Table of Contents

Letter from Crop, Soil, and Environmental Sciences Department Head ........................................... 1
Letter from President of CSES Undergraduate Club ........................................................................... 2
The Department of Crop, Soil, and Environmental Sciences .......................................................... 3
The Environmental, Soil, and Water Science Major ........................................................................... 3
Minor Fields for Environmental, Soil, and Water Science Majors ................................................. 4
Checksheets
   Environmental, Soil, and Water Science Major Checksheet ......................................................... 5
   Wildlife Habitat Minor Checksheet ................................................................................................. 6
   Pest Management Minor Checksheet ............................................................................................. 7
   Crop Biotechnology Minor Checksheet .......................................................................................... 8
   Crop Management Minor Checksheet ........................................................................................... 9
Degree Requirements
   University Requirements .................................................................................................................. 10
   College Requirements .................................................................................................................... 10
   Rules Applying to Course Work Used for Degree Credit .............................................................. 10
   Requirements to Graduate with Honors
      Honors Designation .................................................................................................................... 11
      Honors Distinction ....................................................................................................................... 11
      The AFLS Honors Program ......................................................................................................... 11
   AFLS Grading System .................................................................................................................... 12
Resources Available
   Academic Enhancement Program ..................................................................................................... 12
   Peer Mentoring Program ................................................................................................................ 12
   Scholarships for CSES Students .................................................................................................... 13
   Internship Opportunities ............................................................................................................... 17
   Study Abroad Opportunities ......................................................................................................... 18
   Student Study Lounge .................................................................................................................... 18
   Employment Opportunities ........................................................................................................... 18
   Undergraduate Activities within the CSES Department .............................................................. 19
   CSES Personnel of Interest and Department Committees .......................................................... 19
   Undergraduate Courses
      ENSC ................................................................................................................................. 20
      CSES ................................................................................................................................. 21
   Teaching Faculty in CSES ........................................................................................................... 25
Dear Environmental, Soil, and Water 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 allow 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 them informed of your progress and challenges so that they may be of help to you. The academic assistance they can provide you is limited only by the effort you put in to keeping them 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 forwarding 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 their 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 Science! 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 to. On average, our club meets once a month and you will see signs posted to announce these meetings. These signs are displayed on the first floors of both the Agriculture and Plant Science Buildings. 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 presentation, oral presentation, and/or paper competitions.

In addition, we often schedule additional activities at the request of our members. We have sponsored canoe trips, picnics, camping trips, and other group outings. But we also do our best to give back to our community. As such we have worked with the City of Fayetteville to help remove invasive plant species from a local park and plant native species in their place and participated in several maintenance efforts for local hiking trails.

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 19), or come to one of our meetings.

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

Sincerely,

Christopher Cotton
President, CSES Undergraduate Club
The 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 our 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.

Majors, Minors, and Careers

Within the Crop, Soil, and Environmental Sciences Department students can major in two degree programs, Environmental, Soil, and Water Science and Crop Management. The degree check sheet for the Environmental, Soil, and Water Science major is given on page 5. The major provides students with basic and applied courses that allow our graduates to be highly competitive in the job market.

The Environmental, Soil, and Water Science Major

Why is Environmental, Soil, and Water Science important?
- Growing awareness of environmental issues
- Public demands for clean air and water, and a healthy food supply
- Conservation of natural resources

Who should be interested?
The Environmental, Soil, and Water major is for students interested in issues such as water quality, proper use of soils, land application of wastes, proper use of fertilizers, fate of pesticides in soil and water, remediation of contaminated soils and waters, and wetlands. The major provides a strong science background, as well as a practical education.

Career Opportunities
Students who graduate in Environmental, Soil, and Water Science can work in such areas as:

Local, State, or Federal Governmental Agencies
- Arkansas Soil and Water Conservation Commission
- Arkansas Department of Environmental Quality
- Arkansas Department of Health
- Cooperative Extension Service
- Environmental Protection Agency (EPA)
- United State Department of Agriculture (USDA)
- Natural Resource Conservation Service (NRCS)
- Forest Service (FS)
- Fish and Wildlife Service
Private Sector
- Environmental consulting
- Land-use planning
- Waste management
- Industry

Academia/Research
- Many students go on to Graduate School to further their education
- Research Technician

Certification Possibilities - Coursework prepares students to take the Certified Professional Soil Science exam or the Environmental Professional certification exam. Preparation courses for the certification exams are offered as Special Topics (ENSC 404v).

