**COLLEGE OF AGRICULTURE, FORESTRY AND LIFE SCIENCES**

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 is using 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 61.)

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.

<table>
<thead>
<tr>
<th>Freshman Year</th>
<th>Communications Emphasis Area</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Semester</strong></td>
<td><strong>Junior Year</strong></td>
</tr>
<tr>
<td>3 - AG ED 200 Agricultural Applications of Educational Technology or</td>
<td>3 - AG M 221 Surveying</td>
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<tr>
<td>3 - Arts and Humanities (Non-Lit.) Requirement</td>
<td>4 - COMM 201 Intro. to Communication Studies</td>
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<td>3 - AVS 150 Introduction to Animal Science</td>
<td>4 - CSENV 202 Soils</td>
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<td>1 - AVS 151 Introduction to Animal Science Lab.</td>
<td>3 - FOR 305 Woodland Management or</td>
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<tr>
<td>3 - BIOL 103 General Biology I</td>
<td>3 - W F B 412 Wildlife Management</td>
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<tr>
<td>1 - BIOL 105 General Biology Lab. I</td>
<td>3 - Arts and Humanities (Non-Lit.) Requirement</td>
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<td>3 - Mathematics Requirement</td>
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<tr>
<td>15</td>
<td><strong>Second Semester</strong></td>
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<tr>
<td><strong>Second Semester</strong></td>
<td>3 - ED F 302 Educational Psychology</td>
</tr>
<tr>
<td>1 - AG ED 100 Orientation and Field Experience</td>
<td>3 - HORT 305 Plant Propagation</td>
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<tr>
<td>3 - AP EC 202 Agricultural Economics</td>
<td>3 - Departmental Communication Requirement</td>
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<td>3 - BIOL 104 General Biology II</td>
<td>3 - Oral Communication Requirement</td>
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<td>1 - BIOL 106 General Biology Lab. II</td>
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<tr>
<td>3 - ENGL 103 Accelerated Composition</td>
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</tr>
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<td>3 - Social Science Requirement</td>
<td><strong>Senior Year</strong></td>
</tr>
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<table>
<thead>
<tr>
<th><strong>Sophomore Year</strong></th>
<th><strong>Second Semester</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Semester</strong></td>
<td>12 - AG ED 407 Internship in Extension and Leadership Education</td>
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<tr>
<td>3 - AG ED 201 Intro. to Agricultural Education</td>
<td>41</td>
</tr>
<tr>
<td>3 - AG ED 203 Teaching Agriscience</td>
<td>129 Total Semester Hours</td>
</tr>
<tr>
<td>3 - AG ED 204 Applied Agriculture Calculations</td>
<td>1See General Education Requirements.</td>
</tr>
<tr>
<td>4 - CH 101 General Chemistry or</td>
<td>2See advisor.</td>
</tr>
<tr>
<td>4 - CH 105 Chemistry in Context I</td>
<td>3See General Education Requirements. COMM 150 or 250 is recommended.</td>
</tr>
<tr>
<td>3 - HORT 212 Introduction to Turfgrass Culture</td>
<td>4Internship must meet departmental requirements for Communications Emphasis Area. See advisor.</td>
</tr>
<tr>
<td>1 - HORT 213 Turfgrass Culture Lab.</td>
<td><strong>LEADERSHIP EMPHASIS AREA</strong></td>
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<tr>
<td>17</td>
<td><strong>Junior Year</strong></td>
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<tr>
<td><strong>Second Semester</strong></td>
<td><strong>First Semester</strong></td>
</tr>
<tr>
<td>3 - AG ED 355 Team and Organizational Leadership in Food and Fiber Systems</td>
<td>3 - AG ED 303 Mech. Technology for Agric. Ed.</td>
</tr>
<tr>
<td>3 - AG M 205 Principles of Fabrication</td>
<td>3 - AG M 221 Surveying</td>
</tr>
<tr>
<td>3 - BIOL 201 Biotechnology and Society or</td>
<td>4 - CSENV 202 Soils</td>
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<tr>
<td>3 - BIOSC 200 Biology in the News</td>
<td>3 - FOR 305 Woodland Management or</td>
</tr>
<tr>
<td>4 - CH 102 General Chemistry or</td>
<td>3 - W F B 412 Wildlife Management</td>
</tr>
<tr>
<td>4 - CH 106 Chemistry in Context II</td>
<td>3 - HORT 303 Landscape Plants</td>
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<tr>
<td>1 - COMM 101 Communication Academic and Professional Development</td>
<td>3 - Arts and Humanities (Non-Lit.) Requirement</td>
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<tr>
<td>3 - Arts and Humanities (Literature) Requirement</td>
<td>19</td>
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<tr>
<td>16-17</td>
<td><strong>Second Semester</strong></td>
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</table>

1Students in the Communications and Leadership Emphasis Areas must take AG ED 200. Students in the Teaching Emphasis Area must take a course to satisfy the Arts and Humanities (Non-Literature) Requirement. See General Education Requirements. 

2MTHSC 101, 102, 106, or 203

3See General Education Requirements. Three of these credit hours must also satisfy the Cross-Cultural Awareness Requirement. Note: GEOG 103 or HIST 193 is recommended to satisfy the Social Science Requirement.

4Required of students in Communications Emphasis Area only.

40
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 Requirement1
15
Second Semester
12 - AG ED 407 Internship in Extension and
12 - Leadership Education
12
127 Total Semester Hours

AGRICULTURAL MECHANIZATION AND BUSINESS

Bachelor of Science
The Agricultural Mechanization and Business major provides a program for students who desire training in areas relevant to dynamic agricultural 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/agmec/index.htm.

Freshman Year
First Semester
3 - AG ED 200 Agricultural Applications of
3 - ED F 302 Educational Psychology
3 - HORT 305 Plant Propagation
3 - Oral Communication Requirement2
3 - Technical Requirement3
3 - Elective
16
Second Semester
3 - ACCT 201 Financial Accounting Concepts
3 - BIOL 103 General Biology II
3 - ENGL 103 Accelerated Composition
3 - EX ST 301 Introductory Statistics
3 - Elective
14
Second Semester
3 - ACCT 201 Financial Accounting Concepts
3 - BIOL 103 General Biology II
3 - ENGL 103 Accelerated Composition
3 - EX ST 301 Introductory Statistics
3 - Elective
16
Second Semester
12 - AG ED 406 Directed Teaching
12 - AG ED 425 Teaching Agricultural Mechanics
14
126 Total Semester Hours

Sophomore Year
First Semester
3 - AP EC 202 Agricultural Economics
3 - CH 105 Chemistry in Context I
3 - 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.) Requirement1
14
Second Semester
3 - AG M 206 Machinary Management
3 - AG M 303 Calculations for Mechanized Agric.
3 - CH 106 Chemistry in Context II
4 - CSENV 202 Soils
2 - E G 209 Intro. to Engr./Comp. Graphics
16
Junior Year
First Semester
3 - AG M 221 Surveying
3 - AG M 301 Soil and Water Conservation
3 - AG M 460 Electrical Systems
3 - Arts and Humanities (Literature) Requirement1
3 - Agribusiness Requirement2
3 - Minor Requirement1
18
Second Semester
3 - AG M 406 Mechanical and Hydraulic Systems
3 - COMM 250 Public Speaking
3 - Agribusiness Requirement2
3 - Minor Requirement1
3 - Elective
15
Senior Year
First Semester
3 - AG M 420 Landscape Drainage and Irrigation
3 - AG M 405 Agricultural Structures and
Environmental Control
3 - Minor Requirement1
3 - Plant/Crop Science Requirement4
3 - Social Science Requirement1
15
Second Semester
3 - AG M 410 Precision Agriculture Technology
3 - AG M 472 Capstone
3 - Agribusiness Requirement2
3 - Plant/Crop Science Requirement4 or
3 - Soil Science Requirement1
15
123 Total Semester Hours

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

See 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.

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

See 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.

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

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

See General Education Requirements. Three of these credit hours must also satisfy the Cross-Cultural Awareness 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 such professions 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 Preveterinary 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 AGRIBUSINESS CONCENTRATION

Freshman Year
First Semester
1 - AVS 100 Orientation to Animal and Vet. Sci.
3 - AVS 150 Introduction to Animal Science
1 - AVS 151 Introduction to Animal Science Lab.
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 - Arts and Humanities (Non-Lit.) Requirement1
16-17

Second Semester
3 - AVS 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 101 Essen. Math. for Informed Soc. or
3 - MTHSC 102 Intro. to Math. Analysis or
4 - MTHSC 106 Calculus of One Variable I
2 - AVS Techniques Requirement2
16-18

Sophomore Year
First Semester
3 - ACCT 201 Financial Accounting Concepts
3 - CSENV 423 Field Crops—Forages
3 - EX ST 301 Introductory Statistics
3 - MGT 201 Principles of Management
2 - AVS Techniques Requirement2
14

Second Semester
3 - ECON 211 Principles of Microeconomics
3 - FIN 306 Corporate Finance
3 - Arts and Humanities (Literature) Requirement1
2 - AVS Evaluation Requirement1
2 - AVS Techniques Requirement2
3 - Social Science Requirement1
16

Junior Year
First Semester
4 - AVS 301 Anat. and Phys. of Domestic Animals
3 - AVS 370 Principles of Animal Nutrition
3 - AVS 470 Animal Genetics
3 - ECON 212 Principles of Macroeconomics
3 - Elective
16

Second Semester
3 - AVS 375 Applied Animal Nutrition
3 - AVS 413 Animal Products
3 - AVS 453 Animal Reproduction
3 - LAW 322 Legal Environment of Business
3 - Elective
15

