUSC 10103, MUSC 101H3, MUSC 13303, THTR 10003, THTR 10103, or THTR 100H3.

2 The Humanities Elective courses which satisfy General Education Outcome 3.2 include: AAST 20203, ANTH 10303, ARCH 10103, CLST 10003, CLST 100H3, CLST 10103, COMM 12303, DANC 10003, ENGL 11103, ENGL 11203, ENGL 12103, GNST 20003, HUMN 112H4, HUMN 22103, LALS 20103, MRST 20103, MUSY 20003, MUSY 200H3, PHIL 20003, PHIL 200H3, PHIL 21003, PHIL 23003, THTR 10003, THTR 10103, THTR 101H3, or Intermediate-level world language.

3 The Social Science Elective courses which satisfy General Education Outcomes 3.3 and 4.1 include: ANTH 10203, COMM 10203, HDFS 14003, HDFS 24103, HIST 11193, HIST 111H3, HIST 11293, HIST 112H3, HIST 20903, HUMN 111H4, HUMN 211H4, INST 20103, PLSC 20103, PLSC 28103, PLSC 281H3, RESM 28503, SOCI 10103, SOCI 101H3, or SOCI 20103.

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.

Environmental, Soil and Water Science (ESWS)

Mary C. Savin
ESWS Coordinator
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479-575-5740

Opportunities for employment and post-graduate study are numerous for graduates of the Department of Crop, Soil, and Environmental Sciences. Environmental, Soil, and Water Science graduates find jobs with environmental consulting companies, environmental education organizations, state agencies (e.g., Extension Service, Department of Environmental Quality, Health Department), federal agencies (e.g., Environmental Protection Agency, Natural Resources Conservation Service), municipalities and local environmental services (e.g., waste management and recycling, water and wastewater treatment facilities, parks and tourism departments), a wide variety of private businesses, and environmental research.

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.

Requirements for a Major in Environmental, Soil, and Water Science (ESWS)

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

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

University Requirements		**1**
UNIV 10051	University Perspectives (Counts as General Elective)	
Communication		**12**
Choose from English Core course (6 hours)		
SPCH 10003	Public Speaking (ACTS Equivalency = SPCH 1003)	
CSES 30203	Crop, Soil, and Environmental Sciences Colloquium	
or ACOM 31	Communicating Agriculture to the Public	
U.S. History and Government		**3**
Choose 3 hours U.S. History/Government from state minimum core		
Mathematics		**6**
MATH 11003	**College Algebra (ACTS Equivalency = MATH 1103)**	
MATH 12003	Plane Trigonometry (ACTS Equivalency = MATH 1203) (Higher level MATH is encouraged for students with an ACT of 26 or higher and considering graduate school.)	

