

The University of Arkansas

Dale Bumpers College of Agricultural, Food and Life Sciences

Department of Crop, Soil, and Environmental Sciences

**Crop Science
Degree Program**

**Undergraduate Handbook
2019-2020**

June 2019

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Dear Crop Science Student:

On behalf of the faculty and staff, I want to say “Welcome to the Department of Crop, Soil, and Environmental Sciences!” We are pleased that you have decided to join our departmental undergraduate program and look forward to working with you to help you succeed in your academic endeavors. The variety of academic options available to you in our department allows you to build your undergraduate program to fit your future goals.

You have been assigned an academic advisor who will work with you one-on-one to help guide you through the degree process. Be sure to work closely with your advisor and keep him or her informed of your progress and challenges so that he or she may be of help to you. The academic assistance he or she can provide you is limited only by the effort you put into keeping him or her informed of your situation. Communication is the key! Advisors are often available for drop-in visits, but it is beneficial for everyone if you can schedule an appointment so that you can both be prepared for your meeting. Appointments can be set up in person, by phone, or email.

In addition to the help from your advisor, this handbook should answer many of the questions you may have pertaining to your degree program. It is provided to you as a guide to provide further assistance in helping you through your academic program. Please remember that while we do all we can to insure you are receiving the most up-to-date information available, it is your responsibility to make sure you are fulfilling your degree requirements for your program. If you have questions or concerns, please do not hesitate to ask for clarification.

I am sure you will enjoy your time at the U of A and we look forward to having you be part of our department. I encourage you to get to know everyone in the department. The faculty, staff, and your fellow students are all excellent sources of information and future job networking. Join the CSES Undergraduate Club and get involved in club efforts to provide you with friendship as well as professional and career building opportunities, all of which are important to becoming a well-rounded individual.

Good luck on your educational endeavors and let us know how we can be of help to you!

Sincerely,



Robert K. Bacon
Department Head

Welcome to all of you joining our ranks as undergraduate students in the Department of Crop, Soil, and Environmental Sciences! We think this is a great department and, as students, we work even harder to make sure to keep it that way.

As undergraduates in our department, we encourage you to join the CSES Undergraduate Club and participate in as many of our events as you want to and are able. On average, our club meets once a month. Our meetings are the opportunity for our members to not only hear from guest speakers but also to get together to discuss membership needs and departmental issues. We do our best to send a contingent from our club to participate in the national meetings each year. Club members compete in poster presentations, oral presentations, and/or paper competitions.

How can you find out about our meetings and events? **Look for emails from the club through the CSES Department. Also, check Facebook and make sure you notice the signs in AGRI and PTSC hallways and postings in the Student Lounge (PTSC 113).**

We often schedule additional activities at the request of our members. We have sponsored canoe trips, picnics, camping trips, and other group outings. We also do our best to give back to our community. As such we have participated in composting on campus, worked with Holt Middle School in their school garden and the City of Fayetteville to help remove invasive plant species from a local park and plant native species in their place, and helped out in several maintenance efforts for local hiking trails and stream ecosystems.

As you can tell, our goal is to provide our members with meetings and activities that are beneficial to them academically as well as personally. We are always looking for new ideas for things we can do. Get in touch with me, one of the other officers or advisors (contact information is on page 23), or come to one of our meetings.

We look forward to having you as part of our department!

Sincerely,

Alyssa Ferri
President, CSES Undergraduate Club

Department of Crop, Soil, and Environmental Sciences

(Information adapted from the CSES Departmental Website)

The Department of Crop, Soil, and Environmental Sciences at the University of Arkansas has a long and honored tradition of excellence in teaching, research, and service. The Department has produced a large number of successful graduates currently employed in the public and private sectors. We strive to have out best teachers in the introductory classes and to have faculty who are actively pursuing research in their respective disciplines teaching the classes related to their specialty.

The Crop Science Major

Within the Crop, Soil, and Environmental Sciences Department students can major in two-degree programs, Crop Science and Environmental, Soil and Water Science. The degree check sheet for the Crop Science major is given on page 6. The major provides the student with basic and applied courses that allow our graduates to be highly competitive in the job market.

Why is Crop Science important?

- Sustainable agriculture is critical to future generations
- Bioenergy production presents new challenges
- Biotechnology offers the opportunity to increase agricultural production
- Food demand is increasing worldwide
- Land availability for food and biofuels production is decreasing

Why should I be interested?

The Crop Science major is for students interested in issues dealing with all facets of crop production. The major crops of Arkansas include soybean, rice, cotton, wheat and pasture grasses are studied in detail. The major provides a strong science background, as well as a practical education.

Career Opportunities?

Food, fiber, and bioenergy production are intensifying to supply the world's increasing population, along with greater challenges to protect air, soil and water quality. Students who graduate with a degree in Crop Management can work in such areas as:

Local, State, or Federal Governmental Agencies:

- Arkansas Soil and Water Conservation Commission
- Cooperative Extension Service
- State Plant Board
- United States Department of Agriculture (USDA)
- Natural Resource Conservation Service (NRCS)
- Forest Service (FS)
- International development agencies

Private Sector

- Crop consulting/Certified crop adviser
- Bioenergy production companies
- Farm management
- Precision agriculture advising
- Seed/grain and chemical/pesticide industries
- Research scientist
- Educator
- Retail business management/owner
- Technical representative

Academia/Research

- Many students go on to Graduate School to further their education
- Crop Scientist
- Seed Technologist
- Plant Breeder
- Crop Physiologist
- Weed Scientist
- Research Technician

Certification Possibilities – Coursework prepares the student to take the Certified Crop Adviser examination. Preparation courses for the certification exams are offered as Special Topics (CSES 402v).

Minor Fields for Crop Science Majors

Students majoring in Crop Management are required to select a minor in **Pest Management** or **Agricultural Business** (see check sheets). In addition, you have sufficient elective hours to develop a second minor of your choosing. Other minors offered by the CSES Department are **Crop Biotechnology and Environmental, Soil and Water Science**. Check sheets for these CSES minors are included in this document. *Please remember that students must declare their minor(s) in the AFLS Dean's Office (AFLS E108) to have it officially entered into the ISIS system.*

Bumpers College Minors. Nineteen minors are offered by the Bumpers College. In addition to the minors offered in the CSES department, other options include: Agricultural Education; Agricultural Systems Technology Management; Entomology; Food Science; Global Agricultural, Food and Life Sciences; Horticultural Production; Journalism; Landscape Design and Urban horticulture; Plant Pathology and Turf Management.

Fulbright College Minors. Thirty-seven minors are offered by the Fulbright College including: Biology, Chemistry, Communication, and foreign languages.

Walton College Minors. The Walton College offers a Business Administration Minor for non-business students. Eight minor concentrations are offered including: General Business, Finance, International Business, Management, Marketing, Transportation and Logistics.

University Minors. A new campus-wide minor in Sustainability is schedule to be offered beginning in the Fall 2010 semester

Advising Responsibilities

In the Bumpers College and in the Department of Crop, Soil, and Environmental Sciences at the University of Arkansas we are committed to strong, effective advising. Effective advising is a partnership between the student and the faculty advisor. Each person has responsibilities.

Advisor Responsibilities	Student Responsibilities
know degree requirements	be responsible for self
know resources & services to direct students	be familiar with deadlines
understand the sequence of courses	know degree plan requirements
provide guidance & advice	use your University of Arkansas email
	use available resources
	communicate with advisor & instructors to develop positive relationships

UA Advising Goals

“Academic advising is an active, ongoing partnership between the advisors and students grounded in teaching and learning. Advising is based on students gaining accurate and appropriate information and direction to help make their educational experience relevant, coherent, and meaningful. It is a process that assists students in connecting with the University of Arkansas, making thoughtful decisions related to their academic experiences, and maximizing their education and career opportunities. Quality academic advising is essential to achieving the University’s vision.” (AFLS Academic Advising Syllabus)

For more information about advising in Bumper’s College, see:
<https://bumperscollege.uark.edu/current-students/advising.php>

Dale Bumpers College of Agricultural, Food & Life Sciences
NINE-SEMESTER DEGREE COMPLETION PROGRAM
B.S.A. – Crop, Soil, and Environmental Sciences (CSES) – Crop Science (CPSCBS)
2019-2020

CSES Requirements: 15 hours Communication; 3 hours History; 6 hours Mathematics and Computer Science; 18-23 hours Science; 6 hours Fine Arts/Humanities; 9 hours Social Sciences; 36 hours departmental core; 9-12 hours CPSC Specialization; 15-18 hours electives (1hr – UNIV 1001);

Bold – Course meets University Core; Pre-requisites, co-requisites, or recommended courses are in parentheses.

