COLLEGE OF AGRICULTURE, FORESTRY AND LIFE SCIENCES

The College of Agriculture, Forestry and Life Sciences (CAFLS) supports Clemson University’s land-grant mission to provide education, research and service to the public. The College of Agriculture, Forestry and Life Sciences serves more than 2,000 graduate and undergraduate students.

The College of Agriculture, Forestry and Life Sciences is a multi-disciplinary college of life-based sciences that prepares students to be leaders and innovators in their chosen careers. The shared biological foundation of the CAFLS Departments stimulates student learning and undergraduate research across disciplines; increases opportunities for team-based faculty research across departments, colleges and institutions; and makes available the latest scientific knowledge for the greater benefit of society.

To assist students in achieving these goals, the William B. Bookhart Jr. Student Services Center provides academic advising and developmental services to promote success for students in the related degree programs. These services involve recruitment and retention, academic advising, multicultural affairs, study abroad, career development, and placement.

The College of Agriculture, Forestry and Life Sciences is impacting the world one graduate at a time—from cell research to food production to packaged materials to the globe—developing partnerships for the future to make the world greener, healthier, tastier, and wealthier.

Modern Language Requirement

A number of Clemson University degree programs require the completion of a modern language through a specific course level. Modern languages taught at Clemson University or accepted for transfer credit include American Sign Language, Arabic, Chinese, French, German, Italian, Japanese, Latin, Portuguese, Russian and Spanish. While many degree programs accept any of these modern languages for the requirement, certain programs may have specific modern language requirements. Students should consult their program’s curriculum map for details.

AGRIBUSINESS Bachelor of Science

The Agribusiness curriculum provides strong training in economic and business principles as applied in agribusiness enterprises. Core classes in the major focus on agribusiness economics and management, leadership, marketing and sales, finance, accounting, and business skill development. Employment opportunities for graduates are many and diverse. Private sector opportunities include national and international careers in agribusiness management, banking, finance, sales, marketing, and public relations. Public sector opportunities include positions in organizations that promote food, agriculture, and natural resource interests; government agencies; and educational institutions. Moreover, the curriculum design provides graduates with the skills necessary to successfully establish their own businesses. By completing this curriculum, graduates will have fulfilled the requirements for an approved minor in the college, allowing students to tailor the program to meet specific career objectives.

The curriculum also emphasizes training on globalization, information technology, and interdisciplinary skills needed to analyze the complex interrelationships between business, the environment and society. Students are encouraged to participate on a creative inquiry student research team and to take advantage of an internship and/or study abroad opportunity. The program provides an excellent background for professional or graduate study in several disciplines.

Freshman Year

First Semester
3 - AGRB 2050 Agriculture and Society
3 - MATH 1020 Business Calculus I
3 - STAT 2220 Statistics in Everyday Life
4 - Natural Science Requirement
3 - Oral Communication Requirement
16
Second Semester
3 - AGRB 2020 Agricultural Economics
3 - ENGL 1030 Composition and Rhetoric
3 - STAT 2300 Statistical Methods I
3 - Arts and Humanities (Non-Lit.) Requirement
3 - Elective
15

Sophomore Year

First Semester
3 - ACCT 2010 Financial Accounting Concepts
3 - AGRB 3020 Economics of Farm Management
3 - ECON 2120 Principles of Macroeconomics
3 - MGT 2010 Principles of Management
3 - Arts and Humanities (Literature) Requirement
15
Second Semester
3 - ACCT 2020 Managerial Accounting Concepts
3 - AGRB 3570 Natural Resource Economics
3 - Leadership Requirement
3 - Minor Requirement
3 - Social Science Requirement
15

Junior Year

First Semester
3 - AGRB 3080 Quant. Agribusiness Analysis I
3 - AGRB 3090 Econ. of Agricultural Marketing
3 - ECON (MGT) 3060 Managerial Economics or
3 - ECON 3140 Intermediate Microeconomics
3 - ENGL 3140 Technical Writing
3 - Minor Requirement
15
Second Semester
3 - AGRB 3190 Agribusiness Management
3 - AGRB 3510 Principles Agricultural Sales & Advertising
3 - AGRB 4210 Globalization or
3 - ECON 3100 International Economy
3 - ECON 3020 Money and Banking or
3 - ECON 3150 Intermediate Macroeconomics
3 - Minor Requirement
15

Senior Year

First Semester
3 - AGRB 4090 Commodity Futures Markets
3 - AGRB 4120 Regional Economic Dev.
3 - AGRB 4600 Agricultural Finance
3 - LAW 3220 Legal Environment of Business
3 - Minor Requirement
15
Second Semester
3 - AGRB 4080 Quant. Agribusiness Analysis II
3 - AGRB 4520 Agricultural Policy
3 - AGRB 4560 Prices
3 - Internship, Creative Inquiry or Selected Topics
3 - Minor Requirement
15

Agricultural Education Bachelor of Science

Agricultural Education provides broad preparation in agricultural sciences and professional education, including communications and human relations skills. In addition to required courses, students may select a minor (see approved minors on page 58). The Bachelor’s degree prepares students for professional education positions in the mainstream of agriculture, including teaching, cooperative extension service, and government agricultural agencies. The Agricultural Education degree also prepares students for other educational work, such as agricultural missionary, public relations, and training officers in agricultural industry.

In consultation with the departmental advisor, students choose one of the following emphasis areas: Communications, Leadership, or Teaching.

Admission to Teaching Emphasis Students

Professional application to the professional level of a program is processed during the term in which...
a candidate is to complete 60 semester hours of work. At that time, the candidate is notified of his/her status. Prior to admission, the candidate must have passed all areas of the Praxis CORE and have a minimum cumulative grade-point average of 2.75. A candidate may exempt the CORE by meeting minimum ACT or SAT requirements as determined by the South Carolina Department of Education.

**Directed Teaching/Teaching Internship**—A candidate shall apply to the field experience director prior to the semester in which block methods courses are scheduled. The following conditions must be met prior to registration for directed teaching: (1) admission to the professional level of a program; (2) completion of at least 95 semester hours; (3) a minimum cumulative grade point average of 2.75.

**Freshman Year**

**First Semester**
- AGED 1020 Agric. Ed. Freshman Seminar
- AGED 3650 Multiculturalism in Agric. Ed.
- AVS 1500 Introduction to Animal Science
- AVS 1510 Introduction to Animal Science Lab.
- BIOL 1030 General Biology I
- BIOL 1050 General Biology Lab. I
- HORT 1010 Horticulture
- Mathematics Requirement

**Second Semester**
- AGED 1000 Orientation and Field Experience
- AGM 2050 Principles of Fabrication
- BIOL 1040 General Biology II
- BIOL 1060 General Biology Lab. II
- ENGL 1030 Composition and Rhetoric
- Social Science Requirement
- MATH 1010, 1020, 1060, 1080, or 2070

**Sophomore Year**

**First Semester**
- AGED 2010 Intro. to Agricultural Education
- AGED 2040 Applied Agriculture Calculations
- BT 2200 Biosystems Technology I
- CH 1010 General Chemistry
- HORT 2120 Introduction to Turfgrass Culture
- HORT 2130 Turfgrass Culture Lab.

**Second Semester**
- CH 2020 General Chemistry
- COMM 1010 Communication Academic and Professional Development I
- ENGL 3700 Introduction to Special Education
- PHYS 2070 General Physics I
- STAT 2300 Statistical Methods I
- Technical Requirement

**Junior Year**

**First Semester**
- AGED 3030 Mechanical Technology for Agriculture Education
- AGM 2210 Surveying
- COMM 2010 Intro. to Communication Studies
- PES 2020 Soils
- Arts and Humanities (Non-Lit.) Requirement
- Technical Requirement

**Second Semester**
- EDF 3020 Educational Psychology
- ENR 3020 Natural Resources Measurements
- HORT 4040 Plant Propagation
- HORT 4050 Plant Propagation Techniques Lab.
- Advanced Writing Requirement
- Departmental Communication Requirement
- Oral Communication Requirement

**Senior Year**

**First Semester**
- ENGL 2310 Introduction to Journalism
- HORT 3030 Landscape Plants
- Arts and Humanities (Literature) Requirement
- Departmental Communication Requirement
- Technical Requirement

**Second Semester**
- AGED 4070 Internship in Extension and Leadership Education
- 135 Total Semester Hours
- Select any 2000 level or higher AGM, AGRB, AVS, ENR, FOR, PES or WFB course, or BE 4080, 4510, BIOL 4130, 4140, 4680, 4690, 4800, EES 4510, ENT 4690, ETOX 4850, GEOL 4850, HORT 4270, 4330, or MIRC 4140.

**Junior Year**

**First Semester**
- AGED 3030 Mechanical Technology for Agriculture Education
- AGM 2210 Surveying
- HORT 3030 Landscape Plants
- PES 2020 Soils
- Arts and Humanities (Non-Lit.) Requirement
- Technical Requirement

**Second Semester**
- EDF 3020 Educational Psychology
- ENR 3020 Natural Resources Measurements
- HORT 4040 Plant Propagation
- HORT 4050 Plant Propagation Techniques Lab.
- Oral Communication Requirement
- Technical Requirement

**Senior Year**

**First Semester**
- AGED 4150 Leadership of Volunteers
- AGED 4160 Ethics and Issues in Agriculture and the Food and Fiber System
- MGT 2010 Principles of Management
- Arts and Humanities (Literature) Requirement
- Technical Requirement

**Second Semester**
- AGED 4070 Internship in Extension and Leadership Education
- 133 Total Semester Hours
- Select any 2000 level or higher AGM, AGRB, AVS, ENR, FOR, PES or WFB course, or BE 4080, 4510, BIOL 4130, 4140, 4680, 4690, 4800, EES 4510, ENT 4690, ETOX 4850, GEOL 4850, HORT 4270, 4330, or MIRC 4140.

**Second Semester**
- ENGL 3040 or 3140 is recommended.
- Select from COMM 3200, 3480, 3560, 3610, 3640, 4560, 4640, or 4830

**Sophomore Year**

**First Semester**
- AGED 2010 Intro. to Agricultural Education
- AGED 2040 Applied Agriculture Calculations
- BT 2200 Biosystems Technology I
- CH 1010 General Chemistry
- HORT 2120 Introduction to Turfgrass Culture
- HORT 2130 Turfgrass Culture Lab.

**Second Semester**
- CH 2020 General Chemistry
- EDSP 3700 Introduction to Special Education
- PHYS 2070 General Physics I
- STAT 2300 Statistical Methods I
- Arts and Humanities (Non-Lit.) Requirement

**Junior Year**

**First Semester**
- AGED 3030 Mechanical Technology for Agriculture Education
- AGM 2210 Surveying
- HORT 3030 Landscape Plants
- PES 2020 Soils
- Arts and Humanities (Non-Lit.) Requirement
- Technical Requirement
By completing this curriculum, graduates will have fulfilled the requirements for an Agricultural Business Management minor or other selected minor. Contact the Enrolled Student Services Office to have the minor recorded.

Additional information is available from the departmental offices or can be found at www.clemson.edu/cafs/safes/agmec/index.html.