Minor Fields for Environmental, Soil, and Water Science Majors
Students majoring in Environmental, Soil, and Water Science are encouraged to select a minor in an area of interest utilizing your elective hours. Other minors offered by the CSES Department are Wildlife Habitat, Pest Management, Crop Biotechnology, and Crop Management. Checksheets for these CSES minors are given starting on page 6. If a minor is selected, students must declare the minor 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; Extension and Industry Education; Food Science; Global Agricultural, Food and Life Sciences; Horticultural Production; Journalism; Landscape Design and Urban Horticulture; Pest Management; Plant Pathology; and Turf Management.

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

Environmental, Soil, and Water Science Major (ESWS)

2009 - 2010

**DEPARTMENTAL REQUIREMENTS (28-31 hrs)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSES 1101</td>
<td>Introduction to CSES (FA, must have &lt; 24 credits)</td>
</tr>
<tr>
<td>CSES 2200</td>
<td>Soil Science (FA, CEMS 1103 or CHEM 1074)</td>
</tr>
<tr>
<td>CSES 2210L</td>
<td>Soil Science Lab (FA, co-req CSES/ENSC 2203)</td>
</tr>
<tr>
<td>ENSC 1003</td>
<td>Environmental Science (FA)</td>
</tr>
<tr>
<td>ENSC 3003</td>
<td>Introduction to Water Science (FA, ENSC 1003 or other science (see syllabus) and ENGL 1023)</td>
</tr>
</tbody>
</table>

Select 2nd SOIL SCIENCE core (3-4 hrs)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSES 3214</td>
<td>Soil Resources w/ Lab Component (SP, odd, CSES 2203)</td>
</tr>
<tr>
<td>CSES 4224</td>
<td>Soil Fertility w/ Lab Component (FA, CSES 2203)</td>
</tr>
<tr>
<td>CSES 4253</td>
<td>Soil Classification &amp; Genesis w/ Lab Component (SP, CSES 2203)</td>
</tr>
<tr>
<td>CSES/ENSC 4263</td>
<td>Env. Soil Science (SP, even, CSES 3214)</td>
</tr>
</tbody>
</table>

Select 2nd WATER SCIENCE core (3-4 hrs)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSES/ENSC 4203</td>
<td>Water Quality w/ Lab Component (FA, ENSC 3003)</td>
</tr>
<tr>
<td>GEOG 3333</td>
<td>Oceanography (SP, junior standing)</td>
</tr>
<tr>
<td>GEOL 4033</td>
<td>Hydrogeology w/ Lab Component (SP, MATH 2564, GEOL 3513/3511)</td>
</tr>
<tr>
<td>BIOL 4514</td>
<td>Limnology w/ Lab Component (FA, odd, CHEM 1123, 12 hrs BIOL)</td>
</tr>
</tbody>
</table>

**NATURAL RESOURCES CORE**

*Select 12 credit hours from at least 2 of the following 3 groups*

**METHODS/TECHNIQUES IN ENVIRONMENTAL SCIENCE**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSES 355V</td>
<td>Soil Profile Descriptions (FA, 1 credit, may take twice)</td>
</tr>
<tr>
<td>CSES/ENSC 4603</td>
<td>Precision Ag. (FA, odd, MATH 1213, stats, computer)</td>
</tr>
<tr>
<td>AGME 3153</td>
<td>Surveying in Agriculture and Forestry (FA)</td>
</tr>
<tr>
<td>ENSC 3503</td>
<td>GIS for Environmental Science (SP, odd, CSES 2203)</td>
</tr>
<tr>
<td>ENSC 4034</td>
<td>Analysis of Environmental Contaminants w/ Lab Component (SP, even, CSES 2203, ENSC 3003)</td>
</tr>
</tbody>
</table>

**ENVIRONMENT & SOCIETY**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGEC 3413</td>
<td>Principles of Environmental Economics (SP, AGEC 1103 or ECON 2003)</td>
</tr>
<tr>
<td>AGEC 3503</td>
<td>Agricultural Law (SP)</td>
</tr>
<tr>
<td>ENSC 3503</td>
<td>Environmental Ethics (SP, odd, ENSC 1003 or PHIL 3003)</td>
</tr>
<tr>
<td>RSOC/ENSC 4603</td>
<td>Environmental Sociology (SP)</td>
</tr>
</tbody>
</table>

**ENVIRONMENTAL MANAGEMENT**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSES 2103</td>
<td>Pest Management (SP)</td>
</tr>
<tr>
<td>ENSC 3103</td>
<td>Plants &amp; Environmental Restoration (FA odd, CSES 1203 or HORT 2003)</td>
</tr>
<tr>
<td>ENSC 3293</td>
<td>Env. Soil &amp; Water Conservation w/ Lab Component (SP, CSES 2203)</td>
</tr>
</tbody>
</table>

**GENERAL ELECTIVES (18-24 hrs)**

*Approved upper division elective courses from the following areas:

