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. Bookhout 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 62).

The Bachelor’s degree prepares students for professional education positions in the mainstream of agriculture, including teaching, cooperative extension service, and government agricultural agencies. The Agricultural Education degree also prepares students for other educational work, such as agricultural missionary, public relations, and training officers in agricultural industry.

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

Freshman Year

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

Second Semester
1. AG ED 100 Orientation and Field Experience
2. AG M 205 Principles of Fabrication
3. AP EC 202 Agricultural Economics
4. BIOL 104 General Biology II
5. BIOL 106 General Biology Lab. II
6. ENGL 103 Accelerated Composition
7. Social Science Requirement

Sophomore Year

First Semester
1. AG ED 201 Intro. to Agricultural Education
2. AG ED 204 Applied Agricultural Calculations
3. B T 220 Biosystems Technology I
4. CH 101 General Chemistry or
4. CH 105 Chemistry in Context I
5. HORT 212 Introduction to Turfgrass Culture
6. HORT 213 Turfgrass Culture Lab.

Second Semester
1. AG ED 355 Team and Organizational Leadership in Food and Fiber Systems
2. BIOL 201 Biotechnology and Society or
3. BIOSC 200 Biology in the News
4. CH 102 General Chemistry or
4. CH 106 Chemistry in Context II
1. COMM 201 Communication Academic and Professional Development
2. Arts and Humanities (Literature) Requirement
3. Technical Requirement

Junior Year

First Semester
1. AG ED 307 Internship in Extension and Leadership Education

Second Semester
1. AG ED 308 Agricultural Leadership Education
2. HORT 305 Plant Propagation
4. Advanced Writing Requirement
5. Arts and Humanities (Non-Lit.) Requirement
6. Departmental Communication Requirement
7. Oral Communication Requirement

Senior Year

First Semester
1. AG ED 406 Internship in Extension and Leadership Education

Second Semester
1. AG ED 407 Internship in Extension and Leadership Education

COMMUNICATIONS EMPHASIS AREA

Junior Year

First Semester
2. AG M 221 Surveying
3. COMM 201 Intro. to Communication Studies
4. CSENV 202 Soils
5. FOR 305 Woodland Management
6. W F B 412 Wildlife Management

Second Semester
1. ED F 302 Educational Psychology
2. HORT 305 Plant Propagation
4. Advanced Writing Requirement
5. Arts and Humanities (Non-Lit.) Requirement
6. Departmental Communication Requirement
7. Oral Communication Requirement
8. Technical Requirement

LEADERSHIP EMPHASIS AREA

Junior Year

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

Second Semester
1. ED F 302 Educational Psychology
2. HORT 305 Plant Propagation
4. Advanced Writing Requirement
5. Oral Communication Requirement
6. Technical Requirement
Senior Year

First Semester
3 - AG ED 200 Agricultural Applications of Educational Technology
1 - ED F 315 Technology Skills for Learning
3 - AG ED 303 Mech. Technology for Ag. Ed.
3 - AG M 221 Surveying
4 - CSENV 202 Soils
3 - FOR 305 Woodland Management
3 - W F B 412 Wildlife Management
3 - HORT 303 Landscape Plants
17 or 19

Second Semester
3 - ED F 302 Educational Psychology
3 - HORT 305 Plant Propagation
1 - HORT 306 Plant Propagation Techniques Lab.
3 - Advanced Writing Requirement
3 - Oral Communication Requirement
3 - Technical Requirement

16

Junior Year

First Semester
3 - AG ED 200 Agricultural Applications of Educational Technology or
ED F 315 Technology Skills for Learning
3 - AG ED 303 Mech. Technology for Ag. Ed.
3 - AG M 221 Surveying
4 - CSENV 202 Soils
3 - FOR 305 Woodland Management
3 - W F B 412 Wildlife Management
3 - HORT 303 Landscape Plants
17 or 19

Second Semester
3 - ED F 302 Educational Psychology
3 - HORT 305 Plant Propagation
1 - HORT 306 Plant Propagation Techniques Lab.
3 - Advanced Writing Requirement
3 - Oral Communication Requirement
3 - Technical Requirement

16

Senior Year

First Semester
1 - AG ED 400 Supervised Field Experience II
3 - AG ED 401 Instructional Methods in Ag. Ed.
3 - AG ED 403 Principles of Adult/Ext. Education
2 - AG ED 423 Curriculum
1 - ED F 425 Instructional Technology Strategies
3 - Technical Requirement
12-13

Second Semester
12 - AG ED 407 Internship in Extension and Leadership Education
12

127 Total Semester Hours

3ED F 315 may be substituted. In this case, ED F 425 must be taken in the semester immediately prior to directed teaching.
3ED F 304 or 314 is recommended.
3See General Education Requirements.
3ENGL 304 or 314 is recommended.
3See General Education Requirements. COMM 150 or 250 is recommended.
3See advisor.

AGRICULTURAL MECHANIZATION AND BUSINESS

Bachelor of Science

The Agricultural Mechanization and Business major provides a program for students who desire training in areas related 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 Enrollment Services Office to have the minor recorded.

Additional information is available from the departmental offices or can be found at http://www.clemson.edu/cafls/departments/biosystemseng/agmec/index.html.

Freshman Year

First Semester
3 - AG ED 200 Agricultural Applications of Educational Technology
1 - AG M 101 Intro. to Ag. Mech. and Business
3 - BIOL 106 General Biology Lab.
1 - BIOL 105 General Biology I
3 - MTHSC 102 Intro. to Mathematical Analysis
14

Second Semester
3 - ACCT 201 Financial Accounting Concepts
3 - BIOL 104 General Biology II
1 - BIOL 106 General Biology Lab. II
3 - ENGL 103 Accelerated Composition
3 - EX ST 301 Introductory Statistics
3 - Elective
16

Sophomore Year

First Semester
3 - AP EC 202 Agricultural Economics
4 - CH 105 Chemistry in Context I
4 - PHYS 200 Introductory Physics or
3 - PHYS 207 General Physics I and
1 - PHYS 209 General Physics I Lab.
3 - Arts and Humanities (Non-Lit.) Requirement
14

Second Semester
3 - AG M 206 Machinery Management
3 - AG M 303 Calculations for Mechanized Agric.
4 - CH 106 Chemistry in Context II
4 - CSENV 202 Soils
2 - E G 209 Intro. to Engr./Comp. Graphics
16

Junior Year

First Semester
3 - AG M 221 Surveying
3 - AG M 301 Soil and Water Conservation
3 - AG M 460 Electrical Systems
1 - Arts and Humanities (Literature) Requirement
1 - Agribusiness Requirement
1 - Minor Requirement
15

Second Semester
3 - AG M 406 Mechanical and Hydraulic Systems
3 - COMM 250 Public Speaking
3 - Agribusiness Requirement
3 - Minor Requirement
3 - Elective
15

Senior Year

First Semester
3 - AG M 410 Precision Agriculture Technology
3 - AG M 452 Mobile Power
3 - AG M 472 Capstone
3 - Agribusiness Requirement
3 - Plant/Crop Science Requirement
3 - Social Science Requirement
15

Second Semester
3 - AG M 402 Landscape Drainage and Irrigation
3 - AG M 405 Agricultural Structures and Environmental Control
3 - Minor Requirement
3 - Plant/Crop Science Requirement
3 - Soil Science Requirement
15

123 Total Semester Hours

3See General Education Requirements. Three of these credit hours must also satisfy the Cross-Cultural Awareness Requirement.
3AP EC 302, 308, 309, 319, 351, 402, 409, 452, 456, or 460. This course may also be used to satisfy minor requirement.
3See Agricultural Business Management minor or select other approved minor. If requirements for an approved minor have already been satisfied, this course must be any 300-level (or higher) course from an approved program.
3CSENV 405, 407, 417, 421, 422, 423, (AP EC) 426, HORT 212, 305, (CSENV) 453, 455, 456, PL PA 310, (ENT) 406, 413, or 459. This course may also be used to satisfy minor requirement.
3CSENV 403, 446, 452, (ENTUX, GEOL) 485, or 490. This course may also be used to satisfy minor requirement.
ANIMAL AND VETERINARY SCIENCES

Bachelor of Science
The Animal and Veterinary Sciences curriculum provides students with both a basic and applied understanding of the scientific principles needed for successful careers in the scientific, technical, and business phases of livestock and poultry production, processing, and marketing. Strengths of this program include extensive hands-on instruction at Clemson’s five animal farms, personalized advising, and the opportunity for valuable-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 Pre-veterinary and Science Concentration prepares students to meet the requirements for most veterinary schools, graduate schools, and medical and dental schools. Students with South Carolina residency may compete for contract seats at Mississippi State, Tuskegee, and University of Georgia Colleges of Veterinary Medicine. Experienced preprofessional advising is provided for all students pursuing advanced degrees.