Junior Year
First Semester
3 - AGED 3030 Mechanical Technology for Agriculture Education
3 - AGM 2210 Surveying
3 - HORT 3030 Landscape Plants
3 - PES 2020 Soils
3 - Advanced Writing Requirement
16

Second Semester
3 - AGED 4160 Ethics and Issues in Agriculture and the Food and Fiber System
3 - EDF 3020 Educational Psychology
3 - ENR 3020 Natural Resources Measurements
3 - HORT 4040 Plant Propagation
1 - HORT 4050 Plant Propagation Techniques Lab.
3 - Oral Communication Requirement
16

Senior Year
First Semester
1 - AGED 4000 Supervised Field Experience II
3 - AGED 4010 Instructional Methods in Ag. Ed.
3 - AGED 4030 Principles of Adult/Ext. Education
3 - AGED 4230 Curriculum
3 - EDLT 4980 Secondary Content Area Reading
3 - Arts and Humanities (Literature) Requirement
16

Second Semester
12 - AGED 4020 Directed Teaching
12 - AGED 4250 Teaching Agricultural Mechanics
14
130 Total Semester Hours

Agricultural Mechanization and Business
Bachelor of Science
The Agricultural Mechanization and Business major provides a program for students who desire training in areas relevant to dynamic agricultural enterprises. The program is organized with strength in both business management and technical support of agriculture and agribusiness. To produce well rounded individuals with good communication skills, the curriculum includes courses in the humanities, social sciences, English composition, and public speaking.

By completing this curriculum, graduates will have fulfilled the requirements for an Agricultural Business Management minor or other selected minor. Contact the Enrolled Student Services Office to have the minor recorded.

Additional information is available from the departmental offices or can be found at www.clemson.edu/cafs/safes/agmec/index.html.

Freshman Year
First Semester
1 - AGM 1010 Intro. to Ag. Mech. and Business
3 - AGM 2050 Principles of Fabrication
3 - AGRB 2020 Agricultural Economics or
3 - ECON 2110 Principles of Microeconomics
3 - BIOL 1030 General Biology I
1 - BIOL 1050 General Biology Lab. I
1 - MATH 1020 Business Calculus I
14

Second Semester
3 - ACCT 2010 Financial Accounting Concepts
3 - BIOL 1040 General Biology II
1 - BIOL 1060 General Biology Lab. II
3 - ENGL 1030 Composition and Rhetoric
3 - STAT 2300 Statistical Methods I
3 - Elective
16

Sophomore Year
First Semester
3 - AGM 2190 Agribusiness and Food Systems
3 - AGM 2210 Surveying
4 - CH 1010 General Chemistry
2 - ENGR 2080 Engineering Graphics and Machine Design or
2 - ENGR 2090 Introduction to Engineering Computer Graphics or
2 - ENGR 2100 Comp. Aided Design/Engr. Apps.
4 - PHYS 2000 Introductory Physics or
3 - PHYS 2070 General Physics I and
1 - PHYS 2090 General Physics I Lab.
16

Second Semester
3 - AGM 2060 Machinery Management
3 - AGM 2220 Calculations for Mechanized Agric.
4 - CH 1020 General Chemistry
3 - Arts and Humanities (Literature) Requirement
3 - Plant/Crop Science Requirement
16

Junior Year
First Semester
3 - AGM 3010 Soil and Water Conservation
3 - AGRB 3090 Econ. of Agricultural Marketing
3 - MGT 2010 Principles of Management
3 - PES 2020 Soils
16

Second Semester
3 - AGM 4020 Irrigation System Design
3 - AGM 4520 Mobile Power
3 - COMM 1500 Intro. to Human Comm. or
3 - COMM 2500 Public Speaking
3 - Arts and Humanities (Non-Lit.) Requirement
3 - Minor Requirement
15

Senior Year
First Semester
1 - AGM 4000 Senior Seminar in Agricultural Mechanization and Business
3 - AGM 4050 Environmental Control in Animal Structures
3 - AGM 4060 Mechanical and Hydraulic Systems
3 - AGRB 3190 Agribusiness Management or
3 - MGT 2010 Principles of Management
3 - AGRB 3090 Econ. of Agricultural Marketing or
3 - MKT 3010 Principles of Marketing
3 - Minor Requirement
16

Second Semester
3 - AGM 4100 Precision Agriculture Technology
3 - AGM 4720 Capstone
3 - Minor Requirement
3 - Plant/Crop Science or Soil Science Req.
3 - Social Science Requirement
15

124 Total Semester Hours

1Required for students minoring in Business Administration.
2HORT 1010, 2100, 2110, 2120, 4510, (PES) 4330, 4550, 4560, PES 4040, 4050, 4210, 4220, 4230 (AGRB) 4260, PLEA 3100, 4060, 4100, or 4590. If applicable, these courses may also be used to satisfy minor requirement.
3MGT 2010 may be substituted for either AGRB 3020 or 3190, but not for both.
4See General Education Requirements. Three of these credits must also satisfy the Cross-Cultural Awareness and three must satisfy the Science and Technology in Society Requirements.
5See CAFLS approved minors. If requirements for an approved minor have already been satisfied, this course may be any 3000-level (or higher) course from an approved program. Any required course in the curriculum may also be used to satisfy minor requirements.
6See CAFLS approved minors. If requirements for an approved minor have already been satisfied, this course may be any 3000-level (or higher) course from an approved program. Any required course in the curriculum may also be used to satisfy minor requirements.
7Any 4000-level course from an approved program. Any required course in the curriculum may also be used to satisfy minor requirements.
8Students must earn a grade of C or better in all required AGM courses and in MATH 1020.

Animal and Veterinary Sciences
Bachelor of Science
The Animal and Veterinary Sciences curriculum provides students with both a basic and applied understanding of the scientific principles needed for successful careers in the scientific, technical, and business phases of livestock and poultry production, processing, and marketing; or veterinary/medical professions. Strengths of this program include extensive hands-on instruction at Clemson’s six animal farms, personalized advising, and the opportunity for valued-added experiences, including involvement in research, teaching, extension, international travel, and internships. Students choose from three concentrations.
The Animal Agribusiness Concentration prepares students for careers in the many facets of the animal industries, including production, sales and marketing, business management, advertising, and extension. The Equine Business Concentration prepares students for such professions as trainers, managers, riding instructors, sales or media representatives, breeder association representatives or for equine entrepreneurial careers such as owners of tack shops, boarding facilities, or riding schools. The Preveterinary and Science Concentration prepares students to meet the requirements for most veterinary schools, pre-optometry schools, and pre-dental schools. Students with South Carolina residency may compete for contract seats at Mississippi State, Tuskegee, and University of Georgia Colleges of Veterinary Medicine. Experienced preprofessional advising is provided for all students pursuing advanced degrees.

Change of Major into Animal and Veterinary Sciences
Students who change majors into Animal and Veterinary Sciences must have a 2.5 minimum cumulative grade-point average.

ANIMAL AGROBUSINESS CONCENTRATION

Freshman Year
First Semester
3 - AVS 1500 Introduction to Animal Science
1 - AVS 1510 Introduction to Animal Science Lab.
3 - BIOL 1030 General Biology 1
1 - BIOL 1050 General Biology Lab. I or
5 - BIOL 1100 Principles of Biology I
4 - CH 1010 General Chemistry
3 - COMM 1500 Intro. to Human Comm or
3 - COMM 2500 Public Speaking
15-16
Second Semester
3 - BIOL 1040 General Biology II
1 - BIOL 1060 General Biology Lab. II or
5 - BIOL 1110 Principles of Biology II
4 - CH 1010 General Chemistry
3 - ENGL 1030 Composition and Rhetoric
3 - MATH 1010 Essential Math. for Informed Soc. or
3 - MATH 1020 Business Calculus I or
3 - MATH 1060 Calculus of One Variable I
1 - Elective
15-17

Sophomore Year
First Semester
3 - ACCT 2040 Horse Care Techniques
2 - MGT 2010 Principles of Management
3 - STAT 2300 Corporation Finance
3 - Arts and Humanities (Non-Lit.) Requirement
1 - Elective
15
Second Semester
4 - MATH 1060 Calculus of One Variable I
3 - MATH 1020 Business Calculus I or
3 - MATH 1010 Essential Math. for Informed Soc. or
3 - MATH 1020 Business Calculus I or
3 - MATH 1060 Calculus of One Variable I
1 - Elective
15-17

Junior Year
First Semester
3 - AVS 4100 Domestic Animal Behavior
3 - Advanced AVS Nutrition/Physiology Req. or
3 - Animal-Human Interaction Course Req.
2 - AVS Hands-On Course Requirement
3 - Science and Technology in Society Req. or
15
Second Semester
3 - Advanced AVS Nutrition/Physiology Req. or
3 - Animal-Human Interaction Course Req.
2 - AVS Hands-On Course Requirement
3 - Advanced AVS Nutrition/Physiology Req. or
3 - Business Requirement
3 - Elective
15
120–123 Total Semester Hours

See General Education Requirements. Social Science courses may not be selected from AGRB and ECON courses. Three of these credits must also satisfy the Cross-Cultural Awareness Requirement.

Select from AVS 2000, 2010, 2030, 2040, 2060, 2090, 2110, 2120, 3020, 3090, 3110, 3230, 3600, 3900, 4410, 4420, 4550, 4590. May be taken in either the fall or spring semester.

See General Education Requirements. AGRB and ECON courses may not be used to fulfill the Social Science Requirement. Three of these credits must also satisfy the Cross-Cultural Awareness Requirement.

