In the College of Agriculture and Natural Resources, business, science and technology are utilized to solve problems related to environmental protection; food and fiber production; and animal and plant health. Comprising nearly 25% of the nation's workforce, agriculture and natural resources provide career opportunities in research, industry, education and government.

The curricula in the College of Agriculture and Natural Resources provide the student: (1) knowledge pertaining to a specific agricultural science, (2) fundamental training in other basic sciences, and (3) a broad, general educational experience. The curricula provide a flexible program of study designed to keep the student up to date on the rapid changes and improvements in agriculture. Frequent consultation with a faculty advisor helps the student make steady progress toward achieving these educational goals.

Majors are offered in food and agribusiness management, agricultural economics, agricultural education, bioresources engineering technology, animal science, engineering technology, natural resource management, entomology, environmental soil science, food science and technology, plant protection, plant science, landscape horticulture, plant biology, and general agriculture. Concentrations are available in wildlife conservation, general entomology, pre-veterinary medicine, agricultural biotechnology, applied animal science, general animal science, resource economics, food marketing, food science, and food technology. Students interested in engineering technology or general agriculture may complete their degree requirements on the Newark campus or through the Parallel Program at Dover or Georgetown.

College faculty foster student involvement in the University Honors Program through sponsorship of Science and Engineering Scholars and candidates for the Degree with Distinction. The teaching philosophy of the faculty is to emphasize basic knowledge pertaining to agriculture and natural resources.

DEAN'S SCHOLAR PROGRAM

Each year, the College of Agriculture and Natural Resources allows highly motivated students who have clearly defined educational goals and good academic records to pursue the Dean's Scholar Program. Students in the program are freed of most college requirements and develop individual programs of study under the supervision of their faculty adviser. The individual program must be put in writing and approved by the appropriate department chair and the associate dean of the college. Additional information is available from the Office of Academic Programs in the College.

AGRICULTURAL EDUCATION

This program qualifies the individual for certification by the State Department of Public Instruction as a comprehensive agricultural education instructor. Some students find it desirable to major in a particular area of agricultural sciences and include agricultural education courses in their bachelor's program, while others elect to double major.

A degree in agricultural education qualifies the graduate to serve as a teacher of agricultural education in public or private secondary schools, as an instructor of adult classes in agriculture, or as an educational leader with state or federal agencies or private businesses. Other
opportunities can be found in educational administrative positions, production agriculture, the Cooperative Extension Service, the Natural Resources Conservation Service, and various leadership positions in agricultural organizations and agencies. Those who continue agricultural education studies through graduate school may go into college teaching, research, or government.

The curriculum in agricultural education is arranged individually with the liaison professor in agricultural education. Selected information in the section of this catalog on the College of Human Resources, Education and Public Policy may be helpful to the agricultural education major.

**DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE**

**MAJOR: AGRICULTURAL EDUCATION**

**CURRICULUM**

**CREDITS**

**UNIVERSITY REQUIREMENTS**

ENGL 110  Critical Reading and Writing (with minimum grade of C-) .......................... 3

**MAJOR REQUIREMENTS**

**Mathematics and Computer Science**

Mathematics course ........................................................................................................ 3

Computer Science course (FREC 135, or equivalent) ......................................................... 3

**Agricultural and Biological Sciences**

Minimum of one course in three of the following areas: Animal & Food Sciences, Bioresources Engineering, Food and Resource Economics, Entomology and Applied Ecology, Plant and Soil Sciences, or Biological Science

**Literature and Arts**

Nine credits from English and/or Communication.

**Social Sciences and Humanities**

Minimum of one course in three of the following areas: Anthropology, Black American Studies, Criminal Justice, Economics, Education, Geography, History, Philosophy, Political Science, Psychology, Sociology, or Women's Studies.