ANIMAL AGRIBUSINESS CONCENTRATION

Freshman Year
First Semester
1. AVS 100 Orientation to Animal and Vet. Sci.
2. AVS 150 Introduction to Animal Science
3. AVS 151 Introduction to Animal Science Lab.
4. BIOL 103 General Biology I and
5. BIOL 105 General Biology Lab. I or
6. MTHSC 101 Principles of Biology I
7. CH 101 General Chemistry
8. Arts and Humanities (Non-Lit.) Requirement
9. ECON 212 Principles of Microeconomics
10. FIN 306 Corporation Finance
11. Arts and Humanities (Literature) Requirement
12. Elective
13. AVS Techniques Requirement
14. 16-18

Second Semester
1. AVS 301 Anat. and Phys. of Domestic Animals
2. AVS 370 Principles of Animal Nutrition
3. AVS 375 Applied Animal Nutrition
4. AVS 470 Animal Genetics
5. AVS 435 Animal Reproduction
6. LAW 322 Legal Environment of Business
7. Elective
8. AVS Techniques Requirement
9. Social Science Requirement
10. 16

Junior Year
First Semester
4. AVS 410 Animal Health
5. AVS 465 Contemporary Issues in Animal Sci.
6. MGT 201 Principles of Marketing
7. AVS Experience-Based Activity
8. AVS Techniques Requirement
9. 14

Second Semester
2. AVS 406 Seminars and Related Topics
3. AVS 410 Domestic Animal Behavior
4. AVS 417 Animal Agribusiness Development
5. AVS 450 Sustainable Livestock Production Sys.
6. AVS Experience-Based Activity
7. Elective
8. 16
9. 123–126 Total Semester Hours

Sophomore Year
First Semester
3. ACCT 201 Financial Accounting Concepts
4. CSENV 423 Field Crops–Forages
5. EX ST 301 Introductory Statistics
6. MGT 201 Principles of Management
7. AVS Techniques Requirement
8. 14

Second Semester
3. ECON 211 Principles of Microeconomics
4. FIN 306 Corporation Finance
5. Arts and Humanities (Literature) Requirement
6. AVS Techniques Requirement
7. Social Science Requirement
8. 16

Senior Year
First Semester
4. AVS 203 Animal Health
5. AVS 372 Principles of Animal Nutrition
6. MTHSC 101 Essentials Math. for Informed Soc. or
7. MTHSC 102 Intro. to Math. Analysis or
8. MTHSC 106 Calculus of One Variable I
9. 2 - AVS Techniques Requirement
10. 16-18

Second Semester
2. AVS 406 Seminars and Related Topics
3. AVS 410 Domestic Animal Behavior
4. AVS 417 Animal Agribusiness Development
5. AVS 450 Sustainable Livestock Production Sys.
6. AVS Experience-Based Activity
7. Elective
8. 16
9. 123–126 Total Semester Hours

See General Education Requirements. Three of these credit hours must also satisfy the Cross-Cultural Awareness Requirement.
10. AVS 200, 201, 203, 204, 206, 209 or 455
11. AVS 302, 309, or 311
12. AVS 360, 441, 442, 443, or 491

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EQUINE BUSINESS CONCENTRATION

Freshman Year
First Semester
1. AVS 100 Orientation to Animal and Vet. Sci.
2. AVS 150 Introduction to Animal Science
3. AVS 151 Introduction to Animal Science Lab.
4. BIOL 103 General Biology I and
5. BIOL 105 General Biology Lab. I or
6. MTHSC 101 General Biology I
7. CH 101 General Chemistry
8. Arts and Humanities (Non-Lit.) Requirement
9. 16-17

Second Semester
3. BIOL 106 General Biology Lab. II or
4. BIOL 110 Principles of Biology II
5. CH 102 General Chemistry
6. ENGL 103 Accelerated Composition
7. MTHSC 101 Essentials Math. for Informed Soc. or
8. MTHSC 102 Intro. to Math. Analysis or
9. MTHSC 106 Calculus of One Variable I
10. AVS Techniques Requirement
11. 16-18

Sophomore Year
First Semester
3. ACCT 201 Financial Accounting Concepts
2. AVS 204 Horse Care Techniques
3. CSENV 423 Field Crops–Forages
4. EX ST 301 Introductory Statistics
5. MGT 201 Principles of Management
6. 14

Second Semester
2. AVS 309 Principles of Equine Evaluation
3. ECON 211 Principles of Microeconomics
4. FIN 306 Corporation Finance
5. Arts and Humanities (Literature) Requirement
6. AVS Techniques Requirement
7. Social Science Requirement
8. 16

Junior Year
First Semester
4. AVS 309 Principles of Equine Evaluation
3. ECON 211 Principles of Microeconomics
4. FIN 306 Corporation Finance
5. Arts and Humanities (Literature) Requirement
6. AVS Techniques Requirement
7. Social Science Requirement
8. 16

Second Semester
3. AVS 370 Principles of Animal Nutrition
3. AVS 470 Animal Genetics
3. ECON 212 Principles of Macroeconomics
2. AVS Techniques Requirement
3. Elective
4. 15

First Semester
1. AVS 100 Orientation to Animal and Vet. Sci.
2. AVS 150 Introduction to Animal Science
3. AVS 151 Introduction to Animal Science Lab.
4. BIOL 103 General Biology I and
5. BIOL 105 General Biology Lab. I or
6. MTHSC 101 General Biology I
7. CH 101 General Chemistry
8. Arts and Humanities (Non-Lit.) Requirement
9. 16-17

Second Semester
3. BIOL 106 General Biology Lab. II or
4. BIOL 110 Principles of Biology II
5. CH 102 General Chemistry
6. ENGL 103 Accelerated Composition
7. MTHSC 101 Essentials Math. for Informed Soc. or
8. MTHSC 102 Intro. to Math. Analysis or
9. MTHSC 106 Calculus of One Variable I
10. AVS Techniques Requirement
11. 16-18

Sophomore Year
First Semester
3. ACCT 201 Financial Accounting Concepts
2. AVS 204 Horse Care Techniques
3. CSENV 423 Field Crops–Forages
4. EX ST 301 Introductory Statistics
5. MGT 201 Principles of Management
6. 14

Second Semester
2. AVS 309 Principles of Equine Evaluation
3. ECON 211 Principles of Microeconomics
4. FIN 306 Corporation Finance
5. Arts and Humanities (Literature) Requirement
6. AVS Techniques Requirement
7. Social Science Requirement
8. 16

Junior Year
First Semester
4. AVS 309 Principles of Equine Evaluation
3. ECON 211 Principles of Microeconomics
4. FIN 306 Corporation Finance
5. Arts and Humanities (Literature) Requirement
6. AVS Techniques Requirement
7. Social Science Requirement
8. 16

Second Semester
3. AVS 370 Principles of Animal Nutrition
3. AVS 470 Animal Genetics
3. ECON 212 Principles of Macroeconomics
2. AVS Techniques Requirement
3. Elective
4. 15
Senior Year
First Semester
1. AVS 140 Animal Health
2. AVS 410 Animal Nutrition
3. AVS 415 Animal Behavior
4. AVS 420 Advanced Animal Management
5. AVS 425 Animal Agribusiness Development
6. Elective
14
Second Semester
1. AVS 200 Animal Health Management
2. AVS 211 Animal Agribusiness Development
3. AVS 221 Animal Nutrition
4. AVS 231 Animal Behavior
5. AVS 241 Animal Agribusiness Development
6. Elective
15
121–124 Total Semester Hours

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 careers include community development and economic development specialist positions with local, county, and state governments. Additional opportunities exist in a variety of agencies, research and consulting firms, foundations and councils, financial institutions, public and private utilities, and organizations looking for entrepreneurial skills.