EQUINE BUSINESS CONCENTRATION

Freshman Year
First Semester
3 - AVS 1500 Introduction to Animal Science
1 - AVS 1510 Introduction to Animal Science Lab.
3 - BIOL 1030 General Biology 1
1 - BIOL 1050 General Biology Lab. I or
5 - BIOL 1100 Principles of Biology I
4 - CH 1010 General Chemistry
3 - COMM 1500 Intro. to Human Comm or
3 - COMM 2500 Public Speaking
15-16
Second Semester
3 - BIOL 1040 General Biology II
1 - BIOL 1060 General Biology Lab. II or
5 - BIOL 1110 Principles of Biology II
4 - CH 1010 General Chemistry
3 - ECON 2110 Principles of Microeconomics
1 - Elective
16

Second Semester
3 - BIOL 1040 General Biology II and
1 - BIOL 1060 General Biology Lab. II or
5 - BIOL 1110 Principles of Biology II
4 - CH 1020 General Chemistry
3 - ENGL 1030 Composition and Rhetoric
3 - MATH 1010 Essential Math. for Informed Soc. or
3 - MATH 1020 Business Calculus I or
3 - MATH 1060 Calculus of One Variable I
1 - Elective
15-17

Sophomore Year
First Semester
3 - ACCT 2040 Horse Care Techniques
2 - MGT 2010 Principles of Management
3 - STAT 2300 Corporation Finance
3 - Arts and Humanities (Non-Lit.) Requirement
1 - Elective
15
Second Semester
3 - ECON 2110 Principles of Microeconomics
3 - FIN 3060 Corporation Finance
3 - Arts and Humanities (Literature) Requirement
3 - Social Science Requirement

Senior Year
First Semester
3 - AVS 4100 Domestic Animal Behavior
3 - Advanced AVS Nutrition/Physiology Req. or
3 - Animal-Human Interaction Course Req.
2 - AVS Hands-On Course Requirement
3 - Science and Technology in Society Req. or
15
Second Semester
3 - BIOL 1040 General Biology II
1 - BIOL 1060 General Biology Lab. II or
5 - BIOL 1110 Principles of Biology II
4 - CH 1010 General Chemistry
3 - MATH 3000 Fundamental Genetics
3 - ECON 2120 Principles of Macroeconomics
3 - Elective
15

Second Semester
3 - BIOL 1040 General Biology II and
1 - BIOL 1060 General Biology Lab. II or
5 - BIOL 1110 Principles of Biology II
4 - CH 1020 General Chemistry
3 - ENGL 1030 Composition and Rhetoric
3 - MATH 1010 Essential Math. for Informed Soc. or
3 - MATH 1020 Business Calculus I or
3 - MATH 1060 Calculus of One Variable I
1 - Elective
15-17

Junior Year
First Semester
3 - AVS 4100 Domestic Animal Behavior
4 - AVS 4160 Equine Exercise Physiology
3 - Advanced AVS Nutrition/Physiology Req. or
3 - Animal-Human Interaction Requirement
2 - AVS Hands-On Course Requirement
4 - Elective
14
Second Semester
3 - BIOL 1040 General Biology II
1 - BIOL 1060 General Biology Lab. II or
5 - BIOL 1110 Principles of Biology II
4 - CH 1010 General Chemistry
3 - MATH 3000 Fundamental Genetics
3 - ECON 2120 Principles of Macroeconomics
3 - Elective
16

Second Semester
3 - BIOL 1040 General Biology II and
1 - BIOL 1060 General Biology Lab. II or
5 - BIOL 1110 Principles of Biology II
4 - CH 1020 General Chemistry
3 - ENGL 1030 Composition and Rhetoric
3 - MATH 1010 Essential Math. for Informed Soc. or
3 - MATH 1020 Business Calculus I or
3 - MATH 1060 Calculus of One Variable I
1 - Elective
15-17

Senior Year
First Semester
3 - AVS 4100 Domestic Animal Behavior
4 - AVS 4160 Equine Exercise Physiology
3 - Advanced AVS Nutrition/Physiology Req. or
3 - Animal-Human Interaction Requirement
2 - AVS Hands-On Course Requirement
3 - Business Requirement
2 - Elective
14
120–123 Total Semester Hours

See General Education Requirements. AGRB and ECON courses may not be used to fulfill the Social Science Requirement. Three of these credits must also satisfy the Cross-Cultural Awareness Requirement.
PREVETERINARY AND SCIENCE CONCENTRATION

Freshman Year
First Semester
1 - PHYS 1090 General Physics I
2 - BIOL 1100 Principles of Biology I
3 - COMM 1500 Intro to Human Comm
3 - COMM 2500 Public Speaking

Second Semester
3 - BIOL 1060 General Biology Lab. I or
5 - BIOL 1110 Principles of Biology II
3 - MATH 1060 Calculus of One Variable I
1 - Elective
15-16

Sophomore Year
First Semester
3 - CH 2230 Organic Chemistry I
1 - CH 2270 Organic Chemistry Lab.
3 - PHYS 2070 General Physics I
1 - PHYS 2090 General Physics Lab. I
3 - Arts and Humanities (Literature) Requirement
2 - AVS Hands-On Course Requirement
2 - Elective
15

Second Semester
3 - CH 2240 Organic Chemistry II
1 - CH 2280 Organic Chemistry Lab.
3 - PHYS 2080 General Physics II
1 - PHYS 2100 General Physics Lab II.
3 - STAT 2300 Statistical Methods I
3 - Arts and Humanities (Non-Lit.) Requirement
1 - Elective
15

Junior Year
First Semester
4 - AVS 3010 Anat. and Phys. of Domestic Animals
1 - BCHM 3010 Molecular Biochemistry or
3 - BCHM 3050 Essential Elements of Biochem, or
3 - BCHM 4060 Physiological Chemistry
2 - Elective
15

Second Semester
3 - GEN 3000 Fundamental Genetics
4 - MICR 3050 General Microbiology
3 - Advanced AVS Nutrition/Physiology Req.
3 - Animal-Human Interaction Course Req.
3 - Social Science Requirement
16

Senior Year
First Semester
3 - AVS 4100 Domestic Animal Behavior
3 - Capstone Course Requirement
3 - General Advanced Science Requirement
3 - Social Science Requirement
3 - Science and Technology in Society Req.
15

Second Semester
3 - Advanced AVS Nutrition/Physiology Req.
2 - AVS Hands-On Course Requirement
3 - AVS Products or Production Course Req.
3 - General Advanced Science Requirement
3 - Elective
14

120–123 Total Semester Hours

PREPROFESSIONAL HEALTH SCIENCES—VETERINARY MEDICINE

Under a regional plan, the South Carolina Prevetinary Advisory Committee coordinates a program for South Carolina residents who are interested in pursuing careers in veterinary medicine. South Carolina residents attending any college or university may apply through the Veterinary Medical College Application Service (VMCAS) to the University of Georgia College of Veterinary Medicine. The University of Georgia admits up to 15 students each year through arrangements with the Southern Regional Education Board. The State of South Carolina has a contract with the University of Georgia to admit up to four South Carolina residents. Application must be made directly to the University of Georgia.

Minimum course requirements for admission to colleges/schools of veterinary medicine vary. Students are encouraged to contact the admissions offices of colleges/schools of interest in order to ensure they are aware of requirements. In general, course requirements include the satisfactory completion of prescribed courses in a well-rounded undergraduate degree program. Specific requirements for admission to the University of Georgia College of Veterinary Medicine include the following undergraduate courses: six credits of English, 14 credits of humanities and social studies, eight credits of physics, eight credits of general biology, eight credits of advanced biology, three credits of biochemistry, and 16 credits of organic and inorganic chemistry. Chemistry and physics courses must be at the premedical level; they may not be survey courses.

To be in the best competitive position, applicants should complete courses in animal agriculture, genetics, nutrition, biochemistry, and advanced biology. Considerations for selection are character, scholastic achievement, personality, experience with large and small animals, general knowledge, and motivation. In the past, competition has been keen, and only those applicants who have shown exceptional ability have been admitted. Specific considerations may include a minimal grade-point average and completion of standardized tests such as the Graduate Record Examination and the Veterinary College Admission Test.

Since out-of-state students attending Clemson are ineligible to apply to the University of Georgia or Tuskegee University under the South Carolina quota, they should contact the college(s) of veterinary medicine to which they plan to apply. They may apply at the University of Georgia for out-of-state admission.

Veterinary schools accept students with a broad range of academic backgrounds; therefore, it is recommended that the beginning university student select any undergraduate major and simultaneously complete the courses required for veterinary school entrance and those required for completion of a BS or BA degree. For students selecting Animal and Veterinary Sciences or Biological Sciences at Clemson University, the basic curricula have been designed to accommodate Georgia’s entrance requirements. Further information is available from the Department of Animal and Veterinary Sciences at 864-656-3427.

ENVIRONMENTAL AND NATURAL RESOURCES

Bachelor of Science
The Environmental and Natural Resources curriculum produces professionals who have a broad-based knowledge in natural resources and an ability to interact with other resource professionals to provide thoughtful solutions to environmental and natural resource problems. The world is blessed with an abundance of natural resources, but the problems associated with their conservation are immense. Protection of rare and endangered species, preventing and controlling invasions of exotics, protecting old growth forests, restoring degraded ecosystems, and balancing the resource demands of industry and the public are some of the environmental issues which are enmeshed in politicized environments.

Three concentrations are offered within the Environmental and Natural Resources major, which is administered by the Department of Forestry and Environmental Conservation. The Conservation Biology Concentration is oriented toward students...
who desire a greater exposure to taxa, their habitats, and their interrelationships. The Natural Resources Management Concentration emphasizes both resource management and negotiation skills. The Natural Resource and Economic Policy Concentration provides more in-depth study in economics and policy applications.

Graduates in Environmental and Natural Resources are well prepared for further graduate studies in natural resources and related fields. Potential public sector employers of graduates include federal, state, and municipal resource management agencies, private industries impacting land and water resources, environmental management consulting firms, and various environmental advocacy groups.

**Freshman Year**

First Semester
- 3 - BIOL 1030 General Biology I
- 1 - BIOL 1050 General Biology Lab. I
- 4 - CH 1010 General Chemistry or
- 4 - CH 1050 Chemistry in Context I
- 1 - ENR 1010 Conservation and Environmental and Natural Resources I
- 3 - MATH 1020 Business Calculus I
- 3 - Oral Communications Requirement

Second Semester
- 3 - BIOL 1040 General Biology II
- 1 - BIOL 1060 General Biology Lab. II
- 4 - CH 1020 General Chemistry or
- 4 - CH 1060 Chemistry in Context II
- 3 - ENGL 1030 Composition and Rhetoric
- 1 - ENR 1020 Introduction to Environmental and Natural Resources II
- 3 - STAT 2300 Statistical Methods I

**Sophomore Year**

First Semester
- 3 - AGRB 2020 Agricultural Economics or
- 3 - ECON 2110 Principles of Microeconomics
- 4 - BIOL 3200 Field Botany and
- 1 - Elective or
- 2 - FOR 2050 Dendrology and
- 3 - FOR 2210 Forest Biology
- 3 - CH 2100 Survey Organic Chemistry
- 4 - FNR 2040 Soil Information Systems or
- 4 - PES 2020 Soils

Second Semester
- 3 - GEN 3000 Fundamental Genetics
- 4 - WFB (BIOL) 3130 Conservation Biology
- 3 - Arts and Humanities (Literature) Requirement
- 3 - Physical Environment Requirement
- 3 - Taxonomy/Habitat Requirement

**Junior Year**

First Semester
- 3 - BIOL 3350 Evolutionary Biology
- 3 - Arts and Humanities (Non-Lit.) Requirement
- 3 - Ecology Requirement
- 3 - Natural Resource Economics Requirement
- 3 - Taxonomy/Habitat Requirement

Second Semester
- 3 - ENGL 3140 Technical Writing
- 3 - ENR 3020 Natural Resources Measurements
- 3 - Ecology Requirement
- 3 - Physiology Requirement
- 3 - Taxonomy/Habitat Requirement

**Senior Year**

First Semester
- 3 - FOR (ENR) 4340 GIS for Natural Resources
- 3 - Internship, Creative Inquiry or Directed Research Requirement

Second Semester
- 3 - ENR 4130 Restoration Ecology
- 3 - ENR 4500 Conservation Issues
- 3 - Elective

120 Total Semester Hours

CONSERVATION BIOLOGY CONCENTRATION

**Sophomore Year**

First Semester
- 3 - AGRB 2020 Agricultural Economics or
- 3 - ECON 2110 Principles of Microeconomics
- 4 - BIOL 3200 Field Botany and
- 1 - Elective or
- 2 - FOR 2050 Dendrology and
- 3 - FOR 2210 Forest Biology
- 3 - CH 2100 Survey Organic Chemistry
- 4 - FNR 2040 Soil Information Systems or
- 4 - PES 2020 Soils