- Mathematics
- Chemistry
- Physics
- Economics
- Natural Sciences
- Computer Science
- Social Sciences

**OTHER REQUIREMENTS FOR B.S. DEGREE:**

- 30 total semester hours of which:
  - 12 hours outside the Departmental Alpha Codes within the Bumpers College 30 semester hours in upper division courses
  - no more than 69 lower division transfer hours
  - no more than 25% (31 hrs) of D grades
  - 30 semester hours in Bumpers College at UA
- 2.00 GPA

03/04/09
Wildlife Habitat Minor (WLHA-M)
2009-2010

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

The Wildlife Habitat Minor will consist of 20 semester hours of courses and will include the following**:

**Group A** (13-14 hours):
- BIOL 4734 Wildlife Management Techniques (SP odd)
- CSES 1203 Plant Science (SP, FA) or CSES 2103 Crop Science (SP) or BIOL 1613/1611L Plant Biology (SP, SU)
- CSES 2203 Soil Science (FA)
- ENSC 3103 Plants and Environmental Restoration (FA odd)

The remaining minimum of 6-7 hours will come from the following two groups (select at least 1 course from Group B and 1 course from Group C):

**Group B**
- ENSC 1003 Environmental Science (FA)
- ENSC 3003 Introduction to Water Science (FA, ENSC 1003 or other science (see catalog description) and ENGL 1023)
- ENSC 3223/3221L Ecosystems Assessment (FA even, BIOL 1543, CSES 2203, and ENSC 3003)
- ENSC 3003 GIS For Environmental Science (SP odd, CSES 2203)
- BIOL 3853 General Ecology (SP, FA - 7 hours of biological sciences)
- BIOL 3861 General Ecology Lab (FA, BIOL 3863)
- CSES 462V Internship with Arkansas Game and Fish Commission (based on availability)

**Group C**
- AGEC 3413 Principles of Environmental Economics (SP, AGEC 1103 or ECON 2023)
- BIOL 4703 Ornithology (SP even, BIOL 3863)
- BIOL 4833 Animal Behavior (FA odd)
- CSES 2201L Soil Science Lab (FA)
- CSES 355V Soil Profile Descriptions (FA)
- CSES 4133 Weed ID, Morphology and Ecology (FA, CSES 2103 (or HORT 2003) and CSES 2003).
- CSES 4253 Soil Classification and Genesis (SP, CSES 2203)
- ENTO 3013 Introduction to Entomology (FA)
- GEOG 3003 Conservation of Natural Resources (SP, SU, FA - Junior standing)
- GEOG 3343 Natural Regions of North America (SP odd)
- GEOG 4093 Geography of Arkansas (FA - Junior standing)
- RECR 1023 Recreation and Natural Resources (SP)

**A maximum of 9 hours of CSES or ENSC coursework will be allowed to count towards the student's major as well as the minor.**

Approved: Student ____________________________

Copies to: Student ____________________________

Major Advisor ____________________________

Minor Advisor ____________________________

Date ____________________________

2/17/09
Pest Management Minor (PMGT-M)
2009 - 2010

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

The Pest Management Minor will consist of 19 - 20 semester hours of courses to include:

- CSES 2003 Introduction to Weed Science (FA, CHEM 1074 or CHEM 1103)**
- ENTO 3013 Introduction to Entomology (FA, BIOL 1543/1541L)
- PLPA 3004 Principles of Plant Pathology (FA)
- PLPA 4103 Plant Disease Control (FA, PLPA 3004)

In addition, students must select one course from each Alpha Code (CSES, ENTO, PLPA) below:

- CSES 4133 Weed ID, Morphology and Ecology** (FA, CSES 2103 or HORT 2003)
- CSES 4143 Principles of Weed Control** (SP, CHEM 2613/2611L and CSES 2003)
- ENTO 4024 Insect Diversity and Taxonomy (FA)
- ENTO 4123 Insect Pest Management (SP odd, ENTO 3013)
- ENTO 4133 Advanced Applied Entomology (FA even, ENTO 3013)

Approved: ___________________________ Date ___________________________

Major Advisor ___________________________ Date ___________________________

Minor Advisor ___________________________ Date ___________________________

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

Updated 2/17/09
Crop Biotechnology Minor (CPBT-M)
2009 - 2010

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

The Crop Biotechnology Minor will consist of 18 semester hours of the following courses:

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

_____ BIOL 4304 Plant Physiology (FA, BIOL 1613/1611L and BIOL 1543/1541L and general chemistry)

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

_____ CSES 402V Special Topics (2 1-hour courses taken in two different semesters)

_____ CSES 4103 Plant Breeding (FA even, ANSC 3123 or BIOL 2323 General Genetics)

_____ PLPA 4333 Biotechnology in Agriculture (FA)

Approved: Student ________________________________________ Copies to: Student
Major Advisor ____________________________________________ Major Advisor
Minor Advisor ____________________________________________ AIFS Dean's Office
Date ________________________________ Student's Dean's Office (if not AIFS)