In 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 51 for program details.
**AGRICULTURE EMPHASIS AREA**

### Freshman Year

**First Semester**
- AP EC 205 Agriculture and Society
- ACCT 201 Financial Accounting Concepts
- ENGL 103 Accelerated Composition
- MGT 201 Principles of Management
- Arts and Humanities (Literature) Requirement
- Elective

**Second Semester**
- AP EC 202 Agricultural Economics
- ENGL 103 Accelerated Composition
- EX ST 222 Statistics in Everyday Life
- Arts and Humanities (Literature) Requirement
- Elective

### Sophomore Year

**First Semester**
- AP EC 302 Economics of Farm Management
- AP EC 308 Quantitative Applied Economics
- ECON 212 Principles of Macroeconomics
- Social Science Requirement

**Second Semester**
- ACCT 201 Financial Accounting Concepts
- EX ST 301 Introductory Statistics
- MGT 201 Principles of Management
- Arts and Humanities (Literature) Requirement
- Elective

### Junior Year

**First Semester**
- AP EC 309 Econ. of Agricultural Marketing
- MKT 301 Principles of Marketing
- AP EC 402 Production Economics
- MGT 306 Managerial Economics
- ECON 314 Intermediate Microeconomics
- ENGL 314 Technical Writing
- Agribusiness Requirement

**Second Semester**
- ACCT 201 Financial Accounting Concepts
- ENGL 304 Business Writing
- Agribusiness Requirement

### Senior Year

**First Semester**
- AP EC 409 Commodity Futures Markets
- AP EC 460 Agricultural Finance
- LAW 322 Legal Environment of Business
- Agribusiness Requirement

**Second Semester**
- AP EC 490 Selected Topics
- ECON 315 Intermediate Macroeconomics
- Arts and Humanities (Non-Lit.) Requirement
- Elective

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**ECONOMIC AND STATISTICAL ANALYSIS EMPHASIS AREA**

### Freshman Year

**First Semester**
- AP EC 205 Agriculture and Society
- C U 101 University Success Skills
- MTHSC 106 Calculus of One Variable I
- Natural Science Requirement
- Oral Communication Requirement

**Second Semester**
- AP EC 202 Agricultural Economics
- ENGL 103 Accelerated Composition
- EX ST 222 Statistics in Everyday Life
- MTHSC 108 Calculus of One Variable II

### Sophomore Year

**First Semester**
- EX ST 301 Introductory Statistics
- MGT 201 Principles of Management
- MTHSC 206 Calculus of Several Variables
- Arts and Humanities (Literature) Requirement

**Second Semester**
- ACCT 201 Financial Accounting Concepts
- ECON 302 Economics of Farm Management
- AP EC 308 Quantitative Applied Economics
- ECON 212 Principles of Macroeconomics
- Social Science Requirement

### Junior Year

**First Semester**
- AP EC 309 Econ. of Agricultural Marketing
- MKT 301 Principles of Marketing
- AP EC 402 Production Economics
- ECON 306 Managerial Economics
- ECON 314 Intermediate Microeconomics
- ENGL 314 Technical Writing

**Second Semester**
- AP EC 452 Agricultural Policy
- AP EC 456 Prices
- AP EC 490 Selected Topics
- Agribusiness Requirement

### Senior Year

**First Semester**
- AP EC 409 Commodity Futures Markets
- AP EC 460 Agricultural Finance
- LAW 322 Legal Environment of Business
- Agribusiness Requirement

**Second Semester**
- AP EC 490 Selected Topics
- ECON 302 Money and Banking
- ECON 315 Intermediate Macroeconomics
- Arts and Humanities (Non-Lit.) Requirement
- Elective

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**COMMUNITY AND ECONOMIC DEVELOPMENT CONCENTRATION**

### Freshman Year

**First Semester**
- CP SC 120 Intro. to Information Technology
- MTHSC 102 Intro. to Mathematical Analysis
- Arts and Humanities (Non-Lit.) Requirement
- Science and Tech. in Society Requirement
- Social Science Requirement

**Second Semester**
- ACCT 201 Financial Accounting Concepts
- ENGL 103 Accelerated Composition
- Natural Science Requirement
- Elective

### Sophomore Year

**First Semester**
- AP EC 309 Econ. of Agricultural Marketing
- MKT 301 Principles of Marketing
- AP EC 402 Production Economics
- ECON 306 Managerial Economics
- ECON 314 Intermediate Microeconomics
- ENGL 304 Business Writing
- Agribusiness Requirement

**Second Semester**
- EX ST 301 Introductory Statistics
- Arts and Humanities (Literature) Requirement
- Microeconomics Requirement
- Oral Communication Requirement
- Elective

### Junior Year

**First Semester**
- AP EC 309 Econ. of Agricultural Marketing
- MKT 301 Principles of Marketing
- AP EC 402 Production Economics
- ECON 306 Managerial Economics
- ECON 314 Intermediate Microeconomics
- ENGL 314 Technical Writing

**Second Semester**
- C R D (AP EC) 357 Natural Res. Economics
- ECON 212 Principles of Macroeconomics
- ENGL 314 Technical Writing
- PO SC 302 State and Local Government
- Behavioral Science Requirement

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

**Senior Year**

**First Semester**
- AP EC 409 Commodity Futures Markets
- AP EC 460 Agricultural Finance
- LAW 322 Legal Environment of Business
- Agribusiness Requirement

**Second Semester**
- AP EC 490 Selected Topics
- ECON 302 Money and Banking
- ECON 315 Intermediate Macroeconomics
- Arts and Humanities (Non-Lit.) Requirement
- Elective

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**Second Semester**
- MTHSC 400 Theory of Probability
- EX ST 462 Statistics Applied to Economics
- MTHSC 400 Theory of Probability
- Elective

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**Second Semester**
- MTHSC 400 Theory of Probability
- Elective
Freshman Year
First Semester
1. BIOC 103 Careers in Biochem. and Genetics
2. BIOL 110 Principles of Biology I
3. CH 101 General Chemistry
4. MTHSC 106 Calculus of One Variable I
14
Second Semester
5. BIOL 111 Principles of Biology II
6. CH 102 General Chemistry
7. ENGL 103 Accelerated Composition
8. MTHSC 108 Calculus of One Variable II
16
Sophomore Year
First Semester
1. CH 223 Organic Chemistry
2. CH 227 Organic Chemistry Lab.
3. GEN 302 Molecular and General Genetics
4. GEN 303 Molecular and Gen. Genetics Lab.
5. PHYS 122 Physics with Calculus I
6. PHYS 124 Physics Lab. I
3-4. Advanced Mathematics Requirement
16-17
Second Semester
3. BIOC 301 Molecular Biochemistry
4. CH 224 Organic Chemistry
5. CH 228 Organic Chemistry Lab.
6. COMM 150 Intro to Human Commun. or COMM 250 Public Speaking
7. PHYS 221 Physics with Calculus II
8. PHYS 223 Physics Lab. II
3. Arts and Humanities (Literature) Requirement
3. Behavioral Science Requirement
17
Junior Year
First Semester
3. BIOC 331 Physical Approach to Biochem.
2. BIOC 333 General Biochemistry Lab. I
3. CH 330 Introduction to Physical Chemistry
4. Science Requirement
5. Elective
16
Second Semester
3. BIOC 342 Biochemistry of Metabolism
2. BIOC 434 General Biochemistry Lab. II
3. BIOC 436 Molecular Biol.; Genes to Proteins
4. PHIL 326 Science and Values
5. Science Requirement
14
Senior Year
First Semester
3. BIOC 461 Cell Biology
4. GEN (BIOC) 440 Bioinformatics
5. Social Science Requirement
6. Elective
13
Second Semester
2. BIOC 493 Senior Seminar
3. Science Requirement
3. Social Science Requirement
6. Elective
14
120–121 Total Semester Hours

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

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

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
1 - BIOSC 101 Frontiers in Biology
4 - CH 101 General Chemistry
3 - COMM 150 Intro. to Human Communication
3 - COMM 250 Public Speaking
4 - MTHSC 106 Calculus of One Variable
Second Semester
5 - BIOL 111 Principles of Biology
1 - BIOSC 102 Frontiers in Biology
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 Requirement
3 - Arts and Humanities (Literature) Requirement
3 - Biochemistry or Genetics Requirement
Second Semester
3 - CH 224 Organic Chemistry and
1 - CH 228 Organic Chemistry Laboratory or
4 - Major Requirement
4 - Animal or Plant Diversity Requirement
3 - Biochemistry or Genetics Requirement
5 - Major Requirement

Junior Year
First Semester
3 - BIOSC 335 Evolutionary Biology
3 - BIOSC 461 Cell Biology
2 - BIOSC 462 Cell Biology Lab.
3 - ENGL 315 Scientific Writing and Comm.
3 - PHYS 207 General Physics I and
1 - PHYS 209 General Physics I Lab. or
3 - PHYS 122 Physics with Calculus I and
1 - PHYS 124 Physics Lab. I
Second Semester
3 - PHYS 208 General Physics II and
1 - PHYS 210 General Physics II Lab. or
3 - PHYS 221 Physics with Calculus II and
1 - PHYS 223 Physics Lab. II
3 - Arts and Humanities (Non-Lit.) Requirement
5 - Major Requirement
3 - Social Science Requirement

Senior Year
First Semester
2 - BIOSC 493 Senior Seminar
13 - Major Requirement
Second Semester
12 - Major Requirement
3 - Social Science Requirement
124 Total Semester Hours

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.