Senior Year
First Semester
3 - AVS 310 Animal Health
3 - AVS 415 Contemporary Issues in Animal Sci.
3 - MKT 301 Principles of Marketing
3 - AVS Experience-Based Activity4
2 - AVS Techniques Requirement2
14

Second Semester
2 - AVS 406 Seminars and Related Topics
3 - AVS 410 Domestic Animal Behavior
2 - AVS 417 Animal Agribusiness Development
4 - AVS 450 Sustainable Livestock Production Sys.
3 - AVS Experience-Based Activity4
2 - Elective
16

123–126 Total Semester Hours

2 - AVS Techniques Requirement2
16-18

EQUINE BUSINESS CONCENTRATION

Freshman Year
First Semester
1 - AVS 100 Orientation to Animal and Vet. Sci.
3 - AVS 150 Introduction to Animal Science
1 - AVS 151 Introduction to Animal Science Lab.
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 - Arts and Humanities (Non-Lit.) Requirement1
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 101 Essen. Math. for Informed Soc. or
3 - MTHSC 102 Intro. to Math. Analysis or
4 - MTHSC 106 Calculus of One Variable I
2 - AVS Techniques Requirement2
16-18

Sophomore Year
First Semester
3 - ACCT 201 Financial Accounting Concepts
2 - AVS 204 Horse Care Techniques
3 - CSENV 423 Field Crops—Forages
3 - EX ST 301 Introductory Statistics
3 - MKT 301 Principles of Marketing
3 - GEB 101 Principles of Management
3 - Elective
15

Second Semester
2 - AVS 309 Principles of Equine Evaluation
3 - ECON 211 Principles of Microeconomics
3 - FIN 306 Corporate Finance
3 - Arts and Humanities (Literature) Requirement1
2 - AVS Techniques Requirement2
3 - Social Science Requirement1
16

Junior Year
First Semester
4 - AVS 301 Anat. and Phys. of Domestic Animals
3 - AVS 370 Principles of Animal Nutrition
3 - AVS 470 Animal Genetics
3 - ECON 212 Principles of Macroeconomics
2 - AVS Techniques Requirement2
15

Second Semester
3 - ECON 212 Principles of Macroeconomics
3 - Social Science Requirement1
15

3 - MKT 301 Principles of Marketing
Senior Year
First Semester
1. AVS 310 Animal Health
2. AVS 406 Seminars and Related Topics
4. AVS 416 Equine Exercise Physiology
5. AVS Experience-Based Activity
14

Second Semester
3. AVS 410 Domestic Animal Behavior
4. AVS 412 Advanced Equine Management
5. AVS 417 Animal Agribusiness Development
6. Elective
15

121–124 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.
2. AVS 150 Introduction to Animal Science
3. AVS 151 Intro. to Animal Science Lab.
4. BIOL 103 General Biology I and
5. BIOL 105 General Biology I or
6. CH 101 General Chemistry
7. Arts and Humanities (Non-Lit.) Requirement
16-17

Second Semester
3. BIOL 104 General Biology II and
4. BIOL 106 General Biology II or
5. BIOL 111 Principles of Biology II
6. CH 102 General Chemistry
7. ENGL 103 Accelerated Composition
8. MTHSC 102 Intro. to Math. Analysis or
9. MTHSC 106 Calculus of One Variable I
2. AVS Techniques Requirement
16-18

Sophomore Year
First Semester
3. CH 223 Organic Chemistry
4. CH 227 Organic Chemistry Lab.
5. PHYS 207 General Physics I
6. PHYS 209 General Physics I Lab.
7. Arts and Humanities (Literature) Requirement
2. AVS Techniques Requirement
3. Social Science Requirement
16

Second Semester
3. CH 224 Organic Chemistry
4. CH 228 Organic Chemistry Lab.
5. EX ST 301 Introductory Statistics or MTHSC 203 Elem. Statistical Inference
6. PHYS 208 General Physics II
7. PHYS 210 General Physics II Lab.
8. AVS Techniques Requirement
2. AVS Evaluation Requirement
3. Oral Communication Requirement
15-16

Junior Year
First Semester
4. AVS 301 Anat. and Phys. of Domestic Animals
5. AVS 310 Animal Health
6. AVS 370 Principles of Animal Nutrition
7. BIOCH 301 Molecular Biochemistry or BIOCH 305 Essential Elements of Bioch. or BIOCH 406 Physiological Chemistry
8. Departmental Requirement
16

Second Semester
3. AVS 375 Applied Animal Nutrition
4. AVS 453 Animal Reproduction
5. GEN 300 Fundamental Genetics
6. GEN 301 Fundamental Genetics Lab.
7. MICRO 305 General Microbiology
14

Senior Year
First Semester
2. AVS 406 Seminars and Related Topics
4. AVS Techniques Requirement
5. Departmental Requirement
6. Elective
13

Second Semester
3. AVS 410 Domestic Animal Behavior
4. AVS 413 Animal Products
5. AVS Experience-Based Activity
6. Departmental Requirement
7. 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.

The Economic and Statistical Analysis Emphasis Area contains most of the same courses as the Agribusiness Emphasis Area with increased requirements in calculus, matrix algebra, and probability theory. This more rigorous mathematics preparation provides a stronger foundation for graduate study or career skill development in quantitative economics or probability and statistics.

In the Community and Economic Development Concentration, 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 career interests include community 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 all three 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. All three 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 50 for program details.
AGRIBUSINESS EMPHASIS AREA

Freshman Year
First Semester
3 - AP EC 205 Agriculture and Society
2 - C U 101 University Success Skills
1 - MTHSC 102 Intro. to Mathematical Analysis
1 - Natural Science Requirement1
1 - Oral Communication Requirement1
15

Second Semester
3 - AP EC 202 Agricultural Economics
3 - ENGL 103 Accelerated Composition
3 - EX ST 222 Statistics in Everyday Life
3 - Arts and Humanities (Non-Lit.) Requirement1
3 - Elective
15

Sophomore Year
First Semester
3 - ACCT 201 Financial Accounting Concepts
3 - EX ST 301 Introductory Statistics
3 - MGT 201 Principles of Management
3 - Arts and Humanities (Literature) Requirement1
3 - Elective
15

Second Semester
3 - ACCT 202 Managerial Accounting Concepts
3 - AP EC 302 Economics of Farm Management
3 - AP EC 308 Quantitative Applied Economics
3 - ECON 212 Principles of Macroeconomics
3 - Social Science Requirement1
15

Junior Year
First Semester
3 - AP EC 309 Econ. of Agricultural Marketing or
3 - MKT 301 Principles of Marketing
3 - AP EC 402 Production Economics
3 - ECON (MGT) 306 Managerial Economics or
3 - ECON 314 Intermediate Microeconomics
3 - ENGL 314 Technical Writing
3 - Agribusiness Requirement2
15

Second Semester
3 - AP EC 319 Agribusiness Management
3 - AP EC 421 Globalization or
3 - ECON 310 International Economy
3 - C R D 335 Leadership in Organizations and Communities
3 - EX ST 462 Statistics Applied to Economics
3 - Agribusiness Requirement2
15

Senior Year
First Semester
3 - AP EC 409 Commodity Futures Markets
3 - AP EC 460 Agricultural Finance
3 - ECON 302 Money and Banking or
3 - ECON 315 Intermediate Macroeconomics
3 - LAW 322 Legal Environment of Business
3 - Agribusiness Requirement2
15

Second Semester
3 - AP EC 452 Agricultural Policy
3 - AP EC 456 Prices
3 - AP EC 490 Selected Topics
6 - Agribusiness Requirement2
15

120 Total Semester Hours

ECONOMIC AND STATISTICAL ANALYSIS EMPHASIS AREA
Freshman Year
First Semester
3 - AP EC 205 Agriculture and Society
2 - C U 101 University Success Skills
4 - MTHSC 106 Calculus of One Variable I
1 - Natural Science Requirement1
3 - Oral Communication Requirement1
16

Second Semester
3 - AP EC 202 Agricultural Economics
3 - ENGL 103 Accelerated Composition
3 - EX ST 222 Statistics in Everyday Life
3 - Arts and Humanities (Non-Lit.) Requirement1
4 - MTHSC 108 Calculus of One Variable II
16

Sophomore Year
First Semester
3 - EX ST 301 Introductory Statistics
3 - MGT 201 Principles of Management
4 - MTHSC 206 Calculus of Several Variables
3 - Arts and Humanities (Literature) Requirement1
3 - Elective
16

Second Semester
3 - ACCT 202 Managerial Accounting Concepts
3 - AP EC 302 Economics of Farm Management
3 - AP EC 308 Quantitative Applied Economics
3 - ECON 212 Principles of Macroeconomics
3 - Social Science Requirement1
15

Junior Year
First Semester
3 - AP EC 309 Econ. of Agricultural Marketing or
3 - MKT 301 Principles of Marketing
3 - AP EC 402 Production Economics
3 - ECON (MGT) 306 Managerial Economics or
3 - ECON 314 Intermediate Microeconomics
3 - ENGL 304 Business Writing or
3 - ENGL 314 Technical Writing
3 - MTHSC 210 Applied Matrix Algebra
15

Second Semester
3 - AP EC 319 Agribusiness Management
3 - AP EC 421 Globalization or
3 - ECON 310 International Economy
3 - C R D 335 Leadership in Organizations and Communities
3 - EX ST 462 Statistics Applied to Economics
3 - MTHSC 400 Theory of Probability
15

Senior Year
First Semester
3 - AP EC 409 Commodity Futures Markets
3 - AP EC 460 Agricultural Finance
3 - LAW 322 Legal Environment of Business
6 - Agribusiness Requirement2
15

Second Semester
3 - AP EC 452 Agricultural Policy
3 - AP EC 456 Prices
3 - AP EC 490 Selected Topics
3 - ECON 302 Money and Banking or
3 - ECON 315 Intermediate Macroeconomics
12

120 Total Semester Hours

COMMUNITY AND ECONOMIC DEVELOPMENT CONCENTRATION
Freshman Year
First Semester
3 - CP SC 120 Intro. to Information Technology
3 - MTHSC 102 Intro. to Mathematical Analysis
3 - Arts and Humanities (Non-Lit.) Requirement1
3 - Science and Tech. in Society Requirement1
3 - Social Science Requirement2
15

Second Semester
3 - ACCT 201 Financial Accounting Concepts
3 - ENGL 103 Accelerated Composition
4 - Natural Science Requirement1
5 - Elective
15

Sophomore Year
First Semester
3 - EX ST 301 Introductory Statistics
3 - MGT 201 Principles of Management
3 - C R D (AP EC) 357 Natural Res. Economics
3 - ENGL 103 Accelerated Composition
4 - Natural Science Requirement1
3 - Oral Communication Requirement1
3 - Elective
15

Second Semester
3 - AP EC 309 Econ. of Agricultural Marketing or
3 - MKT 301 Principles of Marketing
3 - AP EC 402 Production Economics
3 - ECON (MGT) 306 Managerial Economics or
3 - ECON 314 Intermediate Microeconomics
3 - ENGL 304 Business Writing or
3 - ENGL 314 Technical Writing
3 - MTHSC 210 Applied Matrix Algebra
15

1See General Education Requirements.
2See advisor.
### 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.