Second Semester
- 3 - GEN 3000 Fundamental Genetics
- 4 - WFB (BIOL) 3130 Conservation Biology
- 3 - Arts and Humanities (Literature) Requirement
- 3 - Physical Environment Requirement
- 3 - Taxonomy/Habitat Requirement

15

**Junior Year**

First Semester
- 3 - AGRB 3570 Natural Res. Economics
- 3 - ECON 2110 Principles of Microeconomics
- 3 - Arts and Humanities (Literature) Requirement
- 3 - Arts and Humanities (Non-Lit.) Requirement
- 3 - Elective

Second Semester
- 3 - AGRB 4750 Econ of Wildlife Mgt & Policy or
- 3 - FOR 3040 Forest Resource Economics
- 3 - ECON 4050 Intro to Econometrics or
- 3 - STAT 3320 Statistical Methods II
- 3 - ENSP 4000 Studies in Environmental Science
- 3 - Macroeconomics Requirement
- 3 - Natural Science or Minor Requirement

15

**Senior Year**

First Semester
- 3 - AGRB 4570 Natural Resource Use, Technology & Policy
- 3 - ECON 3190 Environmental Economics
- 6 - Agribusiness Requirement or
- 3 - Agribusiness Requirement and
- 3 - Minor Requirement
- 3 - Internship, Creative Inquiry or Directed Research Requirement

15

120 Total Semester Hours

Students planning to take organic chemistry must take CH 1010 and CH 1020 and must satisfy the General Education Science and Technology in Society Requirement through another course.

See General Education Requirements. Students must also select a course to satisfy the Cross-Cultural Awareness General Education Requirement.

**NATURAL RESOURCE AND ECONOMIC POLICY CONCENTRATION**

**Sophomore Year**

First Semester
- 3 - AGRB 2020 Agricultural Economics or
- 3 - ECON 2110 Principles of Microeconomics
- 3 - POSC 1010 American National Government or
- 3 - POSC 1020 Intro. to International Relations
- 3 - Geography Requirement
- 3 - Natural Science or Minor Requirement
- 3 - Elective

15

Second Semester
- 3 - POSC 1020 American National Government or
- 3 - POSC 1010 American National Government
- 3 - Internship (AGRB 4910); Creative Inquiry (AGRB 4940); or Directed Research (PES 4910 or 4920)
- 3 - RS (SOC) 4010 or RS (SOC) 4590

15

2017-2018 Undergraduate Announcements
### First Semester
- FNR 2040 Soil Information Systems or  
- PES 2020 Soils
- FOR 2210 Forest Biology
- WFB 3000 Wildlife Biology
- Arts and Humanities (Literature) Requirement

### Second Semester
- ENR 3020 Natural Resources Measurements  
- FOR 2060 Forest Ecology
- WFB 3500 Principles of Fish and Wildlife Biol.
- Arts and Humanities (Nurs.) Requirement
- Social Science Requirement

### Junior Year
#### First Semester
- AGRB 2020 Agricultural Economics or  
- ECON 2110 Principles of Microeconomics
- BIOL 3200 Field Botany or  
- BIOL 4060 Intro. Plant Taxonomy and
- BIOL 4070 Plant Taxonomy Lab.
- ENR 4290 Environmental Law and Policy
- Minor Requirement
- Elective

#### Second Semester
- AGRB 3570 Natural Resources Economics
- GEOL 1010 Physical Geology
- GEOL 1030 Physical Geology Lab.
- WFB (BIOL) 3130 Conservation Biology
- Minor Requirement

#### Senior Year
#### First Semester
- FOR (ENR) 4160 Forest Policy and Admin.
- FOR (ENR) 4340 GIS for Natural Resources
- Internship, Creative Inquiry or Directed Research Requirement
- Minor Requirement
- Elective

#### Second Semester
- ENGL 3140 Technical Writing
- ENR 4500 Conservation Issues
- FOR 4060 Forested Watershed Management
- WFB 4620 Wetland Wildlife Biology
- Minor Requirement

### 121 Total Semester Hours

1. Conservation Biology Concentration and Natural Resources Management Concentration students or students planning to take organic chemistry must take CH 1010 and CH 1020 and must satisfy the General Education Science and Technology in Society Requirement through another course.
2. See General Education Requirements. Three of these credit hours must also satisfy the Cross-Cultural Awaremess Requirements.
3. A minor is required and must be selected from the list of acceptable minors for students in the College of Agriculture, Forestry and Life Sciences on page 58.

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### Food Science and Human Nutrition

#### Bachelor of Science

Food Science and Human Nutrition majors apply principles of basic and applied sciences to the design and manufacture of high quality, sustainable, convenient, safe and nutritious foods, in addition to identifying the relationship between nutrients and human health. The curriculum allows flexibility for concentrating in one of two areas:

In the Food Science and Technology Concentration, students choose to focus their program of study in one of three emphasis areas: (1) Food Packaging and Manufacturing Operations; (2) Sustainable Food, Nutrition and Health; or (3) Culinary Science. All three emphasis areas are approved by the Institute of Food Technologies (IFT), with the Culinary Science emphasis also being one of a few select national programs approved by the Research Chef’s Association as meeting the requirements for the title of Culinology.

The food industry is a global effort that requires highly skilled individuals with strong science knowledge and technical skills. Our program not only prepares students in these areas, but also has a focus on engaging students in "real world" teamfaced research projects and understanding the creation and development of successful global food businesses. The program has hands-on food business entrepreneurship, study abroad and internship opportunities.

Opportunities for employment include a wide variety of career paths, such as new food product research and development, design of sustainable food systems, quality assurance management, analytical testing, operations management, food packaging applications, marketing, customer services and technical sales. Local, state and federal agencies also need graduates for positions in sustainability, food safety and regulatory positions.

In the Nutrition Concentration, students choose to focus their program of study in one of four emphasis areas: (1) Dietetics; (2) Basic and Behavioral Science; (3) Community Health and Wellness; or (4) Food Industry. The same course plan is followed the first two years with the junior and senior years varying according to the emphasis plan. Students normally choose the emphasis by the beginning of the spring semester of the sophomore year so as not to delay graduation. The Dietetics emphasis prepares students for an ACEND-accredited dietetic internship program to become a Registered Dietitian or Registered Dietitian Nutritionist (RD or RDN). The curriculum for the Nutrition concentration with a Dietetics emphasis is accredited by the Accreditation Council for Education in Nutrition and Dietetics (ACEND) as a Didactic Program in Dietetics. The Basic and Behavioral Science emphasis prepares students for graduate study in nutrition and health professions. The Community Health and Wellness emphasis prepares students for careers in community nutrition interacting with healthy populations. The Food Industry emphasis allows students to pair nutrition and food science knowledge for job opportunities in food product development.

To become a RD or RDN, students must complete three main steps. Information on these steps is available at http://www.eatrightacend.org/ACEND/content.  

Statement Policy. Success completion of Clemson University’s B.S. in Food Science and Human Nutrition with a concentration in Nutrition and an emphasis in Dietetics fulfills only the first step of the three step process to become a RD or RDN. Students who select the Dietetics emphasis must complete a formal application process and meet specific criteria for acceptance into the emphasis. The demand for dietetic internship positions greatly exceeds the number of available positions. Due to the competitive nature of dietetic internship acceptance, minimum grade criteria in specific courses are required for Dietetics emphasis acceptance. Two application times for admission into the Dietetics emphasis are available, one at the beginning of the spring semester and one at the beginning of the fall semester. Acceptance and successful completion of the Dietetics emphasis curriculum will not guarantee acceptance into an ACEND-accredited dietetic internship, and two in the process of becoming a RD or RDN.

For Dietetics emphasis admission, students must meet the following requirements:

1. Documented attendance at a dietetics program information session discussing the steps to become a RD/RDN;
2. Complete at least 60 credit hours by the end of the semester the student is applying;
3. Have a minimum GPA of 3.20;
4. Complete BIOL 1030 and BIOL 1050 (or BIOL 1100), BIOL 1040 and BIOL 1060 (or BIOL 1110), CH 1010, CH 1020, CH 2230, CH 2270, BIOL 2220, PSYC 2010 and ECON 2000 or ECON 2120 with a C or better;
5. Complete FDSC 1010, NUTR 2030 and NUTR 2160 with a B or better; and
6. Complete a Dietetics emphasis application form by the beginning of either spring semester or fall semester.

Students with a GPA of less than 3.20 GPA but greater than 3.00 are conditionally accepted with final acceptance based on posted semester grades. Students are allowed to apply up to two times. Once in the Dietetics emphasis, a student may complete the curriculum, but must maintain a minimum GPA of 2.00. To receive a signed Declaration of Intent and/or Verification Statement, students must comply with the GPA, grade and other requirements indicated in the “Declaration of Intent and Verification Statement Policy.” A signed Verification Statement is required for admission to an ACEND-accredited dietetic internship program, but receipt of a Verification Statement does not guarantee acceptance into an ACEND-accredited dietetic internship program. (See the FNPS Handbook for more details.)

To receive a signed Declaration of Intent and/or Verification Statement, a student must meet the following academic and professional requirements:

1. Earn a minimum of a baccalaureate degree from a U.S. regionally accredited college/university;
2. Complete all the academic requirements of a dietetics education program accredited by ACEND;
3. Demonstrate an overall minimum GPA of 3.00 based on all completed college coursework; 4. Complete all DPD-required NUTR and FDSC courses with a B or better; 5. Complete all other DPD-required coursework with a C or better; and 6. Adhere to Clemson University’s Academic Integrity Policy and the Student Code of Conduct.
Combined Bachelor of Science/Master of Science Degree Program
The Department of Food, Nutrition and Packaging Sciences also offers an accelerated five-year combined bachelor’s/master’s program that allows students to count up to twelve hours of graduate credit toward both the BS degree in Food Science and Human Nutrition and the MS degree in Food, Nutrition and Culinary Sciences. Details are available from the Department of Food, Nutrition and Packaging Sciences or at www.clemson.edu/fnps.