Fall Semester Year 1		Spring Semester Year 1	
Course	Hours	Course	Hours
ENGL 1013 Composition I	3	CSES 2103/2101L Crop Science and lab	4
MATH 1203 College Algebra	3	CSES 1203 Plant Science OR BIOL 1613/1611L Plant Biology and lab (Pre-BIOL 1543/1541L)	3-4
BIOL 1543/1541L Principles of Biology and lab	4	ENGL 1023 Comp II (Pre- ENGL 1013)	3
History Core Elective	3	COMM 1313 Public Speaking	3
UNIV 1001 University Perspectives	1	AGEC 1103 Agricultural Microeconomics (Pre- MATH 1203) <i>Required</i>	3
Total Semester Hours	14	Total Semester Hours	16-17
Fall Semester Year 2		Spring Semester Year 2	
Course	Hours	Course	Hours
CHEM 1103/1101L Univ Chemistry I and lab (Pre – MATH 1203) OR CHEM 1073/1071L Fundamentals of Chemistry	4	CHEM 1123/1121L Univ Chemistry II and lab (Pre – CHEM 1103) OR CHEM 2613/2611L Organic Physiological Chemistry and lab (Pre-CHEM 1073/1071L OR CHEM 1123/1121L OR CHEM 1123H/1121M)	4
ENGL 2003 Advanced Comp OR ENGL 3053 Technical & Report Writing	3	AGME 2903 AGRI & HESC Applications of Microcomputers OR AGST 4023 (Pre-MATH 1203 or equiv) OR STAT 2303 (pre-MATH 1203 OR MATH 1024 with C or better)	3
Social Science Core Elective	3	Social Science Core Elective	3
Fine Arts/Humanities Core Elective	3	Fine Arts/Humanities Core Elective	3
Select one (1) course from Group A or B on check sheet	2-3	Select one (1) course from Group A or B on check sheet	2-3
Total Semester Hours	15-16	Total Semester Hours	15-16
Fall Semester Year 3		Spring Semester Year 3	
Course	Hours	Course	Hours
CHEM 2613/2611L Organic Physiological Chemistry and lab (Pre-CHEM 1073/1071L OR CHEM 1123/1121L OR CHEM 1123H/1121M) OR General Elective (AGBS minors may wish to choose a course from the Controlled Electives in the minor)	4	BIOL 2323 General Genetics (Pre-BIOL 1543/1541L & CHEM 1123/1121L OR CHEM 1223/1221L) & MATH 1203 OR STAT 2023) OR BIOL 4303 Plant Physiology (Pre-BIOL 2533 OR CHEM 3813 OR CHEM 5843) OR ANSC/POSC 3123 Principles of Genetics (Pre-BIOL 1543 and MATH 1203)	3
PLPA 3004 Principles of Plant Pathology with lab	4	Select one course from Group A or B	2-3
ENTO 3013 Intro to Entomology (Suggested Pre-BIOL 1543/1541L)	3	CPSC Specialization Elective	3
Select 1 course from Group A on check sheet	2	General Elective	6
CSES 2203/2201L Soil Science & lab (Pre-MATH 1203 and CHEM 1073/1071L or 1103/1101L)	4	Total Semester Hours	14-15
Total Semester Hours	17		
Summer Year 3			
Course	Hours		
CSES 462V Internship (Pre-junior standing) OR CSES 400V Special Problems OR AFLS 401V Study Abroad	3		
Total Semester Hours	3		
Fall Semester Year 4		Spring Semester Year 4	
Course	Hours	Course	Hours
CSES 3023 CSES Colloquium (Pre- COMM 1313)	3	CSES 4013 Advanced Crop Science (Pre- CSES 2103)	3
CSES 4133 Ecology & Morphology of Weedy/Invasive Plants (Pre-CSES 2103 OR HORT 2003) OR CPSC Specialization Elective	3	CSES 4143 Principle of Weed Control (CHEM 1073/1071L) OR CPSC Specialization Elective	3
CSES 4224 Soil Fertility with lab (Pre- CSES 2203/2201L and CHEM 1123/1121L or (CHEM 1073/1071L and CHEM 2613/2611L)	4	General Elective (hours will depend on previous course choices; Course selections should result in semester total of 9-14 credit hours)	0-4
CPSC Specialization Elective	3	CPSC Specialization Elective OR General Elective	0-3
Total Semester Hours	13	Total Semester Hours	6-13
		TOTAL HOURS	120

DEPARTMENT OF CROP, SOIL, AND ENVIRONMENTAL SCIENCES

Check Sheet for Crop Science Major (CPSCBS)

2019-2020

STUDENT _____ STUDENT'S ID _____ ADVISOR _____

ENGLISH/COMMUNICATIONS (15 hrs)

- ___ ENGL 1013
- ___ ENGL 1023
- ___ ENGL 2003 or ENGL 3053
- ___ COMM 1313
- ___ CSES 3023 CSES Colloquium (FA, JR or SR, COMM 1313)

US HISTORY OR GOVERNMENT (3 hrs)

- ___ HIST 2003 or ___ HIST 2013 or ___ PLSC 2003

MATHEMATICS and COMPUTER SCIENCE (6 hrs)

- ___ MATH 1203
- ___ AGME 2903 or ___ AGST 4023 or ___ STAT 2303

PHYSICAL AND BIOLOGICAL SCIENCES (18-23 hrs)

- ___ BIOL 1543 and ___ BIOL 1541L
- ___ BIOL 1613 and ___ BIOL 1611L or ___ CSES 1203
- ___ BIOL 4303 or ___ ANSC/POSC 3123 or ___ BIOL 2323
- ___ CHEM 2613 and ___ CHEM 2611L (CHEM 1073/1071L or CHEM 1123/1121L)

Select One CHEM group (4-8 hrs):

- ___ CHEM 1073 and ___ CHEM 1071L
- or
- ___ CHEM 1103 and ___ CHEM 1101L (MATH 1203 or higher)
- ___ CHEM 1123 and ___ CHEM 1121L (CHEM 1103/1101L)

FINE ARTS AND HUMANITIES (6 hrs)

Fine Arts (3 hrs)

Choose one from the following courses:

- ___ ARCH 1003 ___ ARHS 1003 ___ COMM 1003
- ___ DANC 1003 ___ ENGL 2023 ___ HUMN 2114H
- ___ LARC 1003 ___ MLIT 1003 ___ MLIT 1013
- ___ MLIT 1333 ___ THTR 1003 ___ THTR 1013
- ___ THTR 1013

Humanities (3 hrs)

Choose one from the following courses:

- ___ AAST 2023 ___ ARCH 1013 ___ CLST 1003
- ___ CLST 1013 ___ COMM 1233 ___ ENGL 1213
- ___ GNST 2003 ___ HUMN 1124H ___ HUMN 2124H
- ___ MRST 2013 ___ MUSY 2003 ___ PHIL 2003
- ___ PHIL2103 ___ PHIL 2203 ___ PHIL 3103
- ___ WLIT 1113 ___ WLIT 1123
- ___ _____ Any Intermediate I Foreign Language

SOCIAL SCIENCES (9 hrs)

___ AGECE 1103 Agricultural Economics (required)

(choose 6 hrs from the following; 3 hrs must be outside AGECE/ECON)*

- ___ AGECE 2103* ___ ANTH 1023 ___ COMM 1023
- ___ ECON 2013 ___ ECON 2023 ___ ECON 2143
- ___ GEOS 1123 ___ GEOS 2003 ___ HDFS 1403
- ___ HDFS 2413 ___ HIST 1113 ___ HIST 1123
- HIST 2003 ___ HIST 2013 ___ HUMN 1114H
- ___ HUMN 2114H ___ PLSC 2003 ___ PLSC 2013
- PLSC 2203 ___ PSYC 2003 ___ RESM 2853
- ___ HDFS 2603 ___ SOCI 2013 ___ SOCI 2033

DEPARTMENTAL CORE (36 hrs)

GENERAL AGRONOMY

Required Courses (26 hrs):

- ___ CSES 2103 and ___ 2201L Crop Science & lab (SP)
- ___ CSES 2203 and ___ CSES 2201L Soil Science & lab (FA, SP, MATH 1203, CHEM 1074 or 1103)
- ___ CSES 4013 Advanced Crop Science (SP, CSES 2103)
- ___ CSES 4224 Soil Fertility w/Lab Component (FA, CSES 2203/2201L, CHEM 1123/1121L or CHEM 1073/1071L and CHEM 2613/2611L)
- ___ CSES 462V Internship or CSES 400V Special Problems or AFLS 401V ** (3 hrs)

Select at least 8 hours from the following two groups, at least 6 hours must be from Group A

GROUP A

- ___ CSES 3112 Forage Management (SP-E, CSES 1203 or CSES 2103)
- ___ CSES 3312 Cotton Production (FA-E, CSES 1203 or CSES 2103)
- ___ CSES 3322 Soybean Production (SP-O, CSES 1203 or CSES 2103)
- ___ CSES 3332 Rice Production (FA-O, CSES 1203 or CSES 2103)
- ___ CSES 3342 Cereal Grain Production (SP-E, CSES 1203 or CSES 2103)

GROUP B

- ___ CSES 3214 Soil Res & Nutrient Cycles with lab (SP-O, CSES 2203, BIOL 2013/2011L)
- ___ CSES 355V Soil Profile Descriptions (1-2 hrs) (FA)
- ___ CSES 400V Special Problems (1-6 hrs)
- ___ CSES 4103 Plant Breeding with lab (FA-E, ANSC 3123, or BIOL 2323)
- ___ CSES 4303 Bioenergy Feedstock Prod (SP, MATH 1203 and BIOL 1543 or CSES 1203)
- ___ CSES 4253 Soil Classification and Genesis (FA-O, CSES 2203 and CSES 2201L)
- ___ ENSC_3103 Plants & Env.Restoration (FA, CSES 1203 or HORT 2003 or BIOL 1613)
- ___ ENSC 3263 Soil and Water Conservation (FA even, CSES 2203)
- ___ HORT 2303 Intro to Turfgrass Management (FA)
- ___ PLPA 4333 Biotechnology in Agriculture (FA)

PEST MANAGEMENT (10-11 hrs)

- ___ ENTO 3013 Introduction to Entomology (FA) (BIOL 1543/1541L)
- ___ PLPA 3004 Principles of Plant Pathology (FA)
- ___ CSES 4133 Ecol & Morph of Weedy/Invasive Species (FA, CSES 2103 or HORT 2003) or ___ CSES 4143 Prin. of Weed Control with lab (SP) (CHEM 1073/1071L)

CPSC Specialization

Select one group (C-G) for CPSC Requirements (9-12 hours). Course selected within major cannot be taken for duplicate credit.*** Students who wish to declare a minor must contact the Bumpers College Dean's Office.