<table>
<thead>
<tr>
<th>Freshman Year First Semester</th>
<th>Number of Hours</th>
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<tbody>
<tr>
<td>1. BIOC 103 Careers in Biochem. and Genetics</td>
<td>5</td>
</tr>
<tr>
<td>2. BIOL 110 Principles of Biology I</td>
<td>4</td>
</tr>
<tr>
<td>3. CH 101 General Chemistry</td>
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</tr>
<tr>
<td>4. MTHSC 106 Calculus of One Variable I</td>
<td>14</td>
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<thead>
<tr>
<th>Sophomore Year First Semester</th>
<th>Number of Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. CH 223 Organic Chemistry</td>
<td>3</td>
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<tr>
<td>2. CH 227 Organic Chemistry Lab.</td>
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</tr>
<tr>
<td>3. GEN 302 Moleculat and General Genetics</td>
<td>1</td>
</tr>
<tr>
<td>4. GEN 303 Molecular and Gen. Genetics Lab.</td>
<td>1</td>
</tr>
<tr>
<td>5. PHYS 122 Physics with Calculus I</td>
<td>1</td>
</tr>
<tr>
<td>6. PHYS 124 Physics Lab. I</td>
<td>3-4</td>
</tr>
<tr>
<td>7. Advanced Mathematics Requirement</td>
<td>15-16</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Second Semester First Semester</th>
<th>Number of Hours</th>
</tr>
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<tbody>
<tr>
<td>1. BIOC 301 Molecular Biochemistry</td>
<td>3</td>
</tr>
<tr>
<td>2. CH 224 Organic Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>3. CH 228 Organic Chemistry Lab.</td>
<td>1</td>
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<tr>
<td>4. COMM 150 Intro. to Human Comm. or</td>
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<tr>
<td>5. COMM 250 Public Speaking</td>
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<tr>
<td>6. PHYS 221 Physics with Calculus II</td>
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<tr>
<td>7. PHYS 223 Physics Lab. II</td>
<td>3-4</td>
</tr>
<tr>
<td>8. Arts and Humanities (Literature) Requirement</td>
<td>17</td>
</tr>
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<table>
<thead>
<tr>
<th>Junior Year First Semester</th>
<th>Number of Hours</th>
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<tbody>
<tr>
<td>1. BIOC 431 Physical Approach to Biochem.</td>
<td>2</td>
</tr>
<tr>
<td>2. BIOC 433 General Biochemistry Lab. I</td>
<td>2</td>
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<tr>
<td>3. CH 330 Introduction to Physical Chemistry</td>
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<tr>
<td>4. Science Requirement</td>
<td>3</td>
</tr>
<tr>
<td>5. Elective</td>
<td>3</td>
</tr>
<tr>
<td>6. Elective</td>
<td>3</td>
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<table>
<thead>
<tr>
<th>Senior Year First Semester</th>
<th>Number of Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. BIOSC 461 Cell Biology</td>
<td>3</td>
</tr>
<tr>
<td>2. GEN (BIOC) 440 Bioinformatics</td>
<td>3</td>
</tr>
<tr>
<td>3. Social Science Requirement</td>
<td>3</td>
</tr>
<tr>
<td>4. Elective</td>
<td>5</td>
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<tr>
<td>5. Elective</td>
<td>14</td>
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<table>
<thead>
<tr>
<th>Combined Bachelor of Science in Biological Sciences/Master of Science in Bioengineering</th>
<th>Number of Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. BIOC 493 Senior Seminar</td>
<td>2</td>
</tr>
<tr>
<td>2. Science Requirement</td>
<td>3</td>
</tr>
<tr>
<td>3. Social Science Requirement</td>
<td>3</td>
</tr>
<tr>
<td>4. Elective</td>
<td>6</td>
</tr>
<tr>
<td>5. Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

| Total Semester Hours | 120-121 |

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**Notes:**

1. Students are required to enroll in science and mathematics courses only when all prerequisites have been passed with a grade of C or higher.
2. 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, physiology, wildlife biology, and zoology; for the health professions [medicine, dentistry, etc.], veterinary medicine; and for science teaching.

**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 wellbeing 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, physiology, wildlife biology, and zoology; for the health 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 or
3 - COMM 250 Public Speaking
4 - MTHSC 106 Calculus of One Variable I

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

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 Requirement2
3 - Arts and Humanities (Literature) Requirement3
3 - Biochemistry or Genetics Requirement4

Second Semester
3 - CH 224 Organic Chemistry and
1 - CH 228 Organic Chemistry Laboratory6 or
4 - Major Requirement6
4 - Animal or Plant Diversity Requirement2
3 - Biochemistry or Genetics Requirement4
5 - Major Requirement6

Junior Year

First Semester
3 - BIOSC 335 Evolutionary Biology
3 - BIOSC 461 Cell 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

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.) Requirement4
5 - Major Requirement6
3 - Social Science Requirement6

Senior Year

First Semester
2 - BIOSC 493 Senior Seminar
13 - Major Requirement6

Second Semester
12 - Major Requirement6
3 - Social Science Requirement6

PREPARE FOR THE FUTURE: 6

1 - 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. See advisor.

2At 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).

3See General Education Requirements. Six of these credit hours must also satisfy the Cross-Cultural Awareness and Science and Technology in Society Requirements.

4At least one lecture course must be completed for both biochemistry (BIOCHE 301 or 305) and for genetics (GEN 300 or 302).

5BIOSC 434 may be substituted for CH 228.

6See advisor. Select one lecture/lab combination from each of the following fields:
   - Physiology—BIOSC 316, 401/402, 459/460, 475/476

7The remaining courses may be selected from EX ST 301, MTHSC 203, 301, or any BIOCH, BIOSC, BOT, GEN 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 - CH 201 Survey of Organic Chemistry
4 - ENT (BIOSC) 301 Insect Biol. and Diversity
3 - Arts and Humanities (Literature) Requirement1
3 - Biochemistry or Genetics Requirement2

Second Semester
3 - CH 224 Organic Chemistry and
1 - CH 228 Organic Chemistry Laboratory6 or
4 - Major Requirement6
3 - Biochemistry or Genetics Requirement2
5 - Major Requirement6

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
1 - PHYS 223 Physics Lab. II
3 - Arts and Humanities (Non-Lit.) Requirement4
5 - Major Requirement6
3 - Social Science Requirement6

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.) Requirement4
3 - Entomology Requirement6
3 - Major Requirement6
3 - Social Science Requirement6

Senior Year

First Semester
3 - BIOSC 461 Cell Biology
2 - BIOSC 462 Cell Biology Lab.
2 - BIOSC 493 Senior Seminar
4 - Entomology Requirement6
4 - Major Requirement6

Second Semester
3 - Entomology Requirement6
9 - Major Requirement6
3 - Social Science Requirement6
12 - Major Requirement6

Junior Year

First Semester
3 - CH 223 Organic Chemistry
1 - CH 227 Organic Chemistry Lab. or
3 - CH 201 Survey of Organic Chemistry
4 - ENT (BIOSC) 301 Insect Biol. and Diversity
3 - Arts and Humanities (Literature) Requirement1
3 - Biochemistry or Genetics Requirement2

Second Semester
3 - CH 224 Organic Chemistry and
1 - CH 228 Organic Chemistry Laboratory6 or
4 - Major Requirement6
3 - Biochemistry or Genetics Requirement2
5 - Major Requirement6

Sophomore Year

First Semester
3 - CH 223 Organic Chemistry
1 - CH 227 Organic Chemistry Lab. or
3 - CH 201 Survey of Organic Chemistry
4 - ENT (BIOSC) 301 Insect Biol. and Diversity
3 - Arts and Humanities (Literature) Requirement1
3 - Biochemistry or Genetics Requirement2

Second Semester
3 - CH 224 Organic Chemistry and
1 - CH 228 Organic Chemistry Laboratory6 or
4 - Major Requirement6
3 - Biochemistry or Genetics Requirement2
5 - Major Requirement6

Senior 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 or
3 - COMM 250 Public Speaking
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
4 - MTHSC 111 Calculus II for Biologists

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 Requirement2
3 - Social Science Requirement6

PREPARE FOR THE FUTURE: 6

1See General Education Requirements. Six of these credit hours must also satisfy the Cross-Cultural Awareness and Science and Technology in Society Requirements.

2At least one lecture course must be completed for both biochemistry (BIOCHE 301 or 305) and for genetics (GEN 300 or 302).