Updated 1/23/09
Crop Management Minor (CPMG-M)
2009 - 2010

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

The Crop Management Minor will consist of 18 Semester hours of courses above the freshman level (1000) including:

____ CSES 2103 Crop Science (SP)
____ CSES 2203 Soil Science (FA, CHEM 1074 or 1103)

Remaining 12 semester hours to be selected from:
(at least two courses must be selected in the first group)

____ CSES 3113 Forage Management (SP even, CSES 1203 or CSES 2103)
____ CSES 3312 Cotton Production (FA even, CSES 1203 or CSES 2103)
____ CSES 3322 Soybean Production (SP odd, CSES 1203 or CSES 2103)
____ CSES 3332 Rice Production (FA odd, CSES 1203 or CSES 2103)
____ CSES 3342 Cereal Grain Production (SP even, CSES 1203 or CSES 2103)

____ CSES 2003 Introduction to Weed Science (FA, CSES 1203 or CSES 2103 or HORT 2003)
____ CSES 3214 Soil Resources and Nutrient Cycles (SP odd, CSES 2203)
____ CSES 4013 Advanced Crop Science (SP, CSES 2103)
____ CSES 4103 Plant Breeding (FA even, ANSC 3123 or POSC 3123)
____ CSES 4133 Weed ID, Morphology & Ecology (FA, CSES 2103 or HORT 2003)
____ CSES 4143 Principles of Weed Control (SP, CHEM 2613/2611L and CSES 2003)
____ CSES 4224 Soil Fertility (FA, CSES 2203/2201L)
____ CSES 4234 Plant Anatomy (SP, BIOL 1613/1611L or BIOL 1543/1541L)

Approved: ___________________________ Copies to: ___________________________

Major Advisor ___________________________ Student
Minor Advisor ___________________________ Major Advisor
Date ___________________________ Minor Advisor

AFLS Dean's Office
Student's Dean's Office (if not AFLS)

Updated 2/17/09
Degree Requirements

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

University Graduation Requirements

• 124 semester hours of credit
• 35 hours University Core Courses. See checksheet for specific courses required.
• ENGL 2003 Advanced Composition. See University catalog for exemption options.
• 2.00 GPA ("C" average) on all work attempted at the University of Arkansas.
• ≤68 semester hours of lower-division transfer course work (1000/2000 level).
• ≤25% "D" grades presented to meet degree requirements.

Bumpers College Graduation Requirements

(Advising forms available at: http://bumperscollege.uark.edu/139.htm)

• 30 hours within Bumpers College.
• 9 hours of Broadening electives (Bumpers College courses taken outside of ENSC).
• 39 hours of upper-division courses work (3000-level or above).
• 6 hours of Communications (COMM 1313 and CSES 3023 or AGED 3142/3141.
• 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 the college requirements of English/Communications.
• 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.
• 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:
  
<table>
<thead>
<tr>
<th>Activity</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Band and/or chorus</td>
<td>4</td>
</tr>
<tr>
<td>Drama and/or debate</td>
<td>4</td>
</tr>
<tr>
<td>Judging teams</td>
<td>4</td>
</tr>
<tr>
<td>Physical education activities</td>
<td>4</td>
</tr>
</tbody>
</table>
• 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 course work must have been completed at the University of Arkansas, Fayetteville.
- Only the grade-point average on course work completed at the University of Arkansas, Fayetteville, will be considered.
- 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 may graduate with honors designation without participating in the AFLS Honors Program.

Honors Distinction
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 3.25 are eligible to join the AFLS Honors Program and graduate with Honors Distinction.

The AFLS Honors Program

Mission Statement - The mission of the AFLS Honors Program is to provide students with the opportunity to participate in academic, research, and creative activities beyond the traditional undergraduate experience.

Benefits of the AFLS Honors Program

- 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 we-site (http://bumperscollege.uark.edu/332.htm).
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:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>4.00</td>
</tr>
<tr>
<td>A-</td>
<td>3.67</td>
</tr>
<tr>
<td>B+</td>
<td>3.33</td>
</tr>
<tr>
<td>B</td>
<td>3.00</td>
</tr>
<tr>
<td>B-</td>
<td>2.67</td>
</tr>
<tr>
<td>C+</td>
<td>2.33</td>
</tr>
<tr>
<td>C</td>
<td>2.00</td>
</tr>
<tr>
<td>C-</td>
<td>1.67</td>
</tr>
<tr>
<td>D+</td>
<td>1.33</td>
</tr>
<tr>
<td>D</td>
<td>1.00</td>
</tr>
<tr>
<td>D-</td>
<td>0.67</td>
</tr>
<tr>
<td>F</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Resources Available

Academic Enhancement Program
The mission of the Academic Enhancement Program (AEP) is to aid the academic and personal growth and development of the Dale Bumpers College of Agricultural, Food and Life Sciences community. The AEP is an academic enrichment program that provides both individual and group counseling sessions to assist students with improving their college experience.