FOOD SCIENCE
AND TECHNOLOGY
CONCENTRATION

Freshman Year
First Semester
3 - BIOL 1030 General Biology I and
1 - BIOL 1050 General Biology Lab. I or
5 - BIOL 1100 Principles of Biology I
4 - CH 1010 General Chemistry
3 - COMM 1500 Intro. to Human Comm. or
3 - COMM 2500 Public Speaking
1 - FDSC 1010 Intro. to Food Sci & Human Nutr
3 - MATH 1020 Business Calculus I or
4 - MATH 1060 Calculus of One Variable I

Second Semester
3 - BIOL 1040 General Biology II and
1 - BIOL 1060 General Biology Lab. II or
5 - BIOL 1110 Principles of Biology II
4 - CH 1020 General Chemistry
3 - ENGL 1030 Composition and Rhetoric
1 - FDSC 1020 Perspectives in Food and Nutrition Sciences
1 - FDSC 4500 Creative Inquiry
3 - PSYC 2010 Introduction to Psychology

Sophomore Year
First Semester
3 - CH 2010 Survey of Organic Chemistry and
1 - CH 2020 Survey of Organic Chemistry Lab. or
3 - CH 2230 Organic Chemistry and
1 - CH 2270 Organic Chemistry Lab.
3 - FDSC 3010 Food Regulations and Policy
1 - FDSC 4500 Creative Inquiry
3 - PHYS 1220 Physics with Calculus I and
1 - PHYS 1240 Physics Lab. I or
4 - PHYS 2000 Introductory Physics or
3 - PHYS 2070 General Physics I and
1 - PHYS 2090 General Physics I Lab.
3 - STAT 2300 Statistical Methods I

Second Semester
3 - BCHM 3050 Essential Elements of Biochem.
3 - FDSC 2140 Food Resources and Society
2 - FDSC 3040 Evaluation of Dairy Products
3 - FDSC 4090 Total Qual Mgt for Food & Pckg
1 - FDSC 4170 Seminar
1 - FDSC 4500 Creative Inquiry
3 - Social Science Requirement1,2

Junior Year
First Semester
3 - FDSC 4100 Food Chemistry I
1 - FDSC 4500 Creative Inquiry
4 - MICR 3050 General Microbiology
3 - NUTR 2030 Introduction to Principles of Human Nutrition
3 - Departmental Requirement3
3 - Arts and Humanities (Literature) Req.1

Second Semester
3 - FDSC 4200 Food Chemistry II
2 - FDSC 4300 Food Chemistry and Analysis
1 - FDSC 4500 Creative Inquiry
4 - MICR 4070 Food and Dairy Microbiology
3 - STAT 3300 Statistical Methods II
3 - Emphasis Area Requirement4

Senior Year
First Semester
3 - ENGL 3040 Business Writing or
3 - ENGL 3140 Technical Writing
3 - FDSC 4200 (Quality Certifications)
1 - FDSC 4060 Food Preserv & Processing Lab
1 - FDSC 4180 Seminar
1 - FDSC 4500 Creative Inquiry
6 - Emphasis Area Requirement4

Second Semester
4 - FDSC 4280 Food Process Engineering
4 - FDSC 4100 Food Product Development
1 - FDSC 4500 Creative Inquiry
3 - Arts and Humanities (Non-Lit) Req.1
3 - Emphasis Area Requirement4

15-16
125–130 Total Semester Hours

NUTRITION CONCENTRATION
Freshman Year
First Semester
3 - BIOL 1030 General Biology I and
1 - BIOL 1050 General Biology Lab. I or
5 - BIOL 1100 Principles of Biology I
4 - CH 1010 General Chemistry
3 - COMM 1500 Intro. to Human Comm. or
3 - COMM 2500 Public Speaking
1 - FDSC 1010 Introduction to Food Science and Human Nutrition
3 - MATH 1020 Business Calculus I or
4 - MATH 1060 Calculus of One Variable I

Second Semester
3 - BIOL 1040 General Biology II and
1 - BIOL 1060 General Biology Lab. II or
5 - BIOL 1110 Principles of Biology II
4 - CH 1020 General Chemistry
3 - ENGL 1030 Composition and Rhetoric
3 - PSYC 2010 Introduction to Psychology
1 - Elective
15-16

Sophomore Year
First Semester
4 - BIOL 2200 Human Anatomy and Physiology I
3 - CH 2230 Organic Chemistry
1 - CH 2270 Organic Chemistry Lab.
3 - ECON 2000 Economic Concepts or
3 - ECON 2120 Principles of Macroeconomics
3 - NUTR 2030 Introduction to Principles of Human Nutrition
2 - NUTR 2160 Evidence-Based Nutrition

Second Semester
3 - BCHM 3050 Essential Elements of Biochem.
4 - BIOL 2230 Human Anatomy and Physiology II
3 - MGT 2100 Principles of Management
3 - NUTR 2040 Nutrition Across the Life Cycle
3 - STAT 2300 Statistical Methods I
15-16

Junior Year
First Semester
3 - ACCT 2020 Managerial Accounting Concepts
1 - FDSC 4500 Creative Inquiry
4 - MICR 3050 General Microbiology
4 - NUTR 3020 Nutrition Assessment
3 - NUTR 4510 Human Nutrition & Metabolism I

Second Semester
3 - FDSC 2150/2151, 2160/2161, 3060 or 3070, and three sections of FDSC 4200 (International Cuisine, Ingredient and Flavor, Quality Certifications). The following optional courses are required for Research Chef’s Association Culinary™ Designation: FDSC 2500 and 3500.

Food Packaging and Manufacturing—ACCT 2010 or 2020, and FDSC 4200 (Quality Certifications), PFSIC 4010, 4640/4641 Sustainable Food, Nutrition and Health—Students select four of the following: BIOL 2230/2231, FDSC 4200 (Quality Certifications), HLTH 2500, HORT 4560, NUTR 4510.

See General Education Requirements. Three of these credits must also satisfy the Cross-Cultural Awareness General Education Requirement.

For students undecided on concentration area, AGRB 2020, ECON 2110, or 2120 is recommended.

AVS 4130, BIOL 2220, or FDSC 4300. BIOL 2220 is recommended for students interested in the Sustainable Food, Nutrition and Health Designation: FDSC 2500 and 3500.

Emphasis areas consist of 12 to 15 credit hours. See advisor and departmental handbook/website for more detailed information.

Culinary Science (Culinology™)—FDSC 2150/2151, 2160/2161, 3060 or 3070, and three sections of FDSC 4200 (International Cuisine, Ingredient and Flavor, Quality Certifications). The following optional courses are required for Research Chef’s Association Culinary™ Designation: FDSC 2500 and 3500.

Food Packaging and Manufacturing—ACCT 2010 or 2020, and FDSC 4200 (Quality Certifications), PFSIC 4010, 4640/4641 Sustainable Food, Nutrition and Health—Students select four of the following: BIOL 2230/2231, FDSC 4200 (Quality Certifications), HLTH 2500, HORT 4560, NUTR 4510.
For students interested in conservation biology, water, and natural resources, the Department of Forestry and Environmental Conservation also administers the Conservation Biology Concentration and the Natural Resources Management Concentration within the Environmental and Natural Resources degree program. See pages 48-50 for program details.

### Freshman Year

#### First Semester
- 1 - FOR 1010 Introduction to Forestry
- 3 - ENGL 1030 Composition and Rhetoric
- 3 - BIOL 1030 General Biology I
- 1 - MATH 1020 Business Calculus I
- 1 - ENR 1010 Intro. to Environ. and Natural Res. I
- 3 - Arts and Humanities (Literature) Requirement
- 3 - Arts and Humanities (Non-Lit.) Requirement
- 3 - Minor Requirement

#### Second Semester
- 3 - FOR 2510 Forest Communities
- 1 - FOR 2520 Forest Mensuration
- 1 - FOR 2540 Forest Products
- 4 - FOR 2530 Forest Mensuration
- 4 - FOR 2520 Forest Operations
- 4 - FOR 2540 Forest Products

### Sophomore Year

#### First Semester
- 3 - BIOL 1030 General Biology I
- 1 - BIOL 1050 General Biology Lab. I
- 4 - CH 1010 General Chemistry
- 1 - ENR 1010 Intro. to Environ. and Natural Res. I
- 3 - MATH 1020 Business Calculus I
- 1 - Oral Communication Requirement

#### Second Semester
- 3 - BIOL 1040 General Biology II
- 1 - BIOL 1060 General Biology Lab. II
- 3 - ENGL 1030 Composition and Rhetoric
- 1 - FOR 1010 Introduction to Forestry
- 3 - STAT 2300 Statistical Methods I
- 4 - Departmental Science Requirement

### Junior Year

#### First Semester
- 2 - FOR 3020 Forest Biometrics
- 3 - FOR 3040 Forest Resource Economics
- 3 - FOR 3410 Wood Procurement Practices in the Forest Industry
- 4 - FOR 4130 Integrated Forest Pest Management
- 4 - FOR (ENR) 4340 GIS for Natural Resources
- 1 - Internship, Creative Inquiry or Directed Research Requirement

#### Second Semester
- 3 - BIOL 1040 General Biology II
- 1 - BIOL 1060 General Biology Lab. II
- 3 - ENGL 1030 Composition and Rhetoric
- 1 - FOR 1010 Introduction to Forestry
- 3 - STAT 2300 Statistical Methods I
- 4 - Departmental Science Requirement

### Senior Year

#### First Semester
- 2 - FOR 3080 Remote Sensing in Forestry
- 3 - FOR 4080 Wood and Paper Products
- 3 - FOR 4180 Forest Resource Valuation
- 4 - FOR 4650 Silviculture
- 3 - Minor Requirement
- 1 - Internship, Creative Inquiry or Directed Research Requirement

#### Second Semester
- 3 - BIOL 1040 General Biology II
- 1 - BIOL 1060 General Biology Lab. II
- 3 - ENGL 1030 Composition and Rhetoric
- 1 - FOR 1010 Introduction to Forestry
- 3 - STAT 2300 Statistical Methods I
- 4 - Departmental Science Requirement

### LAND SURVEYING EMPHASIS AREA

#### Freshman Year

#### First Semester
- 3 - BIOL 1030 General Biology I
- 1 - BIOL 1050 General Biology Lab. I
- 4 - CH 1010 General Chemistry
- 1 - ENR 1010 Intro. to Environ. and Natural Res. I
- 3 - MATH 1020 Business Calculus I
- 1 - Oral Communication Requirement

#### Second Semester
- 3 - BIOL 1040 General Biology II
- 1 - BIOL 1060 General Biology Lab. II
- 3 - ENGL 1030 Composition and Rhetoric
- 1 - FOR 1010 Introduction to Forestry
- 3 - STAT 2300 Statistical Methods I
- 4 - Departmental Science Requirement

#### Sophomore Year

#### First Semester
- 2 - FOR 2050 Dendrology
- 2 - FOR 2110 Forest Biology
- 3 - Arts and Humanities (Literature) Requirement
- 3 - Economics Requirement

#### Second Semester
- 3 - BIOL 1040 General Biology II
- 1 - BIOL 1060 General Biology Lab. II
- 3 - ENGL 1030 Composition and Rhetoric
- 1 - FOR 1010 Introduction to Forestry
- 3 - STAT 2300 Statistical Methods I
- 4 - Departmental Science Requirement

#### Third Semester
- 2 - FOR 3080 Remote Sensing in Forestry
- 3 - FOR 4080 Wood and Paper Products
- 3 - FOR 4180 Forest Resource Valuation
- 4 - FOR 4650 Silviculture
- 3 - Minor Requirement
- 1 - Internship, Creative Inquiry or Directed Research Requirement
### Freshman Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td>1 BIOL 1030 General Biology I</td>
<td>1 HORT 1010 Horticulture</td>
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<tr>
<td>1 BIOL 1050 General Biology Lab. I</td>
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<td>4 CH 1010 General Chemistry</td>
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<tr>
<td>3 HORT 1010 Horticulture</td>
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<tr>
<th>Junior Year</th>
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<tbody>
<tr>
<td>First Semester</td>
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<tr>
<td>3 - Elective</td>
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<tr>
<td>3 - Related Science Requirement</td>
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<tr>
<td>3 - Horticulture Specialization Requirement</td>
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<td>3 - Business Requirement</td>
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<td>3 - Elective</td>
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<th>Senior Year</th>
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<tr>
<td>First Semester</td>
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<tr>
<td>3 - Horticulture Specialization Requirement</td>
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<td>6 - Related Science Requirement</td>
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<td>3 - Elective</td>
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<table>
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<tr>
<th>Senior Year (Optional)</th>
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<tbody>
<tr>
<td>Summer</td>
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<tr>
<td>3 - Horticulture Internship</td>
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### Sophomore Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td>3 HORT 2010 Growing Garden Plants in the Fall</td>
<td>3 HORT 2110 Growing Plants in the Spring</td>
</tr>
<tr>
<td>3 HORT 3030 Landscape Plants</td>
<td>4 PES 2020 Soils</td>
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<tr>
<td>3 MATH 1010 Essential Math. for Informed Soc.</td>
<td>3 Arts and Humanities (Literature) Requirement</td>
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<td>4 Plant Biology Requirement</td>
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### HORTICULTURE Bachelor of Science

Horticulture connects plants and people to improve our world, be it through the enhancement of the foods we eat, the creation of healthy natural living spaces, the economic and aesthetic enhancement of our homes and communities, or the application of green solutions to the challenges of environmental quality. The plants of horticulture are the foundation of human and environmental well being, and it is horticulture professionals who have the knowledge, skills, and passion to utilize those plants for the betterment of humankind.

