The mission of the College of Agriculture, Forestry and Life Sciences is to provide teaching, research, and service in agriculture, forestry, and life sciences that will benefit the citizens of South Carolina and the nation. The College of Agriculture, Forestry and Life Sciences serves more than 2,900 graduate and undergraduate students.

The ability to understand and manipulate the molecular structure of biological systems while at the same time understanding their practical management offers immense potential to improve our world, whether it is to improve foods, building products, the environment, or our health. The College of Agriculture, Forestry, and Life Sciences uses the same expertise to produce more food on a shrinking globe; package environmentally sound products; grow better foods to fight breast cancer, prevent heart disease, and increase dairy production; increase timber production and provide new fuels; and develop businesses and promote a “green” 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.

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 page 60.)

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.

### Freshman Year

**First Semester**

1. AG ED 102 Agric. Education Freshman Seminar
2. AG ED 200 Agricultural Applications of Educational Technology or
3. Arts and Humanities (Non-Lit.) Requirement
4. AVS 150 Introduction to Animal Science
5. AVS 151 Introduction to Animal Science Lab.
6. BIOL 103 General Biology I
7. BIOL 105 General Biology Lab. I
8. Mathematics Requirement

**Second Semester**

1. AG ED 100 Orientation and Field Experience
2. AG ED 103 Multiculturalism in Agric. Ed.
3. AP EC 202 Agricultural Economics
4. BIOL 104 General Biology II
5. BIOL 106 General Biology Lab. II
6. ENGL 103 Accelerated Composition
7. Social Science Requirement

### Sophomore Year

**First Semester**

1. AG ED 201 Intro. to Agricultural Education
2. AG ED 203 Teaching Agriscience
3. AG ED 204 Applied Agriculture Calculations
4. CH 101 General Chemistry
5. CH 105 Chemistry in Context I
6. HORT 212 Introduction to Turfgrass Culture
7. HORT 213 Turfgrass Culture Lab.

**Second Semester**

1. AG ED 355 Team and Organizational Leadership in Food and Fiber Systems
2. AG M 221 Principles of Fabrication
3. BIOL 201 Biotechnology and Society or
4. BIOL 200 Biology in the News
5. CH 102 General Chemistry
6. CH 105 Chemistry in Context II
7. COMM 101 Communication Academic and Professional Development
8. Arts and Humanities (Literature) Requirement

### Junior Year

**First Semester**

1. AG ED 200 Orientation and Field Experience
2. AG ED 203 Teaching Agriscience
3. AG ED 204 Applied Agriculture Calculations
4. CH 101 General Chemistry
5. CH 105 Chemistry in Context I
6. HORT 212 Introduction to Turfgrass Culture
7. HORT 213 Turfgrass Culture Lab.

**Second Semester**

1. AG ED 355 Team and Organizational Leadership in Food and Fiber Systems
2. AG M 221 Principles of Fabrication
3. BIOL 201 Biotechnology and Society or
4. BIOL 200 Biology in the News
5. CH 102 General Chemistry
6. CH 105 Chemistry in Context II
7. COMM 101 Communication Academic and Professional Development
8. Arts and Humanities (Literature) Requirement

### Senior Year

**First Semester**

1. ENGL 231 Introduction to Journalism
2. HORT 305 Plant Propagation
3. Departmental Communication Requirement
4. Technical Requirement

**Second Semester**

1. AG ED 407 Internship in Extension and Leadership Education
2. 128 Total Semester Hours

### Communications Emphasis Area

**Junior Year**

**First Semester**

2. AG M 221 Surveying
3. COMM 201 Intro. to Communication Studies
4. CSENV 202 Soils
5. FOR 305 Woodland Management or
6. W F B 412 Wildlife Management
7. Arts and Humanities (Non-Lit.) Requirement

**Second Semester**

2. AG M 221 Surveying
3. COMM 201 Intro. to Communication Studies
4. CSENV 202 Soils
5. FOR 305 Woodland Management or
6. W F B 412 Wildlife Management
7. Arts and Humanities (Non-Lit.) Requirement

### Leadership Emphasis Area

**Junior Year**

**First Semester**

2. AG M 221 Surveying
3. CSENV 202 Soils
4. FOR 305 Woodland Management or
5. W F B 412 Wildlife Management
6. HORT 303 Landscape Plants
7. Arts and Humanities (Non-Lit.) Requirement

**Second Semester**

2. AG M 221 Surveying
3. CSENV 202 Soils
4. FOR 305 Woodland Management or
5. W F B 412 Wildlife Management
6. HORT 303 Landscape Plants
7. Arts and Humanities (Non-Lit.) Requirement

1See General Education Requirements.
2See advisor.
3See General Education Requirements. COMM 150 or 250 is recommended.
4Internship must meet departmental requirements for Communications Emphasis Area. See advisor.
Senior Year
First Semester
3 - AG ED 403 Principles of Adult/Ext. Educ. or
3 - AG ED 440 Prog. Devel. in Adult/Ext. Ed.
3 - AG ED 415 Leadership of Volunteers
3 - AG ED 416 Ethics and Issues in Agriculture
3 - MGT 201 Principles of Management
3 - Technical Requirement 1
15
Second Semester
12 - AG ED 407 Internship in Extension and Leadership Education
12
126 Total Semester Hours
1See General Education Requirements.
2See General Education Requirements. COMM 150 or 250 is recommended.
3See advisor.

TEACHING EMPHASIS AREA
Junior Year
First Semester
3 - AG ED 200 Agricultural Applications of Educational Technology 1
3 - AG ED 303 Mech. Technology for Agric. Ed.
2 - AG M 221 Surveying
4 - CSENV 202 Soils
3 - FOR 305 Woodland Management or
3 - W F B 412 Wildlife Management
3 - HORT 303 Landscape Plants
18
Second Semester
3 - ED F 302 Educational Psychology
3 - HORT 305 Plant Propagation
1 - HORT 306 Plant Propagation Techniques Lab.
3 - Oral Communication Requirement 2
3 - Technical Requirement 3
3 - Elective
16
Senior Year
First Semester
1 - AG ED 400 Supervised Field Experience II
3 - AG ED 401 Instructional Methods in Ag. Ed.
3 - AG ED 403 Principles of Adult/Ext. Educ. or
3 - AG ED 440 Prog. Devel. in Adult/Ext. Ed.
2 - AG ED 423 Curriculum
3 - Technical Requirement 3
12
Second Semester
12 - AG ED 406 Directed Teaching
2 - AG ED 425 Teaching Agricultural Mechanics
14
125 Total Semester Hours
1ED F 315 may be substituted. In this case, ED F 425 must be taken in the semester immediately prior to directed teaching.
2See General Education Requirements. COMM 150 or 250 is recommended.
3See advisor.

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 enterprise. 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.

Graduates in Agricultural Mechanization and Business find meaningful and remunerative employment in a variety of situations directly and indirectly related to agricultural production, processing, marketing, and the many services connected therewith. Farming and technical sales in the agricultural, industrial, and heavy equipment industries are frequently chosen careers.

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/agbioeng/agmech/index.htm.

Freshman Year
First Semester
3 - AG ED 200 Agricultural Applications of Educational Technology 1
1 - AG M 101 Intro to Agr. Mech. and Business
3 - AG M 205 Principles of Fabrication
3 - BIOL 101 General Biology I
1 - BIOL 103 General Biology Lab. I
3 - MTHSC 102 Intro. to Mathematical Analysis
14
Second Semester
3 - ACCT 201 Financial Accounting Concepts
3 - BIOL 104 General Biology II
1 - BIOL 106 General Biology Lab. II
3 - ENGL 103 Accelerated Composition
3 - EX ST 301 Introductory Statistics
3 - Elective
16
Sophomore Year
First Semester
3 - AP EC 202 Agricultural Economics
4 - CH 105 Chemistry in Context I
4 - PHYS 200 Introductory Physics or
3 - PHYS 207 General Physics I and
1 - PHYS 209 General Physics I Lab.
3 - Arts and Humanities (Non-Lit.) Requirement 1
14
Second Semester
3 - AG M 206 Machinery Management
3 - AG M 303 Calculations for Mechanized Agric.
4 - CH 106 Chemistry in Context II
4 - CSENV 202 Soils
2 - E G 209 Intro. to Engr./Comp. Graphics
16
Junior Year
First Semester
2 - AG M 221 Surveying
2 - AG M 301 Soil and Water Conservation
3 - AG M 460 Electrical Systems
3 - Arts and Humanities (Literature) Requirement 1
3 - Agribusiness Requirement 2
3 - Minor Requirement 1
3 - Elective
15
Second Semester
3 - AG M 406 Mechanical and Hydraulic Systems
3 - COMM 250 Public Speaking
3 - Agribusiness Requirement 2
3 - Minor Requirement 1
3 - Plant/Crop Science Requirement 4
3 - Social Science Requirement 1
15
Senior Year
First Semester
3 - AG M 410 Precision Agriculture Technology
3 - AG M 452 Mobile Power
3 - AG M 472 Capstone
3 - Agribusiness Requirement 2
3 - Plant/Crop Science Requirement 4
3 - Soil Science Requirement 1
15
121 Total Semester Hours
1See General Education Requirements. Three of these credit hours must also satisfy the Cross-Cultural Awareness Requirement.
2AP EC 302, 308, 319, 351, 402, 409, 433, 452, 456, or 460. This course may also be used to satisfy minor requirement.
3See Agricultural Business Management minor or select other approved minor. If requirements for an approved minor have already been satisfied, this course must be any 300-level or higher course from an approved program.
4CSENV 403, 404, 446, 452, (ENTOX, GEOL) 485, or 490. This course may also be used to satisfy minor requirement.
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. Strengths of this program include extensive hands-on instruction at Clemson’s five 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 professions such as trainers, managers, riding instructors, sales or media representatives, breed association representatives or for equine entrepreneurial careers such as owners of tack shops, boarding facilities, or riding schools. The Pre-veterinary and Science Concentration prepares students to meet the requirements for most veterinary schools, graduate schools, and medical and 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.

ANIMAL AGRI-BUSINESS CONCENTRATION

Freshman Year

First Semester
1. AVS 100 Orientation to Animal and Vet. Sci.
2. AVS 150 Introduction to Animal Science
3. BIOL 103 General Biology I and
4. BIOL 106 General Biology Lab I or
5. BIOL 110 Principles of Biology I
6. CH 101 General Chemistry
7. Arts and Humanities (Non-Lit.) Requirement
8. AVS Experience-Based Activity
9. Elective
10-12 Total Semester Hours

Second Semester
1. AVS 301 Anat. and Phys. of Domestic Animals
2. AVS 310 Animal Health
3. AVS 312 Forages and Grazing Systems
4. AP EC 202 Agricultural Economics
5. ACCT 201 Financial Accounting Concepts
6. Departmental Requirement
7. Elective
12-14 Total Semester Hours

Sophomore Year

First Semester
1. AVS 100 Orientation to Animal and Vet. Sci.
2. AVS 150 Introduction to Animal Science
3. AP EC 202 Agricultural Economics
4. AVS 310 Animal Health
5. MTHSC 102 Intro. to Math. Analysis
6. Departmental Requirement
7. Elective
8. Elective

Second Semester
1. AVS 309 Principles of Equine Evaluation
2. AVS 406 Seminars and Related Topics
3. AVS 410 Domestic Animal Behavior
4. AVS 417 Animal Agribusiness Development
5. AVS 450 Animal Production Systems
6. AVS Experience-Based Activity
7. 123–126 Total Semester Hours

Junior Year

First Semester
1. AVS 200, 201, 203, 204, 206, or 209
2. AVS 302, 309, 311, or 323
3. Select 12 hours from any graded (not pass/fail) 300– or 400-level course and/or any of the following courses: CSENV 202, ECON 212, LAW 322, MGT 201, 307, MKT 301, SPAN 101, 102
4. AVS 360, 441, 442, 443, or 491
5. Arts and Humanities (Literature) Requirement
6. Social Science Requirement
7. Elective

Second Semester
1. AVS 375 Applied Animal Nutrition
2. AVS 413 Animal Products
3. AVS 414 Animal Reproduction
4. AVS Experience-Based Activity

Senior Year

First Semester
1. AVS 102 Intro. to Business Management
2. AVS 407 Animal Nutrition
3. AVS 410 Domestic Animal Behavior
4. AVS 450 Animal Production Systems
5. AVS Experience-Based Activity

Second Semester
1. AVS 309 Principles of Equine Evaluation
2. AVS 310 Animal Health
3. AVS 370 Principles of Animal Nutrition
4. AVS 470 Animal Genetics
5. AVS Experience-Based Activity

Junior Year

First Semester
1. AVS 204 Horse Care Techniques
2. AVS 205 Horsemanship I or
3. BIOL 106 General Biology Lab II or
4. BIOL 111 Principles of Biology II
5. CH 102 General Chemistry
6. ENGL 103 Accelerated Composition
7. MTHSC 101 Essent. Math. for Inform. Soc. or
8. MTHSC 102 Intro. to Math. Analysis or
9. MTHSC 106 Calculus of One Variable I
10. 16-18 Total Semester Hours