GROUP C - Pest Management (9 hours)

- ___ CSES 4133 Ecol & Morph of Weedy/Invasive Species (FA, CSES 2103 or HORT 2003) or ___ CSES 4143 Principles of Weed Control (SP, CHEM 1073/1071L)
- ___ PLPA 4223 Plant Disease Control with lab (FA, PLPA 3004)
- ___ ENTO 4123 Insect Pest Management (SP-O, ENTO 3013) or ___ ENTO 4133 Advanced Applied Entomology with lab (SP-E, ENTO 3013)

GROUP D - Agricultural Business (12 hours)

- ___ AGECE 2303 Introduction Agribusiness (SP, FA, AGECE 1103 or ECON 2023)
- ___ AGECE 3403 Farm Business Mgmt (FA, AGECE 1103 or ECON 2023, AGECE 2142, and AGME 2903)
- (choose 6 hours from the following)
- ___ AGECE 3303 Food & Agri Mktg (SP, SU, FA, AGECE 1103 or ECON 2023)
- ___ AGECE 3413 (SP, AGECE 1103 or ECON 2023)
- ___ AGECE 3373 (SP, AGECE 1103 or ECON 2023)
- ___ AGECE 4313 (FA, AGECE 2142 and AGECE 2141L or AGECE 2143, and AGECE 2303)
- ___ 3 hours controlled elective hours from approved list in AGBS-Minor

Continued on page 2

GROUP E - Plant Biotechnology (10 hours)

___ CSES 400V Special Problem, (2 2-hour courses taken in two different semesters)

Choose 6 hours from the following:

- ___ BIOL 4303 Plant Physiology (FA, BIOL 2533 or CHEM 3813 or CHEM 5843)
- ___ CHEM 3813 Introduction to Biochemistry (SP, SU, FA, CHEM 3613/3611L or CHEM 3613H/3612M or CHEM 3713/3712L or CHEM 2613/2611L)
- ___ CSES 4103 Plant Breeding (FA even, ANSC/POSC 3123 or BIOL 2323)

GROUP F - Soil Science (9 hours**)**

- ___ CSES 3214 Soil Resources and Nutrient Cycles with Laboratory (SP odd)
- ___ ENSC 3263 Soil & Water Conservation (FA)
- ___ CSES 355V Soil Profile Description (FA, 1 hour, may take twice for credit)
- ___ CSES 4224/4220L Soil Fertility with Laboratory (FA)
- ___ CSES 4253 Soil Classification and Genesis (FA odd)
- ___ ENSC 4263 Environmental Soil Science (SP even)
- ___ ENSC 4401 Professional Certification Preparation (Soils exam, SP even)
- ___ CSES 4553 Wetland Soils (SP odd)

GROUP G - Natural Resources Management (9 hours)

- ___ ENSC 1001L Environmental Science Laboratory (FA, SP)
- ___ ENSC 1003 Environmental Science (FA, SP)

AND at least 5 hr from the following:

- ___ ENSC 3003 Introduction to Water Science (SP, MATH 1203, ENSC 1003 or other sci.)
- ___ AGECE/ENSC 3413 Principles of Environmental Economics (SP, AGECE 1103 or ECON 2023)
- ___ AGECE 3503 Agricultural Law I (FA)
- ___ AGECE 3523 Environmental and Natural Resources Law (SP even)
- ___ BIOL 3861L General Ecology Lab (FA, BIOL 3863)
- ___ BIOL 3863 General Ecology (SP, FA - 7 hours of biological sciences)
- ___ CSES 4133 Ecology and Morphology of Weedy and Invasive Species (FA, CSES 2103 (or HORT

03) and CSES 2003).

- ___ CSES 4553 Wetland Soils (SP odd, CSES 2203)
- ___ CSES 462V Internship
- ___ ENSC 3003 Introduction to Water Science (SP, MATH 1203, ENSC 1003 or other sci.)**
- ___ ENSC 3223 Ecosystem Assessment (FA even, BIOL 1543)
- ___ ENSC 3603 GIS for Environmental Science (SP odd, CSES 2203)
- ___ ENSC 4021L Water Quality Laboratory (FA, CHEM 1123/1121L, BIOL 1543/1541L)
- ___ ENSC 4023 Water Quality (FA, pre or co-req ENSC 4023)
- ___ ENSC 4034 Analysis of Environmental Contaminants w/Lab (SP even, pre or co-req CHEM 2613)
- ___ ENSC 4263 Environmental Soil Science (SP even, CSES 3214, PHYS 2013)
- ___ ENSC 4401 Professional Certification (SP, junior or senior standing)
- ___ GEOS 3043 Sustaining Earth (SP, SU, FA - Junior standing)
- ___ GEOS 3543 Geographic Information Science (FA, SP, online)

GENERAL ELECTIVES (15-18 hours)

- ___ UNIV 1001 University Perspectives*****

OTHER REQUIREMENTS FOR B.S.A. DEGREE:

120 total semester hours of which:
 9 hrs outside the Departmental Alpha Code (CSES) within the Bumpers College
 36 semester hours in upper division courses
 2.00 GPA
 *Students minoring in Agricultural Business should choose AGECE 2103 in the Social Sciences block and will need to select another course in the list of AGBS-M Controlled Electives (as part of the General Electives for the CPSC major) to fulfill the requirements for the minor.
 **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 401V/AFLS 401VH, or CSES 462V International Research Internship (SU) may be used in fulfilling the General Agronomy requirement.
 ***No more than 9 hours can be duplicated between major and minor
 ****UNIV 1001 University Perspectives is required for new freshmen or transfers with less than 24 hours.

UNIVERSITY OF ARKANSAS
Dale Bumpers College of Agricultural, Food and Life Sciences

CROP BIOTECHNOLOGY MINOR
2019 - 2020

* A student planning to minor in Crop Biotechnology must notify the program advisor for consultation and more detailed information. This minor is open to all University of Arkansas students.

The Crop Biotechnology Minor will consist of 16 semester hours of the following courses:

_____ BIOL 2323 General Genetics (SP, BIOL 1584 or BIOL 1543/1541L and (CHEM 1123/1121L or CHEM 1223/1121L) and (MATH 1203 or STAT 2023 or equivalent)) **or** ANSC/POSC 3123 Principles of Genetics (FA, BIOL 1543/1541L and MATH 1203)

_____ PLPA 4333 Biotechnology in Agriculture (FA)

_____ CSES 402V Special Topics (2 2-hour courses taken in two different semesters)

Choose 6 hours from the following:

_____ BIOL 4303 Plant Physiology (FA, BIOL 2533 or CHEM 3813 or CHEM 5843)

_____ CHEM 3813 Introduction to Biochemistry (SP, SU, FA, CHEM 3613/3611L or CHEM 3613H/3612M or CHEM 3713/3712L or CHEM 2613/2611L))

_____ CSES 4103 Plant Breeding (FA even, ANSC/POSC 3123 or BIOL 2323)

Approved:

Student _____

Major Advisor _____

Minor Advisor _____

Date _____

Copies to:	Student
	Major Advisor
	Minor Advisor
	AFLS Dean's Office
	Student's Dean's Office (if not AFLS)

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UNIVERSITY OF ARKANSAS
Dale Bumpers College of Agricultural, Food and Life Sciences
NATURAL RESOURCES MANAGEMENT MINOR
2019 - 2020

* A student planning to minor in Natural Resources Management must notify the program adviser for consultation and more detailed information. * The Natural Resources Management Minor will consist of a total of 18 hours to be comprised of the following required and optional courses. No more than 9 hours can be counted towards a Natural Resources Management minor with an ESWS major.

Required Courses **(7 hours)**

- ___ ENSC 1001L Environmental Science Laboratory (FA, SP)
- ___ ENSC 1003 Environmental Science (FA, SP) **AND**
- ___ CSES 2203 Soil Science (FA, SP, MATH 1203, CHEM 1103 or CHEM 1074) **OR**
- ___ ENSC 3003 Introduction to Water Science (SP, MATH 1203, ENSC 1003 or other sci.)

Optional Courses **Select the remaining 11 hours, with at least 8 hours 3000-level or above.**

- ___ AGEC/ENSC 3413 Principles of Environmental Economics (SP, AGEC 1103 or ECON 2023)
- ___ AGEC 3503 Agricultural Law I (FA)
- ___ AGEC 3523 Environmental and Natural Resources Law (SP even)
- ___ BIOL 3861 General Ecology Lab (FA, BIOL 3863)
- ___ BIOL 3863 General Ecology (SP, FA - 7 hours of biological sciences)
- ___ CSES 1203 Plant Science (SP, FA), CSES 2103 Crop Science (SP), **or** BIOL1613/1611L (SP, SU)
- ___ CSES 2013 Pest Management (SP)
- ___ CSES 2201L Soil Science Laboratory (FA, SP, pre or co-req CSES 2203)
- ___ CSES 2203 Soil Science (FA, SP, MATH 1203, CHEM 1103 or CHEM 1074)**
- ___ CSES 3214 Soil Resources and Nutrient Cycles with Laboratory (SP odd, CSES 2203, BIOL 2013)
- ___ CSES 355V Soil Profile Description (FA, 1 hour, may take twice for credit)
- ___ CSES 4013 Advanced Crop Science (FA, CSES 2103)
- ___ CSES 4133 Ecology and Morphology of Weedy and Invasive Species (FA, CSES 2103 (or HORT 2003) and CSES 2003).
- ___ CSES 4224 Soil Fertility with Laboratory (FA)
- ___ CSES 4253 Soil Classification and Genesis with Laboratory (FA odd, CSES 2203)
- ___ CSES 4253 Wetland Soils (SP odd, CSES 2203)
- ___ CSES 462V Internship
- ___ ENSC 3103 Plants and Environmental Restoration (FA, CSES 1203, BIOL 1613, or HORT 2003)
- ___ ENSC 3003 Introduction to Water Science (SP, MATH 1203, ENSC 1003 or other sci.)**
- ___ ENSC 3223 Ecosystem Assessment (FA even, BIOL 1543)
- ___ ENSC 3263 Soil and Water Conservation (FA)
- ___ ENSC 3603 GIS for Environmental Science (SP odd, CSES 2203)
- ___ ENSC 4021L Water Quality Laboratory (FA, CHEM 1123/1121L, BIOL 1543/1541L)
- ___ ENSC 4023 Water Quality (FA, pre or co-req ENSC 4023)
- ___ ENSC 4034 Analysis of Environmental Contaminants w/Lab (SP even, pre or co-req CHEM 2613)
- ___ ENSC 4263 Environmental Soil Science (SP even, CSES 3214, PHYS 2013)
- ___ ENSC 4401 Professional Certification (SP, junior or senior standing)
- ___ GEOS 3043 Sustaining Earth (SP, SU, FA - Junior standing)
- ___ GEOS 3543 Geographic Information Science (FA, SP, online)

** If not counted as Required Course

Approved: Student _____

Major Advisor _____

Minor Advisor _____

Date _____

University of Arkansas
Dale Bumpers College of Agricultural, Food and Life Sciences

Pest Management Minor (PMGT-M)
2019-2020

* A student planning to minor in Pest Management must notify the program advisor for consultation and more detailed information.