**Physical Sciences**

Minimum of eight credits selected from one of the following two-course sequences:

- CHEM 101/102 or 103/104
- PHYS 201/202 or 207/208
- GEOL 105/106
- SCEN 101/102

AGED 380  Agricultural Education Materials and Approaches I ......................................... 3

AGED 381  Agricultural Education Materials and Approaches II ........................................ 3

EDST 201  Diversity in the Classroom .................................................................................. 3

( fulfill the University multicultural requirement)

EDST 230  Introduction to Exceptional Children ................................................................. 3

EDST 304  Educational Psychology – Social Aspects ......................................................... 3

EDST 305  Educational Psychology – Cognitive Aspects .................................................... 3

EDV 400  Student Teaching ................................................................................................... 6

The Agricultural Education program requires a 2.5 minimum overall G.P.A. for admission in EDDY 400. Student Teaching, a course required for the degree. The teacher education program advisor (see list on p. 164) should be consulted for other policies concerning qualifications for student teaching.

A 2.75 index in at least thirty credits of technical agriculture ............................................ 30

from at least three departments in the college

**ELECTIVES**

After required courses are completed, sufficient credits must be taken to meet the minimum credits required for the degree. Only four credits of activity-type Physical Education and/or four credits of performing Music credit may be counted toward the degree.

**CREDITS TO TOTAL A MINIMUM OF** ............................................................ 130

**ANIMAL AND FOOD SCIENCES**

The Department of Animal and Food Sciences offers undergraduate major and minor programs in Animal Science and in Food Science and Technology.

The Animal Science major encompasses a wide range of disciplines in which the principles of biology, chemistry and biochemistry are applied to animal agriculture. Instruction is offered in animal nutrition, physiology, genetics, and reproduction; in animal health and molecular biology; and in dairy, livestock and poultry management. The department offers four areas of concentration within the major: pre-veterinary medicine, agricultural biotechnology, applied animal science, and general animal science. Animal health, management, nutrition, molecular biology and physiology constitute areas in which the animal science student may wish to specialize. Students interested in pursuing graduate studies in the animal sciences are well prepared by available course work and laboratory experiences. Students interested in veterinary medicine have the opportunity to obtain pre-veterinary training required for admission to veterinary school. The pre-veterinary concentration is designed to meet not only the department, college, and University requirements for the B.S. degree, but also the admission requirements of most veterinary schools to which students apply. Students are encouraged to participate in a broad realm of animal science research projects in the department through independent study/special problems courses. An Honors Degree option is offered for all the concentrations in the Animal Sciences major. A minor in Animal Science is also available.

The Food Science and Technology major is designed to provide students with a broad understanding and professional preparation in the areas of food processing, preservation, evaluation, packaging, and distribution. Upon graduation, job opportunities include positions within the food and allied industries, government, and independent research institutions. The role of the food scientist in such positions may involve product and process development, engineering, quality control and analysis, technical service and sales, with opportunities in regulatory agencies, education, and basic research. Students must choose one of two concentrations within the Food Science and Technology major. The Food Science Concentration has a greater emphasis on the biological, chemical and physical sciences, preparing a student for research opportunities within the Food Science disciplines. Additional recommended electives can provide a student with the course work to pursue a food processing engineering emphasis. The Food Technology Concentration provides a curriculum which has less emphasis on the sciences; however, it allows the flexibility to choose minors in related disciplines such as Food and Agribusiness Management or Nutrition or to take courses in Hotel, Restaurant and Institutional Management. A minor in Food Science is also available.

**DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE**

**MAJOR: ANIMAL SCIENCE**

**CONCENTRATION: GENERAL ANIMAL SCIENCE**

**CURRICULUM**

**CREDITS**

**UNIVERSITY REQUIREMENTS**

ENGL 110  Critical Reading and Writing (with minimum grade of C-) .......................... 3

Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content (see p. 22)

**MAJOR REQUIREMENTS**

Computer Science course (FREC 135, or equivalent) ......................................................... 3

**Agricultural and Biological Sciences**

Minimum of one course in two of the following areas: Food and Resources Economics, Food Science, Bioresources Engineering, Entomology and Applied Ecology, Plant and Soil Sciences

**Literature and Arts**

Six credits selected from English, Art, Art History, Communication, Music, Theatre, or Foreign Language

**Social Sciences and Humanities**

Minimum of one course in three of the following areas: Anthropology, Black American Studies, Criminal Justice, Economics, Education, Geography, History, Philosophy, Political Science, Psychology, Sociology, or Women's Studies.
After required courses are completed, sufficient credits must be taken to meet the minimum credits required for the degree. Only four credits of activity-type Physical Education and/or four credits of performing music credit may be counted toward the degree.