Sophomore Year

First Semester
1. AVS 100 Orientation to Animal and Vet. Sci.
2. AVS 150 Introduction to Animal Science
3. AP EC 202 Agricultural Economics
4. AVS 310 Animal Health
5. MTHSC 102 Intro. to Math. Analysis
6. Departmental Requirement
7. Social Science Requirement
8. Elective

Second Semester
1. AVS 309 Principles of Equine Evaluation
2. AVS 406 Seminars and Related Topics
3. AVS 410 Domestic Animal Behavior
4. AVS 417 Animal Agribusiness Development
5. AVS 450 Animal Production Systems
6. AVS Experience-Based Activity

Senior Year

First Semester
1. AVS 200, 201, 203, 204, 206, or 209
2. AVS 302, 309, 311, or 323
3. Select 12 hours from any graded (not pass/fail) 300– or 400-level course and/or any of the following courses: CSENV 202, ECON 212, LAW 322, MGT 201, 307, MKT 301, SPAN 101, 102
4. AVS 360, 441, 442, 443, or 491
5. Arts and Humanities (Literature) Requirement
6. Social Science Requirement
7. Elective

Second Semester
1. AVS 375 Applied Animal Nutrition
2. AVS 413 Animal Products
3. AVS 414 Animal Reproduction
4. AVS Experience-Based Activity

EQUINE BUSINESS CONCENTRATION

Freshman Year

First Semester
1. AVS 100 Orientation to Animal and Vet. Sci.
2. AVS 150 Introduction to Animal Science
3. BIOL 103 General Biology I and
4. BIOL 105 General Biology Lab I or
5. BIOL 110 Principles of Biology I
6. CH 101 General Chemistry
7. Arts and Humanities (Non-Lit.) Requirement
8. 16-17 Total Semester Hours

Second Semester
1. AVS 301 Anat. and Phys. of Domestic Animals
2. AVS 310 Animal Health
3. AVS 312 Forages and Grazing Systems
4. AP EC 202 Agricultural Economics
5. ACCT 201 Financial Accounting Concepts
6. Departmental Requirement
7. Elective
8. Elective
9. 123–126 Total Semester Hours

Sophomore Year

First Semester
1. AVS 100 Orientation to Animal and Vet. Sci.
2. AVS 150 Introduction to Animal Science
3. AP EC 202 Agricultural Economics
4. AVS 310 Animal Health
5. MTHSC 101 Essent. Math. for Inform. Soc. or
6. MTHSC 102 Intro. to Math. Analysis or
7. MTHSC 106 Calculus of One Variable I
8. 16-18 Total Semester Hours
Senior Year
First Semester
1 - AVS 406 Seminars and Related Topics
2 - AVS 415 Contemporary Issues in Animal Sci.
3 - AVS Experience-Based Activity
3 - Departmental Requirement
3 - Elective
14
Second Semester
3 - AVS 410 Domestic Animal Behavior
4 - AVS 412 Advanced Equine Management
4 - AVS 416 Equine Exercise Physiology
4 - AVS 417 Animal Agribusiness Development
15
122–125 Total Semester Hours

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

PREVETERINARY AND SCIENCE CONCENTRATION

Freshman Year
First Semester
1 - AVS 100 Orientation to Animal and Vet. Sci.
3 - AVS 150 Introduction to Animal Science
1 - AVS 151 Intro. to Animal Science Lab.
3 - BIOL 103 General Biology I
1 - BIOL 105 General Biology Lab. I or
5 - BIOL 110 Principles of Biology I
4 - CH 101 General Chemistry
3 - Arts and Humanities (Non-Lit.) Requirement
16-17
Second Semester
3 - BIOL 104 General Biology II and
1 - BIOL 106 General Biology Lab. II or
5 - BIOL 111 Principles of Biology II
4 - CH 102 General Chemistry
3 - ENGL 103 Accelerated Composition
3 - MTHSC 102 Intro. to Mathematical Analysis
or
4 - MTHSC 106 Calculus of One Variable I
2 - AVS Techniques Requirement
16-18
Sophomore Year
First Semester
3 - CH 223 Organic Chemistry
1 - CH 227 Organic Chemistry Lab.
3 - PHYS 207 General Physics I
1 - PHYS 209 General Physics I Lab.
3 - Arts and Humanities (Literature) Requirement
3 - AVS Techniques Requirement
3 - Social Science Requirement
16
Second Semester
3 - CH 224 Organic Chemistry
1 - CH 228 Organic Chemistry Lab.
3 - EX ST 301 Introductory Statistics or
3 - MTHSC 203 Elem. Statistical Inference
3 - PHYS 208 General Physics II
1 - PHYS 210 General Physics II Lab.
2 - AVS Evaluation Requirement or
3 - Oral Communication Requirement
2 - AVS Techniques Requirement
15-16
Junior Year
First Semester
4 - AVS 301 Anat. and Phys. of Domestic Animals
3 - AVS 110 Animal Health
3 - AVS 370 Principles of Animal Nutrition
3 - BIOCH 301 Molecular Biochemistry or
3 - BIOCH 305 Essential Elements of Bioch. or
3 - BIOCH 406 Physiological Chemistry
3 - Departmental Requirement
16
Second Semester
3 - AVS 375 Applied Animal Nutrition
3 - AVS 453 Animal Reproduction
3 - GEN 300 Fundamental Genetics
1 - GEN 301 Fundamental Genetics Lab.
4 - MICRO 305 General Microbiology
14
Senior Year
First Semester
2 - AVS 406 Seminars and Related Topics
3 - AVS 415 Contemporary Issues in Animal Sci.
2 - AVS Techniques Requirement
3 - Departmental Requirement
3 - Elective
13
Second Semester
3 - AVS 410 Domestic Animal Behavior
3 - AVS 411 Animal Products
3 - AVS Experience-Based Activity
3 - Departmental Requirement
3 - Social Science Requirement
15
121–125 Total Semester Hours

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

APPLIED ECONOMICS AND STATISTICS

Bachelor of Science
The Applied Economics and Statistics curriculum helps the student build a strong understanding of economic principles as applied in agribusiness, community and economic development, and other fields. Courses in applied statistics and quantitative methods help build decision-making and problem-solving skills and acquaint the student with tools for data analysis.

In the Agribusiness Emphasis Area, core courses focus on agribusiness management, leadership, marketing and sales, finance, accounting, and other business skill development. Employment opportunities for Agribusiness graduates are many and diverse. Private sector opportunities include 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.

In the Community and Economic Development Emphasis Area, core courses focus on community development methods, regional economic development, leadership, experiential learning, communication skills, and behavioral science principles. Employment opportunities for Community and Economic Development graduates include positions in social science administration, management, and research. Other careers include community development and economic development specialist positions with local, county, and state governments. Additional opportunities exist in a variety of agencies, research and consulting firms, foundations and councils, financial institutions, public and private utilities, and organizations looking for entrepreneurial skills.

In both plans of study, there is an increasing emphasis on globalization and information technology. Students are encouraged to participate on a creative inquiry student research team and to take advantage of an internship and/or study abroad opportunity. Both the Agribusiness and Community and Economic Development study options provide an excellent background for professional or graduate study in several disciplines.

For students interested in economics and natural resources, the Department of Applied Economics and Statistics also administers the Natural Resource and Economic Policy Concentration within the Environmental and Natural Resources degree program. See page 49 for program details.

AGRICULTURAL EDUCATION/ADVISORY SERVICES

Freshman Year
First Semester
3 - AP EC 205 Agriculture and Society
2 - C U 101 University Success Skills
3 - MTHSC 102 Intro. to Mathematical Analysis
4 - Natural Science Requirement
3 - Oral Communication Requirement
15
### COMMUNITY AND ECONOMIC DEVELOPMENT CONCENTRATION

#### Freshman Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Courses</th>
</tr>
</thead>
</table>
| First Semester | 3 - CP SC 120 Intro. to Information Technology  
3 - MTHSC 102 Intro. to Mathematical Analysis  
3 - Arts and Humanities (Non-Lit.) Requirement  
5 - Elective |
| Second Semester | 3 - ACCT 201 Financial Accounting Concepts  
3 - EX ST 301 Introductory Statistics  
3 - MGT 201 Principles of Management  
3 - Arts and Humanities (Literature) Requirement  
5 - Elective |

#### Sophomore Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Courses</th>
</tr>
</thead>
</table>
| First Semester | 3 - EX ST 301 Introductory Statistics  
3 - Arts and Humanities (Literature) Requirement  
5 - Oral Communication Requirement  
5 - Behavioral Science Requirement |
| Second Semester | 3 - ACCT 201 Financial Accounting Concepts  
3 - ENGL 103 Accelerated Composition  
4 - Natural Science Requirement  
5 - Elective |

#### Junior Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Courses</th>
</tr>
</thead>
</table>
| First Semester | 3 - LEAD 335 Leadership in Organizations and Communities  
3 - ECON 403 Business Law  
3 - AP EC 202 Agricultural Economics  
4 - MTHSC 106 Calculus of One Variable I  
4 - CH 101 General Chemistry  
5 - BIOL 110 Principles of Biology I  
5 - BIOL 110 Principles of Biology I  
5 - BIOL 110 Principles of Biology I  
5 - BIOL 110 Principles of Biology I  
5 - BIOL 110 Principles of Biology I  |
| Second Semester | 3 - AP EC 452 Agricultural Policy  
3 - AP EC 456 Prices  
3 - AP EC 490 Selected Topics  
6 - Agribusiness Requirement  
15  
120 Total Semester Hours |

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3 - Elective
5 - Behavioral Science Requirement
6 - Emphasis Area Requirement
120 Total Semester Hours

### BIOCHEMISTRY

#### Bachelor of Science

Biochemistry is the study of the molecular basis of life. To comprehend current biochemical information and make future contributions to our molecular understanding of life processes, students must obtain a broad background in biology and a firm foundation in chemistry, mathematics, and physics. This is the basis of the biochemistry curriculum.

The program provides an excellent educational background for professional school (medicine, dentistry, or veterinary medicine) and graduate school in biochemistry, molecular biology, or another biological science discipline. Graduates will find employment opportunities in the research and service programs of universities, medical schools, hospitals, research institutes, and industrial and government laboratories.

#### Freshman Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Courses</th>
</tr>
</thead>
</table>
| First Semester | 1 - BIOCH 103 Careers in Biochem. and Genetics  
5 - BIOL 110 Principles of Biology I  
4 - CH 101 General Chemistry  
4 - MTHSC 106 Calculus of One Variable I  
14 |
| Second Semester | 5 - BIOL 111 Principles of Biology II  
4 - CH 102 General Chemistry  
3 - ENGL 103 Accelerated Composition  
4 - MTHSC 108 Calculus of One Variable II  
16 |
| Sophomore Year | 3 - CH 223 Organic Chemistry  
1 - CH 227 Organic Chemistry Lab.  
3 - GEN 302 Molecular and General Genetics  
1 - GEN 303 Molecular and Gen. Genetics Lab.  
3 - PHYS 122 Physics with Calculus I  
1 - PHYS 124 Physics Lab. I  
3 - Advanced Mathematics Requirement  
15-16 |
BIOLOGICAL SCIENCES

Bachelor of Science

Biology encompasses the broad spectrum of the modern life sciences, including the study of all aspects of life from the structure and function of the whole organism down to the subcellular levels and up through the interactions of organisms to the integrated existence of life on the entire planet. Descriptive, structural, functional, and evolutionary questions are explored through the hierarchy of the organization of life. Applications of current advances to the health and well-being of man and society, to nature and the continuation of earth as a balanced ecosystem, and to an appreciation of the place of natural science in our cultural heritage receive emphasis.

Majors in Biological Sciences receive classroom, laboratory, and field training in biology with an emphasis on chemistry, mathematics, and physics as necessary tools. The Bachelor of Science in Biological Sciences curriculum prepares students for graduate study in any of the life science areas (such as agricultural sciences, biochemistry, botany, cell and molecular biology, conservation, ecology and environmental science, entomology, forestry, genetics, industrial and regulatory biology, microbiology, morphology, paleontology, wildlife biology, and zoology; for the healing professions (medicine, dentistry, etc.), veterinary medicine; and for science teaching.

Combined Bachelor of Science in Biological Sciences/Master of Science in Bioengineering

Under this plan, students may reduce the time necessary to earn both degrees by applying graduate credits to both undergraduate and graduate program requirements. See Academic Regulations in this catalog for enrollment guidelines and procedures. Students are encouraged to obtain the specific requirements for the dual degree from the Department of Biological Sciences or Bioengineering as early as possible in their undergraduate program as a number of required courses have prerequisites not normally taken by Biological Sciences majors.