3BIOSC 434 may be substituted for CH 228.

4See advisor. Select one lecture/lab combination from each of the following fields:
   - Physiology—BIOSC 316, 401/402, 459/460, 475/476

5The remaining courses may be selected from EX ST 301, MTHSC 203, 301, or any BIOCH, BIOSC, BOT, GEN or MICRO courses at the 300 level or higher.

6At least one lecture course and associated laboratory must be completed for plant diversity (BIOSC 304/308, BIOSC 305/309, BIOSC 320, or BIOSC 406/407).

7ENT (BIOSC) 400, (BIOSC) 415, and seven additional credits selected from ENT 300, 308, 405, 404/409, 407, (BIOSC) 436, (BIOSC) 455, (BIOSC, W F B) 469, 490, (GEN) 495, PL PA (ENT) 406.

College of Agriculture, Forestry and Life Sciences
## Second Semester
- **3 - CH 224 Organic Chemistry**
- **1 - CH 228 Organic Chemistry Lab.**
- **4 - MICRO 305 General Microbiology**
- **4 - Animal or Plant Diversity Requirement\(^2\)**
- **3 - Biochemistry or Genetics Requirement\(^4\)**

### Junior Year

#### First Semester
- **4 - BIOSC 315 Functional Human Anatomy**
- **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**

#### Second Semester
- **3 - PHYS 208 General Physics II and**
  - **1 - PHYS 210 General Physics II Lab. or**
  - **3 - PHYS 223 Physics Lab. II**
- **3 - PSYCH 201 Introduction to Psychology**
- **4 - Animal Physiology Requirement\(^1\)**
- **3 - Economics Requirement\(^6\)**
  - **2 - Major Requirement\(^2\)**

### Senior Year

#### First Semester
- **3 - BIOSC 461 Cell Biology**
- **2 - BIOSC 462 Cell Biology Lab.**
- **2 - BIOSC 493 Senior Seminar**
- **8 - Major Requirement\(^7\)**

#### Second Semester
- **3 - Arts and Humanities (Non-Lit.) Requirement\(^5\)**
  - **11 - Major Requirement\(^1\)**

124 Total Semester Hours

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## 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. or**
  - **4 - CH 201 Survey of Organic Chemistry**
- **4 - Animal or Plant Diversity Requirement\(^1\)**
- **3 - Biochemistry or Genetics Requirement\(^2\)**
- **3 - Partial Differential Equations Requirement\(^3\)**

#### Second Semester
- **3 - CH 224 Organic Chemistry and**
  - **1 - CH 228 Organic Chemistry Laboratory\(^6\) or**
  - **4 - Major Requirement\(^5\)**
  - **3 - EX ST 301 Introductory Statistics I**
  - **4 - Animal or Plant Diversity Requirement\(^1\)**
  - **3 - Biochemistry or Genetics Requirement\(^2\)**
  - **3 - Major Requirement\(^5\)**

17

### Junior Year

**First Semester**
- **3 - BIOSC 335 Evolutionary Biology**
- **3 - ENGL 315 Scientific Writing and Comm.**
- **3 - EX ST 311 Introductory Statistics II**
- **1 - 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 Requirement\(^5\)**

#### Second Semester
- **4 - BIOSC 428 Quantitative Biology**
- **3 - BIOSC 461 Cell Biology**
- **2 - BIOSC 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 Requirement\(^8\)**

16

### Senior Year

**First Semester**
- **2 - BIOSC 493 Senior Seminar**
- **3 - GEN 440 Bioinformatics**
- **3 - Arts and Humanities (Literature) Requirement\(^6\)**
  - **8 - Major Requirement\(^5\)**

#### Second Semester
- **1 - BIOSC 491 Undergraduate Research**
  - **3 - Arts and Humanities (Non-Lit.) Requirement\(^6\)**
  - **5 - Major Requirement\(^5\)**
  - **3 - Social Science Requirement\(^8\)**

12

125 Total Semester Hours

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\(^1\)At 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).

\(^2\)At 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).

\(^3\)See advisor. Select one lecture/lab combination in ecology (BIOSC 441/445, 443/444, 446/447, 470/471). The remaining courses may be selected from BIOCH 302, EX ST 301, MTHSC 203, 301, or any BIOCH, BIOSC, BOT, GEN, or MICRO courses at the 300 level or higher.

\(^4\)At 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).

\(^5\)See advisor. Select one lecture/lab combination in ecology (BIOSC 441/445, 443/444, 446/447, 470/471). The remaining courses may be selected from BIOCH 302, EX ST 301, MTHSC 203, 301, or any BIOCH, BIOSC, BOT, GEN, or MICRO courses at the 300 level or higher.

\(^6\)See 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 - BIOSC 210 Introduction to Toxicology**
- **3 - CH 223 Organic Chemistry\(^1\) and**
  - **1 - CH 227 Organic Chemistry Lab. or**
  - **4 - CH 201 Survey of Organic Chemistry**
- **4 - Animal or Plant Diversity Requirement\(^2\)**
- **3 - Biochemistry or Genetics Requirement\(^3\)**

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#### Second Semester
- **3 - CH 224 Organic Chemistry\(^1\) and**
  - **1 - CH 228 Organic Chemistry Laboratory\(^6\) or**
  - **4 - Major Requirement\(^5\)**
  - **3 - EX ST 301 Introductory Statistics I**
  - **4 - Animal or Plant Diversity Requirement\(^1\)**
  - **3 - Biochemistry or Genetics Requirement\(^2\)**
  - **3 - Major Requirement\(^5\)**

17

#### Junior Year

**First Semester**
- **3 - BIOSC 335 Evolutionary Biology**
- **3 - ENGL 315 Scientific Writing and Comm.**
- **3 - EX ST 311 Introductory Statistics II**
- **1 - 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 Requirement\(^5\)**

16

**Second Semester**
- **4 - BIOSC 428 Quantitative Biology**
- **3 - BIOSC 461 Cell Biology**
- **2 - BIOSC 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 Requirement\(^8\)**

16

### Senior Year

**First Semester**
- **3 - BIOSC 335 Evolutionary Biology**
- **3 - ENGL 315 Scientific Writing and Comm.**
- **3 - ENTOX (ENT) 430 Toxicology**
- **1 - PHYS 223 Physics Lab. II**
- **3 - Arts and Humanities (Non-Lit.) Requirement\(^6\)**
  - **8 - Major Requirement\(^5\)**
- **4 - Animal or Plant Diversity Requirement\(^2\)**
- **3 - Biochemistry or Genetics Requirement\(^3\)**
- **5 - Major Requirement\(^5\)**

16

#### Second Semester
- **3 - CH 224 Organic Chemistry\(^1\) and**
  - **1 - CH 228 Organic Chemistry Laboratory\(^6\) or**
  - **4 - Major Requirement\(^5\)**
- **4 - Animal or Plant Diversity Requirement\(^2\)**
- **3 - Biochemistry or Genetics Requirement\(^3\)**
- **5 - Major Requirement\(^5\)**

16

#### Junior Year

**First Semester**
- **3 - BIOSC 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 Requirement\(^5\)**

16

**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) Requirement\(^6\)**
  - **5 - Major Requirement\(^5\)**
  - **3 - Social Science Requirement\(^8\)**

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College of Agriculture, Forestry and Life Sciences
Senior Year
First Semester
3 - BIOSC 461 Cell Biology
2 - BIOSC 462 Cell Biology Lab.
2 - BIOSC 493 Senior Seminar
3 - CH 313 Quantitative Analysis
1 - CH 317 Quantitative Analysis Lab.
3 - Major Requirement1

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.) Requirement6
or
3 - COMM 150 Intro. to Human Communication
1 - BIOSC 101 Frontiers in Biology I
4 - CH 101 General Chemistry
3 - ENGL 103 Accelerated Composition
3-4 - Mathematical Sciences Requirement2
16-17

Sophomore Year
First Semester
4 - CH 201 Survey of Organic Chemistry1
3 - Animal or Plant Diversity Requirement4
3 - Biochemistry or Genetics Requirement5
4 - Foreign Language Requirement6
2 - Major Requirement7
3 - Social Science Requirement9
3 - Toxicology Requirement6
2 - Major Requirement7
3 - Arts and Humanities (Non-Lit.) Requirement6
3 - Foreign Language Requirement6
3 - Major Requirement7

Second Semester
4 - Animal or Plant Diversity Requirement4
3 - Biochemistry or Genetics Requirement5
4 - Foreign Language Requirement6
4 - Major Requirement7

Junior Year
First Semester
3 - BIOSC 335 Evolutionary Biology
3 - BIOSC 461 Cell Biology
2 - BIOSC 462 Cell Biology Laboratory
3 - ENGL 315 Scientific Writing and Comm.
3 - Foreign Language Requirement6
1 - BIOSC 102 Frontiers in Biology II
1 - BIOL 106 General Biology Lab. II1
4 - CH 102 General Chemistry
3 - COMM 150 Intro. to Human Communication or
3 - COMM 250 Public Speaking
4 - MTHSC 106 Calculus of One Variable I
16

Second Semester
3 - BIOL 103 General Biology I1
1 - BIOL 104 General Biology Lab. I1
1 - BIOSC 101 Frontiers in Biology I
4 - CH 101 General Chemistry
3 - COMM 150 Intro. to Human Communication or
3 - COMM 250 Public Speaking
4 - MTHSC 106 Calculus of One Variable II
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 Requirement1
3 - Minor Requirement4
3 - Social Science Requirement6
15

Second Semester
3 - PHYS 208 General Physics II
1 - PHYS 210 General Physics II Lab.
3 - Arts and Humanities (Literature) Requirement6
2 - Major Requirement1
3 - Minor Requirement4
3 - Social Science Requirement6
15

125–126 Total Semester Hours

BIOLOGICAL 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/Science Teaching—Biological Sciences
The Bachelor of Arts Degree in Biological Sciences and Science Teaching—Biological Sciences prepares students for teaching biology on the secondary school level and for graduate studies in any of the life science areas. See page 109 for the curriculum.