Credit toward the major will be granted for only two of the following:
ANSC 221, 322, 342, or 420. [ANSC 399 may be taken one time for a maximum of 2 credits toward graduation.]

**ELECTIVES**

After required courses are completed, sufficient credits must be taken to meet the minimum credits required for the degree. Select one 600-level course from ANSC or Biology [see recommended electives].

**ELECTIVES**

After required courses are completed, sufficient credits must be taken to meet the minimum credits required for the degree.

**Recommended Electives**
ANSC 399 Teaching Assistant
ANSC 431 Infection and Immunity in Animal Diseases
ANSC 624 Monogastric Nutrition
ANSC 633 Poultry Pathology
ANSC 635 Introduction to Virology
ANSC 643 Molecular Endocrinology
ANSC 645 Avian Physiology
ANSC 654 Ruminant Nutrition
BISC 601 Immunology
BISC 602 Molecular Biology of the Cell
BISC 650 Bacterial Physiology
BISC 653 Recent Advances in Molecular Biology
BISC 654 Biochemical Genetics
BISC 656 Developmental Genetics
BISC 671 Immunology
BISC 679 Virology
BISC 693 Human Genetics
CHEM 220 Quantitative Analysis
CHEM 418 Introductory Physical Chemistry
COMM 350 Public Speaking
ENGL 312 Written Communications in Business

**CREDITS TO TOTAL A MINIMUM OF** 130
### MAJOR REQUIREMENTS

#### UNIFIED CURRICULUM

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 110</td>
<td>Critical Reading and Writing (with minimum grade of C)</td>
<td>3</td>
</tr>
</tbody>
</table>

Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content (see p. 22)

#### MAJOR REQUIREMENTS

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANSC 201</td>
<td>Animal Agriculture: General Principles</td>
<td>3-4</td>
</tr>
<tr>
<td>ANSC 431</td>
<td>Animal Production: General Principles</td>
<td>3-4</td>
</tr>
<tr>
<td>ANSC 441</td>
<td>Animal Production: General Principles</td>
<td>3-4</td>
</tr>
<tr>
<td>ANSC 432</td>
<td>Animal Production: General Principles</td>
<td>3-4</td>
</tr>
<tr>
<td>ANSC 442</td>
<td>Animal Production: General Principles</td>
<td>3-4</td>
</tr>
<tr>
<td>ANSC 433</td>
<td>Animal Production: General Principles</td>
<td>3-4</td>
</tr>
<tr>
<td>ANSC 443</td>
<td>Animal Production: General Principles</td>
<td>3-4</td>
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<tr>
<td>ANSC 434</td>
<td>Animal Production: General Principles</td>
<td>3-4</td>
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<tr>
<td>ANSC 444</td>
<td>Animal Production: General Principles</td>
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<td>ANSC 435</td>
<td>Animal Production: General Principles</td>
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<td>ANSC 445</td>
<td>Animal Production: General Principles</td>
<td>3-4</td>
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<tr>
<td>ANSC 436</td>
<td>Animal Production: General Principles</td>
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<td>ANSC 446</td>
<td>Animal Production: General Principles</td>
<td>3-4</td>
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<td>ANSC 437</td>
<td>Animal Production: General Principles</td>
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<td>ANSC 447</td>
<td>Animal Production: General Principles</td>
<td>3-4</td>
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<tr>
<td>ANSC 438</td>
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<td>ANSC 448</td>
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<td>ANSC 439</td>
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<td>ANSC 449</td>
<td>Animal Production: General Principles</td>
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<tr>
<td>ANSC 450</td>
<td>Animal Production: General Principles</td>
<td>3-4</td>
</tr>
</tbody>
</table>

A minimum grade of C must be achieved for credits to count toward the fulfillment of 36 credits in FOSC; a minimum grade of 2.00 in 200-level courses must be achieved to proceed to upper-level courses; only 300-level courses and a maximum of four credits of Special Problems/Independent Study (FOSC x66) may count toward the fulfillment of this requirement (FOSC 399, Teaching Assistant, may be taken one time allowing a maximum of 2 credits toward graduation.)