The Pest Management Minor consists of a minimum of 19 hours to include two courses from each pest discipline: entomology (ENTO), plant pathology (PLPA), and weed science (CSES):

Required Courses:

- _____ ENTO 3013 Introduction to Entomology (FA, suggested pre-req: BIOL 1543)
- _____ PLPA 3004 Principles of Plant Pathology with lab (FA)

Select four (4) courses from the following:

- _____ CSES 2003 Introduction to Weed Science (Irr, CSES 1203 or CSES 2103 or HORT 2003)
- _____ CSES 4133 Ecology & Morphology of Weedy & Invasive Plants (FA, CSES 2103 or HORT 2003)
- _____ CSES 4143 Principles of Weed Control (SP, CHEM 1073/1071L)

- _____ ENTO 4123 Insect Pest Management (SP odd, ENTO 3013)
- _____ ENTO 4133 Advanced Applied Entomology (SP even, ENTO 3013)

- _____ PLPA 4223 Plant Disease Control (FA, PLPA 3004)
- _____ PLPA 4304 Applied Plant Disease Management (Irr, PLPA 3004 or instructor consent)

Approved: Student _____
Date _____

Major Advisor _____
Date _____

Minor Advisor _____
Date _____

Copies to: Student
Major Advisor
Minor Advisor
Student's Dean's Office (if not AFLS)

UNIVERSITY OF ARKANSAS
Dale Bumpers College of Agricultural, Food and Life Sciences
SOIL SCIENCE MINOR
2019-2020

* A student planning to minor in Soil Science must notify the program adviser for consultation and more detailed information.

* The Soil Science Minor will consist of a total of 18 hours to be comprised of the following required and optional courses. No more than 9 hours can be counted towards a Soil Science minor with an ESWS major. Note: Students interested in obtaining certification in the area of soil science will need at least 15 soil science hours, preferably covering each of the sub-disciplines (i.e., fertility, genesis, morphology, and classification, chemistry, physics, soil biology and ecology, and land use and management).

Required Courses (4 hours)

_____	CSES 2203	Soil Science (SP, FA)
_____	CSES 2201L	Soil Science Laboratory (SP, FA)

Optional Courses - select the remaining 14 hours from the following list of courses

Undergraduate Courses:

_____	CSES 3214/3210L	Soil Resources and Nutrient Cycles with Laboratory (SP odd)
_____	ENSC 3263	Soil & Water Conservation (FA)
_____	CSES 355V	Soil Profile Description (FA, 1 hour, may take twice for credit)
_____	CSES 4224/4220L	Soil Fertility with Laboratory (FA)
_____	CSES 4253	Soil Classification and Genesis (FA odd)
_____	ENSC 4263	Environmental Soil Science (SP even)
_____	ENSC 4401	Professional Certification Preparation (Soils exam, SP even)
_____	CSES 4553	Wetland Soils (SP odd)

Graduate Courses:

_____	CSES 5033	Advanced Soil Fertility and Plant Nutrition (SP even)
_____	CSES 5224/5220L	Soil Physics with Laboratory (SP)
_____	CSES 5264/5260L	Microbial Ecology with Laboratory (FA odd)
_____	CSES 5453	Soil Chemistry (SP even)

Approved: Student _____
Major Advisor _____
Minor Advisor _____

Copies to: Student
Major Advisor
Minor Advisor
AFLS Dean's Office
Student's Dean's Office (if not AFLS)

Date _____

Minor in Agricultural Business (AGBS-M)
Department of Agricultural Economics and Agribusiness
Dale Bumpers College of Agricultural, Food, and Life Sciences
2019-2020 Checksheet (v1.0 hard copy)

1 Core Requirements: (6 credit hours)

_____ AGEC 1103 Principles of Agricultural
Microeconomics¹

Choose one from

_____ AGEC 2103 Principles of Agricultural
Macroeconomics¹

_____ AGEC 2303 Introduction to Agribusiness

3 Controlled Electives: (6 credits hours)²

_____ Any AGEC course not already used

_____ ECON 3033 Microeconomic Theory

_____ ECON 3133 Macroeconomic Theory

_____ MATH 2043 Survey of Calculus

_____ POSC 4213 Integrated Poultry Management Systems

2 Core Electives: (6 credit hours)

Select any two of the following courses

_____ AGEC 3303 Food and Agricultural Marketing

_____ AGEC 3313 Agribusiness Sales

_____ AGEC 3373 Futures and Options Markets

_____ AGEC 3403 Farm Business Management

_____ AGEC 3413 Principles of Environmental
Economics

_____ AGEC 4313 Agricultural Business Management

_____ AGEC 4323 Agribusiness Entrepreneurship

Students declaring a minor must notify their Dean's Office.

Student Name:

Univ ID No:

Major Advisor:

Minor Advisor:

Date:

¹ May be used to fulfill a Social Science requirement in the University Core.

² Additional upper-division courses in the Sam M. Walton College of Business may be substituted with approval, provided prerequisites for those courses have been satisfied outside of the minor. A minimum of six hours of upper division credit hours of AGEC courses without substitution is required for the minor. A student planning to minor in Agricultural Business should contact the program advisor for consultation and more detailed information.

**University-wide Sustainability Minor
2019-2020**

Hours	Courses
3	SUST 1103 Fundamentals of Sustainability (SP)
3	SUST 2103 Applications of Sustainability (FA)
3	SUST 4103 Capstone Experience in Sustainability or substitute approved by UA Sustainability Curriculum Steering Committee

6	Tier 1 elective courses with sustainability focus
3	Tier 1 or 2 elective courses with sustainability focus Sustainability-focused electives selected from list in 4 thematic areas: Sustainability of Social Systems Sustainability of Natural Systems Sustainability of Built Systems Sustainability of Managed Systems

Tier 1

CSES 3214 Soil Resources & Nutrient Cycles	CSES 2203, BIOL 2013 Corequisite: Lab component
ENSC 3003 Introduction to Water Science	ENGL 1023 and ENSC 1003 or CHEM 1053 or higher or GEOL 1113 or higher or BIOL 1543
ENSC 3103 Plants & Environmental Restoration	CSES 1203 or HORT 2003 or BIOL 1613
ENSC 3223/3221L Ecosystem Assessment	BIOL 1543, CSES 2203, ENSC 3003 Corequisite: ENSC 3221L
ENSC 3263 Soil & Water Conservation	CSES 2203
ENSC 4023 Water Quality	CHEM 1123/1121L, Laboratory/Corequisite: Lab Component
ENSC 4263 Environmental Soil Science	Prerequisite: CSES 3214, PHYS 2013

Tier 2

CSES 2203/2201L Soil Science	CHEM 1103 or CHEM 1074 (Same as ENSC 2203)
ENSC 1003 Environmental Science	None

All courses must be passed with a grade of 'C' or better in order to fulfill these requirements. A full list of courses applicable for the Sustainability minor can be found at <http://sustainability.uark.edu/academics/minor/index.php>.

Degree Requirements

(Information adapted from the University of Arkansas Catalog of Studies website)

University Graduation Requirements

- 120 semester hours of credit
- 35 hours University Core Courses. See check sheet for specific courses required.
- 2.00 GPA ("C" average) on all work attempted at the University of Arkansas.
- ≤68 semester hours of lower-division transfer coursework (1000/2000 level).

Bumpers College Graduation Requirements

(Advising forms available at <http://bumperscollege.uark.edu/forms.exampleadvisingform.pdf>)

- 9 hours of Broadening electives (Bumpers College courses taken outside of ENSC).
- 36 hours of upper division course work (3000 level or above).
- 6 hours of Communications (COMM 1313 and CSES 3023 or AGED 3143).
- In addition to university and college requirements, students must meet other defined departmental requirements specific to each major and concentration. Bumpers College courses outside of the major may be included in departmental requirements.
 - Students who are exempt from ENGL 1013 and/or ENGL 1023 must enroll in 3-6 hours of English, Communications, Literature or Foreign Languages to fulfill requirements of English/ Communications.
- Residency - All students must have a minimum residence requirement of 36 weeks and 30 semester hours. The senior year must be completed in residence on campus unless a senior has already met the minimum residency requirement. This student will be permitted to earn not more than 12 of the last 30 hours in extension or correspondence courses or in residence at another accredited institution granting the baccalaureate degree. No more than six of these 12 hours may be correspondence courses.

Rules Applying to Course Work Used for Degree Credit

- No credit will be given for duplicate coursework.
- A maximum of 6 hours of internship and 6 hours of special problems may be counted for degree credit.
- General electives may be used to meet the requirements for a minor.
- A total of 6 hours of elective credits in activity courses (PE, band, chorus, judging teams, debate, drama, athletics, etc.) may be counted toward a degree. The maximum elective credits in any one activity that may be counted toward a degree are as follows:

Band and/or chorus	4 hours
Drama and/or debate	4 hours
Judging teams	4 hours
Physical education activities	4 hours
- Any course taken by correspondence, including Web-based courses, must be approved in advance in the AFLS dean's office if the credits earned in the course are to be applied toward a degree. This rule applies regardless of the school from which the course is taken.
- All transfer course work to be applied toward the degree must be an approved course listed in the transfer equivalency guide maintained by the Registrar's office. For courses not listed in the guide, petitions can be submitted to the Dean's office by the student's academic adviser.
- All study abroad courses must be approved in advance in the Dean's office if the credits earned in the courses are to be applied toward a degree.