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

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

At least one lecture course must be completed for both biochemistry (BIOCH 301 or 305, or other approved coursework) and for genetics (GEN 300 or 302, or other approved coursework).

BIOC 434 may be substituted for CH 228.

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

The remaining courses may be selected from EX ST 301, MTHSC 301, or other approved statistics courses, or any BIOCH, BIOSC, BOT, GEN or MICRO courses at the 300 level or higher. Students planning to apply to medical, dental or graduate school should select a statistics course.

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 - Major Requirement
4 - Animal or Plant Diversity Requirement
3 - Biochemistry or Genetics Requirement
5 - Major Requirement

Second Semester
3 - CH 224 Organic Chemistry and
1 - CH 228 Organic Chemistry Laboratory or
4 - Major Requirement
4 - Animal or Plant Diversity Requirement
3 - Biochemistry or Genetics Requirement
5 - Major Requirement

Junior Year
First Semester
3 - BIOSC 335 Evolutionary Biology
3 - BIOSC 461 Cell Biology
2 - BIOSC 462 Cell Biology Lab.
3 - ENGL 315 Scientific Writing and Comm.
3 - PHYS 207 General Physics I and
1 - PHYS 209 General Physics I Lab. or
3 - PHYS 122 Physics with Calculus I and
1 - PHYS 124 Physics Lab. I
Second Semester
3 - PHYS 208 General Physics II and
1 - PHYS 210 General Physics II Lab. or
3 - PHYS 221 Physics with Calculus II and
1 - PHYS 223 Physics Lab. II
3 - Arts and Humanities (Non-Lit.) Requirement
5 - Major Requirement
3 - Social Science Requirement

Senior Year
First Semester
2 - BIOSC 493 Senior Seminar
13 - Major Requirement
Second Semester
12 - Major Requirement
3 - Social Science Requirement
124 Total Semester Hours

Senior Year
First Semester
3 - BIOSC 461 Cell Biology
2 - BIOSC 462 Cell Biology Lab.
2 - BIOSC 493 Senior Seminar
4 - Entomology Requirement
4 - Major Requirement
Second Semester
3 - Entomology Requirement
5 - Major Requirement
3 - Social Science Requirement
15
124 Total Semester Hours

PREPHARMACY EMPHASIS AREA
Freshman Year
First Semester
3 - BIOL 103 General Biology
1 - BIOL 105 General Biology Lab.
1 - BIOSC 101 Frontiers in Biology
4 - CH 101 General Chemistry
3 - COMM 150 Intro. to Human Communication
3 - COMM 250 Public Speaking
4 - MTHSC 106 Calculus of One Variable
16

Second Semester
3 - BIOL 104 General Biology
1 - BIOL 106 General Biology Lab.
1 - BIOSC 102 Frontiers in Biology
4 - CH 102 General Chemistry
3 - ENGL 103 Accelerated Composition
4 - MTHSC 111 Calculus II for Biologists
16

Sophomore Year
First Semester
3 - CH 223 Organic Chemistry
1 - CH 227 Organic Chemistry Lab.
4 - Animal or Plant Diversity Requirement
3 - Arts and Humanities (Literature) Requirement
3 - Biochemistry or Genetics Requirement
3 - Social Science Requirement

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
3 - Biochemistry or Genetics Requirement
15

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
14

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 - PSYCH 201 Introduction to Psychology
4 - Animal Physiology Requirement
3 - Economics Requirement
3 - Major Requirement
17

Senior Year
First Semester
3 - BIOSC 461 Cell Biology
2 - BIOSC 462 Cell Biology Lab.
2 - BIOSC 493 Senior Seminar
8 - Major Requirement
15

Second Semester
3 - Arts and Humanities (Non-Lit.) Requirement
11 - Major Requirement
14

124 Total Semester Hours

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

2At least one lecture and associated laboratory must be completed for both animal diversity (BIOSC 302/306 or BIOSC 303/307, or other approved coursework) and for plant diversity (BIOSC 304/308, BIOSC 320, or BIOSC 406/407, or other approved coursework).

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 (BIOCH 301 or 305, or other approved coursework) and for genetics (GEN 300 or 302, or other approved coursework).

5At least one lecture course must be completed for both biochemistry (BIOCH 301 or 305, or other approved coursework) and for genetics (GEN 300 or 302, or other approved coursework).

6See advisor. Select one lecture/lab combination in ecology (BIOSC 441/445, 443/444, 446/447, 470/471). The remaining courses may be selected from any BIOCH, BIOSC, BOT, GEN or MICRO courses at the 300 level or higher. Students planning to apply to medical, dental or graduate school should select a statistics course.

### 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
3 - Biochemistry or Genetics Requirement
5 - Partial Differential Equations Requirement
—
14

Second Semester
3 - CH 224 Organic Chemistry and
1 - CH 228 Organic Chemistry Laboratory or
4 - Major Requirement
3 - EX ST 301 Introductory Statistics I
4 - Animal or Plant Diversity Requirement
3 - Biochemistry or Genetics Requirement
3 - Major Requirement
17

### Junior Year

First Semester
3 - BIOSC 335 Evolutionary Biology
3 - ENGL 315 Scientific Writing and Comm.
3 - EX ST 311 Introductory Statistics II
3 - PHYS 207 General Physics I and
1 - PHYS 209 General Physics I Lab. or
3 - PHYS 122 Physics with Calculus I and
1 - PHYS 124 Physics Lab. I
3 - Major Requirement
15

Second Semester
3 - BIOSC 428 Quantitative Biology
3 - BIOSC 461 Cell Biology
2 - BIOSC 462 Cell Biology Lab.
2 - BIOSC 493 Senior Seminar
8 - Major Requirement
16

### Senior Year

First Semester
2 - BIOSC 491 Undergraduate Research
3 - GEN 440 Bioinformatics
3 - Arts and Humanities (Literature) Requirement
8 - Major Requirement
16

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

125 Total Semester Hours

1At least one lecture and associated laboratory must be completed for both animal diversity (BIOSC 302/306 or BIOSC 303/307, or other approved coursework) and for plant diversity (BIOSC 304/308, BIOSC 320, or BIOSC 406/407, or other approved coursework).

2At least one lecture course must be completed for both biochemistry (BIOCH 301 or 305, or other approved coursework) and for genetics (GEN 300 or 302, or other approved coursework).

3See advisor. Select one lecture/lab combination in ecology (BIOSC 441/445, 443/444, 446/447, 470/471). The remaining courses may be selected from any BIOCH, BIOSC, BOT, GEN or MICRO courses at the 300 level or higher. Students planning to apply to medical, dental or graduate school should select a statistics course.

### TOXICOLOGY EMPHASIS AREA

See Bachelor of Science curriculum for freshman year requirements.

**Sophomore Year**

First Semester
3 - BIOSC 210 Introduction to Toxicology
1 - CH 223 Organic Chemistry and
1 - CH 227 Organic Chemistry Lab. or
4 - CH 201 Survey of Organic Chemistry
4 - Animal or Plant Diversity Requirement
3 - Biochemistry or Genetics Requirement
14

Second Semester
3 - CH 224 Organic Chemistry and
1 - CH 228 Organic Chemistry Laboratory or
4 - Major Requirement
3 - CH 227 Organic Chemistry Lab. or
4 - Animal or Plant Diversity Requirement
3 - Biochemistry or Genetics Requirement
3 - Major Requirement
16

### Junior Year

First Semester
3 - BIOSC 335 Evolutionary Biology
3 - ENGL 315 Scientific Writing and Comm.
3 - EX ST 311 Introductory Statistics II
3 - PHYS 207 General Physics I and
1 - PHYS 209 General Physics I Lab. or
3 - PHYS 122 Physics with Calculus I and
1 - PHYS 124 Physics Lab. I
3 - Major Requirement
15

Second Semester
3 - PHYS 208 General Physics II and
1 - PHYS 210 General Physics II Lab. or
3 - PHYS 221 Physics with Calculus II and
1 - PHYS 223 Physics Lab. II
3 - Social Science Requirement
16

### Senior Year

First Semester
2 - BIOSC 493 Senior Seminar
3 - GEN 440 Bioinformatics
3 - Arts and Humanities (Literature) Requirement
8 - Major Requirement
16

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

125 Total Semester Hours

1At least one lecture and associated laboratory must be completed for both animal diversity (BIOSC 302/306 or BIOSC 303/307, or other approved coursework) and for plant diversity (BIOSC 304/308, BIOSC 320, or BIOSC 406/407, or other approved coursework).