The Horticulture degree program includes courses in science, mathematics, business, leadership, law, and communication, combined with a strong foundation in horticultural sciences and arts. The curriculum provides the flexibility to choose courses within those categories that best support the student’s personal interests, goals, and success. Career opportunities are endless.

Students work closely with faculty in creative inquiry groups to investigate and implement solutions to real problems. Internships are excellent opportunities to learn and explore potential careers.

### Combined Bachelor of Science/Master of Science Degree Program

Horticulture students may begin a Master of Science degree in Plant and Environmental Sciences or a Master of Science degree in Entomology while completing their Bachelor of Science degree, and use up to 12 credits to satisfy the requirements of both the undergraduate and graduate degrees. To be eligible for this plan, students must have a 3.4 or higher grade-point average and have completed at least 90 credits of coursework. Details are available from the Department of Plant and Environmental Sciences.

### Freshman Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td>1 BIOL 1030 General Biology I</td>
<td>1 HORT 1010 Horticulture</td>
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<td>1 BIOL 1050 General Biology Lab. I</td>
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<td>4 CH 1010 General Chemistry</td>
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<td>3 HORT 1010 Horticulture</td>
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<tr>
<th>Second Semester</th>
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<td>3 - Related Science Requirement</td>
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<td>3 - Business Requirement</td>
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<td>3 - Elective</td>
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### Sophomore Year

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<tr>
<th>First Semester</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td>3 HORT 2010 Growing Garden Plants in the Fall</td>
<td>3 HORT 2110 Growing Plants in the Spring</td>
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<td>3 Arts and Humanities (Literature) Requirement</td>
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<tr>
<td>4 Plant Biology Requirement</td>
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Note: Horticulture majors must earn a C or better in all HORT classes.
PACKAGING SCIENCE

Bachelor of Science

The Bachelor of Science degree in Packaging Science prepares students for careers in industries producing and utilizing packages for all types of products. Packaging is an essential part of industrialized economies, protecting, preserving, and helping to market products. The field of packaging is highly competitive and highly innovative, requiring an ever-increasing number of professional positions.

Opportunities for employment include a wide variety of career paths such as manufacturing, marketing, sales, design, purchasing, quality assurance, and customer services. Most career opportunities are in positions requiring technical knowledge combined with management and marketing skills.

The core curriculum assures graduates of having the skills and knowledge required by most entry-level packaging positions. Emphasis area choices or minors allow students to select courses to improve career preparation for specific industry segments, including: Distribution, Transportation and Engineering Technology; Food and Health Care Packaging; Materials; and Package Design and Graphics. Alternatively, any University-approved minor may be completed.

Students changing majors into Packaging Science must:
1. have an overall minimum GPA of 2.0; and
2. have completed four of the following courses with an average GPA of 2.7:
   - BIOL 1030, 1040, CH 1010, 1020, MATH 1060, PHYS 1220, 2070, 2080, 2210; or both MATH 1040 and 1070; and
3. have completed PKSC 1020 with a grade of B or higher.

Combined Bachelor of Science/Master of Science Degree Program

The Department of Food, Nutrition and Packaging Sciences also offers an accelerated five-year combined bachelor’s/master’s program that allows students to count up to twelve hours of graduate credit toward both the BS degree in Packaging Science and the MS degree in Packaging Science. Details are available from the Department of Food, Nutrition and Packaging Sciences or at www.clemson.edu/fnps.

Freshman Year
First Semester
- 3 - BIOL 1030 General Biology I
- 1 - BIOL 1050 General Biology Lab. I
- 4 - CH 1010 General Chemistry
- 4 - MATH 1060 Calculus of One Variable I
- 1 - PKSC 1010 Packaging Orientation
- 3 - Social Science Requirement

Second Semester
- 3 - BIOL 1040 General Biology II
- 1 - BIOL 1060 General Biology Lab. II
- 4 - CH 1020 General Chemistry
- 3 - COMM 1500 Intro to Human Comm or
- 3 - COMM 2500 Public Speaking
- 3 - ENGL 1030 Composition and Rhetoric
- 2 - PKSC 1020 Intro. to Packaging Science

Sophomore Year
First Semester
- 3 - CH 2010 Survey of Organic Chemistry and
- 1 - CH 2020 Survey of Organic Chemistry Lab. or
- 3 - CH 2230 Organic Chemistry and
- 1 - CH 2270 Organic Chemistry Lab.
- 3 - PHYS 1220 Physics with Calculus I and
- 1 - PHYS 1240 Physics Lab. I or
- 3 - PHYS 2070 General Physics I and
- 1 - PHYS 2090 General Physics I Lab.
- 4 - PKSC 2020 Packaging Materials and Manufacture
- 4 - PKSC 2200 Product/Package Design and Prototyping

Second Semester
- 3 - PHYS 2080 General Physics II and
- 1 - PHYS 2100 General Physics II Lab. or
- 3 - PHYS 2210 Physics with Calculus II and
- 1 - PHYS 2230 Physics Lab. II
- 3 - PKSC 2010 Packaging Perishable Products
- 3 - PKSC 2040 Container Systems
- 3 - PKSC 2060 Container Systems Lab.1
- 3 - Arts and Humanities (Literature) Requirement

Summer
- 0 - COOP 1010 Cooperative Education*

Junior Year
First Semester
- 3 - ENGL 3140 Technical Writing
- 4 - GC 1030 Graphic Comm. I for Packaging Sci.
- 3 - PKSC 4100 Packaging Machinery
- 3 - PKSC 4040 Mechanical Properties of Packages and Principles of Protective Packaging
- 1 - PKSC 4540 Product and Package Eval. Lab.1,2
- 3 - Emphasis Area Requirement

Second Semester
- 3 - PKSC 3200 Package Design Theory
- 3 - PKSC 3680 Packaging and Society
- 3 - PKSC 4300 Converting for Flexible Packaging
- 3 - PKSC 4400 Packaging for Distribution
- 3 - Emphasis Area Requirement

Senior Year
First Semester
- 4 - PKSC 4160 Appl. of Polymers in Packaging
- 4 - PKSC 4640 Food and Health Care Pkg. Syst.
- 3 - STAT 2300 Statistical Methods I
- 3 - Emphasis Area Requirement

Second Semester
- 3 - AGRB 2020 Agricultural Economics or
- 3 - ECON 2110 Principles of Microeconomics
- 1 - PKSC 4300 Packaging Career Preparation
- 1 - PKSC 4200 Package Design and Development
- 3 - Arts and Humanities (Non-Lit.) Requirement
- 6 - Emphasis Area Requirement

Total Semester Hours

1. Have an overall minimum GPA of 2.0; and
2. Complete PKSC 1020, 2020, 2040, and 2060 with a grade of C or better before being allowed to register for PKSC 4010, 4040, 4100, 4300, 4400, 4540, 4640.
3. Earn a C or better in all PKSC courses in order to graduate.

See General Education Requirements. Three of these credit hours must also satisfy the Core-Cultural Awareness Requirement. Note: Social Science Requirement must be in an area other than economics or applied economics. A 2000 level or higher modern language course is recommended to satisfy the Arts and Humanities (Non-Literature) Requirement.

Students interested in minors or emphasis areas should take any prerequisites in the sophomore year.

At least one 15-week period of 40 hour weeks of Cooperative Education is required. A six-month period is preferred. Two 10-week summer periods of 40 hours with the same company is an option.

PKSC 4340 and 4540 must be taken concurrently.

Completion of any emphasis area or university approved minor is required. Emphasis areas consist of 15 credit hours from one of the following areas (additional emphasis area courses may be approved by emphasis area coordinator):

- Distribution, Transportation and Engineering Technology—15 Credits selected from AGM 2050, 4060, 4600, CE 2550, 3110, 4100, 4110, 4120, CRP 4120, ENGR 1200, 1300, 2090, ME 4170, MGT 3050, 3170, 4230, 4240
- Food and Health Care Packaging—15 Credits selected from BCHM 1050, BIOE 3020, 3200, 4310, BIOL 2220, PKSC 2840, 4100, 4200, 4240, HILTH 2400, 4100, MGT 3200, MICR 3050, 4070, MKT 3010, NUTR 4100, PKSC 4990
- (3) Package Design and Graphics—15 Credits selected from GC 3460, 4060, 4070, 4400, MKT 3010, 3020, 4310, PKSC 4220, 4990
- (4) Materials—15 Credits selected from ACCT 2010, AGM 2050, BIOE 2010, 3020, CHE 3190, ECON 3140, 3190, ENR 3120, 4290, EES 2100, 2010, 2020, ENSP 2000, 4000, 4720, ETOX 4120, FOR 4410, 4420, GC 3460, 4060, 4070, 4510, LAW 3120, MGT 3010, MKT 3010, MIE 2120, 2410, 2500, 3190, 3420, PKSC 4210, 4220, 4990

PLANT AND ENVIRONMENTAL SCIENCES

Bachelor of Science

The BS degree program in Plant and Environmental Sciences is a multidisciplinary program that educates students with expertise in soils, crop sciences, and applied agricultural biotechnology. It offers students a rigorous, science-based degree with educational opportunities related to management of agricultural commodities and natural resources, as well as soil and water resources. Students can tailor the program to fit their professional and academic goals by selecting one of three concentrations.

The Agricultural Biotechnology Concentration integrates conventional disciplines with molecular advances in plants, pathogens, and biosystem interactions and responses to the educational void between the rapid adoption of biotechnology products into agricultural production and the intermediate- and end-users, farmers, and consumers. Graduates in this concentration will be competitive as scientists in emerging agricultural biotechnology industries, as educators, and as policy makers and officers in regulatory agencies.