The goal of AEP is to help students take control of their college experience. As college counselors, AEP personnel provide guidance, offer advice, ask questions, make suggestions and recommendations, provide referrals, and above all, inform students of the many opportunities available to them. For additional information contact Dr. John Kelly (jkelly@uark.edu; 479-575-5716) or visit the AEP website (http://bumperscollege.uark.edu/aep/index.htm).

The Peer Mentoring Program
The Bumpers College Peer Mentoring program encourages participants to enhance their college experience by engaging with the campus community, adjusting to college life, and preparing for a successful academic career and beyond.

The program provides the opportunity for each new student enrolled in the college to have a link to one-to-one interactions with a current student as his or her mentor or guide to student life at the University of Arkansas.

If you are interested in participating in the Peer Mentoring Program either as a mentor or would like to have a mentor assigned to you, contact John Kelly at jkelly@uark.edu or 479-575-5716 or Alice Griffin at agriffin@uark.edu or 479-575-2252.
Scholarships for Department of Crop, Soil, and Environmental Sciences

Scholarships available to students in the Department of Crop, Soil, and Environmental Sciences 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 makes you eligible for many of these scholarships. There are some scholarships that require additional applications, these are listed under Special Applications. For the 2008/2009 Academic Year, approximately $100,000 was awarded to deserving undergraduates. For additional information contact Dr. Duane Wolf, CSES Scholarship Coordinator (dwolf@uark.edu; 479-575-5739). A link to the scholarship application that is due each year by February 15th will be available through the college’s scholarship webpage http://bumperscollege.uark.edu/39.htm.

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 a 3.0 cum GPA or higher; financial need and extra curricular 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. 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 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; So, Jr, Sr; Arkansas resident; 3.0 GPA; interest in plant food industry. Other considerations: leadership ability, financial need, extracurricular activities. Two scholarships; one designated as Woody Miley for Jr./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 a Fr or transfer student in CSES. Third preference to a 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 given to those from eastern AR. Other considerations: dedication to chosen field, academic performance, financial need, & community involvement. Committee makes 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; upper classman; 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 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 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. International Agricultural Global Studies Office determines 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 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 Farm Bureau Scholarship** - Jr or Sr; Arkansas resident; enrolled in an Arkansas accredited college or university; actively pursuing an ag-related degree. Scholarship based upon 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.agfrc.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. In cooperation with an employer, the course will be supervised by an internship committee.

Enrollment in the internship course (CES 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 Science - Dr. R.K. Bacon (Plant Science 115; 575-2354)
Weed Science - Dr. L.R. Oliver (Altheimer Laboratory 302; 575-3976)
Soil Science/Environmental Science - Dr. D.C. Wolf (Agriculture 105A; 575-5739)

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 preproposal is required to initiate the internship and must be approved by the committee. The preproposal should include the following:

   Internship Preproposal Format (due prior to enrolling in CSES 462V)
   
   A. Title: A brief, clear, specific designation of the subject.
   B. Submitted By: List full name, summer address and phone number where you can be contacted.
   C. Company Sponsor: List company's full name, immediate supervisor's name, address, and phone number.
   D. Date of Submission to Committee:
   E. Dates of Internship: Starting and ending dates
   F. Credit Hours: List the number of semester hours of credit for which you are enrolling (1 to 6 hours).

   Only after the preproposal has been approved by the committee can the student be enrolled in CSES 462V. If 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 until the following term.

2. After the project is approved by the internship committee, the student will be directly responsible to one instructor who is a member of that committee. The student must submit a full proposal to the instructor two weeks after beginning employment. An outline to follow for the proposal format is available from the instructors.

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 will follow the same format as the proposal.

4. In addition to the final written report, the student will make an oral presentation which summarizes his or her internship to CSES Freshman Orientation, Agronomy Colloquium, CSES Seminar, the internship committee, or other audiences.
5. At the conclusion of the internship, the internship instructor will contact the employer to discuss the overall accomplishments of the internship and the employer's evaluation of the student.

6. The internship committee will evaluate the student's performance and determine the letter grade for the course based upon fulfillment of these requirements, the initial agreement relative to the proposal, and performance throughout the project. The semester credit hours available for internship will be a minimum of 1 to a maximum of 6 hours.