Freshman Year

First Semester
5 - BIOL 110 Principles of Biology I
1 - BIOSC 101 Frontiers in Biology I
4 - CH 101 General Chemistry
3 - COMM 150 Intro. to Human Communication
4 - MTHSC 106 Calculus of One Variable I
17
Second Semester
5 - BIOL 111 Principles of Biology II
1 - BIOSC 102 Frontiers in Biology II
4 - CH 102 General Chemistry
3 - ENGL 103 Accelerated Composition
4 - MTHSC 111 Calculus II for Biologists
17
Sophomore Year
First Semester
3 - CH 223 Organic Chemistry and
1 - CH 227 Organic Chemistry Lab. or
4 - CH 201 Survey of Organic Chemistry
4 - Animal or Plant Diversity Requirement
3 - Arts and Humanities (Literature) Requirement
4 - Biochemistry or Genetics Requirement
15
Second Semester
3 - CH 224 Organic Chemistry or
1 - Major Requirement
4 - Animal or Plant Diversity Requirement
4 - Biochemistry or Genetics Requirement
4 - Major Requirement
15
Junior Year
First Semester
3 - BIOSC 335 Evolutionary Biology
2 - BIOSC 461 Cell Biology
3 - ENGL 315 Scientific Writing and Comm.
3 - PHYS 207 General Physics I and
4 - PHYS 209 General Physics I Lab. or
3 - PHYS 122 Physics with Calculus I and
1 - PHYS 124 Physics Lab. I
15
Second Semester
3 - PHYS 208 General Physics II and
1 - PHYS 210 General Physics II Lab. or
3 - PHYS 221 Physics with Calculus II and
1 - PHYS 223 Physics Lab. II
3 - Arts and Humanities (Non-Lit.) Requirement
5 - Major Requirement
5 - Social Science Requirement
15
Senior Year
First Semester
2 - BIOSC 493 Senior Seminar
13 - Major Requirement
15
Second Semester
12 - Major Requirement
3 - Social Science Requirement
15
124 Total Semester Hours

Notes:
1. A student is allowed to enroll in science and mathematics courses only when all prerequisites have been passed with a grade of C or higher.
2. A minimum grade of C is required in all science and mathematics courses. No student may exceed a maximum of two attempts, excluding a W, to complete successfully any science or mathematics course.

Additional Notes:
- CH 331 may be substituted.
- 3CH 331 may be substituted.
- See General Education Requirements. Six of these credit hours must also satisfy the Cross-Cultural Awareness Requirement.
- BIOL 110 and 111 are strongly recommended; however, BIOL 103/105 may substitute for BIOL 110, and BIOL 104/106 may substitute for BIOL 111. The remaining 1-2 credits required must be satisfied by completing 1-2 extra credits from departmental course offerings at the 300 level or above.
- CH 331 may be substituted.
- Three of these credit hours may be selected from departmental course offerings at the 300 level or above.
- CH 228 may be substituted for BIOL 111. The remaining 1-2 credits required must be satisfied by completing 1-2 extra credits from departmental course offerings at the 300 level or above.
- CH 331 may be substituted.
College of Agriculture, Forestry and Life Sciences

ECOLOGY—BIOSC 443/444, 445/445, 446/446, 470/471

PHYSIOLOGY—BIOSC 401/402, 459/460, 475/476

The remaining courses may be selected from BIOCH 302, MTHSC 301, or BIOSC or MICRO courses at the 300 level or higher.

ENTOMOLOGY EMPHASIS AREA

See Bachelor of Science curriculum for freshman year requirements.

Sophomore Year

First Semester
3 - CH 223 Organic Chemistry and
1 - CH 227 Organic Chemistry Lab., or
4 - ENT (BIOSC) 301 Insect Biol. and Diversity
3 - Arts and Humanities (Literature) Requirement1
4 - Biochemistry or Genetics Requirement2
15

Second Semester
3 - BIOSC 304 Biology of Plants and
1 - BIOSC 308 Biochemistry of Plants Practicum or
3 - BIOSC 305 Biology of Algae and Fungi and
1 - BIOSC 309 Algae/Fungi Practicum
3 - CH 224 Organic Chemistry or
3 - Major Requirement1
4 - Biochemistry or Genetics Requirement2
4 - Major Requirement1
15

Junior Year

First Semester
3 - BIOSC 335 Evolutionary Biology
3 - ENGL 315 Scientific Writing and Comm.
3 - PHYS 207 General Physics I and
1 - PHYS 209 General Physics I Lab., or
3 - PHYS 122 Physics with Calculus I and
1 - PHYS 124 Physics Lab. I
4 - Entomology Requirement4
14

Second Semester
3 - PHYS 208 General Physics II and
1 - PHYS 210 General Physics II Lab., or
1 - PHYS 220 General Physics II Lab.
3 - PHYS 221 Physics with Calculus II and
1 - PHYS 223 Physics Lab. II
3 - Arts and Humanities (Non-Lit.) Requirement3
3 - Major Requirement4
3 - Social Science Requirement3
3 - PHYS 209 General Physics I Lab.
3 - PHYS 208 General Physics II
1 - PHYS 209 General Physics I Lab.
or
3 - ENT (BIOSC) 400, (BIOSC) 415, and seven additional credits selected from ENT 300, 308, 401, 404/409, 407, (BIOSC) 416, (BIOSC) 455, (BIOSC, W F B) 469, 490, (GEN) 495, PL PA (ENT) 406

PREPHARMACY EMPHASIS AREA

Freshman Year

First Semester
3 - BIOL 103 General Biology I
1 - BIOL 105 General Biology Lab. I
1 - BIOL 101 Frontiers in Biology I
4 - CH 101 General Chemistry
3 - COMM 150 Intro. to Human Communication
1 - CH 228 Organic Chemistry Lab.
4 - MTHSC 106 Calculus of One Variable I
16

Second Semester
3 - BIOL 104 General Biology II
1 - BIOL 106 General Biology Lab. II
1 - BIOL 102 Frontiers in Biology II
4 - CH 102 General Chemistry
3 - GEN 150 Advanced Composition
3 - MTHSC 111 Calculus II for Biologists
16

Sophomore Year

First Semester
3 - CH 223 Organic Chemistry
1 - CH 227 Organic Chemistry Lab.
4 - Animal or Plant Diversity Requirement2
3 - Arts and Humanities (Literature) Requirement1
3 - Biochemistry or Genetics Requirement4
3 - Entomology Requirement4
3 - Major Requirement1
3 - Social Science Requirement1
115

Second Semester
3 - CH 224 Organic Chemistry
1 - CH 228 Organic Chemistry Lab.
4 - MICRO 305 General Microbiology
4 - Animal or Plant Diversity Requirement2
4 - Biochemistry or Genetics Requirement2
4 - Partial Differential Equations Requirement3
115

Junior Year

First Semester
3 - BIOSC 335 Evolutionary Biology
3 - BIOSC 461 Cell Biology
2 - BIOSC 462 Cell Biology Lab.
3 - ENGL 315 Scientific Writing and Comm.
3 - PHYS 207 General Physics I and
1 - PHYS 209 General Physics I Lab., or
3 - PHYS 122 Physics with Calculus I and
1 - PHYS 124 Physics Lab. I
115

Second Semester
3 - BIOL 208 General Physics II and
1 - BIOL 210 General Physics II Lab., or
3 - PHYS 221 Physics with Calculus II and
1 - PHYS 223 Physics Lab. II
3 - Arts and Humanities (Non-Lit.) Requirement1
3 - Economics Requirement1
6 - Major Requirement6
16

Senior Year

First Semester
4 - BIOSC 315 Functional Human Anatomy
2 - BIOSC 493 Senior Seminar
10 - Major Requirement6
16

Second Semester
4 - Animal Physiology Requirement2
8 - Major Requirement6
12-14 Semester Hours

1Prepharmacy programs require BIOL 103/105 and 104/106 or equivalent; however, BIOL 110 and 111 may substitute. The additional 1–2 credit hours will be subtracted from Major Requirement credits.

2At least one lecture and associated laboratory must be completed for both animal diversity (BIOSC 302/306 or BIOSC 303/307) and for genetics (GEN 300/301 or 302/303). CH 228 may be substituted for BIOSC 302 or 306.

3See advisor. Select one lecture/lab combination from each of the following fields. BIOSC 347 and 476 are recommended to satisfy the Physiology Requirement.

4See General Education Requirements. Six of these credits must also satisfy the Cross-Cultural Awareness and Science and Technology in Society Requirements.

5At least one lecture and associated laboratory must be completed for both biochemistry (BIOSC 301/302 or 305/306) and for genetics (GEN 300/301 or 302/303). CH 228 may be substituted for BIOSC 302 or 306.

6See advisor. Select one lecture/lab combination in ecology (BIOSC 443/444, 445/445, 446/447, 470/471). The remaining courses may be selected from BIOSC 302, MTHSC 301, or any BIOSC or MICRO courses at the 300 level or higher.

7Prepharmacy programs require BIOL 110/111 and 114/116 or equivalent; however, BIOL 110 and 111 may substitute. The additional 1–2 credit hours will be subtracted from Major Requirement credits.

8See General Education Requirements. Six of these credit hours must also satisfy the Cross-Cultural Awareness and Science and Technology in Society Requirements.

9At least one lecture and associated laboratory must be completed for both animal diversity (BIOSC 302/306 or BIOSC 303/307) and for plant diversity (BIOSC 304/308, BIOSC 305/309, BIOSC 320, or BIOSC 406/407).

10One lecture must be completed for both biochemistry (BIOSH 301 or 305) and one lecture and associated laboratory for genetics (GEN 300/301 or 302/303).

11See General Education Requirements. Six of these credit hours must also satisfy the Cross-Cultural Awareness and Science and Technology in Society Requirements.

12See advisor. Select one lecture/lab combination in ecology (BIOSC 443/444, 445/445, 446/447, 470/471). The remaining courses may be selected from BIOSC 302, MTHSC 301, or any BIOSC or MICRO courses at the 300 level or higher.

13BIOSC 316, 459/460, or 475/476

QUANTITATIVE BIOLOGY EMPHASIS AREA

See Bachelor of Science curriculum for freshman year requirements.

Sophomore Year

First Semester
3 - CH 223 Organic Chemistry and
1 - CH 227 Organic Chemistry Lab.
4 - Animal or Plant Diversity Requirement2
3 - Arts and Humanities (Literature) Requirement1
3 - Biochemistry or Genetics Requirement4
115

Second Semester
3 - CH 224 Organic Chemistry
1 - CH 228 Organic Chemistry Lab.
4 - MICRO 305 General Microbiology
4 - Animal or Plant Diversity Requirement2
4 - Biochemistry or Genetics Requirement2
3 - Partial Differential Equations Requirement3
115

Junior Year

First Semester
3 - BIOSC 335 Evolutionary Biology
3 - BIOSC 461 Cell Biology
2 - BIOSC 462 Cell Biology Lab.
3 - ENGL 315 Scientific Writing and Comm.
3 - PHYS 207 General Physics I and
1 - PHYS 209 General Physics I Lab., or
3 - PHYS 122 Physics with Calculus I and
1 - PHYS 124 Physics Lab. I
115

Second Semester
3 - CH 224 Organic Chemistry
3 - CH 228 Organic Chemistry Lab.
4 - MICRO 305 General Microbiology
4 - Animal or Plant Diversity Requirement2
4 - Biochemistry or Genetics Requirement2
3 - Major Requirement4
117
Junior Year

First Semester
- 3 - BIOC 335 Evolutionary Biology
- 3 - ENGL 315 Scientific Writing and Comm.
- 3 - EX ST 311 Introductory Statistics II
- 3 - PHYS 207 General Physics I and
- 1 - PHYS 209 General Physics I Lab. or
- 3 - PHYS 122 Physics with Calculus I and
- 1 - PHYS 124 Physics Lab. I
- 3 - Major Requirement4

Second Semester
- 4 - BIOC 428 Quantitative Biology
- 3 - BIOC 461 Cell Biology
- 2 - BIOC 462 Cell Biology Lab.
- 3 - PHYS 208 General Physics II and
- 1 - PHYS 210 General Physics II Lab. or
- 3 - PHYS 221 Physics with Calculus II and
- 1 - PHYS 223 Physics Lab. II
- 3 - Social Science Requirement5

Senior Year

First Semester
- 2 - BIOC 493 Senior Seminar
- 3 - GEN 440 Bioinformatics
- 3 - Arts and Humanities (Literature) Requirement5
- 7 - Major Requirement4
- 16

Second Semester
- 1 - BIOC 491 Undergraduate Research
- 3 - Arts and Humanities (Non-Lit.) Requirement5
- 5 - Major Requirement4
- 3 - Social Science Requirement5
- 12

125 Total Semester Hours

1At least one lecture and associated laboratory must be completed for both animal diversity (BIOC 302/306 or BIOC 305/309) and for plant diversity (BIOC 304/308, BIOC 305/309, BIOC 320, or BIOC 406/407).