### ELECTIVES

- After required courses are completed, sufficient credits must be taken to meet the minimum credits required for the degree. Only one course of activity-type Physical Education and four credits of Music credits and four credits of 100- and 200-level courses in Military Science/Air Force may be counted toward the degree

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 220</td>
<td>Quantitative Analysis I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 221</td>
<td>Quantitative Analysis Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 418</td>
<td>Introductory Physical Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 419</td>
<td>Introductory Physical Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 445</td>
<td>Physical Chemistry Laboratory</td>
<td>3</td>
</tr>
</tbody>
</table>

#### CREDITS TO TOTAL A MINIMUM OF

- **130**

### HONORS BACHELOR OF SCIENCE IN AGRICULTURE: Animal Science

The recipient of this degree must complete:

1. All requirements for the Bachelor of Science in Agriculture: Animal Science (any concentration).

2. All the University generic requirements for the Honors degree (see page 59). Courses with the ANSC prefix taken at the 300-level or higher are considered to be Honors courses in the major. One 3- or 4-credit course in PLSC, ENTO, or BISC will, if taken as Honors, count toward the 12 Honors credits required in the major or in collateral disciplines.

3. A grade-point index of at least 3.400 in the major.

### REQUIREMENTS FOR A MINOR IN ANIMAL SCIENCE

The minor in animal science requires 16-18 credits in animal science including the following: ANSC 101; 111; 251; 332; one course from ANSC 201, 431, or 441; and one course from ANSC 404, 417, 418, 420, and 421.

### DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE

**MAJOR: FOOD SCIENCE AND TECHNOLOGY**

**CONCENTRATION: FOOD TECHNOLOGY**

<table>
<thead>
<tr>
<th>CURRICULUM</th>
<th>CREDITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNIVERSITY REQUIREMENTS</td>
<td></td>
</tr>
<tr>
<td>ENGL 110 Critical Reading and Writing (with minimum grade of C)</td>
<td>3</td>
</tr>
<tr>
<td>Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content (see p. 22)</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MAJOR REQUIREMENTS</th>
<th>CREDITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural and Biological Sciences</td>
<td>3-4</td>
</tr>
</tbody>
</table>

One course from any of the following areas: Bioresources Engineering, Animal Science, Entomology and Applied Ecology, or Plant and Soil Sciences

<table>
<thead>
<tr>
<th>Literature and Arts</th>
<th>CREDITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Six credits selected from English, Art, Art History, Communication, Music, Theatre, or Foreign Language</td>
<td>6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Social Sciences and Humanities</th>
<th>CREDITS</th>
</tr>
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<tbody>
<tr>
<td>Minimum of one course in three of the following areas: Anthropology, Black American Studies, Criminal Justice, Economics, Education, Geography, History, Philosophy, Political Science, Psychology, Sociology, or Women's Studies</td>
<td>9</td>
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<thead>
<tr>
<th>MAJOR REQUIREMENTS</th>
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<tbody>
<tr>
<td>ANSC 101/102 General Chemistry</td>
<td>8</td>
</tr>
<tr>
<td>ANSC 103/104 General Chemistry</td>
<td>8</td>
</tr>
<tr>
<td>CHEM 214 Elementary Biochemistry</td>
<td>8</td>
</tr>
<tr>
<td>CHEM 537 Introductory Biochemistry</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 201/202 Introductory Physics I and II</td>
<td>8</td>
</tr>
<tr>
<td>BISC 207/208 Introductory Biology I and II</td>
<td>8</td>
</tr>
<tr>
<td>BISC 371 Introduction to Microbiology</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 321/322 Organic Chemistry</td>
<td>8</td>
</tr>
<tr>
<td>NTD 200 Nutrition Concepts</td>
<td>3</td>
</tr>
<tr>
<td>MATH 221/222 Calculus I and II</td>
<td>6-8</td>
</tr>
<tr>
<td>MATH 241/242 Analytic Geometry and Calculus A and B</td>
<td>6-8</td>
</tr>
</tbody>
</table>

**ELECTIVES**

- After required courses are completed, sufficient credits must be taken to meet the minimum credits required for the degree. Only one course of activity-type Physical Education and four credits of Music credits and four credits of 100- and 200-level courses in Military Science/Air Force may be counted toward the degree

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<td>CHEM 445</td>
<td>Physical Chemistry Laboratory</td>
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</tr>
</tbody>
</table>

### CREDITS TO TOTAL A MINIMUM OF

- **128**
The Bioresources Engineering Department offers majors in Bioresources Engineering Technology and Engineering Technology. Both majors are accredited by the Accreditation Board for Engineering and Technology (ABET).