**Study Abroad Opportunities**

The Global Studies Program is specifically tailored to meet the individual needs of each student. Programs include internships, semester or year abroad study and faculty-led study tours. 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 their country of choice. Students enroll for UA study abroad credit, and the courses transfer to the University of Arkansas. Planning in advance with their adviser 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 study visits for two to four weeks can be arranged for one student or a group of students, coordinated by the resident director in Edinburgh. Specific student responsibilities are planned in advance with their University of Arkansas faculty adviser to complement the student's field of study and to earn academic credit. More information can be found at (http://www.uark.edu/depts/intagpro/studyabroad/index.html)

**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 your fellow students. Past club activities have included: guest speakers, canoe trips, and assisting in the cleanup and design of a local wetland/park. For more information contact a club officer or advisor

CSES Club Officers 2009
President - Chris Cotton
Vice-President - Rachel Arthur
Secretary/Treasurer - Bryant Baker

CSES Club Advisors
Dr. Mary Savin (Office: AGRI 105B; Phone: 479-575-5740; msavin@uark.edu)
Dr. Pengyin Chen (Office: PTSC 105; Phone: 479-575-7564; pchen@uark.edu)
Dr. Chuck West (Office: ALTH 214; Phone: 479-575-3982; cwest@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. Susan Fletcher (575-5716; sjfletc@uark.edu)
Ms. Joda Parent (575-2347; jparent@uark.edu)
Ms. Courtney Doudna (575-2354; cdoudna@uark.edu)
Mr. Scott Mattke (575-2749; smattke@uark.edu)
Ms. Jessica Otts (575-5718; jat002@uark.edu)

Faculty Committees of Interest
Assessment Committee - Dr. Duane Wolf (575-5739; dwolf@uark.edu)
Awards Committee - Dr. Chuck West (575-3982; cwest@uark.edu)
Curriculum Committee - Dr. Mary Savin (575-5740; msavin@uark.edu)
Recruitment Committee - Ms. Holly Yeatman (575-5726; hyeatman@uark.edu)
Undergraduate Committee - Dr. David Longer (575-5731; dl longer@uark.edu)

Undergraduate Recruiter
Ms. Holly Yeatman (Office: PTSC 120; Phone: 479-575-5726; hyeatman@uark.edu)
Undergraduate Courses in Environmental Science (ENSC)

**ENSC 1001L Environmental Science Laboratory** (Fa) 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: Duane Wolf*

**ENSC 1003 Environmental Science** (Fa) Series of lectures and discussions introducing the topic of environmental science including factors related to water, soil, and air quality.  
*Instructor: Duane Wolf*

**ENSC 3003 Introduction to Water Science** (Fa) 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: ENGL 1023 and ENSC 1003 or CHEM 1053 or higher or GEOL 1113 or higher or BIOL 1543.  
*Instructor: Kristofer Brye*

**ENSC 3103 Plants and Environmental Restoration** (Odd years, 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. Prerequisite: CSES 1203 or HORT 2003 or BIOL 1613.  
*Instructor: Chuck West*

**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. Lab will meet once per week for 3 hours. Corequisite: ENSC 3223.  
*Instructor: Mary Savin*

**ENSC 3223 Ecosystems Assessment** (Even years, Fa) Application of ecological principles for ESWS majors and college students interested in environmental science. 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, CSES 2203, and ENSC 3003.  
*Instructor: Mary Savin*

**ENSC 3263 Environmental Soil and Water Conservation** (Sp) Effect of land use on water quality. Major sources of agricultural nonpoint pollutants. Best management practices used to minimize water quality impacts. Corequisite: Lab component. Prerequisite: CSES 2203.  
*Instructor:*

**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.  
Instructors: David Miller and Richard Lee

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 8 hours of degree credit.  
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. Corequisite: Lab component. Prerequisite: CHEM 1123 and CHEM 1121L.  
Instructor: Thad Scott

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: CSES 2203 and ENSC 3003.  
Instructors: Mary Savin, John Mattice, and Dave Miller

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: Duane Wolf

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

CSES 1011 Introduction to Crop, Soil, and Environmental Science (Fa) An introduction to the CSES department and majors in Environmental Soil and Water Sciences and Crop Management. Emphasis will be placed on issues and opportunities within these disciplines and orienting students to the department and University of Arkansas. Required of all department majors with less than 24 semester credit hours. Recitation 1 hour 20 minutes per week for the first eight weeks of the semester. Prerequisite: Freshman and sophomore standing only.  
Instructors: Mary Savin
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: David Longer

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

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

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 emphasis on current management approaches and alternative pest control.  
Instructor: Dick Oliver