2At least one lecture and associated laboratory must be completed for both biochemistry (BIOC 301/302 or 305/306) and for genetics (GEN 300/301 or 302/303). CH 228 may be substituted for BIOC 302 or 306.

3See advisor.

4See advisor. Select one lecture/lab combination from each of the following fields:
- Physiology—BIOC 403/402, 459/460, 475/476
- The remaining courses may be selected from BIOC 302, or BIOC or MICRO courses at the 300 level or higher.

5See General Education Requirements. Six of these credits must also satisfy the Cross-Cultural Awareness and the Science and Technology in Society Requirements.

TOXICOLOGY EMPHASIS AREA

See Bachelor of Science curriculum for freshman year requirements.

Sophomore Year

First Semester
- 3 - BIOC 210 Introduction to Toxicology
- 3 - CH 223 Organic Chemistry1 and
- 1 - CH 227 Organic Chemistry Lab.1, or
- 4 - CH 201 Survey of Organic Chemistry
- 4 - Animal or Plant Diversity Requirement2
- 4 - Biochemistry or Genetics Requirement3
- 15

Second Semester
- 3 - CH 224 Organic Chemistry1 or
- 3 - Major Requirement4
- 4 - Animal or Plant Diversity Requirement2
- 4 - Biochemistry or Genetics Requirement3
- 4 - Major Requirement4
- 15

Junior Year

First Semester
- 3 - BIOC 335 Evolutionary Biology
- 3 - ENGL 315 Scientific Writing and Comm.
- 3 - ENTOX (ENT) 430 Toxicology
- 3 - PHYS 207 General Physics I and
- 1 - PHYS 209 General Physics I Lab. or
- 3 - PHYS 122 Physics with Calculus I and
- 1 - PHYS 124 Physics Lab. I
- 3 - Major Requirement4

Second Semester
- 3 - PHYS 208 General Physics II and
- 1 - PHYS 210 General Physics II Lab. or
- 3 - PHYS 221 Physics with Calculus II and
- 1 - PHYS 223 Physics Lab. II
- 3 - Arts and Humanities (Literature) Requirement5
- 4 - Major Requirement4
- 3 - Social Science Requirement5
- 14

Senior Year

First Semester
- 3 - BIOC 461 Cell Biology
- 2 - BIOC 462 Cell Biology Lab.
- 2 - BIOC 493 Senior Seminar
- 3 - CH 413 Quantitative Analysis
- 1 - CH 317 Quantitative Analysis Lab.
- 3 - Major Requirement4
- 14

Second Semester
- 3 - CH 413 Chemistry of Aqueous Systems or
- 3 - ENTOX 421 Chemical Sources and Fate in Environmental Systems
- 3 - Arts and Humanities (Non-Lit.) Requirement5
- 4 - Major Requirement4
- 3 - Social Science Requirement5
- 2 - Toxicology Requirement6
- 16

124 Total Semester Hours

1CH 223/227 and 224 are recommended.

2At least one lecture and associated laboratory must be completed for both animal diversity (BIOC 302/306 or BIOC 305/309) and for plant diversity (BIOC 304/308, BIOC 305/309, BIOC 320, or BIOC 406/407).

3At least one lecture and associated laboratory must be completed for both biochemistry (BIOC 301/302 or 305/306) and for genetics (GEN 300/301 or 302/303). CH 228 may be substituted for BIOC 302 or 306.

4See advisor. Select one lecture/lab combination from each of the following fields:
- Physiology—BIOC 403/402, 459/460, 475/476
- The remaining courses may be selected from BIOC 302, or BIOC or MICRO courses at the 300 level or higher.

5See General Education Requirements. Six of these credits must also satisfy the Cross-Cultural Awareness and the Science and Technology in Society Requirements.

6Any 400-level ENTOX course

BIOLICAL SCIENCES

Bachelor of Arts

The Bachelor of Arts in Biological Sciences provides a strong foundation in biology and is ideal for students desiring a liberal education emphasizing an interdisciplinary approach to a thorough understanding of the life sciences.

Double Major in Biological Sciences/Secondary Education

The Bachelor of Arts Degree in Biological Sciences and Secondary Education—Biological Sciences prepares students for teaching biology on the secondary school level and for graduate study in any of the life science areas. See page 108 for the curriculum.

Freshman Year

First Semester
- 5 - BIOL 110 Principles of Biology1
- 1 - BIOC 102 Frontiers in Biology I
- 1 - CH 101 General Chemistry
- 3 - COMM 150 Intro. to Human Communication
- 4 - MTHSC 106 Calculus of One Variable I
- 17

Second Semester
- 5 - BIOL 111 Principles of Biology II1
- 1 - BIOC 102 Frontiers in Biology II
- 4 - CH 102 General Chemistry
- 3 - ENGL 103 Accelerated Composition
- 3 - Mathematical Sciences Requirement2
- 16-17

Sophomore Year

First Semester
- 4 - CH 201 Survey of Organic Chemistry1
- 4 - Animal or Plant Diversity Requirement2
- 4 - Biochemistry or Genetics Requirement3
- 4 - Foreign Language Requirement2
- 16

Second Semester
- 4 - Animal or Plant Diversity Requirement2
- 4 - Biochemistry or Genetics Requirement3
- 4 - Foreign Language Requirement2
- 3 - Minor Requirement2
- 15

Junior Year

First Semester
- 3 - BIOC 335 Evolutionary Biology
- 3 - BIOC 461 Cell Biology
- 3 - ENGL 315 Scientific Writing and Comm.
- 3 - Foreign Language Requirement2
- 4 - Animal or Plant Diversity Requirement2
- 4 - Biochemistry or Genetics Requirement3
- 3 - Arts and Humanities (Non-Lit.) Requirement5
- 3 - Social Science Requirement5
- 16

Second Semester
- 3 - BIOC 335 Evolutionary Biology
- 3 - ENGL 315 Scientific Writing and Comm.
- 3 - Foreign Language Requirement2
- 4 - Animal or Plant Diversity Requirement2
- 4 - Biochemistry or Genetics Requirement3
- 3 - Arts and Humanities (Non-Lit.) Requirement5
- 3 - Social Science Requirement5
- 16
### Senior Year

**First Semester**
- 2 - BIOSC 493 Senior Seminar
- 3 - PHYS 207 General Physics I
- 1 - PHYS 209 General Physics I Lab.
- 3 - Major Requirement
- 3 - Minor Requirement
- 3 - Social Science Requirement

**Second Semester**
- 3 - PHYS 208 General Physics II
- 1 - PHYS 210 General Physics II Lab.
- 3 - Arts and Humanities (Literature) Requirement
- 3 - Major Requirement
- 3 - Minor Requirement
- 3 - Social Science Requirement

Total Semester Hours: 125–126

### Sophomore Year

**First Semester**
- 4 - CH 201 Survey of Organic Chemistry
- 4 - Animal or Plant Diversity Requirement
- 4 - Biochemistry or Genetics Requirement
- 4 - Foreign Language Requirement

**Second Semester**
- 4 - Animal or Plant Diversity Requirement
- 4 - Biochemistry or Genetics Requirement
- 4 - Foreign Language Requirement
- 3 - Minor Requirement

### Junior Year

**First Semester**
- 4 - BIOSC 315 Functional Human Anatomy
- 3 - BIOSC 335 Evolutionary Biology
- 3 - BIOSC 461 Cell Biology
- 3 - ENGL 315 Scientific Writing and Comm.
- 3 - Foreign Language Requirement

**Second Semester**
- 4 - BIOSC 316 Human Physiology
- 3 - Arts and Humanities (Non-Lit.) Requirement
- 3 - Foreign Language Requirement
- 6 - Minor Requirement

### Senior Year

**First Semester**
- 2 - BIOSC 493 Senior Seminar
- 3 - PHYS 207 General Physics I
- 1 - PHYS 209 General Physics I Lab.
- 1 - Major Requirement
- 3 - Minor Requirement
- 3 - Social Science Requirement

**Second Semester**
- 3 - PHYS 208 General Physics II
- 1 - PHYS 210 General Physics II Lab.
- 3 - Arts and Humanities (Literature) Requirement
- 3 - Major Requirement
- 3 - Minor Requirement
- 3 - Social Science Requirement

Total Semester Hours: 125

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### PREREHABILITATION SCIENCES EMPHASIS AREA

#### Freshman Year

**First Semester**
- 3 - BIOL 103 General Biology I
- 1 - BIOL 105 General Biology Lab. I
- 1 - BIOSC 101 Frontiers in Biology I
- 4 - CH 101 General Chemistry
- 3 - COMM 150 Intro. to Human Communication
- 4 - MTHSC 106 Calculus of One Variable I

**Second Semester**
- 3 - BIOL 104 General Biology II
- 1 - BIOL 106 General Biology Lab. II
- 1 - BIOSC 102 Frontiers in Biology II
- 4 - CH 102 General Chemistry
- 3 - ENGL 103 Accelerated Composition
- 3 - EX ST 101 Introductory Statistics

### Sophomore Year

**First Semester**
- 4 - CH 201 Survey of Organic Chemistry
- 4 - Animal or Plant Diversity Requirement
- 4 - Biochemistry or Genetics Requirement
- 4 - Foreign Language Requirement

**Second Semester**
- 4 - Animal or Plant Diversity Requirement
- 4 - Biochemistry or Genetics Requirement
- 4 - Foreign Language Requirement
- 3 - Minor Requirement

### Junior Year

**First Semester**
- 4 - BIOSC 315 Functional Human Anatomy
- 3 - BIOSC 335 Evolutionary Biology
- 3 - BIOSC 461 Cell Biology
- 3 - ENGL 315 Scientific Writing and Comm.
- 3 - Foreign Language Requirement

**Second Semester**
- 4 - BIOSC 316 Human Physiology
- 3 - Arts and Humanities (Non-Lit.) Requirement
- 3 - Foreign Language Requirement
- 6 - Minor Requirement

### Senior Year

**First Semester**
- 2 - BIOSC 493 Senior Seminar
- 3 - PHYS 207 General Physics I
- 1 - PHYS 209 General Physics I Lab.
- 1 - Major Requirement
- 3 - Minor Requirement
- 3 - Social Science Requirement

**Second Semester**
- 3 - PHYS 208 General Physics II
- 1 - PHYS 210 General Physics II Lab.
- 3 - Arts and Humanities (Literature) Requirement
- 3 - Major Requirement
- 3 - Minor Requirement
- 3 - Social Science Requirement

Total Semester Hours: 125

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### 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 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. 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. These two concentrations are administered by the Department of Forestry and Natural Resources. The Natural Resource and Economic Policy Concentration provides more in-depth study in economics and policy applications and is administered by the Department of Applied Economics and Statistics.

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 103 General Biology I
- 1 - BIOL 105 General Biology Lab. I
- 4 - CH 105 Chemistry in Context I

**Second Semester**
- 1 - ENR 101 Intro. to Env. and Natural Res. I
CONSERVATION BIOLOGY CONCENTRATION

Sophomore Year
First Semester
3 - AP EC 257 Natural Resources, Environment, and Economics
4 - BIOSC 320 Field Botany or
2 - FOR 205 Dendrology and
3 - FOR 221 Forest Biology
3 - EX ST 301 Introductory Statistics
3 - Arts and Humanities (Literature) Requirement
3 - Oral Communication Requirement
16-17

Second Semester
4 - CSENV 202 Soils
3 - GEN 300 Fundamental Genetics
3 - W F B (BIOSC) 313 Conservation Biology
3 - Physical Environment Requirement
3 - Taxonomy/Habitat Requirement
3

Junior Year
First Semester
3 - ENGL 314 Technical Writing
3 - Arts and Humanities (Non-Lit.) Requirement
3 - Ecology Requirement
3 - Physiology Requirement
3 - Taxonomy/Habitat Requirement
15

Second Semester
3 - BIOSC 335 Evolutionary Biology
3 - E N R 302 Natural Resources Measurements
3 - Ecology Requirement
3 - Natural Resource Economics Requirement
3 - Taxonomy/Habitat Requirement
15

Senior Year
First Semester
3 - E N R (BIOSC) 413 Restoration Ecology
3 - FOR (E N R) 434 GIS for Landscape Planning
3 - Conservation Policy/Law Requirement
3 - Internship or Directed Research
3 - Taxonomy/Habitat Requirement
15

Second Semester
3 - E N R 450 Conservation Issues
1 - FOR 498 Senior Portfolio or
1 - W F B 498 Senior Portfolio
3 - Social Science Requirement
6 - Taxonomy/Habitat Requirement
13

120–121 Total Semester Hours
3 - See General Education Requirements. Three of these credit hours must also satisfy the Cross-Cultural Awareness Requirement.
3 - GEOG 101, GEO 103, or PHYS 240
3 - CH 101 and 102 and must satisfy the General Education Requirement.
3 - ENGL 314 Technical Writing
3 - ECON 319 Environmental Economics
3 - AP EC 457 Natural Resource Use, Technology, and Policy
2 - FOR 400 Public Relations in Natural Resources
3 - FOR (E N R) 434 GIS for Landscape Planning
5 - Minor Requirement
15

Senior Year
First Semester
3 - C R D (AP EC) 491 Internship, Agribusiness, and Community and Rural Development
3 - Minor Requirement
3 - EX ST 462 Statistics Applied to Economics
9 - Applied Economics Requirement or
6 - Applied Economics Requirement and
3 - Minor Requirement
15

Second Semester
3 - E N R 450 Conservation Issues
3 - Applied Economics Requirement
3 - Community Development Requirement
4 - Elective or
3 - Minor Requirement and
1 - Elective
16

121 Total Semester Hours
3 - GEOG 441, CSENV 202, EN SP 200, FOR 206, 315, W F B 300, 350, 412, or 416
3 - GEOG 101, 103, or 106
3 - Select from remaining courses in footnote 1 or BIOSC 320/306, 303/307, 304/308, 305/309, 320, 406/407, 410/411, 464, 468, 472, 477, CSENV 404, ENT (BIOSC) 301, BIOSC, W F B 469, FOR 251, 406, GEO 112, 210, 403, MICRO 423, W F B 418, 440, or 462. At least four of the courses must be laboratories or courses with a required laboratory component.
3 - BIOSC 441, 442, 443, 446, or 470
3 - BIOS 301, BIOSC 401/402, 458, 475, or (AVS) 480
3 - AP EC 433, (W F B) 475, C R D (AP EC) 357, or FOR 304
3 - E N R 429, 450, or W F B 430
3 - See advisor.