Students with a concentration in Agronomy will graduate with comprehensive knowledge to increase farm profits by decreasing the costs of crop production; build soil fertility and fertility through rotations, multiple cropping, and nutrient cycling; protect the environment by minimizing or more efficiently using synthetic agrichemicals; manage crop pests and weeds with integrated, ecologically sound strategies; build soil tilth and fertility through rotations, water resources. Students can tailor the program to fit their professional and academic goals by selecting one of three concentrations.

The BS degree program in Plant and Environmental Sciences is a multidisciplinary program that educates students with expertise in soils, crop sciences, and applied agricultural biotechnology. It offers students a rigorous, science-based degree with educational opportunities related to management of agricultural commodities and natural resources, as well as soil and water resources. Students can tailor the program to fit their professional and academic goals by selecting one of three concentrations.

The Agricultural Biotechnology Concentration integrates conventional disciplines with molecular advances in plants, pathogens, and biosystem interactions and responses to the educational void between the rapid adoption of biotechnology products into agricultural production and the intermediate- and end-users, farmers, and consumers. Graduates in this concentration will be competitive as scientists in emerging agricultural biotechnology industries, as educators, and as policy makers and officers in regulatory agencies.

Students with a concentration in Agronomy will graduate with comprehensive knowledge to increase farm profits by decreasing the costs of crop production; build soil fertility and fertility through rotations, multiple cropping, and nutrient cycling; protect the environment by minimizing or more efficiently using synthetic agrichemicals; manage crop pests and weeds with integrated, ecologically sound strategies; develop strategies for profitable marketing of agricultural commodities; and create a strong, diversified agriculture that is stable through market and weather fluctuations. Graduates can assume positions as self-
employed farmers, farm managers, state and federal natural resource managers, research technicians, agricultural industry employees, greenhouse managers, consultants in pest management and sustainable agriculture, field ecology professionals, agritourism industry specialists, extension personnel, or regulatory officers.

Students with a concentration in Soil and Water Science can address compelling problems such as land application of agricultural and industrial wastes, reduction of contamination of ground and surface waters, establishment of functional septic drain fields, and production of food and fiber crops. Graduates will be able to establish careers in traditional agrarian fields such as soil scientists and conservationists, extension agents, and farm consultants, and in the broader environmental arenas of DHEC, consulting engineering firms, and environmental consulting. Graduates will be well prepared for graduate work in fields ranging from soil science to environmental engineering and law.

Combined Bachelor of Science/Master of Science Degree Program

Plant and Environmental Sciences students may begin a Master of Science degree in Plant and Environmental Sciences or a Master of Science degree in Entomology while completing their Bachelor of Science degree, and use up to 12 credits to satisfy the requirements of both the undergraduate and graduate degrees. To be eligible for this plan, students must have a 3.4 or higher grade-point average and have completed at least 90 credits of coursework. Details are available from the Department of Plant and Environmental Sciences.

Freshman Year

First Semester
3 - BIOL 1030 General Biology I\(^1\)
1 - BIOL 1050 General Biology Lab. I\(^1\)
4 - CH 1010 General Chemistry
3 - MATH 1020 Business Calculus I or
4 - MATH 1060 Calculus of One Variable I
3 - PES 1040 Introduction to Plant Science
14–15

Second Semester
3 - BIOL 1040 General Biology II\(^1\)
1 - BIOL 1060 General Biology Lab II\(^1\)
4 - CH 1020 General Chemistry
3 - ENGL 1030 Composition and Rhetoric
3 - STAT 2300 Statistical Methods I
3 - Arts and Humanities (Non-Lit.) Requirement\(^2\)
17

Second Semester
3 - BIOL 1060 General Biology Lab. II
3 - CH 1020 Survey of Organic Chemistry Lab.
4 - ENT 3010 Insect Biology and Diversity
3 - PES 3100 Principles of Plant Pathology
14

Second Semester
3 - AGRB 2050 Agriculture and Society
3 - BIOL 3350 Evolutionary Biology
3 - COMM 1500 Intro. to Human Comm. or
3 - COMM 2500 Public Speaking
3 - GEN 3000 Fundamental Genetics
4 - MICR 3050 General Microbiology
1 - PES 4550 Seminar
17

Junior Year

First Semester
3 - BCHM 3050 Essential Elements of Biochem.
3 - ECON 2100 Economic Concepts or
3 - ECON 2110 Principles of Microeconomics
3 - PES 3350 Agricultural Biotechnology
3 - PES 4220 Major World Crops
3 - Social Science Requirement\(^3\)
15

Second Semester
3 - BIOL 4010 Plant Physiology
1 - BIOL 4020 Plant Physiology Lab.
3 - ENGL 3150 Scientific Writing and Comm.
1 - PES 4010 Academic and Professional Dev.
3 - PES 4050 Plant Breeding
3 - PES 4090 Biology of Invasive Plants
14

Summer
3 - PES 3400 Medical Botany

Senior Year

First Semester
3 - PES 4450 Regulatory Issues and Policies
3 - PES 4900 Beneficial Soil Organisms in Plant Growth
3 - Arts and Humanities (Literature) Requirement\(^4\)
6 - Concentration Requirement\(^1\)
15

Second Semester
3 - PES 3500 Practicum
9 - Concentration Requirement\(^1\)
12

121–122 Total Semester Hours

\(^1\) BIOL 1100 may substitute for BIOL 1030/1050 and BIOL 3110 may substitute for BIOL 1040/1060; BIOL 1100 and 1110 are recommended for students in the Agricultural Biotechnology Concentration.

\(^2\) See General Education Requirements. PHIL 1030 is recommended for students in the Agricultural Biotechnology Concentration.

\(^3\) Select from AGRB 4520, BIOL 3020/3060, 3130, 3200/3201, 4060/4070, 4410, 4460, 4580, 4610, ECON 3100, ENR 4200, ENT 4000, 4070, 4150, 4360, 4950, GEN 4050, 4100, 4400, MICR 4010, 4020, 4020, 4130/4131, PES 4210, 4230, PESA 4100, 4250, 4260, 4540, 4590. Courses to support proficiency in a modern language also are encouraged.

AGRICULTURAL BIOTECHNOLOGY CONCENTRATION

Sophomore Year
First Semester
3 - BIOL 3040 Biology of Plants
3 - CH 2010 Survey of Organic Chemistry
4 - ENT 3010 Insect Biology and Diversity
3 - PES 3100 Principles of Plant Pathology
14

Second Semester
3 - AGRB 2050 Agriculture and Society
3 - BIOL 3350 Evolutionary Biology
3 - COMM 1500 Intro. to Human Comm. or
3 - COMM 2500 Public Speaking
3 - GEN 3000 Fundamental Genetics
4 - MICR 3050 General Microbiology
1 - PES 4550 Seminar
17

Junior Year
First Semester
3 - BCHM 3050 Essential Elements of Biochem.
3 - ECON 2100 Economic Concepts or
3 - ECON 2110 Principles of Microeconomics
3 - PES 3350 Agricultural Biotechnology
3 - PES 4220 Major World Crops
3 - Social Science Requirement\(^3\)
15

Second Semester
3 - BIOL 4010 Plant Physiology
1 - BIOL 4020 Plant Physiology Lab.
3 - ENGL 3150 Scientific Writing and Comm.
1 - PES 4010 Academic and Professional Dev.
3 - PES 4050 Plant Breeding
3 - PES 4090 Biology of Invasive Plants
14

Summer
3 - PES 3400 Medical Botany

Senior Year
First Semester
3 - PES 4450 Regulatory Issues and Policies
3 - PES 4900 Beneficial Soil Organisms in Plant Growth
3 - Arts and Humanities (Literature) Requirement\(^4\)
6 - Concentration Requirement\(^1\)
15

Second Semester
3 - PES 3500 Practicum
9 - Concentration Requirement\(^1\)
12

121–122 Total Semester Hours

AGRONOMY CONCENTRATION

Sophomore Year
First Semester
3 - CH 2010 Survey of Organic Chemistry
4 - ENT 3010 Insect Biology and Diversity
4 - PES 2020 Soils
3 - PLPA 3100 Principles of Plant Pathology
15

Second Semester
3 - AGRB 2050 Agriculture and Society
3 - COMM 1500 Intro. to Human Comm. or
3 - COMM 2500 Public Speaking
3 - GEN 3000 Fundamental Genetics
4 - MICR 3050 General Microbiology
13

Summer
3 - ENT 4070 Applied Agricultural Entomology
3 - PLPA 4110 Plant Disease Diagnosis
6

Junior Year
First Semester
3 - AGRB 2020 Agricultural Economics or
3 - ECON 2110 Principles of Microeconomics
3 - BCHM 3050 Essential Elements of Biochem.
3 - IPM 4010 Principles of Integrated Pest Mgt.
3 - PES 4220 Major World Crops
3 - Concentration Requirement\(^1\)
15

Second Semester
3 - BIOL 4010 Plant Physiology
1 - BIOL 4020 Plant Physiology Lab.
3 - ENGL 3150 Scientific Writing and Comm.
1 - PES 4010 Academic and Professional Dev.
3 - PES 4050 Plant Breeding
3 - PES 4090 Biology of Invasive Plants
1 - PES 4550 Seminar
15

Senior Year
First Semester
3 - PES 4450 Regulatory Issues and Policies
3 - PES 4900 Beneficial Soil Organisms in Plant Growth
3 - Arts and Humanities (Literature) Requirement\(^4\)
3 - Concentration Requirement\(^1\)
3 - Social Science Requirement\(^2\)
15

Second Semester
3 - PES 3500 Practicum
3 - PES 4520 Soil Fertility and Management
1 - PES 4530 Soil Fertility Lab.
6 - Concentration Requirement\(^1\)
13

121–124 Total Semester Hours

\(^1\) Select from AGM 2050/2051, 2060/2061, 3010, 4020, 4100/4101, AGRB 3020, 3090, 3190, 4520, BIOL 3130 3200/3201, 3210, 4130, 4410, 4460, 4470, ENR 4130, ENT 3020, 3080, 4000, 4150, 4560, HORT 3100, 4040, 4050, 4550, 4560, MICR 4010, 4020, 4100, PES 3150, 4210, 4230, 4260, 4330, 4460, PLPA 4250, 4260, 4540, 4590

\(^2\) See General Education Requirements.
TURFGRASS
Bachelor of Science
Turfgrass is a major part of our built environment and daily life, including home lawns, sports fields, and golf courses. Grassed areas are aesthetically attractive and provide many environmental benefits, including the prevention of soil erosion, noise reduction, improved water quality, and reduced injuries from sports.

Graduates pursue careers in management of professional golf courses and sports fields and in lawn care; production and sale of seed, sod, supplies, and equipment; or as technicians for businesses or government agencies. The curriculum provides a strong foundation in science, advanced business, and environmental and leadership skills that are needed for success in today’s competitive environment. Courses in horticulture also provide a background for turfgrass managers who may have responsibilities for landscaped areas.