2At least one lecture course must be completed for both biochemistry (BIOCH 301 or 305, or other approved coursework) and for genetics (GEN 300 or 302, or other approved coursework).

3See advisor. Select one lecture/lab combination in ecology (BIOSC 441/445, 443/444, 446/447, 470/471). The remaining courses may be selected from any BIOCH, BIOSC, BOT, GEN or MICRO courses at the 300 level or higher. Students planning to apply to medical, dental or graduate school should select a statistics course.
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 Requirement

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.) Requirement
4 - Major Requirement
3 - Social Science Requirement
3 - Toxicology Requirement

124 Total Semester Hours

CH 223 and 224 are recommended.

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

At least one lecture course must be completed for both biochemistry (BIOCH 301 or 305, or other approved coursework) and for genetics (GEN 300 or 302, or other approved coursework).

BIOSC 414 may be substituted for CH 228.

See advisor. Select one lecture/lab combination from each of the following fields. BIOSC 459/460 or 475/476 are recommended to satisfy the Physiology Requirement.

Physiology—BIOSC 316, 401/402, 459/460, 475/476

The remaining courses may be selected from EX ST 311, ENTHSC 301, or other approved statistics courses, or any BIOCH, BIOSC, BOT, GEN or MICRO courses at the 300 level or higher. Students planning to apply to medical, dental or graduate school should select a statistics course.

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

Any 400-level ENTOX course.

BIOLICAL SCIENCES

Bachelor of Arts

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

Double Major in Biological Sciences/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 111 for the curriculum.

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
3 - Mathematical Sciences Requirement

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

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

Junior Year
First Semester
3 - BIOSC 333 Evolutionary Biology
1 - BIOSC 461 Cell Biology
1 - BIOSC 462 Cell Biology Laboratory
3 - ENGL 415 Scientific Writing and Comm.
3 - Foreign Language Requirement
3 - Minor Requirement

Second Semester
3 - Arts and Humanities (Non-Lit.) Requirement
3 - Foreign Language Requirement
3 - Major Requirement
6 - Minor Requirement

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

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

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
3 - Mathematical Sciences Requirement

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

PREREHABILITATION SCIENCES EMPHASIS AREA

Freshman Year
First Semester
3 - BIOL 103 General Biology I
1 - BIOL 105 General Biology Lab. I
1 - BIOSC 101 Frontiers in Biology I
4 - CH 101 General Chemistry
3 - COMM 150 Intro. to Human Communication 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
3 - Statistics Requirement

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

49
Second Semester
3 - PSYCH 201 Introduction to Psychology
4 - Animal or Plant Diversity Requirement $^1$
3 - Biochemistry or Genetics Requirement $^4$
4 - Foreign Language Requirement $^7$
3 - Social Science Requirement $^6$

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 Requirement $^7$
15

Second Semester
4 - BIOSC 316 Human Physiology
3 - Arts and Humanities (Non-Lit.) Requirement $^6$
3 - Foreign Language Requirement $^7$
6 - Minor Requirement $^7$
16

Senior Year
First Semester
2 - BIOSC 493 Senior Seminar
3 - ENGL 315 Scientific Writing and Comm.
3 - PHYS 207 General Physics I
1 - PHYS 209 General Physics I Lab.
3 - Minor Requirement $^1$
3 - Social Science Requirement $^6$
15

Second Semester
3 - PHYS 208 General Physics II
1 - PHYS 210 General Physics II Lab.
3 - Arts and Humanities (Literature) Requirement $^8$
3 - Major Requirement $^8$
6 - Minor Requirement $^7$
16

120 Total Semester Hours
$^1$Rehabilitation programs require BIOL 101/105 and 104/106 or equivalent; however, BIOL 110 and 111 may substitute. The additional 1-2 credit hours will be subtracted from Major Requirement credits.
$^2$EX ST 301, MTHSC 301, or other approved coursework.
$^3$At least one lecture and associated laboratory must be completed for both animal diversity (BIOSC 302/306 or BIOSC 303/307, or other approved coursework) and for plant diversity (BIOSC 304/308, BIOSC 320, or BIOSC 406/407, or other approved coursework).
$^4$At least one lecture course must be completed for both biochemistry (BIOC 301 or 305, or other approved coursework) and for genetics (GEN 300 or 302, or other approved coursework).
$^5$Four semesters (through 202) in the same modern foreign language are required.
$^6$See General Education Requirements. Six of these credit hours must also satisfy the Cross-Cultural Awareness and Science and Technology in Society Requirements.
$^7$See page 62 for approved minors. Psychology is recommended. The Medical University of South Carolina and other Rehabilitation Sciences programs require PSYCH 201 and 383.
$^8$See advisor. Select one lecture course in ecology (BIOSC 441, 443, 446, 470). The remaining course must be selected from MICRO 305 or any BIOSC course at the 300 level or higher. BIOSC 478 or 479 is recommended.

Notes:
1. HLTH 150 is recommended.
2. American Heart Association Basic Life Support for Health Professionals is required.

BIOSYSTEMS ENGINEERING
Bachelor of Science
The Biosystems Engineering program is administered jointly with the College of Engineering and Science. See page 90 for the curriculum.

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, 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 Resources 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.

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

Freshman Year
First Semester
3 - BIOL 103 General Biology I
1 - BIOL 106 General Biology Lab. I
4 - CH 101 General Chemistry $^1$ or
1 - CH 102 and must satisfy the General Education Requirements.
3 - MTHSC 102 Intro. to Mathematical Analysis
1 - W F B 498 Senior Portfolio
15

Second Semester
3 - BIOSC 304/308, BIOSC 320, or BIOSC 406/407, or other approved coursework.
3 - Conservation Biology Concentration students or students planning to take organic chemistry must take CH 101 and CH 102 and must satisfy the General Education Science and Technology in Society Requirement through another course.

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
4 - CSENV 202 Soils
15

Second Semester
3 - GEN 300 Fundamental Genetics
3 - W F B (BIOSC) 313 Conservation Biology
3 - Arts and Humanities (Literature) Requirement $^6$
3 - Physical Environment Requirement $^6$
3 - Taxonomy/Habitat Requirement $^7$
15

Junior Year
First Semester
3 - BIOSC 335 Evolutionary Biology
3 - Arts and Humanities (Non-Lit.) Requirement $^1$
3 - Ecology Requirement $^a$
3 - Conservation Policy/Law Requirement $^7$
3 - Taxonomy/Habitat Requirement $^7$
15

Second Semester
3 - ENGL 314 Technical Writing
3 - E N R 302 Natural Resources Measurements
3 - Ecology Requirement $^a$
3 - Physiology Requirement $^a$
3 - Taxonomy/Habitat Requirement $^7$
15

Senior Year
First Semester
3 - FOR (E N R) 434 GIS for Landscape Planning
3 - Conservation Policy/Law Requirement $^7$
3 - Internship, Creative Inquiry or Directed Research Requirement $^6$
3 - Social Science Requirement $^7$
3 - Taxonomy/Habitat Requirement $^7$
15

Second Semester
3 - E N R (BIOC) 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 $^7$
2 - Elective
15

120 Total Semester Hours
Second Semester
6 - E N R 450 Conservation Issues
6 - Applied Economics Requirement4
3 - Community Development Requirement2
3 - Elective or__ 3 - Minor Requirement__ 15
120 Total Semester Hours

SECOND SEMESTER
3 - Internship, Creative Inquiry or Directed Research Requirement3
3 - Minor Requirement2
3 - Elective
15

SECOND SEMESTER
3 - ENR 450 Conservation Issues
3 - ENOL 314 Technical Writing
2 - FOR 406 Forested Watershed Management
1 - FOR 498 Senior Portfolio or__ 1 - W F B 498 Senior Portfolio
3 - W F B 462 Wetland Wildlife Biology
3 - Minor Requirement2
15
122 Total Semester Hours

SECOND SEMESTER
3 - Internship (F N R 490); Creative Inquiry (F N R 470); Directed Research (W F B 463); or Senior Honors Thesis (F N R 491).

SECOND SEMESTER
3 - Internship (AP EC 491); Creative Inquiry (AP EC 494); or Directed Research (AGRIC H491 or H492).
1C R D 335 or 336 or R S 401 or 459

FOOD SCIENCE
Bachelor of Science

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

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

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

Food processing industries, ingredient manufacturers, and packaging suppliers employ graduates in new food product development, quality assurance, production management, and technical sales. State and federal agencies also need graduates for food safety and regulatory positions. With the Nutrition and Dietetics Concentration, employment opportunities include dietitians, nutritionists, consultants, and food specialists. Placement rates are high for all of these fields, and graduates are also well prepared to pursue graduate study in many areas.
The Department of Food, Nutrition and Packaging Sciences also offers an accelerated five-year combined bachelor’s/master’s program that allows students to count up to twelve hours of graduate credit toward both the BS degree in Food Science and the MS degree in Food, Nutrition and Culinary Sciences. Details are available from the Department of Food, Nutrition and Packaging Sciences or at www.clemson.edu/fnps.