NATURAL RESOURCE AND ECONOMIC POLICY CONCENTRATION

Sophomore Year
First Semester
3 - AP EC 257 Natural Resources, Environment, and Economics
3 - PO SC 101 American National Government or
3 - PO SC 102 Intro to International Relations
3 - Ecology Requirement
3 - Minor Requirement
3 - Geography Requirement
3 - Oral Communication Requirement
15

Second Semester
3 - C R D (AP EC) 357 Natural Res. Economics
3 - ECON 202 Soils
3 - EX ST 301 Introductory Statistics
3 - Arts and Humanities (Literature) Requirement
3 - Arts and Humanities (Non-Lit.) Requirement
15

Junior Year
First Semester
3 - E N R 429 Environmental Law and Policy
3 - ECON 314 Intermediate Microeconomics
3 - ENGL 314 Technical Writing
3 - W F B (BIOSC) 313 Conservation Biology or
3 - Minor Requirement
3 - Applied Economics Requirement
15

Second Semester
3 - AP EC 457 Natural Resource Use, Technology, and Policy
3 - ECON 319 Environmental Economics
3 - FOR (E N R) 434 GIS for Landscape Planning
3 - Ecology Requirement II or
3 - Minor Requirement
3 - Macroeconomics Requirement
15

Senior Year
First Semester
3 - C R D (AP EC) 491 Internship, Agribusiness, and Community and Rural Development
3 - Minor Requirement
3 - EX ST 462 Statistics Applied to Economics
9 - Applied Economics Requirement or
6 - Applied Economics Requirement and
3 - Minor Requirement
15

Second Semester
3 - E N R 450 Conservation Issues
3 - Applied Economics Requirement
3 - Community Development Requirement
4 - Elective or
3 - Minor Requirement and
1 - Elective
16

121 Total Semester Hours
3 - AP EC 313, 352, 402, 409, 413, 433, 452, 456, 458, (W F B) 475, 490, C R D (AP EC) 411, (AP EC) 412, or (AP EC) 491
3 - ECON 302, 310 or 315
3 - CR D 335 or 336

NATURAL RESOURCES MANAGEMENT CONCENTRATION

Sophomore Year
First Semester
3 - AP EC 257 Natural Resources, Environment, and Economics
4 - CSENV 202 Soils
2 - FOR 205 Dendrology
3 - FOR 221 Forest Biology
3 - Arts and Humanities (Literature) Requirement
15

Second Semester
3 - FOR 206 Forest Ecology
3 - W F B (BIOSC) 313 Conservation Biology
3 - Arts and Humanities (Non-Lit.) Requirement
3 - Oral Communication Requirement
3 - Social Science Requirement
15

Junior Year
First Semester
3 - BIOSC 320 Field Botany or
3 - BIOSC 406 Intro. Plant Taxonomy and
1 - BIOSC 407 Plant Taxonomy Lab.
3 - E N R 429 Environmental Law and Policy or
3 - FOR 400 Public Relations in Natural Resources
3 - FOR (E N R) 434 GIS for Landscape Planning
5 - Minor Requirement
15
Second Semester  
3 - C R D (AP EC) 357 Natural Res. Economics  
3 - E N R 302 Natural Resources Measurements  
3 - GEO 101 Physical Geology  
1 - GEO 103 Physical Geology Lab.  
3 - W F B 350 Principles of Fish and Wildlife Biol.  
3 - Minor Requirement*  
16  
Senior Year  
First Semester  
3 - FOR (E N R) 416 Forest Policy and Admin.  
3 - W F B 418 Fishery Conservation  
3 - W F B 462 Wetland Wildlife Biology  
3 - Conservation Colloquium or Internship1  
4 - Minor Requirement*  
16  
Second Semester  
3 - E N R 450 Conservation Issues  
3 - ENGL 314 Technical Writing  
3 - EX ST 301 Introductory Statistics  
2 - FOR 460 Forested Watershed Management  
1 - FOR 498 Senior Portfolio or  
1 - W F B 498 Senior Portfolio  
3 - Minor Requirement*  
15  
122 Total Semester Hours  
*See General Education Requirements. Three of these credit hours must also satisfy the Cross-Cultural Awareness Require-
*Minor is required and must be selected from the following: Biochemistry; Biological Sciences; Chemistry; Crop and Soil 
Environmental Science; Environmental Science and Policy; Forest Resource Management; Geology; Horticulture; Legal 
Studies; Microbiology; Natural Resource Economics; Nonprofit Leadership; Park and Protected Area Management; Therapeu-
tic Recreation; Travel and Tourism; Urban Forestry; Wildlife 
and Fisheries Biology.  
See advisor.

FOOD SCIENCE

Bachelor of Science  
Food Science majors apply principles of basic and applied sciences to the design, creation, manufacture, packaging, distribution, and utilization of safe, nutritious, and enjoyable foods and food products. The curriculum allows flexibility for concentrating in one of two areas.

In the Food Science and Technology Concentration, students may emphasize business, culinary science (one of three national programs that have been approved by the Research Chef’s Association as Culinology™), engineering, food packaging, and additional sciences that complement requirements of the Institute of Food Technologists.

The Nutrition and Dietetics Concentration emphasizes nutrition and related areas. It is currently initially accredited by the Commission on Accreditation for Dietetics Education of the American Dietetic Association.

Food processing industries, ingredient manufacturers, and packaging suppliers employ graduates in new food product development, quality assurance, production management, and technical sales. State and federal agencies also need graduates for food safety and regulatory positions. With the Nutrition and Dietetics Concentration, employment opportunities include dietitians, nutritionists, consultants, and food specialists. Placement rates are high for all of these fields, and graduates are also well prepared to pursue graduate study in many areas.

The Department of Food Science and Human Nutrition 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 the MS degree in Food, Nutrition and Culinary Sciences. Details are available from the Department of Food Science and Human Nutrition or at www.clemson.edu/foodscience.

FOOD SCIENCE  
AND TECHNOLOGY  
CONCENTRATION  

Freshman Year  
First Semester  
3 - BIOL 103 General Biology I and  
1 - BIOL 105 General Biology Lab. I or  
5 - BIOL 110 Principles of Biology  
4 - CH 101 General Chemistry  
1 - COMM 150 Intro. to Human Communication  
1 - FD SC 101 Epochs in Man’s Struggle for Food  
3 - MTHSC 124 Intro. to Math. Analysis or  
4 - MTHSC 106 Calculus of One Variable I  
15-17  
Second Semester  
3 - BIOL 104 General Biology II and  
1 - BIOL 106 General Biology Lab. II or  
5 - BIOL 111 Principles of Biology II  
4 - CH 101 General Chemistry  
3 - ENGL 103 Accelerated Composition  
1 - FD SC 102 Perspectives in Food and Nutrition Sciences  
1 - FD SC 450 Creative Inquiry  
3 - PSYCH 201 Introduction to Psychology  
16-17  
Sophomore Year  
First Semester  
4 - CH 201 Survey of Organic Chemistry or  
3 - CH 223 Organic Chemistry and  
1 - CH 227 Organic Chemistry Lab.  
1 - FD SC 450 Creative Inquiry  
3 - PHYS 122 Physics with Calculus I and  
1 - PHYS 124 Physics Lab. I or  
4 - PHYS 200 Introductory Physics or  
3 - PHYS 207 General Physics I and  
1 - PHYS 209 General Physics I Lab.  
3 - Arts and Humanities (Literature) Requirement1  
3 - Social Science Requirement*  
15  
Second Semester  
3 - BIOC 405 Essential Elements of Biochem.  
3 - EX ST 301 Introductory Statistics  
3 - FD SC 214 Food Resources and Society  
1 - FD SC 450 Creative Inquiry  
3 - Arts and Humanities (Non-Lit.) Requirement1  
2 - Elective  
15  
Junior Year  
First Semester  
1 - FD SC 301 Food Regulations and Policy  
1 - FD SC 417 Seminar  
1 - FD SC 450 Creative Inquiry  
4 - MICRO 305 General Microbiology  
3 - NUTR 451 Human Nutrition  
3 - Departmental Requirement*  
2 - Emphasis Area Requirement*  
15  
Second Semester  
4 - ENGL 304 Business Writing or  
4 - ENGL 314 Technical Writing  
4 - FD SC 410 Food Product Development  
1 - FD SC 450 Creative Inquiry  
4 - MICRO 407 Food and Dairy Microbiology  
3 - Emphasis Area Requirement*  
15  
Senior Year  
First Semester  
3 - FD SC 306 Food Service Operations or  
3 - FD SC 307 Restaurant Food Service Mgt.  
4 - FD SC 401 Food Chemistry I  
4 - FD SC 404 Food Preservation and Processing  
2 - FD SC 407 Quantity Food Production  
1 - FD SC 450 Creative Inquiry  
3 - Emphasis Area Requirement*  
15  
Second Semester  
4 - FD SC 402 Food Chemistry II  
4 - FD SC 408 Food Process Engineering  
3 - FD SC (PKGS) 409 Total Quality Mgt. for 
the Food and Packaging Industries  
1 - FD SC 450 Creative Inquiry  
3 - Emphasis Area Requirement*  
15  
122–125 Total Semester Hours  
*See General Education Requirements. Three of these credit hours must also satisfy the Cross-CulturalAwareness Require-
*For students undecided on concentration area, AP EC 202, 
ECON 211, or 212 is recommended.  
*FD SC 430 or AVS 413  
See advisor.
NUTRITION AND DIETETICS
CONCENTRATION

Freshman Year
First Semester
3 - BIOL 103 General Biology I and
1 - BIOL 105 General Biology Lab. I or
5 - BIOL 110 Principles of Biology I
4 - CH 101 General Chemistry
3 - COMM 150 Intro. to Human Communication
1 - FD SC 101 Epochs in Man’s Struggle for Food
3 - MTHSC 102 Intro. to Math. Analysis or
4 - MTHSC 106 Calculus of One Variable I
15-17

Second Semester
3 - BIOL 104 General Biology II and
1 - BIOL 106 General Biology Lab. II or
5 - BIOL 111 Principles of Biology II
4 - CH 102 General Chemistry
3 - ENGL 103 Accelerated Composition
1 - FD SC 102 Perspectives in Food and
Nutrition Sciences
3 - PSYCH 201 Introduction to Psychology

Sophomore Year
First Semester
3 - AP EC 202 Agricultural Economics or
3 - ECON 211 Principles of Microeconomics or
3 - ECON 212 Principles of Macroeconomics
4 - CH 201 Survey of Organic Chemistry or
3 - CH 223 Organic Chemistry and
1 - CH 227 Organic Chemistry Lab.
1 - NUTR 216 Current Issues in Nutrition
3 - PHYS 122 Physics with Calculus I and
1 - PHYS 124 Physics Lab. I or
4 - PHYS 200 Introductory Physics or
3 - PHYS 207 General Physics I and
1 - PHYS 209 General Physics I Lab.
3 - Arts and Humanities (Literature) Requirement 2
15

Second Semester
3 - BIOCH 305 Essential Elements of Biochem.
3 - EX ST 301 Introductory Statistics
3 - FD SC 214 Food Resources and Society
1 - FD SC 450 Creative Inquiry
3 - Arts and Humanities (Non-Lit.) Requirement 2
2 - Elective
15

Junior Year
First Semester
4 - BIOSC 222 Human Anatomy and Phys. I
1 - FD SC 301 Food Regulations and Policy
1 - FD SC 450 Creative Inquiry
4 - MICRO 305 General Microbiology
3 - NUTR 451 Human Nutrition
2 - Elective
15

Second Semester
4 - BIOSC 223 Human Anatomy and Phys. II
3 - ENGL 304 Business Writing or
3 - ENGL 314 Technical Writing
1 - FD SC 450 Creative Inquiry
4 - MICRO 407 Food and Dairy Microbiology
3 - NUTR 455 Nutrition and Metabolism
15

Senior Year
First Semester
3 - FD SC 306 Food Service Operations
4 - FD SC 401 Food Chemistry I
3 - FD SC 404 Food Preservation and Processing
2 - FD SC 407 Quantity Food Production
1 - NUTR 418 Professional Devel. in Dietetics or
1 - NUTR 419 Professional Devel. in Nutrition 2
4 - NUTR 424 Medical Nutrition Therapy I
17

Second Semester
4 - FD SC 402 Food Chemistry II
3 - FD SC (PKGSC) 409 Total Quality Mgt. for
the Food and Packaging Industries
1 - FD SC 450 Creative Inquiry
4 - NUTR 425 Medical Nutrition Therapy II
3 - NUTR 426 Community Nutrition
15

122-125 Total Semester Hours
See General Education Requirements. Three of these credit
hours must also satisfy the Cross-Cultural Awareness Require-
ment.
3 - NUTR 419 is recommended for students not pursuing registered
dietitian (RD) status.