Freshman Year
First Semester
5 - BIOL 110 Principles of Biology I1
1 - BIOSC 101 Frontiers in Biology I
4 - CH 101 General Chemistry
3 - COMM 150 Intro. to Human Communication or
3 - COMM 250 Public Speaking
4 - MTHSC 106 Calculus of One Variable I
17

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

Sophomore Year
First Semester
4 - CH 201 Survey of Organic Chemistry1
3 - Animal or Plant Diversity Requirement4
3 - Biochemistry or Genetics Requirement5
4 - Foreign Language Requirement6
2 - Major Requirement7
3 - Social Science Requirement9
3 - Toxicology Requirement6
2 - Major Requirement7
3 - Arts and Humanities (Non-Lit.) Requirement6
3 - Foreign Language Requirement6
3 - Major Requirement7

Second Semester
4 - Animal or Plant Diversity Requirement4
3 - Biochemistry or Genetics Requirement5
4 - Foreign Language Requirement6
4 - Major Requirement7

Junior Year
First Semester
4 - CH 201 Survey of Organic Chemistry1
3 - Animal or Plant Diversity Requirement4
3 - Biochemistry or Genetics Requirement5
4 - Foreign Language Requirement6
2 - Major Requirement7
3 - Social Science Requirement9
3 - Toxicology Requirement6
2 - Major Requirement7
3 - Arts and Humanities (Non-Lit.) Requirement6
3 - Foreign Language Requirement6
3 - Major Requirement7

Senior Year
First Semester
2 - BIOSC 493 Senior Seminar
3 - PHYS 207 General Physics I
1 - PHYS 209 General Physics I Lab.
3 - Major Requirement1
3 - Minor Requirement4
3 - Social Science Requirement6
15

Second Semester
3 - PHYS 208 General Physics II
1 - PHYS 210 General Physics II Lab.
3 - Arts and Humanities (Literature) Requirement6
2 - Major Requirement1
3 - Minor Requirement4
3 - Social Science Requirement6
15

125–126 Total Semester Hours

Junior Year
First Semester
4 - BIOSC 315 Functional Human Anatomy
3 - BIOSC 335 Evolutionary Biology
3 - BIOSC 461 Cell Biology
2 - BIOSC 462 Cell Biology Laboratory
3 - Foreign Language Requirement4

PREREHABILITATION SCIENCES
EMPHASIS AREA

Freshman Year
First Semester
3 - BIOL 103 General Biology I1
1 - BIOL 104 General Biology Lab. I1
1 - BIOSC 101 Frontiers in Biology I
4 - CH 101 General Chemistry
3 - COMM 150 Intro. to Human Communication or
3 - COMM 250 Public Speaking
4 - MTHSC 106 Calculus of One Variable I
16

Second Semester
3 - BIOL 104 General Biology II1
1 - BIOL 106 General Biology Lab. II1
1 - BIOSC 102 Frontiers in Biology II
4 - CH 102 General Chemistry
3 - ENGL 103 Accelerated Composition
3 - EX ST 301 Introductory Statistics
15

Sophomore Year
First Semester
4 - CH 201 Survey of Organic Chemistry1
4 - Animal or Plant Diversity Requirement2
3 - Biochemistry or Genetics Requirement5
4 - Foreign Language Requirement6
15

Second Semester
4 - Animal or Plant Diversity Requirement2
3 - Biochemistry or Genetics Requirement5
4 - Foreign Language Requirement6
6 - Minor Requirement8
17

Junior Year
First Semester
4 - BIOSC 315 Functional Human Anatomy
3 - BIOSC 335 Evolutionary Biology
3 - BIOSC 461 Cell Biology
2 - BIOSC 462 Cell Biology Laboratory
3 - Foreign Language Requirement4

1BIOL 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 extra credits from departmental course offerings at the 300 level or above. See advisor.

2At 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 310, or BIOSC 406/407).

3Any 400-level ENTOX course.

4At least one lecture and associated laboratory must be completed for both biochemistry (BIOSH 301 or 305) and for genetics (GEN 300 or 302).

5Four semesters (through 202) in the same modern foreign language are required.

6See advisor. Select one lecture course from each of the following fields:
- Ecology—BIOSC 441, 443, 446, 470
- Physiology—BIOSH 316, 401, 459, 475

7Any 400-level ENTOX course.

8Any 400-level ENTOX course.

9Any 400-level ENTOX course.

3CH 223 and 227 may be substituted for CH 201. Most professors strongly recommend the 4-credit lecture/laboratory combination, so students are advised to take CH 223 and 227. CH 224 is recommended.

4At 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 310, or BIOSC 406/407).

5At least one lecture course must be completed for both biochemistry (BIOSH 301 or 305) and for genetics (GEN 300 or 302).

6At least one lecture course 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 310, or BIOSC 406/407).

7At least one lecture course must be completed for both biochemistry (BIOSH 301 or 305) and for genetics (GEN 300 or 302).

8Four semesters (through 202) in the same modern foreign language are required.

9See advisor. Select one lecture course from each of the following fields:
- Ecology—BIOSC 441, 443, 446, 470
- Physiology—BIOSH 316, 401, 459, 475

10See General Education Requirements. Six of these credit hours must also satisfy the Cross-Cultural Awareness and Science and Technology in Society Requirements.

11At 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 310, or BIOSC 406/407).

12At least one lecture course must be completed for both biochemistry (BIOSH 301 or 305) and for genetics (GEN 300 or 302).

13Four semesters (through 202) in the same modern foreign language are required.

14See advisor. Select one lecture course from each of the following fields:
- Ecology—BIOSC 441, 443, 446, 470
- Physiology—BIOSH 316, 401, 459, 475

15Any 400-level ENTOX course.

16Any 400-level ENTOX course.
ENVIRONMENTAL AND NATURAL RESOURCES

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

Three concentrations are offered within the Environmental and Natural Resources major. 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.

CONSERVATION BIOLOGY

CONCENTRATION

Sophomore Year
First Semester
3 - AP EC 257 Natural Resources, Environment, and Economics
4 - BIOSC 320 Field Botany and
1 - Elective or
2 - FOR 205 Dendrology and
3 - FOR 221 Forest Biology
3 - CH 223 Organic Chemistry
4 - F N R 204 Soil Information Systems or
6 - CSENV 202 Soils

Second Semester
3 - GEN 300 Fundamental Genetics
3 - W F B (BIOSC) 313 Conservation Biology
3 - Arts and Humanities (Language) Requirement
3 - Physical Environment Requirement
3 - Taxonomy/Habitat Requirement

Junior Year
First Semester
3 - BIOSC 335 Evolutionary Biology
3 - Arts and Humanities (Non-Lit.) Requirement
3 - Ecology Requirement
3 - Natural Resource Economics Requirement
3 - Taxonomy/Habitat Requirement

Second Semester
3 - ENGL 314 Technical Writing
3 - E N R 302 Natural Resources Measurements
3 - Ecology Requirement
3 - Physiology Requirement
3 - Taxonomy/Habitat Requirement

Senior Year
First Semester
3 - FOR (E N R) 434 GIS for Landscape Planning
3 - Conservation Policy/Law Requirement
3 - Internship, Creative Inquiry or Directed Research Requirement
3 - Social Science Requirement
3 - Taxonomy/Habitat Requirement

Second Semester
3 - E N R (BIOSC) 413 Restoration Ecology
3 - E N R 450 Conservation Issues
1 - FOR 498 Senior Portfolio or
1 - W F B 498 Senior Portfolio
6 - Taxonomy/Habitat Requirement
2 - Elective

120 Total Semester Hours

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

BIOSYSTEMS ENGINEERING

Bachelor of Science
The Biosystems Engineering program is administered jointly with the College of Engineering and Science. See page 89 for the curriculum.
NATURAL RESOURCE AND ECONOMIC POLICY CONCENTRATION

Sophomore Year
First Semester
- AP EC 257 Natural Resources, Environment, and Economics
- PO SC 101 American National Government or PO SC 102 Intro. to International Relations
- Geography Requirement
- Natural Science Requirement or Minor Requirement
- Elective

Second Semester
- C R D (AP EC) 357 Natural Res. Economics
- ECON 212 Principles of Macroeconomics
- Arts and Humanities (Literature) Requirement
- Arts and Humanities (Non-Lit.) Requirement
- Elective

Junior Year
First Semester
- ECON 314 Intermediate Microeconomics
- E N R 429 Environmental Law and Policy
- Applied Economics Requirement
- Natural Science Requirement or Minor Requirement
- Elective

Second Semester
- C R D (AP EC) 357 Natural Res. Economics
- ECON 212 Principles of Macroeconomics
- Arts and Humanities (Literature) Requirement
- Arts and Humanities (Non-Lit.) Requirement
- Elective

Senior Year
First Semester
- AP EC 457 Nat. Res. Use, Technology and Policy
- ECON 319 Environmental Economics
- Applied Economics Requirement
- Applied Economics Requirement and Minor Requirement
- Internship, Creative Inquiry or Directed Research Requirement

Second Semester
- C R D (AP EC) 357 Natural Res. Economics
- GEOL 101 Physical Geology
- GEOL 103 Physical Geology Lab.
- W F B (BIOSC) 313 Conservation Biology
- Minor Requirement

Senior Year
First Semester
- FOR (E N R) 416 Forest Policy and Admin.
- FOR (E N R) 434 GIS for Landscape Planning
- Internship, Creative Inquiry or Directed Research Requirement
- Minor Requirement
- Elective

Second Semester
- E N R 450 Conservation Issues
- E N R 302 Natural Resources Measurements
- ENGL 314 Technical Writing
- FOR 406 Forested Watershed Management
- FOR 498 Senior Portfolio
- W F B 498 Senior Portfolio
- W F B 462 Wetland Wildlife Biology
- Minor Requirement

1See General Education Requirements. Three of these credit hours must also satisfy the Cross-Cultural Awareness Requirement.
2See General Education Requirements. Three of these credit hours must also satisfy the Cross-Cultural Awareness Requirement.
3Minor 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; Therapeutic Recreation; Travel and Tourism; Urban Forestry; Wildlife and Fisheries Biology.