Requirements to Graduate with Honors Designation and/or Honors Distinction

Honors Designation

Students who have demonstrated exceptional academic performance in baccalaureate degree programs will be recognized at graduation by the honors designation of *Cum Laude*, *Magna Cum Laude*, or *Summa Cum Laude*. To earn these, a student must meet the following criteria:

- At least one-half of the degree coursework must have been completed at the University of Arkansas, Fayetteville.
- Only the grade-point average on coursework completed at the University of Arkansas, Fayetteville, will be considered.
- Must successfully complete the Bumpers College Honors Program, which includes a minimum of 9-12 hours of honors course work, 3-6 hours of honors thesis, and a completed honors capstone research or creative project culminating in a written thesis documenting the project.
- For each of the three honors designations, the student must have the minimum grade-point average indicated.
Cum Laude: 3.50 to 3.74
Magna Cum Laude: 3.75 to 3.89
Summa Cum Laude: 3.90 to 4.00
- Students who do not participate in the AFLS Honors Program but earn the above grade-point averages will graduate “with distinction”, “with high distinction”, and “with highest distinction”, respectively.

The AFLS Honors Program

Mission Statement - The mission of the AFLS Honors Program is to provide undergraduate students with opportunities beyond the traditional undergraduate experience.

- Students who enter the University with a High School GPA of 3.5 and an ACT of 28 or who transfer in with a cumulative college GPA of 3.5 (< 62 credit hrs) are eligible to join the AFLS Honors Program and graduate with Honors Designation.

Benefits of the AFLS Honors Program

- Enhance opportunities for admission to graduate and professional schools
- Opportunity to work directly with faculty mentors on their research/creative projects culminating in their honors thesis
- Specialized honors courses
- Opportunity to receive stipends to support thesis projects and study abroad opportunities
- Opportunities to publish results and present findings at scientific or professional meetings
- Advanced course pre-enrollment
- Opportunity for special housing in the Honors Quarters
- Special recognition at the College commencement ceremony

For additional information and to apply for admission to the program visit the AFLS Honors Program website (<http://bumpershonors.uark.edu/index.php>).

AFLS Grading System

The Dale Bumpers College of Agricultural, Food and Life Sciences utilizes a plus/minus grading system that assigns numerical values to 12 different grades. These values are used for courses when grade-point averages are calculated. See Grades and Marks for the method of calculating grade-point averages. The 12-step grading system with assigned values is as follows:

	A4.00	A-.....3.67
B+.....3.33	B3.00	B-.....2.67
C+.....2.33	C2.00	C-.....1.67
D+.....1.33	D1.00	D-.....0.67
	F0.00	

Resources Available

There are many resources on campus available to assist students in overcoming personal obstacles and achieving success while at the University of Arkansas. While the goal is for students to take control of their college experience, departmental, college, and university personnel are here to provide guidance, offer advice, ask questions, make suggestions and recommendations, provide referrals, and above all, inform students of the many opportunities available to them. Students are encouraged to ask advisors about university resources and how to find them. Academic advisor contact information should be available in your Student Center in UA Connect. Students will also learn about many of those resources in their freshmen orientation course, UNIV 1001 University Perspectives.

If you would rather speak to someone outside the department, feel free to contact Vicky Watkins, Retention and Curriculum Coordinator, in the Bumpers College Dean's Office, at 479-575-2121, email watkinsv@uark.edu, or schedule an appointment with Ms. Watkins in UA Success.

University academic support resources are consolidated under the Center for Learning and Student Success (CLASS+) +Tutoring, +Writing Support, +Supplemental Instruction, +Academic Coaching, located at class.uark.edu, 479-575-2885, or you can visit the office in the lower level of Gregson Hall. The entrance to the CLASS+ office is on the south side of Gregson Hall, down the stairs behind the UA bus stop.

In addition, students can also receive assistance by contacting CAPs (Counseling and Psychological Services) at Pat Walker Health Center on the corner of Maple and Garland. Schedule an appointment by calling 479-575-5276. For additional information, visit the CAPs website at <http://health.uark.edu/counseling/index.php>.

Scholarships for Department of Crop, Soil, and Environmental Sciences

Scholarships available to CSES students are made possible by generous gifts from many firms and individuals. The criteria for these scholarships include academics, majors and minors, interests, financial need, and extracurricular activities. The Bumpers Scholarship Application (which is also the University of Arkansas universal application for current students) makes you eligible for many of these scholarships. There are some scholarships that require additional applications; these are listed under Special Applications. For the 2016-2017 academic year, approximately \$100,000 was awarded to deserving undergraduates. For additional information contact Dr. Kristofor Brye, CSES Scholarship Coordinator (kbrye@uark.edu; 479-575-5742). A link to the scholarship application that is due each year will be available through the college's scholarship web page

<http://bumperscollege.uark.edu/academics/scholarships-and-financial-aid/index.php>.

Check the college website for application due date (usually beginning of February).

College Level Undergraduate Scholarships

Acacia Corporation - All majors; all levels.

Adkins, Governor Homer - Agriculture major; Arkansas resident; departments make nominations.

Agriculture Beginning Scholars - AFLS incoming Fr; recruiting scholarships for 4-H record book winners; students have high ACT and high school GPA.

Agriculture General Scholarship (Foundation) - Any major; all levels; student in DBCAFLS.

Alexander, Robert and Marilyn Endowed - Any major; all levels. Recipients must demonstrate financial need, leadership abilities, and exemplify high standards of learning.

Anderson, T. C. and Ada - Any major; all levels. Recipients must demonstrate financial need, leadership abilities, and exemplify high standards of learning.

Bald Knob Ag Science - Prefer HORT majors but all considered; from Bald Knob or at least White County; incoming freshmen must have at least a 23 ACT; current students must have ≥ 3.0 cum GPA; financial need and extracurricular activities to be considered

Boy's 4-H House Alum - All majors; all levels; need & academics to be considered; prefer male students.

Brown, Gordon R. - Lonoke County Farm Bureau - All majors; So, Jr, Sr; Lonoke County resident.

CAFLS Alumni - All majors; Sr; >3.0 cum GPA; active in college & university extracurricular activities; financial need to be considered.

Carney, Mr. & Mrs. Cy - Agriculture major; Fr, So, Jr, Sr, transfer; Arkansas resident; show financial need.

Daughters of Demeter - All majors; Sr; Arkansas resident; >3.0 cum GPA; show need, active in extracurricular activities. Departments make nominations.

Davis, Eddie - All major; prefer So, Jr, Sr. (renewable)

Elliott, Lester (Ozark Arts & Crafts) - All majors; preference given to current/former members of 4-H.

Estelle, Luther & Edna - All majors; all levels; Arkansas resident or born in Arkansas; full-time student with a 2.5 cum GPA, incoming freshmen should be in top 25% of their class. (renewable)

Ewart, Dr. & Mrs. James B. - Incoming freshmen; 2 or more years of high school FFA; Arkansas resident; selection based on GPA, ACT, offices held. The recipient should attend state FFA convention in June to receive a certificate.

- Fleming, Joseph F.** - All majors; all levels.
- Gamma Sigma Delta** - All majors - based on academics; includes two GSD, one Lippert Ellis, and one John White awards.
- Lawson, Marvin & Bessie** - Non-traditional student; enrolled full time; overcoming significant obstacles to pursue education. Must demonstrate financial need, exhibit leadership skills, strong work ethic and a positive attitude. Scholarship Committee to solicit nominations from DBCAFLS faculty.
- Maloch, Lucille & Delton** - Preference to children of Cooperative Extension personnel; need & academics to be considered. Two scholarships: one in HESC and one to an Agri student; if not enough funds for 2 scholarships then awards will alternate.
- Parette, Billie E.** - All majors.
- Rust, John (Division of Agriculture)** - All majors; Fr, So, Jr, Sr, transfer. (renewable)
- Short, Romeo E. AR Farm Bureau** - All majors; So, Jr, Sr; 30 hr per academic yr; 3.0 cum GPA. College scholarship committee makes nominee list, this is sent to the Farm Bureau office, they rank them and we award from this information. (renewable)
- Stearns, Margaret** - Entering Fr; >28 ACT/1240 SAT and >3.5 HS GPA. Must show evidence of strong leadership qualities in high school, church and/or civic organizations. Preference to Arkansas residents. \$9000 Fellowship - Deadline April 15th
- Strang, E. E. & Roxie Sebastian County Farm Bureau** - All majors; So, Jr, Sr; Sebastian County; if all else is equal prefer a member of Farm Bureau. Nominee list is sent to Sebastian County Farm Bureau and they make the selection.
- Triangle Cooperative Service Company Scholarship** - All majors; Jr, Sr; agricultural cooperative background; >2.5 GPA. Triangle companies may recommend names from eligible applicants to DBCAFLS Scholarship Committee.

Departmental Level Undergraduate Scholarships

- Adair, C. Roy** - CSES major; Sr (must have completed 90 hours); upper fourth of their class; show financial need and possess leadership qualities.
- Anderson, Robert** - CSES major with PMGT, ENTO, or PLPA minor; Fr.
- Ark Crop Protection Assn** - CSES or HORT major or ENTO, PLPA, or PMGT minor; Jr, Sr; prefer Arkansas resident. Other considerations: GPA, financial need, leadership ability, extracurricular activities, interest in pesticides. Two scholarships (DeSalvo & Hansen) each year.
- Ark Plant Food Assn** - CSES major; Arkansas resident; 3.0 GPA; interest in plant food industry. Other considerations: leadership ability, financial need, extracurricular activities. The Woody Miley - APFA is for Jr/Sr and the Wayne Sabbe - APFA is for So, Jr, or Sr.
- Ark Seed Dealers Assn** - CSES major; Jr, Sr; 2.5 cum GPA; agricultural-related major; Arkansas resident; great financial need. (renewable with met criteria)
- Barrentine, Dr. James L. Endowed** - CSES major. First preference to Fr or transfer students from eastern AR. Second preference to Fr or transfer student in CSES. Third preference to So, Jr, or Sr in good academic standing with >2.50 cum GPA. Demonstrating community involvement. CSES Alumni and Friends Committee will make recommendations for scholarship recipients.
- Bartholomew, R. P. & Mildred E. Kline** - CSES major; financial need; >3.0 cum GPA.
- Beacher, R. L.** - CSES major. (Future Endowment)
- Boyer, Paul & Irma** - CSES major or ENTO, PLPA, or PMGT minor; incoming Fr; must earn >2.5 cum GPA to receive the second-semester award.

Caviness Endowment - CSES major; So, Jr, Sr; prefer interest in plant breeding; >3.0 cum GPA; active in college extracurricular activities.