FOREST RESOURCE
MANAGEMENT

Bachelor of Science
The Forest Resource Management curriculum combines
broad education in the arts and sciences with
applied forest sciences. This combination provides
the necessary foundation for the scientific manage-
ment of forest resources, products, and services.

Forsters are qualified for a broad spectrum of employ-
ment opportunities in the public and private sectors.
They may be engaged as managers, administrators,
or owners of forest lands or forest-based businesses; as
technical specialists in the production of timber,
usable water, wildlife, and aesthetic values, and in the
recreational use of the forest; or as professionals in
other areas where the conservation of natural
resources is a concern. Forsters earning advanced
degrees find employment in academic work and in
research conducted by public and private agencies.

The curriculum, accredited by the Society of Ameri-
can Foresters, provides a strong program in the basic
knowledge and skills required of a professional for-
ester. Forest Resource Management majors will select
a minor. (See page 60.) The curriculum also provides
the necessary prerequisites for graduate study.

For students interested in conservation biology,
water, and natural resources, the Department of
Forestry and Natural Resources also administers the
Conservation Biology Concentration and the
Natural Resources Management Concentration
within the Environmental and Natural Resources
degree program. See page 49 for program details.

Freshman Year
First Semester
3 - BIOL 103 General Biology I
1 - BIOL 105 General Biology Lab. I
4 - CH 105 Chemistry in Context I
1 - E N R 101 Intro. to Environ. and Natural Res.
3 - MTHSC 102 Intro. to Mathematical Analysis
3 - Oral Communication Requirement 2
15

Second Semester
3 - BIOL 104 General Biology II
1 - BIOL 106 General Biology Lab. II
3 - ENGL 103 Accelerated Composition
3 - EX ST 301 Introductory Statistics
1 - E N R 102 FNR Freshman Portfolio
4 - Departmental Science Requirement 3
17

Sophomore Year
First Semester
4 - FOR 204 Forest Information Systems
2 - FOR 205 Forest Ecology
3 - FOR 221 Forest Biology
3 - Arts and Humanities (Literature) Requirement 2
3 - Economics Requirement 4
15

Second Semester
3 - ENGL 314 Technical Writing
3 - FOR 206 Forestry Ecology
3 - Arts and Humanities (Non-Lit.) Requirement 2
3 - Social Science Requirement 2
3 - Minor Requirement 5
15

Forestry Summer Camp
2 - FOR 251 Forest Communities
1 - FOR 252 Forest Operations
4 - FOR 253 Forest Mensuration
1 - FOR 254 Forest Products
8

Junior Year
First Semester
2 - FOR 102 Forest Biometrics
3 - FOR 104 Forest Resource Economics
3 - FOR 141 Wood Procurement Practices in
the Forest Industry
4 - FOR 413 Integrated Forest Pest Management
3 - (E N R) 434 GIS for Landscape Planning
1 - Internship, Creative Inquiry or Directed
Research Requirement 6
16

Second Semester
2 - FOR 308 Remote Sensing in Forestry
3 - FOR 408 Wood and Paper Products
3 - FOR 418 Forest Resource Valuation
4 - FOR 465 Silviculture
3 - Minor Requirement 5
1 - Internship, Creative Inquiry or Directed
Research Requirement 6
16
Senior Year
First Semester
4 - FOR 410 Harvesting Processes
3 - FOR (E N R) 416 Forest Policy and Admin.
4 - FOR 417 Forest Resource Mgmt. and Regulation
3 - Minor Requirement5
1 - Internship, Creative Inquiry or Directed Research Requirement6
15
Second Semester
1 - F N R 499 Natural Resources Seminar
2 - FOR 406 Forested Watershed Management
3 - FOR 415 Forest Wildlife Management
2 - FOR 425 Forest Resource Management Plans
1 - FOR 498 Senior Portfolio
6 - Minor Requirement5
15
131 Total Semester Hours
5CH 101 may be substituted; however, students selecting this option may be required to use elective hours to satisfy the General Education Science and Technology in Society Requirement.
6See General Education Requirements. Three of these credit hours must also satisfy the Cross-Cultural Awareness Requirement. (Note: Social Science Requirement must be in an area other than economics or applied economics.)

LAND SURVEYING EMPHASIS AREA

Freshman Year
First Semester
3 - BIOL 103 General Biology I
1 - BIOL 105 General Biology Lab. I
4 - CH 105 Chemistry in Context I
1 - E N R 101 Intro. to Environ. and Natural Res.
3 - MTHSC 102 Intro. to Mathematical Analysis
3 - Oral Communication Requirement1
15
Second Semester
3 - BIOL 104 General Biology II
1 - BIOL 106 General Biology Lab. II
3 - ENGL 103 Accelerated Composition
3 - EX ST 301 Introductory Statistics
1 - F N R 102 FNR Freshman Portfolio
4 - Departmental Science Requirement2
15

Sophomore Year
First Semester
4 - F N R 204 Soil Information Systems
2 - FOR 205 Dendrology
3 - FOR 221 Forest Biology
3 - Arts and Humanities (Literature) Requirement1
3 - Economics Requirement1
15
Second Semester
2 - E G 210 Engineering Graphics for Civil Engr.
3 - ENGL 314 Technical Writing
3 - FOR 206 Forestry Ecology
3 - Arts and Humanities (Non-Lit.) Requirement1
3 - Social Science Requirement1
14

Forestry Summer Camp
2 - FOR 251 Forest Communities
1 - FOR 252 Forest Operations
4 - FOR 253 Forest Mensuration
1 - FOR 254 Forest Products
8

Junior Year
First Semester
3 - FOR 302 Forest Biometrics
3 - FOR 304 Forest Resource Economics
3 - FOR 341 Wood Procurement Practices in the Forest Industry
4 - FOR 413 Integrated Forest Pest Management
3 - (E N R) 434 GIS for Landscape Planning
15
Second Semester
2 - AG M 221 Surveying: Earthwork and Area Measurements
2 - FOR 308 Remote Sensing in Forestry
3 - FOR 408 Wood and Paper Products
3 - FOR 418 Forest Resource Valuation
4 - FOR 465 Silviculture
14
Summer
3 - F N R 490 Field Training in Natural Resources4

Senior Year
First Semester
4 - FOR 410 Harvesting Processes
3 - FOR (E N R) 416 Forest Policy and Admin.
2 - FOR 417 Forest Resource Mgmt. and Regulation
3 - FOR 433 GPS Applications
15
Second Semester
3 - B E 322 Small Watershed Hydrology and Sedimentology
1 - F N R 499 Natural Resources Seminar
2 - FOR 406 Forested Watershed Management
3 - FOR 415 Forest Wildlife Management
2 - FOR 425 Forest Resource Management Plans
1 - FOR 498 Senior Portfolio
3 - LAW 333 Real Estate Law
15
129 Total Semester Hours
4Summer internship must be in land surveying.
5See General Education Requirements. Three of these credit hours must also satisfy the Cross-Cultural Awareness Requirement. (Note: Social Science Requirement must be in an area other than economics or applied economics.)
6See advisor.
7AP EC 257, ECON 200, 211, or 212

GENETICS
Bachelor of Science
Genetics is the study of heredity. Genetics research takes many forms, from the study of heredity at the level of individual molecules to study at the level of cells and chromosomes, individuals, or populations. To comprehend current genetic information and to make future contributions to our molecular understanding of life processes, students must obtain a broad background in biology and a firm foundation in chemistry and mathematics. This is the basis of the genetics curriculum.

A degree in Genetics is a strong preparation for many careers. The degree provides an excellent foundation for medical, veterinary, or pharmacy school, as well as graduate research in any discipline related to biology, including bioinformatics, forensic technology, and genetic counseling. Because of the increasing emphasis on genetics in everyday life, a Bachelor of Science in Genetics can also be a direct path to a career in the emerging biotechnology industries (pharmaceuticals, agricultural technologies, biomimetic materials) either in research, sales, or business operations. Combined with a law degree, a genetics background of science is a good background for a career as a patent attorney.

Freshman Year
First Semester
5 - BIOL 110 Principles of Biology I
4 - CH 101 General Chemistry
1 - GEN 103 Careers in Biochem. and Genetics
4 - MTHSC 106 Calculus of One Variable I
14
Second Semester
5 - BIOL 111 Principles of Biology II
4 - CH 102 General Chemistry
3 - ENGL 103 Accelerated Composition
4 - MTHSC 108 Calculus of One Variable II
16

Sophomore Year
First Semester
3 - CH 223 Organic Chemistry
1 - CH 227 Organic Chemistry Lab.
3 - COMM 150 Intro. to Human Comm. or COMM 250 Public Speaking
3 - GEN 302 Molecular and General Genetics
3 - PHYS 122 Physics with Calculus I
1 - PHYS 124 Physics Lab. I
14
Second Semester
3 - BIOC 301 Molecular Biochemistry
1 - BIOC 302 Molecular Biochemistry Lab.
3 - CH 224 Organic Chemistry
1 - CH 228 Organic Chemistry Lab.
3 - EX ST 301 Introductory Statistics
3 - Arts and Humanities (Literature) Requirement2
3 - Social Science Requirement2
17
Junior Year
First Semester
- 3: BIOSC 461 Cell Biology
- 2: BIOSC 462 Cell Biology Lab.
- 3: GEN 410 Fundamentals of Genetics I
- 1: GEN 411 Fundamentals of Genetics I Lab.
- 3: Science Requirement
- 3: Elective

Second Semester
- 3: GEN 420 Fundamentals of Genetics II
- 1: GEN 421 Fundamentals of Genetics II Lab.
- 3: GEN (BIOCH) 440 Bioinformatics
- 2: PHIL 326 Science and Values
- 3: Genetics Requirement
- 3: Elective

Senior Year
First Semester
- 3: GEN 450 Comparative Genetics
- 3: Science Requirement
- 3: Social Science Requirement
- 4: Elective

Second Semester
- 2: GEN 493 Senior Seminar
- 6: Genetics Requirement
- 3: Science Requirement
- 3: GEN 493 Senior Seminar

120 Total Semester Hours

Microbiology
Bachelor of Science

Microbiology deals with the study of bacteria, viruses, yeasts, filamentous fungi, protozoa, and unicellular algae. Microbiologists seek to describe these organisms in terms of their structures, functions, and processes of reproduction, growth, and death at both the cellular and molecular levels. They are also concerned with their ecology, particularly in regard to their pathological effects on man, and with their economic importance.

The Microbiology major provides a thorough training in the basic microbiological skills. Further, students receive instruction in mathematics, physics, chemistry, and biochemistry, all essential to the training of a modern microbiologist. Students can prepare for a variety of careers through a wide choice of electives. The Microbiology curriculum with a Biomedicine Concentration is recommended for students planning postgraduate programs. Microbiology graduates may enter graduate school in microbiology, biochemistry, bioengineering, or related disciplines; they may

College of Agriculture, Forestry and Life Sciences
enter medical or dental schools or pursue careers in one of the many industries or public service departments dependent upon microbiology. Some of these are the fermentation and drug industries, medical and public health microbiology, various food industries, and agriculture.

Microbiology majors planning to apply for admission to a medical or dental school should inform their advisors immediately upon entering the program.

### Freshman Year

**First Semester**
- 5 - BIOL 110 Principles of Biology I
- 4 - CH 101 General Chemistry
- 3 - COMM 150 Intro. to Human Communication
- 1 - MICRO 101 Microbes and Human Affairs
- 1 - CH 227 Organic Chemistry Lab.