**FOOD SCIENCE AND TECHNOLOGY CONCENTRATION**

**Freshman Year**

**First Semester**
- 3 - BIOL 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

**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 102 Accelerated Composition
- 1 - FD SC 102 Perspectives in Food and Nutrition Sciences
- 1 - FD SC 450 Creative Inquiry
- 3 - PSYCH 201 Introduction to Psychology

**Sophomore Year**

**First Semester**
- 4 - CH 201 Survey of Organic Chemistry or
  - 3 - CH 223 Organic Chemistry and
  - 1 - CH 227 Organic Chemistry Lab.
- 1 - FD SC 450 Creative Inquiry
- 3 - PHYS 128 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
- 3 - Social Science Requirement

**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 102 Accelerated Composition
- 1 - FD SC 102 Perspectives in Food and Nutrition Sciences
- 1 - FD SC 450 Creative Inquiry
- 3 - PSYCH 201 Introduction to Psychology

**Junior Year**

**First Semester**
- 3 - FD SC 301 Food Regulations and Policy
- 1 - FD SC 417 Seminar
- 1 - FD SC 450 Creative Inquiry
- 4 - MICRO 305 General Microbiology
- 3 - NUTR 451 Human Nutrition
- 3 - Departmental Requirement
  - 2 - Emphasis Area Requirement

**Second Semester**
- 3 - ENGL 304 Business Writing or
  - 3 - ENGL 314 Technical Writing
- 2 - FD SC 403 Food Chemistry and Analysis
- 4 - FD SC 410 Food Product Development
- 1 - FD SC 450 Creative Inquiry
- 4 - MICRO 407 Food and Dairy Microbiology
- 3 - Arts and Humanities (Literature) Requirement

**Senior Year**

**First Semester**
- 3 - FD SC 306 Food Service Operations or
  - 3 - FD SC 307 Restaurant Food Service Mgt.
- 3 - 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 - Arts and Humanities Area Requirement

**Second Semester**
- 3 - FD SC 406 Food Chemistry II
- 4 - FD SC 408 Food Process Engineering
- 3 - FD SC (PKGSC) 409 Total Quality Mgt. for Food and packaging Industries
- 1 - FD SC 450 Creative Inquiry
- 3 - Departmental Requirement

**NUTRITION AND DIETETICS CONCENTRATION**

**Freshman Year**

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

**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 102 Accelerated Composition
- 1 - FD SC 102 Perspectives in Food and Nutrition Sciences
- 1 - FD SC 450 Creative Inquiry
- 3 - Arts and Humanities (Non-Lit.) Requirement

**Sophomore Year**

**First Semester**
- 3 - AP EC 202 Agricultural Economics or
  - 2 - BIOSC 434 Biological Chemistry Lab. Techniq.
- 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

**Second Semester**
- 3 - BIOSC 305 Essential Elements of Biochem.
- 2 - BIOSC 434 Biological Chemistry Lab. Techniq.
- 3 - FD SC 214 Food Resources and Society
- 1 - FD SC 450 Creative Inquiry
- 3 - Arts and Humanities (Non-Lit.) Requirement

**Junior Year**

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

**Second Semester**
- 4 - BIOSC 223 Human Anatomy and Phys. II
- 3 - ENGL 304 Business Writing or
  - 3 - ENGL 314 Technical Writing
- 2 - FD SC 403 Food Chemistry and Analysis
- 1 - FD SC 450 Creative Inquiry
- 4 - MICRO 407 Food and Dairy Microbiology
- 3 - NUTR 455 Nutrition and Metabolism

**Senior Year**

**First Semester**
- 3 - FD SC 306 Food Service Operations
- 3 - 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 - 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

124-127 Total Semester Hours

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

FOREST RESOURCE MANAGEMENT

Bachelor of Science
The Forest Resource Management curriculum combines 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 62). 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 50-51 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 - EN R 101 Intro. to Environ. and Natural Res. I
3 - MTHSC 102 Intro. to Mathematical Analysis
3 - Oral Communication Requirement

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

Sophomore Year
First Semester
4 - ENGL 103 Technical Writing
3 - FOR 206 Forestry Ecology
3 - Arts and Humanities (Literature) Requirement
3 - Economics Requirement

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

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

Junior Year
First Semester
2 - FOR 302 Forest Biometrics
1 - FOR 304 Forest Resource Economics
3 - FOR 314 Wood Procurement Practices in the Forest Industry
4 - FOR 415 Forested Watershed Management
1 - FOR (E N R) 434 GIS for Landscape Planning
1 - Internship, Creative Inquiry or Directed Research Requirement

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 - Internship, Creative Inquiry or Directed Research Requirement

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 Forest Management
3 - Minor Requirement
1 - Internship, Creative Inquiry or Directed Research Requirement

Second Semester
4 - 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

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 - EN R 101 Intro. to Environ. and Natural Res. I
3 - MTHSC 102 Intro. to Mathematical Analysis
3 - Oral Communication Requirement

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

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
3 - Economics Requirement

Second Semester
3 - Arts and Humanities (Non-Lit.) Requirement
3 - Social Science Requirement
3 - FOR 206 Forestry Ecology
3 - ENGL 314 Technical Writing
2 - E G 210 Engineering Graphics for Civil Engr.
3 - ENGL 314 Technical Writing
3 - FOR 206 Forestry Ecology
3 - Arts and Humanities (Non-Lit.) Requirement
3 - Social Science Requirement

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

Senior Year
First Semester
3 - FOR 408 Wood and Paper Products
1 - GEN (BIOCH) 440 Bioinformatics
2 - GEN 421 Fundamentals of Genetics II Lab.
3 - MTHSC 106 Calculus of One Variable I
14
Second Semester
3 - GEN 450 Comparative Genetics
4 - CH 102 General Chemistry
3 - EX ST 301 Introductory Statistics
5 - BIOL 111 Principles of Biology I
2 - BIOL 406 Forested Watershed Management
1 - CH 227 Organic Chemistry Lab.
15

Sophomore Year
First Semester
3 - BIOSC 461 Cell Biology
1 - CH 228 Organic Chemistry Lab.
1 - GEN 410 Fundamentals of Genetics I
3 - COMM 350 Intro. to Human Comm. or ENGL 250 Public Speaking
6 - Genetics Requirement 5
16
Second Semester
3 - BIOL 410 Fundamentals of Genetics II Lab.
2 - GEN 411 Fundamentals of Genetics I Lab.
3 - PHYS 122 Physics with Calculus I
4 - MTHSC 108 Calculus of One Variable II
15

Junior Year
First Semester
3 - GEN 420 Fundamentals of Genetics II Lab.
2 - GEN 421 Fundamentals of Genetics II Lab.
3 - GEN (BIOCH) 440 Bioinformatics
3 - PHIL 626 Science and Values
3 - Genetics Requirement 5
3 - Elective 6
14
Second Semester
3 - FOR 304 Forest Resource Economics
2 - FOR 433 GPS Applications for Landscape Planning
3 - FOR 498 Senior Portfolio
1 - FOR 410 Harvesting Processes
1 - FOR 406 Forested Watershed Management
1 - FOR 408 Wood and Paper Products
17