NATURAL RESOURCES MANAGEMENT CONCENTRATION

Sophomore Year
First Semester
- F N R 204 Soil Information Systems or CSENV 202 Soils
- FOR 205 Dendrology
- FOR 221 Forest Biology
- W F B 300 Wildlife Biology
- Arts and Humanities (Literature) Requirement

Second Semester
- E N R 302 Natural Resources Measurements
- FOR 206 Forest Ecology
- Arts and Humanities (Non-Lit.) Requirement
- Social Science Requirement

Junior Year
First Semester
- AP EC 257 Natural Resources, Environment, and Economics
- BOSC 320 Field Botany or BOSC 406 Intro. Plant Taxonomy and BOSC 407 Plant Taxonomy Lab.
- E N R 429 Environmental Law and Policy or FOR 400 Public Relations in Natural Res.
- Minor Requirement
- Elective

Second Semester
- C R D (AP EC) 357 Natural Res. Economics
- GEOL 101 Physical Geology
- GEOL 103 Physical Geology Lab.
- W F B (BIOSC) 313 Conservation Biology
- Minor Requirement

F O O D S C I E N C E

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 Dietetic 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 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 450 Creative Inquiry
3 - 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

Sophomore 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
3 - FD SC 404 Food Preservation and Processing
2 - FD SC 407 Quantity Food Production
1 - FD SC 450 Creative Inquiry
3 - Emphasis Area Requirement* 16

Second Semester
4 - FD SC 402 Food Chemistry II
4 - FD SC 408 Food Process Engineering
3 - FD SC (PKGSC) 409 Total Quality Mgmt. for
the Food and Packaging Industries
1 - FD SC 450 Creative Inquiry
3 - Emphasis Area Requirement* 15
122–125 Total Semester Hours

Junior 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) Requirement* 15
3 - Social Science Requirement* 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 - Elective 15

Junior Year
First Semester
4 - BIOCH 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 - BIOCH 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* 4 - NUTR 424 Medical Nutrition Therapy I

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 15-16

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* 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 - Elective 15

Junior Year
First Semester
4 - BIOCH 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 - BIOCH 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* 4 - NUTR 424 Medical Nutrition Therapy I
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

FOREST RESOURCE MANAGEMENT

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

Foresters are qualified for a broad spectrum of employment 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. Foresters earning advanced degrees find employment in academic work and in research conducted by public and private agencies.

The curriculum, accredited by the Society of American Foresters, provides a strong program in the basic knowledge and skills required of a professional forester. Forest Resource Management majors will select a minor (see page 61). 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 pages 49-50 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. I
1 - MTHSC 102 Intro. to Mathematical Analysis
3 - Oral Communication Requirement 1
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 Requirement 3
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) 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 1
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 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 - FOR (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 1
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.
3 - FOR 417 Forest Resource Mgt. and Regulation
2 - FOR 431 Recreation Resource Planning in Forestry Management
3 - Minor Requirement 1
1 - Internship, Creative Inquiry or Directed Research Requirement 6
16

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 Requirement 1
15

131 Total Semester Hours

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. I
3 - MTHSC 102 Intro. to Mathematical Analysis
3 - Oral Communication Requirement 1
16

Second Semester
1 - F N R 102 FNR Freshman Portfolio
2 - FOR 251 Forest Communities
1 - FOR 252 Forest Operations
4 - FOR 253 Forest Mensuration
3 - FOR 221 Forest Biology
2 - FOR 205 Dendrology
3 - Arts and Humanities (Literature) Requirement 2
3 - Economics Requirement 3
15

Sophomore Year
First Semester
1 - FOR 254 Forest Products
2 - FOR 253 Forest Mensuration
3 - F N R 102 FNR Freshman Portfolio
2 - FOR 205 Dendrology
3 - Arts and Humanities (Non-Lit.) Requirement 1
3 - Social Science Requirement 1
6 - Minor Requirement 1
16

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 Requirement 1
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

Note:
1 - See General Education Requirements. Three of these credit hours must also satisfy the Cross-Cultural Awareness Requirement.
2 - NUTR 419 is recommended for students not pursuing registered dietitian (RD) status.
3 - See 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.)
4 - To be selected by the middle of the sophomore year
5 - AP EC 257, ECON 200, 211, or 212
6 - To be selected by the middle of the sophomore year
7 - F N R 470, 490, or FOR 419

College of Agriculture, Forestry and Life Sciences

52
Junior Year
First Semester
2. 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. FOR (E N R) 434 GIS for Landscape Planning
Second Semester
3. AO 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

Summer
3. F N R 490 Field Training in Natural Resources

Senior Year
First Semester
4. FOR 410 Harvesting Processes
3. FOR (E N R) 416 Forest Policy and Admin.
3. FOR 417 Forest Resource Mgmt. and Regulation
3. FOR 433 GPS Applications
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

130 Total Semester Hours

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 minerals) in research, sales, or business operations. Combined with a law degree, a genetics bachelor 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
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

Sophomore Year
First Semester
3. CH 223 Organic Chemistry
1. CH 227 Organic Chemistry Lab.
3. COMM 150 Intro. to Human Comm. or 3. 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
2. 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) Requirement
3. Social Science Requirement
18

Junior Year
First Semester
3. BIOC 461 Cell Biology
3. GEN 410 Fundamentals of Genetics I
2. GEN 411 Fundamentals of Genetics I Lab.
3. Science Requirement
3. Elective
14
Second Semester
3. GEN 420 Fundamentals of Genetics II
2. GEN 421 Fundamentals of Genetics II Lab.
3. GEN (BIOC) 440 Bioinformatics
3. PHIL 326 Science and Values
3. Genetics Requirement
3. Elective
17

Senior Year
First Semester
3. GEN 450 Comparative Genetics
3. Science Requirement
3. Social Science Requirement
6. Elective
15
Second Semester
2. GEN 493 Senior Seminar
6. Genetics Requirement
3. Science Requirement
4. Elective
15

123 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 better.
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.

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

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

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

**First Semester**
- 3 - BIOL 103 General Biology I
- 1 - BIOL 105 General Biology Lab. I
- 4 - CH 101 General Chemistry¹ or
- 4 - CH 105 Chemistry in Context¹
- 3 - HORT 101 Horticulture
- 4 - Spanish Language Requirement²

**Second Semester**
- 4 - CH 102 General Chemistry¹ or
- 4 - CH 106 Chemistry in Context¹
- 3 - ENGL 103 Accelerated Composition
- 1 - HORT 102 Experience Horticulture
- 3 - MTHSC 102 Intro. to Mathematical Analysis
- 4 - Related Science Requirement²

## Sophomore Year

**First Semester**
- 3 - HORT 303 Landscape Plants
- 3 - MTHSC 101 Essential Math. for Informed Soc.
- 3 - Arts and Humanities (Non-Lit.) Requirement³
- 3 - Business Requirement²
- 4 - Plant Biology Requirement²

**Second Semester**
- 3 - HORT 305 Plant Propagation
- 1 - HORT 306 Plant Propagation Techniques Lab.
- 3 - Arts and Humanities (Literature) Requirement¹
- 3 - Horticulture Specialization Requirement²
- 3 - Social Science Requirement²

**Summer**
- 3 - HORT 271 Internship⁴ or
- 3 - HORT 471 Advanced Internship⁴

## Junior Year

**First Semester**
- 4 - CSENV 202 Soils
- 3 - Horticulture Specialization Requirement²
- 3 - Oral Communication Requirement¹
- 3 - Social Science Requirement²
- 3 - Elective

**Second Semester**
- 3 - BIOSC 401 Plant Physiology
- 1 - BIOSC 402 Plant Physiology Lab.
- 1 - HORT 409 Seminar
- 3 - Business Requirement²
- 3 - Horticulture Specialization Requirement²
- 3 - Related Science Requirement²

## Senior Year

**First Semester**
- 3 - Business Requirement²
- 6 - Horticulture Specialization Requirement²
- 6 - Related Science Requirement²

**Second Semester**
- 6 - Horticulture Specialization Requirement²
- 6 - Related Science Requirement²
- 1 - Elective
- 13
- 120 Total Semester Hours

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**Microbiology**

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 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.
1 See General Education Requirements. Six of these credit hours must also satisfy the Cross-Cultural Awareness and Science and Technology in Society Requirements.
2 Elective hours may be used toward satisfying the requirements of a minor.
3 BIOCH 301 or 305
4 See advisor. Minimum of 17 credits is required. At least one course must be selected from each of the following fields:
   - Biomedicine—BIOSC 420, 434, 454/457, 467, 484, 489, GEN 300, HLTH 380, MICRO 400, 411, (AVS, BIOSC) 414, 417
   - Environmental—BIOSC (PL PA) 425, MICRO 402, 403, 410
   - Food Safety, Industrial, and Technology—BIOSC 487, GEN (BIOSC, MICRO) 418, MICRO 407, 413
5 BIOSC 454 or MICRO 416
6 Students planning on applying to medical/dental schools should take PHYS 208 and 210 during the second semester of the junior year.