**Second Semester**
- 3 - ENGL 103 Accelerated Composition
- 4 - CH 102 General Chemistry
- 5 - BIOL 111 Principles of Biology II
- 1 - CH 228 Organic Chemistry Lab.

### Sophomore Year

**First Semester**
- 3 - CH 223 Organic Chemistry
- 1 - CH 227 Organic Chemistry Lab.
- 4 - MICRO 305 General Microbiology
- 3 - Arts and Humanities (Non-Lit.) Requirement
- 1 - CH 228 Organic Chemistry Lab.

**Second Semester**
- 3 - BIOSC 315 Functional Human Anatomy
- 4 - CH 102 General Chemistry
- 3 - ENGL 103 Accelerated Composition
- 3 - Mathematics Requirement
- 1 - PHYS 208 General Physics II

### Junior Year

**First Semester**
- 3 - BIOCH 461 Cell Biology
- 2 - BIOSC 462 Cell Biology Lab.
- 3 - MICRO 416 Introductory Virology
- 3 - Social Science Requirement
- 1 - PHYS 221 Physics with Calculus II

**Second Semester**
- 4 - MICRO 411 Pathogenic Bacteriology
- 3 - MICRO 417 Molecular Mechanisms of Carcinogenesis and Aging
- 3 - Biomedicine Requirement
- 3 - Elective

### Senior Year

**First Semester**
- 3 - GEN 302 Molecular and General Genetics
- 1 - GEN 303 Molecular and General Genetics Lab.
- 4 - MICRO 401 Microbial Diversity and Ecology
- 4 - MICRO (AVS, BIOSC) 414 Basic Immunology
- 3 - PHYS 207 General Physics I and
- 1 - PHYS 209 General Physics I Lab. or
- 3 - PHYS 122 Physics with Calculus I and
- 1 - PHYS 124 Physics Lab. I

**Second Semester**
- 3 - BIOC 301 Molecular Biochemistry
- 3 - CH 224 Organic Chemistry
- 1 - CH 228 Organic Chemistry Lab.
- 3 - Arts and Humanities (Non-Lit.) Requirement
- 3 - Biomedicine Requirement
- 3 - Social Science Requirement

### BIOMEDICINE CONCENTRATION

**Freshman Year**

**First Semester**
- 5 - BIOL 110 Principles of Biology I
- 4 - CH 101 General Chemistry
- 3 - COMM 150 Intro. to Human Communication
- 1 - MICRO 101 Microbes and Human Affairs
- 1 - CH 228 Organic Chemistry Lab.

**Second Semester**
- 5 - BIOL 111 Principles of Biology II or
- 4 - BIOSC 315 Functional Human Anatomy
- 4 - CH 102 General Chemistry
- 3 - ENGL 103 Accelerated Composition
- 3 - Mathematics Requirement

**Sophomore Year**

**First Semester**
- 3 - CH 223 Organic Chemistry
- 1 - CH 227 Organic Chemistry Lab.
- 4 - MICRO 305 General Microbiology
- 3 - Arts and Humanities (Literature) Requirement
- 3 - Elective

**Second Semester**
- 3 - BIOC 301 Molecular Biochemistry
- 3 - CH 224 Organic Chemistry
- 1 - CH 228 Organic Chemistry Lab.
- 3 - Arts and Humanities (Non-Lit.) Requirement
- 3 - Biomedicine Requirement
- 3 - Social Science Requirement
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 marketing and management skills.

The core curriculum assures graduates of having the skills and knowledge required by most entry-level packaging positions. Emphasis area choices or approved minors allow students to select courses to improve career preparation for specific industry segments, including distribution and transportation, engineering technology, food and health care packaging, package design and graphics, materials, international packaging, marketing/finance, business administration, entrepreneurship, environmental engineering, environmental science and policy, and management.

Students changing majors to Packaging Science must have at least a 2.0 cumulative grade-point ratio.

Freshman Year
First Semester
1. BIOL 103 General Biology I
2. BIOL 105 General Biology Lab. I
3. CH 101 General Chemistry
4. MTHSC 106 Calculus of One Variable I
5. PKGSC 101 Packaging Orientation

Second Semester
1. BIOL 104 General Biology II
2. BIOL 106 General Biology Lab. II
3. CH 102 General Chemistry
4. ENGL 103 Accelerated Composition
5. PKGSC 102 Intro. to Packaging Science
6. PKGSC 103 Packaging Science E-Portfolio

Sophomore Year
First Semester
1. CH 201 Survey of Organic Chemistry
2. CH 223 Organic Chemistry and
3. CH 227 Organic Chemistry Lab.
4. PHYS 207 General Physics I
5. PHYS 209 General Physics I Lab.
6. PHYS 122 Physics with Calculus I
7. PHYS 124 Physics Lab. II
8. PKGSC 202 Packaging Materials and Manuf.
9. PKGSC 203 Packaging Research Fundamentals

Second Semester
2. PHYS 208 General Physics II and
3. PHYS 210 General Physics II Lab. or
4. PHYS 221 Physics with Calculus II and
5. PHYS 223 Physics Lab. II
6. PKGSC 201 Packaging Perishable Products
7. PKGSC 204 Container Systems
8. PKGSC 206 Container Systems Lab.
9. PKGSC 220 Packaging Drawing/CAD
10. PKGSC 404 and 454 must be taken concurrently.

Summer
0. CO-OP 101 Cooperative Education

Junior Year
First Semester
1. PKGSC 320 Package Design Fundamentals
2. PKGSC 368 Packaging and Society
3. PKGSC 404 Mechanical Properties of Packages and Principles of Protective Packaging
4. PKGSC 430 Converting for Flexible Packaging
5. PKGSC 454 Product and Package Eval. Lab.
6. Emphasis Area Requirement

Second Semester
1. COMM 250 Public Speaking
2. PKGSC 401 Packaging Machinery
3. PKGSC 440 Packaging for Distribution
4. Arts and Humanities (Literature) Requirement
5. Emphasis Area Requirement

Senior Year
First Semester
1. EC 301 Introductory Statistics
2. PKGSC 430-440 Appl. of Polymers in Packaging
3. PKGSC 464 Food and Health Care Pkg. Syst.
4. PKGSC 420 Package Design and Development
5. Arts and Humanities (Non-Lit.) Requirement

Second Semester
1. AP EC 202 Agricultural Economics or
2. ECON 211 Principles of Microeconomics
3. PKGSC 403 Packaging Career Preparation
4. PKGSC 420 Package Design and Development
5. Arts and Humanities Requirement
6. Emphasis Area Requirement

122 Total Semester Hours

At Clemson, rather than having a separate, organized preprofessional health studies program, students are allowed to major in any curriculum, as long as the basic entrance requirements of the professional health school are fulfilled. These schools are not as concerned about a student’s major as they are about academic performance in whichever curriculum the student chooses. Professional health schools have neither preferences nor prejudices concerning any curriculum, which is evidenced by the fact that their entering students represent a broad spectrum of curricula. The emphasis is placed on the student’s doing well in the curriculum chosen, and this becomes critical as competition increases for the limited number of places available in professional health schools.
PREPHARMACY

The two-year Prepharmacy program requires 66–72 credit hours, depending on the pharmacy school of interest. Upon completion of the program, students will be eligible to apply to a college of pharmacy, usually the South Carolina College of Pharmacy (MUSC and USC campuses), and may be eligible to apply for the Bachelor of Science in Preprofessional Studies. The degree in Pharmacy is awarded by the institution attended. It is important for students to work closely with their advisor as there are variations in courses required by the pharmacy schools.

For financial aid purposes, students in the Prepharmacy program are considered to be enrolled in a degree-seeking program.

First Year

First Semester
3 - BIOL 103 General Biology I
1 - BIOL 105 General Biology Lab. I
4 - CH 101 General Chemistry
4 - MTHSC 106 Calculus of One Variable I
3 - PSYCH 201 Introduction to Psychology
3 - Arts and Humanities (Non-Lit.) Requirement
18

Second Semester
3 - BIOL 104 General Biology II
1 - BIOL 106 General Biology Lab. II
4 - CH 102 General Chemistry
3 - ECON 200 Economic Concepts
3 - ENGL 103 Accelerated Composition
3 - EX ST 301 Introductory Statistics
1 - Elective
18

Second Year

First Semester
4 - BIOSC 222 Human Anatomy and Phys. I
3 - CH 223 Organic Chemistry
1 - CH 227 Organic Chemistry Lab.
3 - PHYS 207 General Physics I
1 - PHYS 209 General Physics I Lab.
3 - Arts and Humanities (Literature) Requirement
3 - History or Philosophy Requirement
18

Second Semester
4 - BIOSC 223 Human Anatomy and Phys. II
3 - CH 224 Organic Chemistry
1 - CH 228 Organic Chemistry Lab.
3 - COMM 150 Intro. to Human Comm. or COMM 250 Public Speaking
3 - PHYS 208 General Physics II
1 - PHYS 210 General Physics II Lab.
3 - Science and Tech. in Society Requirement
18

Third Year
72–90 Total Semester Hours

PREREHABILITATION SCIENCES

The Prehabilitation Sciences major includes concentrations in physical therapy, occupational therapy, communication sciences and disorders, as well as in physician assisting and allied health areas. This curriculum is designed to meet the requirements of the programs in the College of Health Professions at the Medical University of South Carolina and other professional schools. The program requires a minimum of 90 semester hours of undergraduate coursework. In addition, students must apply to a professional school for acceptance into its program.

Because preparation for some of the concentrations, such as the physical therapy, occupational therapy, and communication sciences and disorders programs at MUSC, requires a baccalaureate degree in any area, students are advised to select a major with similar requirements after consultation with the Prehabilitation Sciences advisor. The following curriculum fulfills the general requirements for those fields requiring less than a baccalaureate degree. Electives should be chosen after consultation with the advisor. Professional schools may change their requirements at any time, so it is imperative that students in this major stay in close contact with their advisor.

For financial aid purposes, students in the Prehabilitation Sciences program are considered to be enrolled in a degree-seeking program.

First Year

First Semester
3 - BIOL 103 General Biology I
1 - BIOL 105 General Biology Lab. I
4 - CH 101 General Chemistry
3 - PSYCH 201 Introduction to Psychology
3 - Arts and Humanities (Non-Lit.) Requirement
17

Second Semester
3 - BIOL 104 General Biology II
1 - BIOL 106 General Biology Lab. II
4 - CH 102 General Chemistry
3 - ECON 200 Economic Concepts
3 - ENGL 103 Accelerated Composition
3 - EX ST 301 Introductory Statistics
1 - Elective
18

Second Year

First Semester
3 - BIOL 103 General Biology I
1 - BIOL 105 General Biology Lab. I
4 - CH 101 General Chemistry
3 - PSYCH 201 Introduction to Psychology
3 - Arts and Humanities (Non-Lit.) Requirement
17

Second Semester
3 - BIOL 104 General Biology II
1 - BIOL 106 General Biology Lab. II
4 - CH 102 General Chemistry
3 - ENGL 103 Accelerated Composition
3 - EX ST 301 Introductory Statistics
3 - SOC 201 Introduction to Sociology
1 - Elective
18

Second Year

First Semester
3 - BIOSC 222 Human Anatomy and Phys. I
3 - PHYS 207 General Physics I
1 - PHYS 209 General Physics I Lab.
3 - PSYCH 340 Lifespan Developmental Psych.
3 - Arts and Humanities (Literature) Requirement
17

PREVETERINARY MEDICINE

Under a regional plan, the South Carolina Prevet- erinary 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. Currently the University of Georgia admits up to 17 students each year through arrangements with the Southern Regional Education Board. The State of South Carolina has a contract with Mississippi State University to admit up to five South Carolina residents. The State of South Carolina also has a contract with Tuskegee University to admit up to four South Carolina residents. Application must be made directly to Tuskegee University.

Maximum requirements for admission to a college of veterinary medicine generally 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.

56
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 at-large 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.

SOILS AND SUSTAINABLE CROP SYSTEMS

Bachelor of Science

The BS degree program in Soils and Sustainable Crop Systems 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 with emphasis areas.

The Agricultural Biotechnology Concentration integrates conventional disciplines with molecular advances in plants, pathogens, and biosystem interactions and responds 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 Soil and Water Environmental 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.

Students with a concentration in Sustainable Crop Production will graduate with comprehensive knowledge to increase farm profits by decreasing the costs of crop and production; build soil health 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; and 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.