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
15
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
15
Sophomore Year
First Semester
3 - HORT 303 Landscape Plants
3 - MTHSC 101 Essential Math. for Informed Soc.
3 - Arts and Humanities (Non-Lit.) Requirement3
4 - Business Requirement2
16
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
13
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 Requirement3
3 - Horticulture Specialization Requirement2
3 - Social Science Requirement2
13
Second Semester
3 - BIOSC 401 Plant Physiology Lab.
3 - BIOSC 434 Biol. Chemistry Lab. Techniques
3 - BIOL 110 Principles of Biology I1
3 - ENGL 103 Accelerated Composition
3 - Mathematics Requirement2
15-16
Sophomore Year
First Semester
3 - CH 223 Organic Chemistry
1 - CH 227 Organic Chemistry Lab.
3 - Arts and Humanities (Literature) Requirement3
4 - General Microbiology Requirement4
3 - Social Science Requirement3
3 - Elective3
17
Second Semester
2 - BIOSC 434 Biol. Chemistry Lab. Techniques
3 - CH 224 Organic Chemistry
1 - CH 228 Organic Chemistry Lab.
3 - Arts and Humanities (Non-Lit.) Requirement3
3 - Biochemistry Requirement6
3 - Microbiology Requirement7
15
Junior Year
First Semester
3 - BIOSC 461 Cell Biology
4 - MICRO 401 Microbial Diversity and Ecology
3 - PHYS 207 General Physics I and
1 - PHYS 209 General Physics I Lab. or
3 - PHYS 212 Physics with Calculus I and
1 - PHYS 124 Physics Lab. I
3 - Microbiology Requirement7
14
Second Semester
3 - ENGL 315 Scientific Writing and Comm.
4 - MICRO 412 Bacterial Physiology
3 - Microbiology Requirement7
3 - Virology Requirement8
4 - Elective5,9
17
Senior Year
First Semester
4 - MICRO 415 Microbial Genetics
4 - Microbiology Requirement7
3 - Social Science Requirement3
3 - Elective3
14
Second Semester
2 - MICRO 493 Senior Seminar
4 - Microbiology Requirement7
9 - Elective3
15
124–125 Total Semester Hours
3BIOL 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 higher. See advisor.
3MTHSC 111, 301, or EX ST 301, or other approved course-work. See advisor. Medical and dental schools have different mathematics requirements.
### BIOMEDICINE

#### CONCENTRATION

**Freshman Year**

<table>
<thead>
<tr>
<th>Semester</th>
<th>Courses</th>
</tr>
</thead>
</table>
| First Semester | 5 - BIOL 110 Principles of Biology I\(^a\)  
1 - CH 101 General Chemistry  
3 - COMM 150 Intro. to Human Communication or COMM 250 Public Speaking  
1 - Micro 103 Microbes and Human Affairs  
4 - MTHSC 106 Calculus of One Variable I |
| Second Semester| 5 - BIOL 111 Principles of Biology II or CH 102 General Chemistry  
3 - ENGL 103 Accelerated Composition  
3 - Elective |

<table>
<thead>
<tr>
<th>Semester</th>
<th>Courses</th>
</tr>
</thead>
</table>
| First Semester | 3 - CH 223 Organic Chemistry  
1 - CH 227 Organic Chemistry Lab.  
3 - Arts and Humanities (Literature) Requirement\(^b\)  
4 - General Microbiology Requirement\(^a\)  
4 - Elective |
| Second Semester| 3 - CH 224 Organic Chemistry  
1 - CH 228 Organic Chemistry Lab.  
3 - Arts and Humanities (Non-Lit.) Requirement\(^a\)  
3 - Biochemistry Requirement\(^b\)  
3 - Biomedicine Requirement\(^b\)  
3 - Social Science Requirement\(^b\) |
| Junior Year     | 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.  
3 - Genetics Requirement\(^b\) |

**Second Semester**

<table>
<thead>
<tr>
<th>Courses</th>
</tr>
</thead>
</table>
| 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 |

**Senior Year**

| First Semester | 3 - BIOSC 461 Cell Biology  
2 - BIOSC 462 Cell Biology Lab.  
4 - MICRO 415 Microbial Genetics  
3 - MICRO 416 Introductory Virology  
3 - Social Science Requirement\(^b\) |
|----------------|-------------------------------------------------------------------------|
| Second Semester| 3 - MICRO 411 Pathogenic Bacteriology  
3 - MICRO 417 Molecular Mechanisms of Carcinogenesis and Aging  
1 - MICRO 421 Pathogenic Bacteriology Lab.  
2 - MICRO 493 Senior Seminar  
3 - Biomedicine Requirement\(^a\)  
3 - Elective |

<table>
<thead>
<tr>
<th>Second Semester</th>
<th>123–124 Total Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 - BIOL 110 and 111 are strongly recommended; however, BIOL 103/105 may substitute for BIOL 110. The remaining 1-2 credits required must be satisfied by completing 1-2 extra credits from departmental course offerings at the 300 level or higher. See advisor.</td>
<td></td>
</tr>
<tr>
<td>MTHSC 111, 112, or EX ST 301, or other approved coursework. See advisor. Medical and dental schools have different mathematics requirements.</td>
<td></td>
</tr>
</tbody>
</table>

**Sophomore Year**

| First Semester | 5 - PKGSC 206 Container Systems Lab.1  
3 - PKGSC 204 Container Systems  
4 - PKGSC 201 Packaging Perishable Products  
1 - PHYS 223 Physics Lab. II  
3 - Elective |
<table>
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</tr>
</thead>
<tbody>
<tr>
<td>Second Semester</td>
<td>3 - PKGSC 220 Package Drawing/CAD</td>
</tr>
</tbody>
</table>

### 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 transportations, engineering technology, food and health care packaging, package design and graphics, materials, international packaging, marketing/finance, business administration, entrepreneurship, environmental engineering, environmental science and policy, and management.

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

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

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

**Freshman Year**

| First Semester | 3 - BIOL 103 General Biology I  
1 - BIOL 105 General Biology Lab. I  
4 - CH 101 General Chemistry  
4 - MTHSC 106 Calculus of One Variable I  
1 - PKGSC 101 Packaging Orientation\(^b\)  
1 - Social Science Requirement\(^b\) |
<table>
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<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Second Semester</td>
<td>103/105 may substitute for BIOL 110, and BIOL 104/106 count up to twelve hours of graduate credit toward both the BS degree in Packaging Science and the MS degree in Packaging Science. Students must also satisfy the Cross-Cultural Awareness and Science and Technology in Society Requirements.</td>
</tr>
</tbody>
</table>

**Sophomore Year**

| First Semester | 4 - CH 201 Survey of Organic Chemistry or  
3 - CH 223 Organic Chemistry and  
1 - CH 227 Organic 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.\(^b\)  
2 – PKGSC 203 Packaging Research Fundamentals |
|----------------|-------------------------------------------------------------------------|
| 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  
4 - PKGSC 204 Container Systems\(^b\)  
1 - PKGSC 206 Container Systems Lab.\(^b\)  
2 - PKGSC 220 Package Drawing/CAD |
Summer
0 - CO-OP 101 Cooperative Education

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

Second Semester
3 - COMM 250 Public Speaking
3 - PKGS 401 Packaging Machinery
3 - PKGS 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 - PKGS 416 Appl. of Polymers in Packaging
4 - PKGS 464 Food and Health Care Pkg. Syst.
3 - Emphasis Area Requirement
14

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

122 Total Semester Hours

1A C or better is required in this course for graduation.
2See 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.
3Students interested in minors or emphasis areas should take any prerequisites in the sophomore year.
4At least one 15-week period (six months preferred) of Cooperative Education is required.
5PKGS 404 and 454 must be taken concurrently.
6Completion of an approved minor or emphasis area is required. Approved minors are Business Administration, Entrepreneurship, Environmental Engineering, Environmental Science and Policy, and Management. Emphasis Areas consist of 15 credit hours selected from one of the following areas: Distribution and Transportation, Engineering and Technology, Food and Health Care Packaging, Package Design and Graphics, Materials, International Packaging, and Marketing/Finance. See advisor for approved emphasis area courses.

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

PREPHARMACY

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

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

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

Second Semester
3 - BIOL 104 General Biology II
1 - BIOL 106 General Biology Lab. II
4 - CH 102 General Chemistry
3 - ECON 200 Economic Concepts
3 - ENGL 103 Accelerated Composition
3 - MTHSC 107 Calculus of One Variable II
1 - Elective
18

Second Year
First Semester
4 - BIOC 222 Human Anatomy and Phys. I
1 - 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 - BIOC 223 Human Anatomy and Phys. II
3 - CH 224 Organic Chemistry
1 - CH 228 Organic Chemistry Lab.
1 - 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

1A A H 210 or MUSIC 210
2Select any ENGL course from General Education Arts and Humanities (Literature) Requirement.
3See advisor.
4See General Education Requirements.
5Students 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 Prehabilitation Sciences major includes concentrations in physical therapy, occupational therapy, communication sciences and disorders, as well as in physician assisting and allied health areas. This curriculum is designed to meet the requirements of the programs in the College of Health Professions at the Medical University of South Carolina and other professional schools. The program requires a minimum of 90 semester hours of undergraduate coursework. In addition, students must apply to a professional school for acceptance into its program.

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

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

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

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

Second Year
First Semester
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
17

Second Semester
4 - BIOSC 223 Human Anatomy and Phys. II
3 - COMM 150 Intro. to Human Comm. or 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
17

Third Year*
90 Total Semester Hours
3See General Education Requirements. Three of these credit hours must also satisfy the Cross-Cultural Awareness Requirement.

3Select any ENGL course from General Education Arts and Humanities (Literature) Requirement.
3See advisor.
3Students 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.