Bioresources engineering technology is the application of engineering techniques in such areas as production mechanization, energy, soil and water conservation, plant and animal environments, agricultural waste management, processing and storage, and building construction. This requires a knowledge of physical and natural sciences and technical skills to support engineering activities.

The bioresources engineering technology curriculum is designed to prepare students for engineering-related employment in agricultural, natural resources, and environmental industries. A scientific or business background may be obtained according to the student’s interest through the selection of electives in the College of Agriculture and Natural Resources and other colleges of the University.

MAJOR: BIORESOURCES ENGINEERING TECHNOLOGY
CURRICULUM

UNIVERSITY REQUIREMENTS
ENG 110 Critical Reading and Writing (with minimum grade C) 3
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content (see p 22) 3

MAJOR REQUIREMENTS
Communications
Six additional credits to provide training in oral and written communications.
EGTE 365 Junior Seminar 1
A second writing course selected from:
ENGL 301 Expository Writing 3
ENGL 302 Advanced Composition 3
ENGL 307 News Writing and Editing 3
ENGL 312 Written Communications in Business 3
ENGL 410 Technical Writing 3

An oral communications course selected from:
AGRI 212 Oral Communications in Agriculture and Natural Resources 3

Technical Sciences
EGTE 125 Intro. to Bioresources Engineering Tech 2

Electives
Three credits selected from one of the following areas:
EGTE 218 Fundamentals of Hydraulic Systems 4
EGTE 244 Electricity for Engineering Technology 4
EGTE 311 Fundamentals of Thermodynamics 4
EGTE 354 Rural/Light Industrial Buildings 4

Three credits selected from one of the following areas:
Dynamics, Electronics, Materials Technology, or Strength of Materials
EGTE courses that satisfy this requirement are:
EGTE 344 Electronics and Microprocessors 3
EGTE 435 Machinery Design and Development 3

Technical Skills
EGTE 111 Computer Applications in Engineering Technology 3
EGTE 113 Land Surveying 2
EGTE 125 Intro to Bioresources Engineering Tech 2
EGTE 209 Computer Aided Drafting 3
EGTE 443 Instrumentation 3

Technical Specialization
EGTE 321 Storm-Water Management 4
ENGINEERING TECHNOLOGY

Engineering technology is part of the broad discipline of engineering, in which a knowledge of the mathematical and natural sciences is applied in utilization of materials and forces. Engineering technology requires the application of scientific and engineering knowledge combined with technical skills in support of engineering activities. The curriculum prepares the engineering technologist to make independent judgments and to design and manage systems and components to achieve conceptual goals with consideration of their effectiveness, safety or cost. Close liaison is maintained between the educational programs and employers to give graduates the greatest opportunity for career development.

Two concentrations are available within the major: technical applications and technical management. The technical applications concentration includes coursework in mechanization, energy management, hydraulics and hydrology, building environments, waste management, processing and construction. Students are prepared for engineering-related employment with industry, consulting firms, construction companies, and government agencies. The technical management concentration provides basic management concepts utilized in engineering and production-related activities. This concentration is often useful to the part-time student who already has an associate degree in engineering technology and desires to prepare for management opportunities, and for other individuals who need additional technical training.

Students who choose the engineering technology major may take all of the necessary courses at the University of Delaware or they may transfer previously completed appropriate course work from other accredited institutions. Students wishing to have prior course work considered must contact an advisor in the department for a degree analysis.

Computer use for problem solving is important throughout the engineering technology curriculum. Students are urged to have their own computer with spreadsheet and word processing software, and should be able to connect to the University computer network.