Sciences		**35**
BIOL 10103 & BIOL 10101	**Principles of Biology (ACTS Equivalency = BIOL 1014 Lecture) and Principles of Biology Laboratory (ACTS Equivalency = BIOL 1014 Lab)**	
BIOL 20003 & BIOL 20001	General Microbiology (ACTS Equivalency = BIOL 2004 Lecture) and General Microbiology Laboratory (ACTS Equivalency = BIOL 2004 Lab)	
BIOL 38773 & BIOL 38771	General Ecology and General Ecology Laboratory	
or ENSC 32203 & ENSC 32201	Ecosystems Assessment and Ecosystems Assessment Laboratory	
CSES 12003	**Introduction to Plant Sciences**	
CHEM 14103 & CHEM 14101	**University Chemistry I (ACTS Equivalency = CHEM 1414 Lecture) and University Chemistry I Laboratory (ACTS Equivalency = CHEM 1414 Lab)**	
CHEM 14203 & CHEM 14201	**University Chemistry II (ACTS Equivalency = CHEM 1424 Lecture) and University Chemistry II Laboratory (ACTS Equivalency = CHEM 1424 Lab)**	
CHEM 26103 & CHEM 26101	Organic Physiological Chemistry (ACTS Equivalency = CHEM 1224 Lecture) and Organic Physiological Chemistry Laboratory (ACTS Equivalency = CHEM 1224 Lab)	
or CHEM 36053 & CHEM 36051	Organic Chemistry I and Organic Chemistry I Laboratory	
GEOL 11103 & GEOL 11101	**Physical Geology (ACTS Equivalency = GEOL 1114 Lecture) and Physical Geology Laboratory (ACTS Equivalency = GEOL 1114 Lab)**	
PHYS 20103 & PHYS 20101	**College Physics I (ACTS Equivalency = PHYS 2014 Lecture) and College Physics I Laboratory (ACTS Equivalency = PHYS 2014 Lab)**	
Fine Arts and Humanities		**6**
Select 3 hours Fine Arts from state minimum core		
Select 3 hours Humanities from state minimum core		
Social Sciences		**9**
Select 9 hours Social Sciences from state minimum core		
ESWS Requirements*		
Environmental Science Core		**17**
CSES 22003	Soil Science	
CSES 22001	Soil Science Laboratory	
ENSC 10003	Environmental Science	
ENSC 10001	Environmental Science Laboratory	
ASTM 29003	Agricultural and Human Environmental Sciences Applications of Microcomputers	
ENSC 30003	Introduction to Water Science	
MATH 21003	Principles of Statistics (ACTS Equivalency = MATH 2103)	
Soil Science Core		
Select one of the following:		3-4
CSES 32104	Soil Resources and Nutrient Cycles	
CSES 42204	Soil Fertility	
CSES 42503	Soil Classification and Genesis	
CSES 45503	Wetland Soils	
ENSC 32603	Soil and Water Conservation	
ENSC 42603	Environmental Soil Science	
Water Science Core		
Select one of the following:		3
ENSC 40203	Water Quality	
GEOS 33303	Oceanography	
GEOS 40303	Hydrogeology	
GEOS 43603	Climatology	
GEOS 44703	Applied Climatology	
Natural Resources Core		
Select 9 hours from the following two groups:		9
Environmental Science**		
ASTM 31503	Surveying in Agriculture and Forestry	
CSES 20103	Pest Management	
CSES 35501	Soil Profile Description (1 hour, may take twice)	
CSES 4620V	Internship (1-6 credit hours)	
CSES 45503	Wetland Soils	
ENSC 31003	Plants and Environmental Restoration	
ENSC 32603	Soil and Water Conservation	
ENSC 36003	GIS for Environmental Science	
ENSC 44001	Professional Certification Preparation	
GEOS 30403	Sustaining Earth	
GEOS 35403	Geospatial Applications and Information Science	
Environmental Studies (0-3 hours)		
AGEC 34103	Principles of Environmental Economics	
AGEC 35003	Agricultural Law I	
AGEC 35203	Environmental and Natural Resources Law	
ENSC 39303	Environmental Ethics	
SOCI 46003	Environmental Sociology	
General Electives		16-17
Total Hours		**120**

*Courses within major cannot be taken for duplicate credit.

**One 3-hr study abroad course, either Experiential Learning in Indian Agriculture (Jan) or Sustainability in the Eurozone Agro-Food Chain (May), which are both taken under AFLS 4010V/AFLS 401HV, can be substituted for 3 hours of Natural Resources core.

Environmental, Soil, and Water Science B.S.A.
Eight-Semester Degree Program

Students wishing to follow the degree plan should see the Eight-Semester Degree Policy (http://catalog.uark.edu/undergraduatecatalog/academicregulations/eightsemesterdegreecompletionpolicy/) for university requirements of the program.

First Year	Units	
	Fall	**Spring**
ENGL 10103 Composition I (ACTS Equivalency = ENGL 1013) (Satisfies General Education Outcome 1.1)	3	

ENSC 10003 Environmental Science & ENSC 10001 Environmental Science Laboratory	4	
Satisfies General Education Outcomes 3.4 and 5.1:		
BIOL 10103 Principles of Biology (ACTS Equivalency = BIOL 1014 Lecture) & BIOL 10101 Principles of Biology Laboratory (ACTS Equivalency = BIOL 1014 Lab)	4	
Satisfies General Education Outcome 3.4:		
MATH 11003 College Algebra (ACTS Equivalency = MATH 1103) (Satisfies General Education Outcome 2.1)	3	
UNIV 10051 University Perspectives	1	
Fine Arts or Humanities State Minimum Core Elective (Satisfies General Education Outcome 3.1 or 3.2)[1, 2]		3
ENGL 10203 Composition II (ACTS Equivalency = ENGL 1023) (Satisfies General Education Outcome 1.1)		3
CSES 12003 Introduction to Plant Sciences		3
Social Sciences State Minimum Core Elective (Satisfies General Education Outcome 3.3)		3
CHEM 14103 University Chemistry I (ACTS Equivalency = CHEM 1414 Lecture) & CHEM 14101 University Chemistry I Laboratory (ACTS Equivalency = CHEM 1414 Lab)		4
Year Total:	15	16