Students work closely with faculty in creative inquiry groups to investigate and implement solutions to real problems. Student interns experience a wide range of turf facilities, businesses, and public institutions to develop skills and experience needed for successful careers. In addition, the University’s golf course (Walker Golf Course) and athletic fields offer great employment and learning opportunities.

Combined Bachelor of Science/Master of Science Degree Program
Turfgrass students may begin a Master of Science degree in Plant and Environmental Sciences or a Master of Science degree in Entomology while completing their Bachelor of Science degree, and use up to 12 credits to satisfy the requirements of both the undergraduate and graduate degrees. To be eligible for this plan, students must have a 3.4 or higher grade-point average and have completed at least 90 credits of coursework. Details are available from the Department of Plant and Environmental Sciences.

Freshman Year
First Semester
3 - BIOL 1030 General Biology I
1 - BIOL 1050 General Biology Lab I
4 - CH 1010 General Chemistry
3 - HORT 1010 Horticulture
3 - MATH 1020 Business Calculus I
3 - Arts and Humanities (Non-Lit) Requirement
17
Second Semester
3 - BIOL 1040 General Biology II
1 - BIOL 1060 General Biology Laboratory II
4 - CH 1020 General Chemistry
3 - ENGL 1030 Composition and Rhetoric
3 - MATH 1010 Essential Math for Informed Soc.
14

Sophomore Year
First Semester
3 - BIOL 3040 Biology of Plants
1 - BIOL 3080 Biology of Plants Lab
1 - HORT 2120 Introduction to Turfgrass Culture
1 - HORT 2130 Turfgrass Culture Lab.
1 - HORT 3030 Landscape Plants
3 - Social Science Requirement
14
Second Semester
3 - HORT 4270 Urban Tree Care
4 - PES 2020 Soils
3 - Arts and Humanities (Literature) Requirement
3 - Oral Communications Requirement
3 - Social Science Requirement
16

Summer
3 - HORT 2710 Internship or
3 - HORT 4710 Advanced Internship
3

Junior Year
First Semester
4 - ENT 3100 Insect Biology and Diversity
3 - PLPA 3100 Principles of Plant Pathology
3 - Business Requirement
3 - Horticulture Specialization Requirement
3 - Soil Science Requirement
16
Second Semester
3 - AGM 3100 Soil and Water Conservation
3 - PES 4220 Major World Crops
9 - Concentration Requirement
3 - PES 4460 Soil Management
3 - HORT 4120 Advanced Turfgrass Management
3 - HORT 4200 Senior Capstone Course
First Semester
Senior Year
3 - PES 3500 Practicum
2 - PLPA (ENT) 4060 Diseases and Insects of Turfgrasses
3 - HORT 4710 Advanced Internship
3 - Oral Communications Requirement
3 - Arts and Humanities (Literature) Requirement
4 - PES 4020 Soils
3 - HORT 4270 Urban Tree Care
4 - PES 2020 Soils
3 - Arts and Humanities (Literature) Requirement
3 - Oral Communications Requirement
3 - Social Science Requirement
16

Summer
1 - PLPA (ENT) 4080 Diseases and Insects of Turfgrasses Laboratory

Senior Year
First Semester
3 - HORT 4090 Senior Capstone Course
3 - HORT 4120 Advanced Turfgrass Management
3 - PES 4460 Soil Management
3 - Business Requirement
3 - Related Science Requirement
15
Second Semester
3 - HORT (PES) 4330 Landscape and Turf Weed Management
3 - PES 4520 Soil Fertility
1 - PES 4530 Soil Fertility Lab
3 - Business Requirement
6 - Related Science Requirement
16

123 Total Semester Hours

*See General Education Requirements. Six of these credits must also satisfy the Cross-Cultural Awareness and the Science and Technology in Society Requirements.
WILDLIFE AND FISHERIES BIOLOGY
Bachelor of Science

Increased interest in sustainable use and conservation of natural resources has resulted in these areas becoming increasingly technical and requiring highly qualified wildlife and fisheries biologists. Greatest demands for graduates are in the areas of management, research, survey, and regulatory positions with state and federal agencies; industrial research and quality control laboratories; conservation, recreation, and other public service agencies; and private enterprises.

The Bachelor of Science degree program in Wildlife and Fisheries Biology provides a solid foundation for many careers in the sciences. The curriculum is strong in basic and applied sciences, communication skills, and the social sciences. In addition, three credit hours are available for field training with appropriate natural resource agencies. Students may satisfy coursework requirements for professional certification by the Wildlife Society and/or the American Fisheries Society.

For students interested in conservation biology, water, and natural resources, the Department of Forestry and Environmental Conservation also administers the Conservation Biology and Natural Resources Management Concentrations within the Environmental and Natural Resources degree program. See pages 48-50 for program details.

Combined Bachelor of Science/Master of Science Degree Program

Under this plan, students may reduce the time necessary to earn both degrees by applying graduate credits to both undergraduate and graduate program requirements. Students are encouraged to obtain the specific requirements for both degrees by contacting the Department of Forestry and Environmental Conservation as early as possible in their undergraduate program, as a number of required courses have prerequisites not normally taken by Wildlife and Fisheries Biology majors. Enrollment guidelines and procedures can be found under Academic Regulations in this catalog.

Freshman Year
First Semester
3 - WFB 4000 Wildlife Conservation Policy
1 - BOL 1050 General Biology Lab. I
4 - CH 1010 General Chemistry
4 - PHYS 2000 Introductory Physics
3 - ENGL 1000 Principles of Fish and Wildlife Biology
1 - Elective
15

Second Semester
3 - WFB 4010 Wildlife Management
3 - WFB 4120 Fisheries Techniques
3 - WFB (BIOL) 3130 Conservation Biology
1 - MATH 1020 Business Calculus 1
1 - Oral Communication Requirement
15

Sophomore Year
First Semester
3 - WFB 4000 Wildlife Conservation Policy
1 - BOL 1050 General Biology Lab. I
4 - CH 1010 General Chemistry
4 - PHYS 2000 Introductory Physics
3 - ENGL 1030 Composition and Rhetoric
1 - Elective
15

Second Semester
3 - WFB 4010 Wildlife Management
3 - WFB 4120 Fisheries Techniques
3 - WFB (BIOL) 3130 Conservation Biology
1 - MATH 1020 Business Calculus 1
1 - Oral Communication Requirement
15

Junior Year
First Semester
3 - BOL 3030 Vertebrate Biology
4 - BIOL 3200 Field Botany
3 - ENGL 3140 Technical Writing
3 - WFB 4100 Wildlife Management Techniques
1 - Arts and Humanities (Non-Lit.) Requirement
16

Second Semester
3 - WFB (BOL) 3130 Conservation Biology
3 - WFB 4120 Wildlife Management
4 - WFB 4160 Fisheries Techniques
3 - WFB 4620 Wetland Wildlife Biology
3 - Approved Requirement
16

Senior Year
First Semester
4 - AVS 3010 Anat. and Phys. of Domestic Animals
3 - FOR (ENR) 4340 GIS for Natural Resources
1 - Elective
16

Second Semester
1 - FNR 4990 Natural Resources Seminar
3 - WFB 4300 Wildlife Conservation Policy
6 - Approved Requirement
3 - Policy and Law Requirement
13

122 Total Semester Hours

1*Internship must be completed in one or two semesters. First internship must be completed within one year after successfully passing HORT 2120/2130. Prior approval is required for internships, and a GPA of 2.0 is required for registration. Students are strongly encouraged to take multiple internships.

2Nine credits selected from ACCT 2010, 2020, any 3000- or 4000-level AGRB course, ELE 3100, 4100, 4990, LAW 5220, any 2000-4000-level MGT course, any 2000–4000-level MKT course, or PRM 4830

3Six credits selected from HORT 2020, 3080, 3090, 4000, 4050, 4080, 4610. Turfgrass internship courses do not count as HORT specialization courses.

4In addition to PES 2020, 4460, 4520, and 4530, students must select one additional soils course from PES 4030, 4080 or 4900.

5Nine credits selected from AGM 3010, BIOL 3200, 4060, 4070, 4410, 4450, 4460, 4470, ENSF 2000, GEN 3000, GEOL 1010, 1030, 3000, IPM 4010, MICR 3050, PES 4010, 4050, 4060, 4090, 4900, PHYS 2000, 2070, 2090, 2400, 2450, WFB 4120

6*Note: Turfgrass majors must earn a C or better in all HORT courses. Courses may be repeated as often as necessary to achieve the minimum grade.

1See General Education Requirements. Six of these credit hours must also satisfy the Cross-Cultural Awareness and the Science and Technology in Society Requirements. (Note: Social Science Requirement must be in an area other than economics or applied economics.)

2Select from AGM 3570, 4331, 4770, or any 3000–4000-level WFB course(s) not already used to meet another requirement. Students considering APS Certification, which requires 15 hours of physical sciences, should enroll in GEOL 1010/1030 or PHYS 2000/2001. Note: The same course(s) may not be used to satisfy both the Approved Requirement and the Policy and Law Requirement.

3Select from AGM 3570, 4770, ENR 4230, 4500, FOR 4160, WFB 4300. Note: The same course(s) may not be used to satisfy both the Approved Requirement and the Policy and Law Requirement.
MINORS

Following are minors acceptable for students in the College of Agriculture, Forestry and Life Sciences. Students cannot major and minor in the same field or acquire a minor that is not allowed by the degree program.

Accounting
Adult/Extension Education
Aerospace Studies
Agricultural Business Management
Agricultural Mechanization and Business
American Sign Language Studies
Animal and Veterinary Sciences
Anthropology
Architecture
Art
Athletic Leadership
Biochemistry
Biological Sciences
Brand Communications
British and Irish Studies
Business Administration
Chemistry
Chinese Studies
Cluster
Communication Studies
Computer Science
Creative Writing
Crop and Soil Environmental Science
Digital Production Arts
East Asian Studies
Economics
English
Entomology
Entrepreneurship
Environmental Science and Policy
Equine Industry—not open to Animal and Veterinary Sciences majors
Film Studies
Financial Management
Food Science
Forest Products—not open to Forestry majors
Forest Resource Management
French Studies
Gender, Sexuality and Women’s Studies
Genetics
Geography
Geology
German Studies
Global Politics
Great Works
History
Horticulture—not open to Turfgrass majors
Human Resource Management
Italian Studies
Japanese Studies
Legal Studies
Management
Management Information Systems
Mathematical Sciences
Microbiology
Middle Eastern Studies
Military Leadership
Music
Natural Resource Economics
Nonprofit Leadership
Nuclear Engineering and Radiological Sciences
Packaging Science
Pan African Studies
Park and Protected Area Management
Philosophy
Physics
Plant Pathology
Political and Legal Theory
Political Science
Precision Agriculture
Psychology
Public Policy
Race, Ethnicity and Migration
Religious Studies
Russian Area Studies
Science and Technology in Society
Screenwriting
Sociology
Spanish Studies
Spanish-American Area Studies
Sustainability
Theatre
Travel and Tourism
Turfgrass—not open to Horticulture majors
Urban Forestry
Wildlife and Fisheries Biology
Women’s Leadership
Writing
Youth Development Studies

See Minors section for details.