DEGREE: BACHELOR OF APPLIED SCIENCE

MAJOR: BIORESOURCES ENGINEERING

CORE CURRICULUM

UNIVERSITY REQUIREMENTS

ENGL 110 Critical Reading and Writing [with minimum grade of C] 3

Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content (see p. 22)

MAJOR REQUIREMENTS

Communications

A second writing course selected from:

ENGL 301 Expository Writing
ENGL 302 Advanced Composition
ENGL 307 News Writing and Editing
ENGL 312 Written Communications in Business
ENGL 410 Technical Writing

An oral communications course selected from:

COMM 200 Introduction to Human Communication Systems
COMM 255 Fundamentals of Communication
COMM 312 Oral Communication in Business
COMM 350 Public Speaking
COMM 355 Small Group Communication

Social Sciences and Humanities

ECON 151 Introduction to Microeconomics
ECON 152 Introduction to Macroeconomics

Nine additional credits to be selected from a minimum of nine of the following areas: Anthropology, Art, Art History, Black American Studies, Criminal Justice, Economics, Education, English, Foreign Language, Geography, History, Music, Philosophy, Political Science, Psychology, Sociology, Theatre or Women's Studies

Basic Sciences and Mathematics

Biological Science course 3
CHEM 103/104 General Chemistry 8

Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content (see p. 22)

ENGGE 354 Rural/Light Industrial Buildings 4

Technical Support

PISC 204 Introduction to Soil Science 4
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content (see p. 22)

ELECTIVES

After required courses are completed, sufficient elective credits must be taken to meet the minimum number of credits required for the degree.

Only four credits of activity-type Physical Education and/or four credits of performing Music credit may be counted toward the degree.

CREDITS TO TOTAL A MINIMUM OF 130

CONCENTRATION: TECHNICAL APPLICATIONS

Students must complete all the requirements for the core curriculum in Engineering Technology, in addition to the concentration requirements below.

Technical Skills

EGTE 109 Technical Drafting 2
EGTE 111 Computer Application in Engineering Technology 3
EGTE 209 Computer Aided Drafting 3

Microcomputer course [EGTE 112 Personal Computers and Technology preferred] 3
Instrumentation or microprocessor course 3
A maximum of thirty semester credits will be permitted in this category. The selection of courses in the technical skills category must be consistent with the specialization. A maximum of six hours of drafting and one course in computer-aided drafting can be applied to degree requirements. Also a maximum of eight hours of surveying and topographic mapping and a maximum of six hours of construction, operation, and production techniques can be applied towards degree requirements. For transfer students, after matriculation in the program, course work will normally be limited to instrumentation and computer use.

**Technical Specialization**

One of the following (cannot be satisfied by transfer credit): 3-4

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGTE 331</td>
<td>Storm Water Management</td>
</tr>
<tr>
<td>EGTE 435</td>
<td>Mechanical Power Units</td>
</tr>
<tr>
<td>EGTE 456</td>
<td>Fundamentals of HVAC</td>
</tr>
</tbody>
</table>

Four of the following: 12-15

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGTE 331</td>
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<tr>
<td>EGTE 341</td>
<td>Mechanical Power Units</td>
</tr>
<tr>
<td>EGTE 435</td>
<td>Electrical and Electronic Systems</td>
</tr>
<tr>
<td>EGTE 445</td>
<td>Food Engineering Technology</td>
</tr>
<tr>
<td>EGTE 456</td>
<td>Fundamentals of HVAC</td>
</tr>
</tbody>
</table>

**Technical Support**

Nineteen credits selected to support the specialization and 19 career interests of the student.

**ELECTIVES**

After required courses are completed, sufficient elective credits must be taken to meet the minimum number of credits required for the degree. Only four credits of activity-type Physical Education and/or four credits of performing Music credit may be counted toward the degree.

**CREDITS TO TOTAL A MINIMUM OF** ......................................................... 130

**CONCENTRATION: TECHNICAL MANAGEMENT**

Students must complete all the requirements for the core curriculum in Engineering Technology, in addition to the concentration requirements below.

**Technical Skills**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGTE 109</td>
<td>Technical Drafting</td>
</tr>
<tr>
<td>EGTE 111</td>
<td>Computer Applications in Engineering Technology</td>
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<tr>
<td>EGTE 209</td>
<td>Computer Aided Drafting</td>
</tr>
<tr>
<td>EGTE 445</td>
<td>Food Engineering Technology</td>
</tr>
<tr>
<td>EGTE 456</td>
<td>Fundamentals of HVAC</td>
</tr>
</tbody>
</table>

Microcomputer course (EGTE 112 Personal Computers and Technology preferred) 3

Instrumentation or minor professor course 3

A maximum of thirty semester credits will be permitted in this category. The selection of courses in the technical skills category must be consistent with specialization. A maximum of six hours of drafting and one course in computer-aided drafting can be applied towards degree requirements. Also a maximum of eight hours of surveying and topographic mapping and a maximum of six hours of construction, operation, and production techniques can be applied towards degree requirements. For transfer students, after matriculation in the program, course work will normally be limited to instrumentation and computer use.