Cullum, Sherman D. - CSES major; So, Jr, Sr. (renewable)

Delta Classic - CSES major; Fr; >2.75 GPA preference to >3.0. Preference is given to those from eastern AR. Other considerations: dedication to the chosen field, academic performance, financial need, & community involvement. The committee makes a selection with input from the CSES Student Enhancement Team.

Earle, Fontaine Richard - CSES major; Jr, Sr; crop science or plant chemistry interest.

Hicks, Harold & Iva - CSES, AEAB, or HESC majors or ENTO or PLPA minors.

Jenkins, Johnie N. - CSES major.

Offutt, M. Sam - CSES major; Fr; >24 ACT and high cum GPA.

Staplcotn - CSES, AEAB, or BAEG major or PMGT minor; 2.5 GPA; Arkansas resident; prefer cotton farm family; one scholarship per department. (renewable)

Stutte, Charles A. - CSES major; Jr, Sr; >3.0 GPA.

Wells, Bobby R. - CSES major; upperclassman; academic merit to be considered; one or more scholarships or fellowships each year depending on funds.

White River EPA Scholarship - Environmental Science; So, Jr, Sr.

York, Harvey & J. O. - CSES major; Jr; interest in plant breeding.

Undergraduate Scholarships Requiring Special Applications

AFLS - Division of Agriculture Land Grant - All majors; New Fr, or New Transfers. 3.25 high school GPA, transfer students must have >3.00 cum GPA. Deadline February 15th.

Arkansas Agricultural Consultants Association - CSES or HORT major or ENTO, PLPA, or PMGT minor; Jr or Sr; prefer Arkansas residents; >2.5 cum. GPA. Must complete a special application available on AFLS web-site.

Arkansas State Plant Board Intern Scholarship - Plant sciences majors or minors; Jr, Sr; >2.8 cum GPA, demonstrating leadership qualities. Must submit a DBCAFLS scholarship application, academic resume and one recommendation letter by Feb. 15th.

Hinkle, Dale & Wilhelmina - CSES major; Jr, Sr; interest in environmental science. Deadline March 15 to be awarded for the current year.

Jacobs, Clifford Bruce - CSES major; Fr or ACTA transfer student; 2.5 GPA; from DeWitt or Gillett high school (Arkansas County). (renewable)

Undergraduate and Graduate Study Abroad Scholarships

Locke, Richard International Agricultural Study Abroad - All majors - Study abroad programs. Students must make all arrangements for travel through the International Agricultural Global Studies Program which determines the recipient.

Sabbe, Wayne E. Endowed/International Agronomic Study Abroad - CSES grad or Jr or Sr. Preference to student with research emphasis in soil science. Student must follow CSES scholarship application procedures, must submit international studies program plan to CSES scholarship committee. Study abroad program cannot be in the home country. Deadlines October 15 for the following spring and February 15 for the following summer, fall, or year-long awards.

Other Scholarships to Consider Applying for

American Society of Agronomy - Several scholarships available to a variety of recipients. Information is available at: <https://www.agronomy.org/students/>

- Arkansas Alumni Association** - Several scholarships available to a variety of recipients. Information is available at <http://arkalum.org/scholarships/>
- Arkansas Association of Professional Soil Classifiers** - Deadline is usually October/November. <http://www.accessarkansas.org/soilclassifiers/index.htm>
- Arkansas Academic Challenge Scholarship** - Scholarship information is available at <http://www.adhe.edu>
- Arkansas Farm Bureau Scholarship** - Jr or Sr; Arkansas resident; enrolled in an Arkansas accredited college or university; actively pursuing an ag-related degree. Scholarship based on academic achievement, character, career plans, financial need and leadership potential. Must maintain a 2.5 GPA. Information is available at <http://www.arfb.com/programs/scholarship.asp>
- Arkansas Game and Fish Commission** - Arkansas high school Sr or Arkansas college undergraduate pursuing a career in the field of natural resources conservation with a 2.5 cumulative GPA (4.0 scale). Applicants must not have received a full scholarship from another source. Information is available at: <http://www.agfc.com/education-class/programs/conservation-scholarship-program.aspx>
- Arkansas Society of Professional Sanitarians** - So; Arkansas resident; enrolled in an environmental field. Deadline usually in March or April. Information is available at <http://www.arkansassanitarians.org/scholarship.php>
- Arkansas Environmental Federation Randall Mathis Scholarship for Environmental Studies and Larry Wilson Scholarship for Environmental Studies** - Deadline is usually January. Information is available at <http://www.environmentark.org/scholarships.html>
- Garden Club of America** - Numerous scholarships available with deadlines ranging from November through February. Information is available at <http://gcamerica.org/scholarships.php3>
- Mark and Theresa Gentry Land and Water Scholarship** - Undergraduate and graduate students of the University of Arkansas, Fayetteville, who are studying land and water resources management, or related areas. Application forms are available at the Arkansas Water Resources Center, 112 Ozark Hall, University of Arkansas, Fayetteville, Arkansas, 72701, (479) 575-5867, by e-mailing awrc@uark.edu. Deadline is typically February. Information is available at <http://www.uark.edu/depts/awrc/scholarships.html>
- Razorback Chapter Soil and Water Conservation Scholarship (NRCS)** - Contact: brent.clark@ar.usda.gov
- Soil and Water Conservation Scholarships** - Deadline is typically February. Additional information available at http://www.swcs.org/en/members_only/scholarships/
- University of Arkansas University-Wide Scholarship** - UA students from any academic discipline. Must have completed at least one fall semester. High level of academic achievement coupled with leadership qualities, financial need, or have achieved academic success despite significant adversity. Deadline is typically February. Information is available at <http://scholarships.uark.edu/index.php/csschl/default>
- Nonresident Tuition Award** - Out-of-state tuition differential for students from TX, MS, LA, KS, MO, OK, TN.

Internship Opportunities in Crop, Soil, and Environmental Science (CSES 462V)

The internship program is based upon the principle that what students learn in the workplace can be a valuable supplement to what they learn in the classroom. By combining work and study, students gain greater insight into each and may be better prepared for employment in their chosen careers. The CSES internship is designed to fit needs of the individual student, but, for full credit, the student must meet minimal requirements listed below and the internship must have a substantive academic component to it beyond simply going to work for someone. In cooperation with an employer, the course will be supervised by an internship committee made up of three instructors from the CSES faculty representing Crop Science, Environmental, Soil, and Water Science, and Weed Science.

Requirements for academic credit:

1. Learning objectives for an internship project will be initially agreed upon by a CSES internship committee, an employer (sponsor), and the student. A written pre-proposal is required to initiate the internship and must be approved by the committee prior to the conclusion of the spring semester if it is going to be a summer internship, and prior to each subsequent semester if it is going to be a fall or spring internship. An outline of what the pre-proposal should include and an example of a well-prepared pre-proposal are listed below. *Only after the pre-proposal has been approved by the committee* will the student be enrolled in CSES 462V. If it is anticipated that the student will not complete all of the requirements prior to the end of a term (Spring/Fall/Summer), the student may postpone enrolling in the internship course until the following term.
2. After the project is approved by the internship committee, the student will work directly with one instructor who is a member of the internship committee. The student must prepare and submit a full proposal to the instructor for review and approval by the internship committee. The student should work with the instructor to develop an appropriate format for the proposal, particularly if the academic component of the internship is something other than a mini-research project. An outline to follow for the proposal format is described below along with an example of a well-prepared proposal.
3. Upon completion of the internship employment, the student must submit a final written report to the instructor. This report will be distributed to the internship committee for review and evaluation. The final report should follow a similar format as the internship proposal. An example of a well-prepared final report is included below.
4. In addition to the final written report, the student will make an oral presentation which summarizes his/her internship to the CSES Colloquium class, CSES Seminar, the internship committee, or another appropriate audience to be decided upon by the committee and the student.

5. The internship committee will evaluate the student's performance and determine the letter grade for the course based upon fulfillment of all requirements. The semester credit hours available for internship will be a minimum of 1 to a maximum of 3 hours.
6. For summer internships, student will be required to enroll in CSES 462V for 1 credit hour for the summer semester, where the only requirement for the summer semester will be preparation and submission of the internship proposal. Students will then enroll in 1 to 2 credit hours for the fall semester so that the final written report and oral presentation can be completed before the fall semester ends. This same split-credit enrollment will be applied to fall and spring semester internships as needed.

Enrollment in the internship course (CSES 462V) is by instructor's consent only. Therefore, any student wishing to enroll in the internship class must contact one of the internship committee members listed below for a copy of all current requirements and approval to enroll.

Internship Committee

Crop Management: Dr. Larry C. Purcell
Alzheimer Laboratory
Phone: 575-3983
Email: lpurcell@uark.edu

Weed Science: Dr. Jason K. Norsworthy
Alzheimer Laboratory
Phone: 575-8740
Email: jnorswor@uark.edu

Environmental, Soil, and Water Science: Dr. Kristofor R. Brye
123 AGRI Building
Phone: 575-5742
Email: kbrye@uark.edu

Study Abroad Opportunities

The International Programs are specifically tailored to meet the individual needs of each student (<http://bumperscollege.uark.edu/internationalprograms/index.php>). Programs include internships, semester or year abroad study, and faculty-led study tours (see page 25 for study tour led by CSES faculty). Students have participated in a variety of programs.

Internships

Lengths of internships vary but usually involve six to twelve weeks. These may be prearranged independent studies or working internships directed by faculty at the University of Arkansas in cooperation with a university or agency.

Semester

Longer programs are designed to give students a full semester of study abroad in their field of interest and in the country of choice. Students enroll for UA study abroad credit, and the courses transfer to the University of Arkansas. Planning in advance with their advisor allows students to build a strong academic transcript.

Year

This option is essentially the same as the semester option, in which courses taken abroad may be transferred back to the University of Arkansas. Special planning is required so that all credit hours earned abroad are transferable to the student's degree program.

Study Visits and Tours

Individualized and group study visits for two to four weeks are sometimes arranged for one student or a group of students, coordinated by various faculty. Specific student responsibilities are planned in advance with the University of Arkansas faculty advisor to complement the student's field of study and to earn academic credit.