Second Year	Units	
	Fall	Spring
General Elective as Broadening Elective (could apply toward a minor)	3	
GEOL 11103 Physical Geology (ACTS Equivalency = GEOL 1114 Lecture) & GEOL 11101 Physical Geology Laboratory (ACTS Equivalency = GEOL 1114 Lab)	4	
U.S. History or Government State Minimum Core Elective (Satisfies General Education Outcome 4.2)	3	
SPCH 10003 Public Speaking (ACTS Equivalency = SPCH 1003) (Satisfies General Education Outcomes 1.2 and 5.1)	3	
MATH 12003 Plane Trigonometry (ACTS Equivalency = MATH 1203)	3	
CHEM 14203 University Chemistry II (ACTS Equivalency = CHEM 1424 Lecture) & CHEM 14201 University Chemistry II Laboratory (ACTS Equivalency = CHEM 1424 Lab)		4
Fine Arts or Humanities State Minimum Core Elective (Satisfies General Education Outcome 3.1 or 3.2)[1, 2]		3
Social Sciences State Minimum Core Elective (Satisfies General Education Outcome 3.3)		3
ENSC 30003 Introduction to Water Science		3
ASTM 29003 Agricultural and Human Environmental Sciences Applications of Microcomputers		3
Year Total:	16	16

Third Year	Units	
	Fall	Spring
CSES 22003 Soil Science & CSES 22001 Soil Science Laboratory	4	
PHYS 20103 College Physics I (ACTS Equivalency = PHYS 2014 Lecture) & PHYS 20101 College Physics I Laboratory (ACTS Equivalency = PHYS 2014 Lab)	4	
Water Science or Natural Resources Core	3	
Select one of the following:	3-4	
General Electives as AFLS Broadening Electives (Could apply toward a minor)[4]		
CHEM 36053 Organic Chemistry I & CHEM 36051 Organic Chemistry I Laboratory		
BIOL 20003 General Microbiology (ACTS Equivalency = BIOL 2004 Lecture) & BIOL 20001 General Microbiology Laboratory (ACTS Equivalency = BIOL 2004 Lab)		4
CHEM 26103 Organic Physiological Chemistry (ACTS Equivalency = CHEM 1224 Lecture) & CHEM 26101 Organic Physiological Chemistry Laboratory (ACTS Equivalency = CHEM 1224 Lab)		4
Social Sciences State Minimum Core Elective (Satisfies General Education Outcomes 3.3 and 4.1)[3]		3
Water Science or Soil Science Core (For Water Science: Recommended: ENSC 30003; Soil Science: Pre-at least CSES 22003)		3-4
Year Total:	14	14

Fourth Year	Units	
	Fall	Spring
Select one of the following:	3	
CSES 30203 Crop, Soil, and Environmental Sciences Colloquium (Satisfies General Education Outcome 6.1)		
ACOM 31403 Communicating Agriculture to the Public		
Select one of the following:	4	
ENSC 32203 Ecosystems Assessment & ENSC 32201 Ecosystems Assessment Laboratory		
BIOL 38773 General Ecology & BIOL 38771 General Ecology Laboratory		
Statistics or Natural Resources Core	3	
Soil Science or Natural Resources Core	3-4	
Natural Resources Core or General Elective (Could apply elective toward a minor)[4]	3	
Natural Resources Core or General Elective[4]		3
Statistics or Natural Resources Core		3
General Elective[4]		3
General Elective as Broadening Elective (Could apply toward a minor)[4]		2-3
General Elective (May wish to take another elective. Could apply toward a minor)[4]		2-3

Year Total:	16	13
Total Units in Sequence:		**120**

1 The Fine Arts Elective courses which satisfy General Education Outcome 3.1 include:
ARCH 10003, ARHS 10003, COMM 10003, DANC 10003, LARC 10003, MUSC 10003, MUSC 100H3, MUSC 10103, MUSC 101H3, MUSC 13303, THTR 10003, THTR 10103, or THTR 101H3.