Freshman Year

First Semester
5 - BIOL 110 Principles of Biology I
4 - CH 101 General Chemistry
3 - MTHSC 102 Intro. to Math. Analysis1 or
4 - MTHSC 106 Calculus of One Variable I1
1 - SSCS 101 Survey of Soils and Sustainable Crop Systems
3 - Arts and Humanities (Non-Lit.) Requirement

Second Semester
5 - BIOL 111 Principles of Biology II1
4 - CH 102 General Chemistry
3 - ENGL 103 Accelerated Composition
3 - EX ST 301 Introductory Statistics or
4 - MTHSC 108 Calculus of One Variable II or
4 - MTHSC 201 Multivariable Calculus
1 - SSCS 102 Academic and Professional Dev. I
16-17

Senior Year

First Semester
1 - SSCS 103 Survey of Soils and Sustainable Crop Systems
1 - MTHSC 104 Calculus of One Variable II
3 - Arts and Humanities (Non-Lit.) Requirement
Second Semester
1 - MTHSC 105 Calculus of One Variable III
1 - CH 220 Organic Chemistry
3 - Arts and Humanities (Literature) Requirement2
16-17

AGRICULTURAL BIOTECHNOLOGY CONCENTRATION

Sophomore Year

First Semester
3 - CH 223 Organic Chemistry
1 - CH 227 Organic Chemistry Lab.
3 - COMM 250 Public Speaking
1 - ECON 200 Economic Concepts1 or
3 - ECON 201 Principles of Microeconomics
3 - SSCS 333 Agricultural Genetics
3 - Arts and Humanities (Literature) Requirement2
16

Second Semester
3 - AP EC 205 Agriculture and Society
3 - BSCOS 335 Evolutionary Biology
3 - CH 224 Organic Chemistry
1 - CH 228 Organic Chemistry Lab.
3 - GEN 300 Fundamental Genetics
1 - GEN 301 Fundamental Genetics Lab.
14

Junior Year

First Semester
3 - BIOL 305 Essential Elements of Biochem.
1 - BIOL 306 Essential Elements of Bioch. Lab.
3 - BSCOS 304 Biology of Plants
3 - CSENV 422 Major World Crops
3 - SSCS 335 Agricultural Biotechnology
3 - Social Science Requirement3
16

Second Semester
1 - CSENV 350 Practicum
3 - ENGL 315 Scientific Writing and Comm.
3 - PL PA 310 Plant Diseases and People
3 - PL PH (BSCOS) 340 Plant Med. and Magic
1 - SSCS 401 Academic and Professional Dev. II
4 - Emphasis Area Requirement1
15

Senior Year

First Semester
3 - BSCOS 401 Plant Physiology
1 - BSCOS 402 Plant Physiology Lab.
3 - CSENV 350 Practicum
4 - ENT (BSCOS) 301 Insect Biology and Diversity
1 - SSCS 445 Regulatory Issues and Policies
1 - SSCS 450 Agric. Biosystems and Risk Assess.
3 - Emphasis Area Requirement1
16

Second Semester
3 - CSENV 350 Practicum
3 - CSENV 409 Biology of Invasive Plants
3 - SSCS 451 Agric. Biotech. and Global Society
9 - Emphasis Area Requirement1
13

124–126 Total Semester Hours

1ECON 200 is recommended for students in the Agricultural Biosystems and Technology Emphasis Area. ECON 211 is recommended for students in the Agricultural Biotechnology and Global Society Emphasis Area.

2See General Education Requirements. PHIL 103 is recommended for students in the Agricultural Biotechnology Concentration.

3Select from department-approved list. Emphasis Areas include Agricultural Biosystems and Technology; and Agricultural Biotechnology and Global Society.

SOIL AND WATER ENVIRONMENTAL SCIENCE CONCENTRATION

Sophomore Year

First Semester
3 - CH 223 Organic Chemistry and
1 - CH 227 Organic Chemistry Lab. or
4 - CH 201 Survey of Organic Chemistry
4 - CSENV 202 Soils
3 - GEO 101 Physical Geology
1 - GEO 103 Physical Geology Lab.
3 - PHYS 207 General Physics I and
1 - PHYS 209 General Physics I Lab. or
3 - PHYS 122 Physics with Calculus I and
1 - PHYS 124 Physics Lab. I
16

College of Agriculture, Forestry and Life Sciences
Second Semester
3 - PHYS 208 General Physics II and
1 - PHYS 210 General Physics II Lab. or
3 - PHYS 221 Physics with Calculus II and
1 - PHYS 223 Physics Lab. II
3 - Arts and Humanities (Literature) Requirement¹
3 - Cross-Cultural Awareness Requirement¹
4 - Emphasis Area Requirement²
14

Junior Year
First Semester
3 - COMM 250 Public Speaking
4 - MICRO 305 General Microbiology
5 - Emphasis Area Requirement²
3 - Plant Science Requirement³
15

Second Semester
3 - CSENV 475 Soil Physics and Chemistry
3 - CSENV 490 Beneficial Soil Organisms in Plant Growth
3 - ENGL 315 Scientific Writing and Comm.
1 - SSICS 401 Academic and Professional Dev. II
3 - Emphasis Area Requirement²
3 - Social Science Requirement¹
16

Senior Year
First Semester
3 - CSENV 350 Practicum
2 - CSENV 403 Soil Genesis and Classification
1 - CSENV 455 Seminar
3 - Applied Spatial Technology Requirement⁴
3 - Emphasis Area Requirement²
3 - Field Scale Environmental Mgt. Requirement⁴
15

Second Semester
3 - CSENV 475 Soil Physics and Chemistry
3 - CSENV 403 Beneficial Soil Organisms in Plant Growth
3 - ENGL 315 Scientific Writing and Comm.
3 - SSICS 401 Academic and Professional Dev. II
16

124–126 Total Semester Hours

SUSTAINABLE CROP PRODUCTION CONCENTRATION

Sophomore Year
First Semester
3 - AP EC 202 Agricultural Economics
3 - CH 223 Organic Chemistry³
1 - CH 227 Organic Chemistry Lab.¹
4 - CSENV 202 Soils
3 - PL PA 310 Plant Diseases and People
14

Second Semester
3 - AP EC 205 Agriculture and Society
3 - CH 224 Organic Chemistry³
1 - CH 228 Organic Chemistry Lab.¹
3 - COMM 250 Public Speaking
3 - SSICS 333 Agricultural Genetics
3 - Plant Science Requirement²
16

Junior Year
First Semester
4 - ENT (BIOSC) 301 Insect Biology and Diversity
3 - I P M 401 Principles of Integrated Pest Mgt.
3 - Plant Science Requirement²
3 - Social Science Requirement¹
16

Second Semester
3 - BIOSC 401 Plant Physiology
1 - BIOSC 402 Plant Physiology Lab.
3 - CSENV 403 Plant Breeding
3 - CSENV 409 Insect Pests
3 - ENGL 315 Scientific Writing and Comm.
3 - SSICS 401 Academic and Professional Dev. II
16

Senior Year
First Semester
3 - CSENV 490 Beneficial Soil Organisms in Plant Growth
3 - ENT 407 Applied Agricultural Entomology
6 - Emphasis Area Requirement³
12-13

Second Semester
3 - CSENV 350 Practicum
3 - CSENV 452 Soil Fertility and Management
1 - CSENV 453 Soil Fertility Lab.
1 - CSENV 455 Seminar
3 - Arts and Humanities (Literature) Requirement⁴
6 - Emphasis Area Requirement³
17

123–126 Total Semester Hours

¹See General Education Requirements.
²Select from department-approved list. Emphasis Areas include Soil and Water Quality, Soil Management, and Soil Science.
³BIOCS 441, CSENV 421, 422, 423, (AP EC) 426, or HORT 456
⁴AG M 410, FOR 433, or other course approved by advisor
⁵AG M 402, ENTOX 421, or other course approved by advisor

TURFGRASS

Bachelor of Science

Turfgrass is a major part of our built environment and daily life, including home lawns, sports fields, and golf courses. Graded 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.

Grades 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. Students intern experience a wide range of multifacilites, 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.

Freshman Year
First Semester
3 - BIOL 103 General Biology I
1 - BIOL 105 General Biology Lab. I
3 - HORT 101 Horticulture
3 - MTHSC 102 Intro. to Mathematical Analysis
3 - Arts and Humanities (Non-Lit.) Requirement¹
3 - Social Science Requirement¹
16

Second Semester
3 - ENGL 103 Accelerated Composition
1 - HORT 102 Experience Horticulture
3 - MTHSC 101 Essential Math for Informed Soc.
4 - Laboratory Science Requirement²
3 - Social Science Requirement¹
14

Sophomore Year
First Semester
4 - CH 105 Chemistry in Context I
3 - HORT 212 Introduction to Turfgrass Culture
1 - HORT 213 Turfgrass Culture Lab.
3 - HORT 303 Landscape Plants
4 - Plant Biology Requirement²
15

Second Semester
4 - CH 106 Chemistry in Context II
3 - Applied Science Requirement²
3 - Arts and Humanities (Literature) Requirement³
3 - Business Requirement²
3 - Spanish Language Requirement²
16
WILDLIFE AND FISHERIES BIOLOGY

Bachelor of Science

Increased interest in conservation of natural resources and the environment and demand for seafood products 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 Natural Resources also administers the Conservation Biology and Natural Resources Management Concentrations within the Environmental and Natural Resources degree program. See page 49 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 the dual degree from the Department of Forestry and Natural Resources as early as possible in their undergraduate program, as a number of required courses have prerequisites 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 - BIOL 103 General Biology I
1 - BIOL 105 General Biology Lab. I
4 - CH 105 Chemistry in Context I
1 - E N R 101 Intro. to Env. and Natural Res. I
3 - MTHSC 102 Intro. to Mathematical Analysis
3 - Oral Communication Requirement
15

Second Semester
3 - BIOL 104 General Biology II
1 - BIOL 106 General Biology Lab. II
4 - CH 106 Chemistry in Context II or
4 - PHYS 200 Introductory Physics
3 - ENGL 103 Accelerated Composition
3 - EX ST 301 Introductory Statistics
1 - F N R 102 FNR Freshman Portfolio
15

Sophomore Year

First Semester
4 - F N R 204 Soil Information Systems
2 - FOR 205 Dendrology
3 - FOR 221 Forest Biology
3 - W F B 300 Wildlife Biology
1 - W F B 301 Wildlife Biology Lab.
3 - Arts and Humanities (Non-Lit.) Requirement
16

Second Semester
3 - BIOSC 303 Vertebrate Biology
3 - E N R 302 Natural Resources Measurements
3 - FOR 206 Forestry Ecology
3 - W F B 350 Principles of Fish and Wildlife Biol.
3 - Social Science Requirement
15

Junior Year

First Semester
4 - BIOSC 320 Field Botany
1 - ENGL 314 Technical Writing
3 - GEN 300 Fundamental Genetics
3 - W F B 410 Wildlife Management Techniques
3 - Arts and Humanities (Literature) Requirement
15

Second Semester
3 - W F B (BIOSC) 313 Conservation Biology
3 - W F B 412 Wildlife Management
3 - W F B 416 Fishery Biology
3 - W F B 440 Non-Game Wildlife Management
3 - W F B 462 Wetland Wildlife Biology
15

Senior Year

First Semester
3 - AP EC 257 Natural Resources, Environment, and Economics
4 - AVS 301 Anat. and Phys. of Domestic Animals
3 - FOR 206 Forestry Ecology
3 - BIOSC 303 Vertebrate Biology
1 - W F B 301 Wildlife Biology Lab.
16

Second Semester
1 - F N R 499 Natural Resources Seminar
3 - W F B 410 Wildlife Conservation Policy
8 - Approved Requirement
3 - Policy and Law Requirement
15

1Students planning to take organic chemistry should substitute CH 101 and 102.
2See General Education Requirements. Three of these credit hours must also satisfy the Cross-Cultural Awareness Requirement; and, if CH 105 is not selected, three credits must also satisfy the Science and Technology in Society Requirement. (Note: Social Science Requirement must be in an area other than economics or applied economics.)
3Select from department-approved list.
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
Athletic Leadership
Biochemistry
Bioengineering
Biological Sciences
Business Administration
Chemistry
Cluster
Communication Studies
Computer Science
Crop and Soil Environmental Science
East Asian Studies
Economics
Education
English
Entomology
Entrepreneurship
Environmental Engineering
Environmental Science and Policy
Equine Business—not open to Animal and Veterinary Sciences majors
Film Studies
Financial Management
Food Science
Forest Products
Forest Resource Management
Genetics
Geography
Geology
Global Politics
Great Works
History
Horticulture—not open to Turfgrass majors
International Engineering and Science
Legal Studies
Management
Management Information Systems
Mathematical Sciences
Microbiology
Military Leadership
Modern Languages
Music
Natural Resource Economics
Nonprofit Leadership
Packaging Science
Pan African Studies
Park and Protected Area Management
Philosophy
Physics
Plant Pathology
Political Science
Psychology
Public Policy
Religion
Russian Area Studies
Science and Technology in Society
Screenwriting
Sociology
Spanish-American Area Studies
Textiles
Theatre
Therapeutic Recreation
Travel and Tourism
Turfgrass—not open to Horticulture majors
Urban Forestry
Wildlife and Fisheries Biology
Women’s Studies
Writing

See pages 36–39 for details.