Student Study Lounge

Located in Plant Science 113 for use by students in the Department of Crop, Soil, and Environmental Sciences; computer and printer access as well as an area for small groups to meet.

Employment Opportunities

Students in the CSES Department are encouraged to fill out an employment application in the CSES main office (Plant Science 115). These applications are kept on file for faculty and staff to review when they are looking for student workers.

Undergraduate Activities within the CSES Department

CSES Undergraduate Club

All undergraduate students in the department are encouraged to participate in the CSES Undergraduate Club. The group meets at least once per month but often schedules extra activities when members have special requests. Club members enjoy academic, social, and service-oriented opportunities to interact with fellow students. Past club activities have included: guest speakers, canoe trips, assisting in the cleanup and design of a local wetland/park, working with middle school children in a school garden and designing QR codes with background information for the garden. For more information, contact a club officer or advisor.

CSES Club Officers 2019-2020

President – Jordan Vansandt

Vice-President – Stormy Concoby

Secretary – Ashley Smith

Treasurer – Connor Pearson

CSES Club Advisors

Dr. Mary Savin (Office: AGRI 105B; Phone: 479-575-5740; msavin@uark.edu)

Dr. Lisa Wood (Office: AGRI 105A; Phone: 479-575-5739; lswood@uark.edu)

CSES Soil Judging Team

Each fall semester, members of the CSES Soil Judging Team meet once per week to practice for the regional soil judging competition held in October. No previous experience is necessary and you can enroll in the CSES 355v Soil Profile Description course for 1-hour credit. For more information, contact Dr. Kristofor Brye (kbrye@uark.edu; 479-575-5742).

CSES Personnel of Interest and Department Committees

Office Personnel (Plant Science 115)

Ms. Daniela Kidd (575-2354; drkidd@uark.edu)

Ms. Ramisa Fairouz (575-5716); rfairouz@uark.edu)

Mr. Scott Mattke (575-2749; smattke@uark.edu)

Faculty Committees of Interest

Assessment Committee - Dr. Mary Savin (575-5740; msavin@uark.edu)

Awards Committee – Dr. Jason Norsworthy (575-8740; tlrobert@uark.edu)

Curriculum Committee - Dr. Mary Savin (575-5740; msavin@uark.edu)

(CSES Undergraduate Club President is a committee member.)

Honors Committee - Dr. Lisa Wood (575-8671; lswood@uark.edu)

Recruitment Committee - Ms. Holly Yeatman (575-5726; hyeatman@uark.edu)

Undergraduate Committee - Dr. Lisa Wood (575-8671; lswood@uark.edu)

Undergraduate Recruiter

Ms. Holly Yeatman (Office: PTSC 120; Phone: 479-575-5726; hyeatman@uark.edu)

Undergraduate Courses in AFLS (AFLS)

AFLS 401V-3, AFLS 401VH-3, and AFLS 501V-3 Experiential Learning in Indian Agriculture (Jan intersession) Faculty-led study tour in northern India to help students develop a global perspective and cultural understanding, specifically of Indian agriculture and its challenges.

Instructors: Vibha Srivastava and Mary Savin

Undergraduate Courses in Environmental Science (ENSC)

ENSC 1001L Environmental Science Laboratory (Fa, Sp) Laboratory, field trip, and discussion sessions covering the concepts and information allowing students to critically evaluate environmental issues. Topics will include laboratory safety, recycling, composting, geographic information systems, soil testing, water quality, hazardous wastes, waste disposal, wetlands, wastewater treatment, and sustainable food systems. Laboratory 2 hours/week. Prerequisite or Corequisite: ENSC 1003.

Instructor: Lisa Wood

ENSC 1003 Environmental Science (Fa, Sp) Series of lectures and discussions introducing the topic of environmental science including factors related to water, soil, and air quality. (Natural science university core course with laboratory)

Instructor: Lisa Wood

ENSC 3003 Introduction to Water Science (Sp) Properties, occurrence, and description of the types, functions, quality and quantity, potential contaminants, uses and guiding policies and regulations of the various water resources in the environment. Prerequisite: ENSC 1003 or CHEM 1053 or higher or GEOL 1113 or higher or BIOL 1543.

Instructor: Kristofor Brye

ENSC 3103 Plants and Environmental Restoration (Fa) Selection, establishment, and use of plants to promote soil stabilization, water quality, and wildlife habitat. Principles and practices of managing plants for soil remediation, nutrient and sediment trapping, and restoration of plant communities. Service Learning course

Prerequisite: CSES 1203 or HORT 2003 or BIOL 1613.

Instructor: Lisa Wood

ENSC 3221L Ecosystems Assessment Laboratory (Even years, Fa) The purpose of this laboratory is to complement concepts learned in lecture by carrying out experiments that familiarize students with methods used in soil and aquatic ecology. Students will collect samples, analyze and interpret data obtained from soil and water samples. The lab will meet once per week for 3 hours. Corequisite: ENSC 3223.

Instructor: Mary Savin

ENSC 3223 Ecosystems Assessment (Even years, Fa) Applications of the basic ecological principles of organisms, populations, communities, and ecosystems to gain an appreciation for how large-scale patterns in terrestrial and aquatic ecosystems are influenced by small-scale interactions among individuals (microorganisms to invertebrate macrofauna) and between individuals and their local environment. Lecture 3 hours per week. Corequisite: ENSC 3221L. Prerequisite: BIOL 1543.

Instructor: Mary Savin

ENSC 3263 Soil and Water Conservation (Even years, Fa) Effect of land use on water quality. Major sources of agricultural nonpoint pollutants. Best management practices used to minimize water quality impacts. Prerequisite: CSES 2203.

Instructor: Kristofor Brye

ENSC 3413 Principles of Environmental Economics (Sp) An introductory, issues-oriented course in the economics of the environment. What is involved in society making decisions about environmental quality will be studied. Environmental issues important to the State of Arkansas and the United States will be emphasized. Prerequisite: AGEC 1103 or ECON 2023. (Same as AGEC 3413)
Instructor: Jennie Popp

ENSC 3603 GIS for Environmental Science (Odd Years, Sp) Provide instruction on the uses of GIS techniques in solving practical environmental and agricultural land use problems. Areas include: 1) an introduction to spatial variability in soils with an emphasis on the application of GIS techniques to map and understand spatial parameters important to different land uses, and 2) development of individual experience in the use of GIS in solving environmental and agricultural problems using an oral and written term project. Prerequisite: CSES 2203.
Instructor: Vaughn Skinner

ENSC 3933 Environmental Ethics (Odd years, Sp) The course addresses ethical questions about nature and the natural environment. Topics of discussion include anthropocentric and biocentric ethics, population control, obligations to future generations, animal rights, moral considerability, Leopold's land ethic, deep ecology, and ecofeminism. Lecture/discussions 3 hours/week. Prerequisite: ENSC 1003 or PHIL 2003 or PHIL 2103.
Instructor: David Miller

ENSC 400V Special Problems (Sp, Su, Fa) (1-3) Work on special problems in environmental science or related fields. May be repeated for up to 6 hours of degree credit.
Instructor: Faculty

ENSC 4021L Water Quality Laboratory (Fa) Field and laboratory experience in physical, chemical, and biological characteristics of natural waters (rain, river, lake, soil, ground, etc.). Laboratory experiments in water sampling, measurement of water quality parameters such as pH, alkalinity, and acidity, redox, hardness, BOD, TSS, etc., and instrumentation. Prerequisite or Corequisite: ENSC 4023.
Instructor: Faculty

ENSC 4023 Water Quality (Fa) Physical, chemical, and biological characteristics of natural waters (rain, river, lake, soil, ground, etc.). Discussion of water quality parameters such as pH, alkalinity and acidity, redox, hardness, BOD, TSS, etc. Aquatic processes of pollutants and principles of modeling. Laboratory experiments in water sampling, measurement of water quality parameters, and instrumentation. Prerequisite: CHEM 1123 and CHEM 1121L.
Instructor: Faculty

ENSC 4034 Analysis of Environmental Contaminants (Even years, Sp) Methods of analysis for inorganic and organic contaminants, radionuclides and microorganisms in soil and water. Quality assurance and quality control, sampling protocols, sample handling, instrumentation, and data analysis. Lecture 2 hours and laboratory 4 hours per week. Corequisite: Lab component. Prerequisite: CHEM 2613/2611L or CHEM 3603/3601L.
Instructor: Mary Savin

ENSC 404V Special Topics (Irregular) (1-3) Studies of selected topics in environmental sciences not available in other courses. May be repeated for up to 12 hours of degree credit.
Instructor: Faculty

ENSC 4263 Environmental Soil Science (Even years, Sp) Study of the behavior of pesticides, toxic organic compounds, metals, nutrients, and pathogenic microorganisms in the soil/plant/water continuum. Lecture 3 hours per week. Prerequisite: CSES 3214.
Instructor: Lisa Wood

ENSC 4401 Professional Certification Preparation (Sp) Concepts and skills already learned in other soil and environmental science and related courses are reinforced with the opportunity to prepare to take a national certification examination. If so chosen, students may pursue certification as soil or environmental science professionals. Prerequisite: Senior standing.

Instructor: Mary Savin

Undergraduate Courses in Crop, Soil, and Environmental Sciences (CSES)

CSES 1203 Introduction to Plant Sciences (Sp, Fa) An introduction to basics of agricultural crop plant structure, growth, and production. (Same as HORT 1203)

Instructor: TBD

CSES 2013 Pest Management (Sp) Introduction to basic principles of pest management as they relate to vertebrate animals, insects, plant disease and weeds. Selected pests are studied with an emphasis on current management approaches and alternative pest control. *Instructor: Team taught*

CSES 2101L Crop Science Laboratory (Sp) 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.

Instructor: TBD

CSES 2103 Crop Science (Sp) 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.

Instructor: TBD

CSES 2201L Soil Science Laboratory (Fa, Sp) 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.

Instructor: Dave Miller

CSES 2203 Soil Science (Fa, Sp) Origin, classification, and physical, chemical, and biological properties of soils. Lecture 3 hours, discussion 1 hour per week. Corequisite: Drill component. Prerequisite: CHEM 1103 or CHEM 1074.