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: Dave Longer

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: Dave Longer

CSES 2201L Soil Science Laboratory (Fa) 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) 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. A student-oriented class with collaborative participation. Colloquium workshop: 3 hours per week. Prerequisite: Junior or Senior standing only.  
Instructors: Mary Savin, Larry Purcell, Chuck West, and Jason Norsworthy
CSES 3113 Forage Management (Even years, Sp) 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: Chuck West

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.  Instructor: Mary Savin

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

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: Penguin Chen

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: John Kelly

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: Kristofer Brye

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 8 hours of degree credit.  Instructor: Faculty

CSES 4013 Advanced Crop Science (Sp) Fundamental concepts of crop physiology, crop improvement, seed science, and crop production systems. Recitation 3 hours per week. Prerequisite: CSES 2103.  Instructor: John Kelly and Dave Longer

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 4043 Environmental Impact and Fate of Pesticides (Fa) Environmental issues associated with pesticide use, including fate of pesticides in the environment, ecological impact of pesticides, and exposure risks to humans. Course recommended for students who have 12 hours of biological and/or physical sciences or consent. Lecture 3 hours per week.  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: John Kelly**

CSES 4133 Weed Identification, Morphology, and Ecology (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, 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: Dick Oliver**

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 2613 and CHEM 2611L 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.  

**Instructor: Nathan Slaton**

CSES 4234 Plant Anatomy (Sp) Advanced training in plant anatomy. Studying the structure, terminology, techniques and function associated with vascular plant anatomy. Corequisite: Lab component. Prerequisite: BIOL 1613/1611 or BIOL 1543/1541L.  

**Instructor: Briggs Skulman**

CSES 4253 Soil Classification and Genesis (Sp) 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.  

**Instructor:**

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: Robert Bacon, Dick Oliver, and Duane Wolf**

CSES4803 Precision Agriculture (Odd years, Fa) Introduction to precision agriculture, benefits, spatial variability within a field, zone concept, site-specific management. Spatial data collection: sensors, GPS, yield monitoring, remote sensing. Knowledge discovery from data: data processing, neural networks, genetic algorithms, use of GIS. Decision support systems. Variable-rate technology: real-time and map-based systems, variable-rate machinery, and smart controls. Evaluation: yield mapping, economic analysis. Corequisite: Lab component. Prerequisite: MATH 1213 and junior standing. (Same as BENG 4803)

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

Robert K. Bacon (Office: PTSC 115; Phone: 479-575-2354; rbacon@uark.edu)
Department Head/Professor of Small Grain Breeding (Ph.D. Purdue University)
Teaches: CSES 462V Internship (Sp, Su, Fa) (1-6 hrs credit)

Kristofer Brye (Office: AGRI 123; Phone: 479-575-5742; kbrye@uark.edu)
Professor of Applied Soil Physics (Ph.D. University of Wisconsin, Madison)
Teaches: CSES 355V Soil Profile Description (Fa) (1-2 hrs credit); ENSC 3003 Introduction to Water Science (Fa)

Nilda R. Burgos (Office: ALTH 222; Phone: 479-575-3984; nburgos@uark.edu)
Associate Professor of Weed Science (Ph.D. University of Arkansas)

Pengyin Chen (Office: PTSC 105; Phone: 479-575-7564; pchen@uark.edu)
Professor of Soybean Breeding and Genetics (Ph.D. Virginia Tech)
Teaches: CSES 3322 Soybean Production (Odd years, Sp)

John T. Kelly (Office: PTSC 120; Phone: 479-575-5733; jkelly@uark.edu)
Program Associate III of Small Grain Breeding (Ph.D. University of Arkansas)
Teaches: CSES 3342 Cereal Grain Production (Even years, Sp); CSES 4013 Advanced Crop Science (Sp); CSES 4103 Plant Breeding (Even years, Fa)

David E. Longer (Office: PTSC 104; Phone: 479-575-5731; dlonger@uark.edu)
Professor of Crop Science (Ph.D. Purdue University)
Teaches: CSES 1203 Introduction to Plant Sciences (Sp, Fa); CSES 2103/2101L Crop Science with Laboratory (Sp); CSES 4013 Advanced Crop Science (Sp)

John D. Mattice (Office: ALTH 302; Phone: 479-575-6791; jmattice@uark.edu)
Research Associate Professor, Pesticide Residues (Ph.D. University of Arkansas)
Teaches: ENSC 4034 Analysis of Environmental Contaminants with Laboratory (Even years, Sp)

Marilynn McClelland (Office: ALTH 302; Phone: 479-575-8779; mmcclell@uark.edu)
Program Associate III

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); ENSC 4034 Analysis of Environmental Contaminants with Laboratory (Even years, Sp)