2 The Humanities Elective courses which satisfy General Education Outcome 3.2 include:
AAST 20203, ANTH 10303, ARCH 10103, CLST 10003, CLST 100H3, CLST 10103, COMM 12303, DANC 10003, ENGL 11103, ENGL 11203, ENGL 12103, GNST 20003, HUMN 22103, LALS 20103, MRST 20103, MUSY 20003, MUSY 200H3, PHIL 20003, PHIL 200H3, PHIL 21003, PHIL 23003, THTR 10003, THTR 10103, THTR 101H3, or intermediate-level world language.

3 The Social Science Elective courses which satisfy General Education Outcomes 3.3 and 4.1 include:
ANTH 10203, COMM 10203, HDFS 14003, HDFS 24103, HIST 11193, HIST 111H3, HIST 11293, HIST 112H3, HIST 20903, HUMN 111H4, HUMN 211H4, INST 20103, PLSC 20103, PLSC 28103, PLSC 281H3, RESM 28503, SOCI 10103, SOCI 101H3, or SOCI 20103.

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.

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 43303	Biotechnology in Agriculture	3
CSES 41003	Plant Breeding	3
Genetics		
CSES 4000V	Special Problems (two 2-hour courses taken in two different semesters)	4
Select one of the following:		3
BIOL 23373	General Genetics	
ANSC/POSC 31203	Principles of Genetics	
Controlled Electives		
Select one from the following:		3
CHEM 38103	Elements of Biochemistry	
CSES 37003	Precision Agriculture for Crops	
BENG 31103	Measurement and Control for Biological Systems	
BENG 41203	Biosensors & Bioinstrumentation	
BIOL 25473	Cell Biology	
BIOL 45803	Genetic Engineering	
Total Hours		**16**

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 21033	Crop Science	3
CSES 22003	Soil Science	3
Select 12 hours with at least 4 hours coming from Group A:		12
Group A		
CSES 33102	Cotton Production	
CSES 33202	Soybean Production	
CSES 33302	Rice Production	
CSES 33402	Cereal Grain Production	
Group B		
CSES 32104	Soil Resources and Nutrient Cycles	
CSES 40133	Advanced Crop Science	
CSES 41003	Plant Breeding	
CSES 41303	Ecology and Morphology of Weedy and Invasive Plants	
CSES 41403	Principles of Weed Control	
CSES 42204	Soil Fertility	
Total Hours		**18**

Faculty

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.
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.
Davis, Jason, Ph.D., M.S., B.S. (University of Arkansas), Assistant Professor, 2024.
De Guzman, Christian T., Ph.D. (Louisiana State University), B.S. (University of Philippines, Los Banos), Assistant Professor, 2020.
DeLaune, Paul, Ph.D., M.S. (University of Arkansas), B.S. (Oklahoma State University), Professor, 2024.
Elli, Elvis, Ph.D. (Universidade de Sao Paulo), M.S., B.S. (Universidade Federal de Santa Maria), Assistant Professor, 2023.
Fernandez, Samuel, Ph.D., M.S. (Universidade de Lavras), B.S. (Universidade de Brasilia), Assistant Professor, 2022.
Finch, Bronc, Ph.D. (Oklahoma State University) M.S., B.S. (West Texas A&M University), Assistant Professor, 2023.
Greub, Kelsey, Ph.D. (University of Arkansas), M.S. (Auburn University), B.S. (Texas A&M University), Instructor, 2023.
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.
Miller, David M., Ph.D. (University of Georgia), M.S., B.S. (Purdue University), Professor, 1988, 2001.
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.
Roberts, Trenton L., Ph.D. (University of Arkansas), M.S. (University of Arizona), B.S. (Oklahoma State University), Associate Professor, 2010, 2022.
Ross, Jeremy, Ph.D., M.S., B.S. (University of Arkansas), Professor, 1996, 2017.
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.
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, 2009.
Speir, Shannon, Ph.D. (University of Notre Dame), M.S. (University of Arkansas), B.S. (Texas Christian University), Assistant Professor, 2022.
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.
Vieira, Caio, Ph.D., M.S. (University of Missouri-Columbia) B.S. (Universidade de Sao Paulo), Assistant Professor, 2023.
Wood, Lisa S., Ph.D., M.S., B.S. (University of Arkansas), Clinical Associate Professor, 2012, 2019.

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 indicatiors 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.