Instructor: Dave Miller

CSES 3023 Crop, Soil, and Environmental Sciences Colloquium (Fa) 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. Colloquium workshop: 3 hours per week. Prerequisite: Junior or Senior standing only.

Instructor: Mary Savin

CSES 3113 Forage Management (Irregular) Forage crops for pasture, hay, and silage with reference to growth and development, production, nutritional quality, and grazing systems. Lecture 3 hours per week. Prerequisite: CSES 1203 or CSES 2103 or HORT 1203.

Instructor: TBD

CSES 3214 Soil Resources and Nutrient Cycles (Odd years, Sp) 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. Corequisite: Lab component. Prerequisite: CSES 2203/2011L, BIOL 2013/2011L.

Instructor: Mary Savin

CSES 3312 Cotton Production (Even years, Fa) Principles and techniques associated with the production of cotton. Recitation 2 hours per week. Prerequisite: CSES 1203 or CSES 2103 or HORT 1203.
Instructor: Faculty

CSES 3322 Soybean Production (Odd years, Sp) 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 or HORT 1203.
Instructor: Larry Purcell

CSES 3332 Rice Production (Odd years, Fa) 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 or HORT 1203.
Instructor: Rick Norman

CSES 3342 Cereal Grain Production (Even years, Sp) An overview of the botany, production, cultural practices, soil & climatic adaptation and utilization of the major cereal grains. Prerequisite: CSES 1203 or CSES 2103 or HORT 1203.
Instructor: Esten Mason

CSES 355V Soil Profile Description (Fa) (1-2) Training for soil profile description writing and membership of judging teams. May be repeated for up to 2 hours of degree credit.
Instructor: Kristofor Brye

CSES 3603 Metrics for Sustainable Agriculture (Fa) 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 the 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.
Instructor: Marty Matlock

CSES 400V Special Problems (Sp, Su, Fa) (1-6) Work on special problems in crop, soil, and environmental sciences or related field. May be repeated for up to 6 hours of degree credit.
Instructor: Faculty

CSES 4013 Advanced Crop Science (Fa) Fundamental concepts of crop physiology, crop improvement, seed science, and crop production systems. Recitation 3 hours per week. Prerequisite: CSES 2103.
Instructor: Team taught

CSES 402V Special Topics (Irregular) (1-3) 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.
Instructor: Faculty

CSES 4103 Plant Breeding (Even years, Fa) 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.
Instructor: Esten Mason

CSES 4133 Ecology and Morphology of Weedy and Invasive Species (Fa) 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, the 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). *Instructor: Nilda Burgos*

CSES 4143 Principles of Weed Control (Sp) 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 and CSES 2003. *Instructor: Jason Norsworthy*

CSES 4224 Soil Fertility (Fa) 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. Corequisite: Lab component. Prerequisite: CSES 2201L and CSES 2203 and CHEM 1123/1121L or CHEM 1073/1071L and CHEM 2613/2611L. *Instructor: Trent Roberts*

CSES 4253 Soil Classification and Genesis (Odd years, Fa) 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 2203/2201L. *Instructor: Kristofor Brye*

CSES 4303 Bioenergy Feedstock Production (Sp) 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. Prerequisites MATH1203 and BIOL1543 or CSES1203. Courses in introductory chemistry or soil science are preferred. On-line *Instructor: TBD*

CSES 4553 Wetland Soils (Odd years, Sp) Focus on wetlands and wetland soils from a jurisdictional rather than ecological standpoint. Topics include wetland hydrology, hydric soil determination, and principles of wetland identification and delineation. Field emphasis meets 3 hours once per week (Pre-requisites: CSES 2203/2201L). *Instructor: Lisa Wood*

CSES 462V Internship (Sp, Su, Fa) (1-6 hrs credit) Supervised practical work experience in crop management 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: junior standing. May be repeated for up to 6 hours of degree credit. *Instructors: Kris Brye, Jason Norsworthy, and Larry Purcell*

Teaching Faculty in the Department of Crop, Soil, and Environmental Sciences

Kristofor Brye (Office: AGRI 123; Phone: 479-575-5742; kbrye@uark.edu)

Professor of Applied Soil Physics and Pedology (Ph.D. University of Wisconsin, Madison)
Teaches: CSES 355V Soil Profile Description (Fa) (1-2 hrs credit); CSES 2203 Soil Science (Sp); CSES 4253 Soil Classification and Genesis (Fa, odd); CSES 462V Internship (Sp, Su, Fa) (1-6 hrs credit); ENSC 3003 Introduction to Water Science (Sp); ENSC 3263 Soil and Water Conservation (Fa, even)

Nilda R. Burgos (Office: ALTH 222; Phone: 479-575-3984; nburgos@uark.edu)

Professor of Weed Science (Ph.D. University of Arkansas)
Teaches: CSES 4133 Ecology and Morphology of Weedy and Invasive Plant Species (Fa)

R. Esten Mason (Office: PTSC 122; Phone: 479-575-5725; esten@uark.edu)

Associate Professor of Crop Science (Ph.D. Texas A&M University)
Teaches: CSES 3342 Cereal Grains Production (Even years, Sp); CSES 4103 Plant Breeding (Even years, Fa)

David M. Miller (Office: AGRI 106; Phone: 479-575-5747; dmmiller@uark.edu)

Professor of Soil Chemistry (Ph.D. University of Georgia)
Teaches: CSES 2203 Soil Science (Fa); CSES 2201L Soil Science Laboratory (Fa); ENSC 3933 Environmental Ethics (Odd years, Sp)

Mozzoni, Leandro (Office: PTSC 102; Phone: 479-575-7564; lmozzon@uark.edu)

Associate Professor (Ph.D. University of Arkansas) Crop, Soil & Environmental Science with emphasis in soybean breeding and genetics.

Richard J. Norman (Office: AGRI 105; Phone: 479-575-5738; rnorman@uark.edu)

Professor of Soil Fertility (Ph.D. University of Illinois)
Teaches: CSES 3332 Rice Production (Odd years, Fa)

Jason Norsworthy (Office: ALTH 302; Phone: 479-575- 8740; jnorswor@uark.edu)

Professor of Weed Science (Ph.D. University of Arkansas)
Teaches: CSES 2013 Pest Management (Sp); CSES 4143 Principles of Weed Control (Sp); CSES 462V Internship (Sp, Su, Fa) (1-6 hrs credit)

Andy Pereira (Office: PTSC 112; Phone: 479-575-8435; apereira@uark.edu)

Professor, Anheuser-Busch and Arkansas Wholesalers Professorship in Plant Molecular Genetics (Ph.D. Iowa State University, Plant Molecular Genetics)
Teaches: CSES 5543 Genomics (Even Years, Sp)

Larry C. Purcell (Office: ALTH 302; Phone: 479-575-3983; lpurcell@uark.edu)

Distinguished Professor and Alzheimer Chair for Soybean Research (Ph.D. University of Florida)
Teaches: CSES 3322 Soybean Production (Odd years, Sp); CSES 462V Internship (Sp, Su, Fa) (1-6 hrs credit)

Trenton Roberts (Office: ALTH; Phone: 479-575-6752; tlobert@uark.edu)
Associate Professor (Ph.D. University of Arkansas, Soil Fertility) Teaches:
CSES 4224 Soil Fertility (Fa)

Mary Savin (Office: AGRI 105B; Phone: 479-575-5740; msavin@uark.edu)
Professor of Soil Biology and Microbial Ecology (Ph.D. University of Rhode Island)
Teaches: AFLS 401V-3, AFLS 401VH-3, and AFLS 501V-3 Experiential Learning in Indian
Agriculture (Jan intersession); CSES 3023 Crop, Soil, and Environmental Sciences
Colloquium (Fa); CSES 3214 Soil Resources and Nutrient Cycles with Laboratory (Odd
years, Sp); ENSC 3223/3221L Ecosystems Assessment with Laboratory (Even years, Fa);
ENSC 4034 Analysis of Environmental Contaminants with Laboratory (Even years, Sp);
ENSC 4401 Preparation for Professional Certification (Sp)

Vaughn Skinner (Office: Farm; Phone: 479-575-5479; jskinner@uark.edu)
Resident Director, Agricultural Research & Extension Center (M.S. University of Arkansas)
Teaches: ENSC 3603 GIS for Environmental Science (Odd Years, Sp)

Vibha Srivastava (Office: PTSC 109; Phone: 479-575-4872; vibhas@uark.edu)
Professor of Plant Tissue Culture and Transformation (Ph.D. Jawaharlal Nehru University,
New Delhi)
Teaches: AFLS 401V-3, AFLS 401VH-3, and AFLS 501V-3 Experiential Learning in Indian
Agriculture (Jan intersession)
Crop Biotechnology minor advisor

Willett, Cammy ((Office: ALTH 214; Phone 479-575-3982; willettc@uark.edu)
Assistant Professor (Ph.D. University of Missouri, Soil Science)
Teaches CSES 504V Pesticides in the Soil Environment, CSES 5214 Analytical Research
Techniques in Agronomy

Wood, Lisa (Office: AGRI 105A; Phone 479-575-5739; lswood@uark.edu)
Clinical Assistant Professor (Ph.D. University of Arkansas, Fayetteville, Curriculum and
Instruction)
Teaches: ENSC 1003, Environmental Science, ENSC 3103, Plants and Environmental
Restoration, ENSC 4263, Environmental Soil Science, ENSC 4553, Wetland Soils, CSES 5103,
Scientific Presentations, UNIV 1001, University Perspectives

Organizational Chart of the CPSC Student

University of Arkansas System
President Donald Bobbitt

University of Arkansas Fayetteville
Chancellor Joseph Steinmetz

Dale Bumpers
College of Agricultural, Food and Life Sciences
Dean Deacue Fields

Dept. of Crop, Soil, and Environmental Sciences
Department Head Robert Bacon

Major
Crop Science

Minors:

Crop Biotechnology
Natural Resources Mgmt.
Pest Management
Soil Science
Agricultural Business
Sustainability & Others