**BIOMEDICINE CONCENTRATION**

**Freshman Year**

**First Semester**
3 - BIOL 110 Principles of Biology I
4 - CH 227 Organic Chemistry Lab.
3 - COMM 150 Intro. to Human Communication or
3 - COMM 250 Public Speaking
1 - MICRO 101 Microbes and Human Affairs
3 - MICROS 106 Calculus of One Variable I

**Second Semester**
3 - MICRO 101 Principles of Biology II or
3 - BIOSC 315 Functional Human Anatomy
4 - CH 132 General Chemistry
3 - ENGL 103 Accelerated Composition
3 - Mathematics Requirement
14-16

**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
4 - Elective
15

**Second Semester**
3 - CH 224 Organic Chemistry
1 - CH 228 Organic Chemistry Lab.
3 - Arts and Humanities (Non-Lit) Requirement
3 - Biochemistry Requirement
3 - Biomedicine Requirement
3 - Social Science Requirement
16

**Junior Year**

**First Semester**
3 - GEN 300 Fundamental Genetics
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
15

**Second Semester**
3 - ENGL 315 Scientific Writing and Comm.
4 - MICRO 412 Bacterial Physiology
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
4 - Elective
15

**Senior Year**

**First Semester**
3 - BIOSC 461 Cell Biology
2 - BIOSC 462 Cell Biology Lab.
3 - MICROS 415 Microbial Genetics
3 - MICROS 416 Introductory Virology
3 - Social Science Requirement
15
122–124 Total Semester Hours

3 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 completed by taking 1–2 extra credits from departmental course offerings at the 300 level or higher. See advisor.
4 MTHSC 111, 202, 301, or EX ST 311
5 See General Education Requirements. Six of these credit hours must also satisfy the Cross-Cultural Awareness and Science and Technology in Society Requirements.
6 BIOCH 301 or 305.
7 BIOSC 423, 432, BIOSC 420, (PL PA) 425, 434/456, 457, 467, 484, 489, HLTH 380, MICRO 420 or 491.

**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 2.0 cumulative grade-point ratio.

**Freshman Year**

**First Semester**
3 - BIOL 101 General Biology I
1 - BIOL 105 General Biology Lab. I
4 - CH 101 General Chemistry
4 - MTHSC 106 Calculus of One Variable I
1 - PKGSC 101 Packaging Orientation
3 - Social Science Requirement
16

**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
2 - PKGSC 102 Intro. to Packaging Science
1 - PKGSC 103 Packaging Science ePortfolio
14

**Sophomore Year**

**First Semester**
4 - CH 201 Survey of Organic Chemistry or
3 - CH 223 General Chemistry and
1 - CH 227 General Chemistry 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. II
4 - PKGSC 202 Packaging Materials and Manuf.
2 - PKGSC 203 Packaging Research Fundamentals
14

**Second Semester**
4 - G C 103 Graphic Comm. I for Packaging Sci.
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 - PKGSC 201 Packaging Perishable Products
3 - PKGSC 204 Container Systems
1 - PKGSC 206 Container Systems Lab.
2 - PKGSC 220 Package Drawing/CAD
17

**Junior Year**

**First Semester**
3 - PKGSC 320 Package Design Fundamentals
3 - PKGSC 368 Packaging and Society
3 - PKGSC 404 Mechanical Properties of Packages
3 - PKGSC 430 Converting for Flexible Packaging
1 - PKGSC 454 Product and Package Eval. Lab.
3 - Emphasis Area Requirement
16

**Summer**
0 - CO-OP 101 Cooperative Education

**Junior Year**

**First Semester**
3 - PKGSC 320 Package Design Fundamentals
3 - PKGSC 368 Packaging and Society
3 - PKGSC 404 Mechanical Properties of Packages
3 - PKGSC 430 Converting for Flexible Packaging
1 - PKGSC 454 Product and Package Eval. Lab.
3 - Emphasis Area Requirement
16
Second Semester
3 - COMM 250 Public Speaking
3 - PKGSC 401 Packaging Machinery
3 - PKGSC 440 Packaging for Distribution
3 - Arts and Humanities (Literature) Requirement*  
3 - Emphasis Area Requirement*  
15

Senior Year
First Semester
3 - EX ST 301 Introductory Statistics
4 - PKGSC 416 Appl. of Polymers in Packaging
4 - PKGSC 464 Food and Health Care Pkg. Syst.
2 - Emphasis Area Requirement*  
14

Second Semester
3 - AP EC 202 Agricultural Economics or  
3 - ECON 211 Principles of Microeconomics
1 - PKGSC 403 Packaging Career Preparation
3 - PKGSC 420 Package Design and Development
3 - Arts and Humanities (Non-Lit.) Requirement*  
6 - Emphasis Area Requirement*  
16

122 Total Semester Hours

*A C or better is required in this course for graduation.

See 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. A 200-level or higher foreign language course is recommended to satisfy the Arts and Humanities (Non-Literature) Requirement.

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

At 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.

PREPROFESSIONAL HEALTH STUDIES
Non-degree
The health professions need individuals with a diversity of educational backgrounds and a wide variety of talents and interests. The philosophies of education, the specific preprofessional course requirements, the noncognitive qualifications for enrollment, and the systems of training vary among the professional health schools; but all recognize the desirability of a broad education—a good foundation in the natural sciences, highly developed communication skills, and a solid background in the humanities and social sciences. The absolute requirements for admission to professional health schools are limited to allow latitude for developing individualized undergraduate programs of study; however, most schools of medicine and dentistry require 16 semester hours of chemistry, including organic chemistry, eight hours of biological sciences, eight hours of physics, and six hours of mathematics. These requirements should be balanced with courses in vocabulary building, the humanities, and social sciences. The basic requirements in the natural sciences and as many of the courses in the humanities and social sciences as possible should be completed by the third year so students are prepared to take the Dental Admission Test or the Medical College Admission Test prior to applying to a professional school.

Undergraduates may also prepare to study optometry, podiatry, and other health professions. While the basic requirements for these professional schools are essentially the same as those for schools of medicine and dentistry, specific requirements for individual schools in these professions vary somewhat; consequently, interested students are advised to consult with the chief health professionals advisor.

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.

Second Year
First Semester
4 - BIOSC 222 Human Anatomy and Phys. I
3 - CH 223 Organic Chemistry
1 - CH 227 Organic Chemistry Lab.
1 - 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  
3 - 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

1 A H 210 or MUSIC 210  
2 Select any ENGL course from General Education Arts and Humanities (Literature) Requirement.  
3 See advisor.  
4 See General Education Requirements.  
5 Students planning to receive the Bachelor of Science degree upon completion of the program are required to complete a minimum of 18 additional credit hours which must include MICRO 305. See advisor for requirements.

PREREHABILITATION SCIENCES
The Prerehabilitation Sciences major includes concentrations in physical therapy, occupational therapy, communication sciences and disorders programs, 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 Prerehabilitation Sciences advisor. The following semester 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 Prerehabilitation 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
3 - Science and Technology in Society Req.

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

Second Year

First Semester
4 - 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
3 - Arts and Humanities Requirement

Second Semester
4 - BIOSC 223 Human Anatomy and Phys. II
3 - COMM 150 Intro. to Human Comm. or
3 - COMM 250 Public Speaking
3 - CP SC 120 Intro. to Information Technology
3 - PHYS 208 General Physics II
1 - PHYS 210 General Physics II Lab.
3 - Mathematics Requirement

Third Year
90 Total Semester Hours

Third Year
3 - Arts and Humanities Requirement

Students planning to receive the Bachelor of Science degree upon completion of the program are required to complete an additional 24 credit hours. See advisor for requirements.

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 immediate- 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 fertility and fertility through rotations, multiple cropping, and nutrient cycling; protect the environment by minimizing or more efficiently using synthetic agrichemicals; manage crop pests and weeds with integrated, ecologically sound strategies; develop strategies for profitable marketing of agricultural commodities; and create a strong, diversified agriculture that is stable through market and weather fluctuations. Graduates can assume positions as self-employed farmers, farm managers, state and federal natural resource managers, research technicians, agricultural industry employees, greenhouse managers, consultants in pest management and sustainable agriculture, field ecologists, 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 106 Calculus of One Variable I
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 II
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 207 Multivariable Calculus
1 - SSCS 102 Academic and Professional Dev.

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 Caro- lina 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 Caro- lina residents. Application must be made directly to Tuskegee University.

Minimum 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. (Chem- istry 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 Admis- sion Test.

Since out-of-state students attending Clemson are ineligible to apply to the University of Georgia or Tuskegee University under the South Carolina quota, they should contact the college(s) of veterinary medi- cine 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 re- quirements. Further information is available from the Department of Animal and Veterinary Sciences at (864) 656-3427.

Students planning to receive the Bachelor of Science degree upon completion of the program are required to complete an additional 24 credit hours. See advisor for requirements.

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 immediate- 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 fertility and fertility through rotations, multiple cropping, and nutrient cycling; protect the environment by minimizing or more efficiently using synthetic agrichemicals; manage crop pests and weeds with integrated, ecologically sound strategies; develop strategies for profitable marketing of agricultural commodities; and create a strong, diversified agriculture that is stable through market and weather fluctuations. Graduates can assume positions as self-employed farmers, farm managers, state and federal natural resource managers, research technicians, agricultural industry employees, greenhouse managers, consultants in pest management and sustainable agriculture, field ecologists, 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 106 Calculus of One Variable I
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 II
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 207 Multivariable Calculus
1 - SSCS 102 Academic and Professional Dev.
### Sophomore Year

**First Semester**
- CH 223 Organic Chemistry
- BIOSC 335 Evolutionary Biology
- CH 224 Organic Chemistry
- GEN 300 Fundamental Genetics
- GEN 301 Fundamental Genetics Lab.