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)
Associate Professor of Weed Science (Ph.D. University of Arkansas)
Teaches: CSES 3023 Crop, Soil, and Environmental Sciences Colloquium (Fa); CSES 4143 Principles of Weed Control (Sp)

L. Dick Oliver (Office: ALTH 302; Phone: 479-575-3976; oliver@uark.edu)
University Professor and Elms Farming Chair for Weed Science (Ph.D. Purdue University)
Teaches: CSES 2003 Introduction to Weed Science (Fa); CSES 2013 Pest Management (Sp); CSES 4133 Weed Identification, Morphology, and Ecology (Fa); CSES 462V Internship (Sp, Su, Fa) (1-6 hrs credit)

Derrick M. Oosterhuis (Office: ATLH 216; Phone: 479-575-3979; oosterhu@uark.edu)
Distinguished Professor of Cotton Physiology (Ph.D. Utah State University)
Teaches: CSES 3312 Cotton Production (Even years, Fa)

Larry C. Purcell (Office: ALTH 302; Phone: 479-575-3983; lpurcell@uark.edu)
Professor and Altheimer Chair for Soybean Research (Ph.D. University of Florida)
Teaches: CSES 2012 Introduction to Organic Crop Production (Sp); CSES 3023 Crop, Soil, and Environmental Sciences Colloquium (Fa)

Mary Savin (Office: AGRI 105B; Phone: 479-575-5740; msavin@uark.edu)
Associate Professor of Soil Biology and Microbial Ecology (Ph.D. University of Rhode Island)
Teaches: CSES 1011 Introduction to Crop, Soil, and Environmental Sciences (F); CSES 3023 Crop, Soil, and Environmental Sciences Colloquium (F); CSES 3214 Soil Resources and Nutrient Cycles with Laboratory (Odd years, Sp); ENSC 3223/3221L Ecosystems Assessment with Laboratory (Even years, F); ENSC 4034 Analysis of Environmental Contaminants with Laboratory (Even years, Sp); ENSC 404V-1 Special Topics: Preparation for the Fundamentals of Soil Science Exam (national certification exam administered by the Council of Soil Science Examiners and SSSA) (Even years, Sp); ENSC 404V-1. Special Topics: Preparation for the Environmental Professional Intern Exam (national environmental science certification exam administered by the Institute of Professional Environmental Practice) (Odd years, Sp); CSES 402V-3 Special Topics, Microbial Ecology (Odd years, Fa - irregular)

Thad Scott (Office: AGRI 104; Phone: 479-575-6337; jts004@uark.edu)
Assistant Professor of Environmental Water Science (Ph.D. Baylor University)
Teaches: ENSC 4023 Water Quality (Fa)

Andrew Sharpley (Office: PTSC 111; Phone: 479-575-5721; sharpley@uark.edu)
Professor of Soils and Water Quality (Ph.D. Massey University, New Zealand)

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)
Briggs Skulman (Office: ALTH 110; Phone: 479-575-7569; bskulman@uark.edu)
Program Associate III
Teaches: CSES 4234 Plant Anatomy (Sp)

Nathan Slaton (Office: ALTH 306; Phone: 479-575-3910; nslaton@uark.edu)
Professor, Soil Fertility/Director of Soil Testing (Ph.D. University of Arkansas)
Teaches: CSES 4224 Soil Fertility (Fa)

Vibha Srivastava (Office: PTSC 109; Phone: 479-575-4872; vibhas@uark.edu)
Associate Professor of Plant Tissue Culture and Transformation (Ph.D. Jawaharlal Nehru University, New Delhi)

James McD. "Mac" Stewart (Office: PTSC 110; Phone: 479-575-5722; jstewart@uark.edu)
University Professor, Biotechnology/Cotton (Ph.D. Oklahoma State University)

Charles P. West (Office: ALTH 214; Phone: 479-575-3982; cwest@uark.edu)
Professor, Forage Physiology and Ecology (Ph.D. Iowa State University)
Teaches: CSES 3023 Crop, Soil, and Environmental Sciences Colloquium (Fa); CSES 3113 Forage Management (Even years, Sp); ENSC 3103 Plants and Environmental Restoration (Odd years, Fa)

Duane C. Wolf (Office: AGRI 105A; Phone: 479-575-5739; dwolf@uark.edu)
University Professor (Ph.D. University of California, Riverside, Soil Science)
Teaches: AFLS 1011H Honors Orientation (F); ENSC 1003 Environmental Science (F), ENSC1001L Environmental Science Laboratory (F); and ENSC 4263 Environmental Soil Science (Even Years Sp); CSES 462V Internship (Sp, Su, Fa) (1-6 hrs credit)