PREVETERINARY MEDICINE

Under a regional plan, the South Carolina Preveternary Advisory Committee coordinates a program for South Carolina residents who are interested in pursuing careers in veterinary medicine. South Carolina residents attending any college or university may apply through the Veterinary Medical College Application Service (VMCAS) to the University of Georgia College of Veterinary Medicine. Currently, the University of Georgia admits up to 17 students each year through arrangements with the Southern Regional Education Board. The State of South Carolina has a contract with Mississippi State University to admit up to five South Carolina residents. The State of South Carolina also has a contract with Tuskegee University to admit up to four South Carolina residents. Application must be made directly to Tuskegee University.

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. (Chemistry and physics courses must be at the premedical level or higher. They may not be survey courses.)

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

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

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

SOILS AND SUSTAINABLE CROP SYSTEMS

Bachelor of Science

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

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

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

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

**Freshman Year**

**First Semester**
1. BIOL 110 Principles of Biology I
2. PHYS 209 General Physics I Lab.
3. CH 226 Organic Chemistry
4. ECON 201 Survey of Organic Chemistry and
5. ECON 202 Economic Concepts
6. MTHSC 201 Principles of Microeconomics
7. ARTS 101 Visual Art
8. ARTS 102 Music
9. ARTS 103 Literature
10. ARTS 104 History
11. ARTS 105 Philosophy
12. ARTS 106 Literature
13. ARTS 107 History
14. ARTS 108 Philosophy
15. ARTS 109 Literature
16. ARTS 110 History

**Second Semester**
1. BIOL 111 Principles of Biology II
2. PHYS 210 General Physics II Lab.
3. CH 223 Organic Chemistry
4. ECON 203 Business Concepts
5. MTHSC 202 Principles of Microeconomics
6. ARTS 201 Visual Art
7. ARTS 202 Music
8. ARTS 203 Literature
9. ARTS 204 History
10. ARTS 205 Philosophy
11. ARTS 206 Literature
12. ARTS 207 History
13. ARTS 208 Philosophy
14. ARTS 209 Literature
15. ARTS 210 History

**Sophomore Year**

**CONCENTRATION**

**Agricultural Biotechnology**

**Sophomore Year**

**First Semester**
1. CH 223 Organic Chemistry and
2. CH 227 Organic Chemistry Lab.
3. ECON 201 Survey of Organic Chemistry
4. CSENV 202 Soils
5. GEO 101 Physical Geology
6. GEO 103 Physical Geology Lab.
7. PHYS 207 General Physics I and
8. PHYS 209 General Physics I Lab.
9. PHYS 122 Physics with Calculus I
10. PHYS 124 Physics Lab. I
11. ARTS 201 Visual Art
12. ARTS 202 Music
13. ARTS 203 Literature
14. ARTS 204 History
15. ARTS 205 Philosophy
16. ARTS 206 Literature
17. ARTS 207 History
18. ARTS 208 Philosophy
19. ARTS 209 Literature
20. ARTS 210 History

**Second Semester**
1. CSENV (SSCS) 350 Practicum
2. ENGL 103 Accelerated Composition
3. CSENV (SSCS) 350 Practicum
4. ENT (BIOSC) 301 Insect Biology and Diversity
5. CSENV 445 Regulatory Issues and Policies
7. CSENV 451 Agric. Biotech. and Global Society
8. CSENV 452 Agric. Biotech. and Global Society
9. CSENV 453 Agric. Biotech. and Global Society
10. CSENV 454 Agric. Biotech. and Global Society
11. CSENV 455 Agric. Biotech. and Global Society
12. CSENV 456 Agric. Biotech. and Global Society

**Junior Year**

**First Semester**
1. BIOL 110 Principles of Biology I
2. PHYS 210 General Physics II Lab.
3. CH 223 Organic Chemistry
4. CSENV 202 Soils
5. GEO 101 Physical Geology
6. GEO 103 Physical Geology Lab.
7. PHYS 207 General Physics I and
8. PHYS 209 General Physics I Lab.
9. PHYS 122 Physics with Calculus I
10. PHYS 124 Physics Lab. I
11. ARTS 201 Visual Art
12. ARTS 202 Music
13. ARTS 203 Literature
14. ARTS 204 History
15. ARTS 205 Philosophy
16. ARTS 206 Literature
17. ARTS 207 History
18. ARTS 208 Philosophy
19. ARTS 209 Literature
20. ARTS 210 History

**Second Semester**
1. CSENV (SSCS) 350 Practicum
2. ENGL 103 Accelerated Composition
3. CSENV (SSCS) 350 Practicum
4. ENT (BIOSC) 301 Insect Biology and Diversity
5. CSENV 445 Regulatory Issues and Policies
7. CSENV 451 Agric. Biotech. and Global Society
8. CSENV 452 Agric. Biotech. and Global Society
9. CSENV 453 Agric. Biotech. and Global Society
10. CSENV 454 Agric. Biotech. and Global Society
11. CSENV 455 Agric. Biotech. and Global Society
12. CSENV 456 Agric. Biotech. and Global Society

**Senior Year**

**First Semester**
1. BIOL 110 Principles of Biology I
2. PHYS 210 General Physics II Lab.
3. CH 223 Organic Chemistry
4. CSENV 202 Soils
5. GEO 101 Physical Geology
6. GEO 103 Physical Geology Lab.
7. PHYS 207 General Physics I and
8. PHYS 209 General Physics I Lab.
9. PHYS 122 Physics with Calculus I
10. PHYS 124 Physics Lab. I
11. ARTS 201 Visual Art
12. ARTS 202 Music
13. ARTS 203 Literature
14. ARTS 204 History
15. ARTS 205 Philosophy
16. ARTS 206 Literature
17. ARTS 207 History
18. ARTS 208 Philosophy
19. ARTS 209 Literature
20. ARTS 210 History

**Second Semester**
1. CSENV (SSCS) 350 Practicum
2. ENGL 103 Accelerated Composition
3. CSENV (SSCS) 350 Practicum
4. ENT (BIOSC) 301 Insect Biology and Diversity
5. CSENV 445 Regulatory Issues and Policies
7. CSENV 451 Agric. Biotech. and Global Society
8. CSENV 452 Agric. Biotech. and Global Society
9. CSENV 453 Agric. Biotech. and Global Society
10. CSENV 454 Agric. Biotech. and Global Society
11. CSENV 455 Agric. Biotech. and Global Society
12. CSENV 456 Agric. Biotech. and Global Society

**College of Agriculture, Forestry and Life Sciences**
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**
- BIOL 103 General Biology I
- BIOL 103 General Biology Lab. I
- CH 101 General Chemistry or CH 106 Chemistry in Context
- HORT 101 Horticulture
- Spanish Language Requirement
- 3

**Second Semester**
- CH 102 General Chemistry or CH 106 Chemistry in Context
- ENGL 103 Accelerated Composition
- MTHSC 102 Intro. to Mathematical Analysis
- Related Science Requirement
- 4

**Sophomore Year**

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

**Second Semester**
- Arts and Humanities (Literature) Requirement
- Business Requirement
- Related Science Requirement
- Social Science Requirement
- 3

**Junior Year**

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

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

**Senior Year**

**First Semester**
- CSENV 452 Soil Fertility and Management
- CSENV (SSCS) 350 Practicum
- Emphasis Area Requirement
- 3

**Second Semester**
- CSENV 453 Soil Fertility Lab.
- CSENV 455 Seminar
- Arts and Humanities (Literature) Requirement
- Emphasis Area Requirement
- 6

**Summer**
- PL PA (ENT) 408 Diseases and Insects of Turfgrasses Laboratory

**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 course work 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 pages 50-51 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.

### 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 - ENR 101 Intro. to Env. and Natural Res. I
- 3 - MTHSC 102 Intro. to Mathematical Analysis
- 3 - Oral Communication Requirement

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

15 Total Semester Hours

### Sophomore Year

**First Semester**
- 4 - F N R 204 Soil Information Systems
- 2 - FOR 205 Dendrology
- 2 - 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 Total Semester Hours

**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

12 Total Semester Hours

### 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 Total Semester Hours

**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

12 Total Semester Hours

**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 Total Semester Hours

**Second Semester**
- 1 - F N R 499 Natural Resources Seminar
- 3 - W F B 430 Wildlife Conservation Policy
- 8 - Approved Requirement
- 3 - Policy and Law Requirement

12 Total Semester Hours

122 Total Semester Hours

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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
Art
Athletic Leadership
Biochemistry
Biological Sciences
Business Administration
Chemistry
Cluster
Communication Studies
Computer Science
Crop and Soil Environmental Science
Digital Production Arts
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 37–40 for details.