**Second Semester**
- AP EC 205 Agriculture and Society
- BIOSC 335 Evolutionary Biology
- CH 224 Organic Chemistry
- GEN 300 Fundamental Genetics
- GEN 301 Fundamental Genetics Lab.

### Junior Year

**First Semester**
- BIOCH 305 Essential Elements of Biochem.
- BIOCH 306 Essential Elements of Bioch. Lab.
- BIOSC 304 Biology of Plants
- CSENV 422 Major World Crops
- CSENV 335 Agricultural Biotechnology
- Social Science Requirement

**Second Semester**
- CSENV 350 Practicum
- ENGL 315 Scientific Writing and Comm.
- PL PA 310 Plant Diseases and People
- PL PH (BIOSC) 340 Plant Med. and Magic
- SSFS 401 Academic and Professional Dev. II
- Arts and Humanities (Literature) Requirement

### Senior Year

**First Semester**
- BIOSC 401 Plant Physiology
- BIOSC 402 Plant Physiology Lab.
- CSENV 350 Practicum
- ENGL 315 Scientific Writing and Comm.
- PL PH (BIOSC) 340 Plant Med. and Magic
- SSFS 401 Academic and Professional Dev. II

**Second Semester**
- CSENV 450 Agricultural Genetics
- ECON 200 Economic Concepts
- COMM 250 Public Speaking
- SSFS 333 Agricultural Genetics
- Plant Science Requirement

### Second Semester

- AP EC 205 Agriculture and Society
- CH 224 Organic Chemistry
- GEN 300 Fundamental Genetics
- GEN 301 Fundamental Genetics Lab.
- Arts and Humanities (Literature) Requirement

## Total Semester Hours

- 15
- 16
- 14
- 16
- 15
- 16
- 15
- 16
- 15

### Note

- 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.
- MTHSC 106 is recommended for students in the Agricultural Biotechnology Concentration.
- ECON 200 is recommended for students in the Agricultural Biotechnology and Global Society Emphasis Area.
- See General Education Requirements. PHIL 103 is recommended for students in the Agricultural Biotechnology Concentration.

## SOIL AND WATER ENVIRONMENTAL SCIENCE CONCENTRATION

### Sophomore Year

**First Semester**
- CH 223 Organic Chemistry
- GEOL 101 Physical Geology
- PHYS 207 General Physics I and
- PHYS 209 General Physics I Lab.
- PHYS 122 Physics with Calculus I and
- PHYS 124 Physics Lab. I

**Second Semester**
- PHYS 208 General Physics II and
- PHYS 210 General Physics II Lab.
- PHYS 221 Physics with Calculus II and
- PHYS 223 Physics Lab. II
- Arts and Humanities (Literature) Requirement
- Cross-Cultural Awareness Requirement
- Emphasis Area Requirement

### Junior Year

**First Semester**
- COMM 250 Public Speaking
- MICRO 305 General Microbiology
- Plant Science Requirement

**Second Semester**
- CSENV 475 Soil Physics and Chemistry
- CSENV 490 Beneficial Soil Organisms in Plant Growth
- ENGL 315 Scientific Writing and Comm.
- SSFS 401 Academic and Professional Dev. II
- Emphasis Area Requirement
- Social Science Requirement

### Senior Year

**First Semester**
- CSENV 350 Practicum
- I P M 401 Principles of Integrated Pest Mgt.
- Emphasis Area Requirement
- Plant Science Requirement

**Second Semester**
- AP EC 301 Insect Biology and Diversity
- I P M 401 Principles of Integrated Pest Mgt.
- Emphasis Area Requirement
- Plant Science Requirement
- Social Science Requirement

### Total Semester Hours

- 124–126 Total Semester Hours

## Note

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

## SUSTAINABLE CROP PRODUCTION CONCENTRATION

### Sophomore Year

**First Semester**
- AP EC 202 Agricultural Economics
- CH 227 Organic Chemistry
- CH 224 Organic Chemistry
- PL PA 310 Plant Diseases and People
- PL PH (BIOSC) 340 Plant Med. and Magic
- SSFS 401 Academic and Professional Dev. II
- Arts and Humanities (Literature) Requirement

**Second Semester**
- AP EC 205 Agriculture and Society
- CH 224 Organic Chemistry
- GEN 300 Fundamental Genetics
- GEN 301 Fundamental Genetics Lab.
- Arts and Humanities (Literature) Requirement

### Junior Year

**First Semester**
- BIOSC 402 Plant Physiology
- COMM 250 Public Speaking
- Micro 305 General Microbiology
- Plant Science Requirement

**Second Semester**
- CSENV 403 Soil Genesis and Classification
- CSENV 455 Seminar
- Applied Spatial Technology Requirement
- Emphasis Area Requirement
- Field Scale Environmental Mgt. Requirement

### Senior Year

**First Semester**
- BIOSC 401 Plant Physiology
- BIOSC 402 Plant Physiology Lab.
- CSENV 403 Soil Genesis and Classification
- CSENV 455 Seminar
- Applied Spatial Technology Requirement
- Emphasis Area Requirement

**Second Semester**
- BIOSC 401 Plant Physiology
- BIOSC 402 Plant Physiology Lab.
- CSENV 403 Soil Genesis and Classification
- CSENV 455 Seminar
- Applied Spatial Technology Requirement
- Emphasis Area Requirement

### Total Semester Hours

- 124–126 Total Semester Hours

## Note

- See General Education Requirements.
- Select from department-approved list. Emphasis Areas include Soil and Water Quality, Soil Management, and Soil Science.
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) Requirement
6 - Emphasis Area Requirement
17

123–126 Total Semester Hours

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

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

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

Freshman Year
First Semester
3 - BIOL 103 General Biology I
1 - BIOL 105 General Biology Lab. I
4 - CH 101 General Chemistry† or
4 - CH 105 Chemistry in Context†
3 - HORT 101 Horticulture
4 - Spanish Language Requirement
15

Second Semester
4 - CH 102 General Chemistry† or
4 - CH 106 Chemistry in Context†
3 - ENGL 103 Accelerated Composition
1 - HORT 102 Experience Horticulture
3 - MTHSC 102 Intro. to Mathematical Analysis
4 - Related Science Requirement
15

Sophomore Year
First Semester
3 - HORT 212 Introduction to Turfgrass Culture
1 - HORT 213 Turfgrass Culture Lab.
1 - HORT 303 Landscape Plants
3 - MTHSC 101 Essential Math for Informed Soc.
4 - Plant Biology Requirement
14

Second Semester
3 - Arts and Humanities (Literature) Requirement
3 - Business Requirement
3 - Related Science Requirement
3 - Social Science Requirement
1 - Elective
13

Summer
3 - HORT 271 Internship† or
3 - HORT 471 Advanced Internship†

Junior Year
First Semester
4 - CSENV 202 Soils
3 - Arts and Humanities (Non-Lit.) Requirement
3 - Business Requirement
3 - Related Science Requirement
3 - Social Science Requirement
16

Second Semester
3 - BIOSC 401 Plant Physiology
1 - BIOSC 402 Plant Physiology Lab.
1 - HORT 409 Seminar
3 - HORT 420 Applied Turfgrass Physiology
2 - PL PA (ENT) 406 Diseases and Insects of Turfgrasses
3 - Horticulture Specialization Requirement
3 - Oral Communication Requirement
16

Maymester
1 - PL PA (ENT) 408 Diseases and Insects of Turfgrasses Laboratory

Senior Year
First Semester
3 - HORT 412 Advanced Turfgrass Management
3 - Business Requirement
3 - Horticulture Specialization Requirement
3 - Related Science Requirement
3 - Soils Requirement
15

Second Semester
3 - HORT (CSENV) 433 Landscape and Turf Weed Management
3 - Horticulture Specialization Requirement
3 - Related Science Requirement
3 - Soils Requirement
12

120 Total Semester Hours

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 not normally taken by Wildlife and Fisheries Biology majors. Enrollment guidelines and procedures can be found under Academic Regulations in this catalog.
<table>
<thead>
<tr>
<th>Freshman Year</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td>First Semester</td>
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<tr>
<td>3 - BIOL 103</td>
<td>1 - F N R 499</td>
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<tr>
<td>General Biology I</td>
<td>Natural Resources Seminar</td>
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<tr>
<td>1 - BIOL 105</td>
<td>3 - W F B 430</td>
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<tr>
<td>General Biology Lab. I</td>
<td>Wildlife Conservation Policy</td>
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<tr>
<td>4 - CH 105</td>
<td>8 - Approved Requirement</td>
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<tr>
<td>Chemistry in Context I</td>
<td>3 - Policy and Law Requirement</td>
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<tr>
<td>1 - E N R 101 Intro. to Env. and Natural Res. I</td>
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<tr>
<td>3 - MTHSC 102 Intro. to Mathematical Analysis</td>
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<tr>
<td>3 - Oral Communication Requirement</td>
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<td>15</td>
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</tbody>
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Second Semester

1 - 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 - FOR 206 Forestry Ecology
3 - W F B (BIOSC) 313 Conservation Biology
3 - W F B 350 Principles of Fish and Wildlife Biol.
3 - Arts and Humanities (Literature) Requirement
3 - Social Science Requirement
15

Junior Year

First Semester
3 - BIOSC 303 Vertebrate Biology
4 - BIOSC 320 Field Botany
3 - ENGL 314 Technical Writing
3 - GEN 300 Fundamental Genetics
3 - W F B 410 Wildlife Management Techniques
16

Second Semester
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
3 - Approved Requirement
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 (E N R) 434 GIS for Landscape Planning
1 - W F B 498 Senior Portfolio
4 - Approved Requirement
15

1 Students planning to take organic chemistry should substitute CH 101 and 102.
2 See 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.)
3 Select 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
Architecture
Athletic Leadership
Biochemistry
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
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.