**Technical Specialization**

One of the following (cannot be satisfied by transfer credit): 3-4

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGTE 321</td>
<td>Storm Water Management</td>
</tr>
<tr>
<td>EGTE 431</td>
<td>Mechanical Power Units</td>
</tr>
<tr>
<td>EGTE 435</td>
<td>Machinery Design and Development</td>
</tr>
<tr>
<td>EGTE 456</td>
<td>Fundamentals of HVAC</td>
</tr>
</tbody>
</table>

One who meets the required number of technical specialization credits to a minimum of nine

**Technical Management**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>FREC 201</td>
<td>Records and Accounts</td>
</tr>
<tr>
<td>ACCT 207</td>
<td>Accounting I.</td>
</tr>
</tbody>
</table>

**ELECTIVES**

After required courses are completed, sufficient elective credits must be taken to meet the minimum number of credits required for the degree. Only four credits of activity-type Physical Education and/or four credits of performing Music organization credit may be counted toward the degree.

**CREDITS TO TOTAL A MINIMUM OF** ......................................................... 130

**REQUIREMENTS FOR A MINOR IN ENGINEERING TECHNOLOGY**

A minor in engineering technology may be earned by a student in any University bachelor degree program through successful completion of engineering technology courses in accordance with the requirements listed here. All students must meet the required prerequisites for any engineering technology course before it is taken. Before being admitted to the minor, the student must have successfully completed MATH 222 or MATH 242, CHEM 102 or CHEM 104, and PHYS 202 or PHYS 208. A grade point average of at least 2.0 is required in the 20 credits of engineering technology courses for the minor and in the mathematics and science courses listed below.

The required engineering technology courses are:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGTE 109</td>
<td>Technical Drafting</td>
</tr>
<tr>
<td>EGTE 112</td>
<td>Computer Applications in Engineering Technology</td>
</tr>
</tbody>
</table>

An additional 15 credits in engineering technology must be taken of which at least 6 credits must be at the 300-level or higher. All engineering technology courses shall be selected with the approval of an advisor in the Department of Bioresources Engineering to meet each student’s objectives. For students concerned with the environment, these courses might include EGTE 103, 113, and 328; for those interested in electronics, EGTE 244 and 344. Courses can also be chosen to give the student’s minor an emphasis in other areas such as manufacturing, mechanics, or technical management.

**ENTOMOLOGY AND APPLIED ECOLOGY**

Entomology emphasizes the structure, physiology, behavior, ecology, classification, and management of insects. Applied ecology uses practical methods to manage interrelationships of organisms with each other and their nonliving environment. Pest management and wildlife conservation are examples of applied ecology. Wildlife conservation is the effort to perpetuate free-living, breeding populations of non-domestic species.

The Department offers two concentrations in the major. Students can focus their biological interest on insects in the General Entomology Concentration. This program requires basic sciences as well as specialty courses on insects. Some flexibility in course selection permits students to emphasize pest management or insect biology. The Wildlife Conservation Concentration is for students with interests in the biological aspects of environmental science, e.g., conservation, wildlife biology, or ecology. It requires basic sciences, specialty courses in vertebrates, insects, plants, and conservation and other supporting courses. The curriculum’s flexibility accommodates career goals ranging from research to nature education, conservation advocacy and wildlife management. An Honors Degree option is offered for both concentrations. The department also offers an Entomology minor and co-offers Natural Resource Management and Plant Protection, as interdisciplinary majors.

The faculty advisor and student jointly plan the course program according to the student’s career objective. Course selection should be made in consultation with the academic advisor during the preregistration period of each term.
DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE
MAJOR: ENTOMOLOGY
CONCENTRATION: GENERAL ENTOMOLOGY

CURRICULUM

CREDITS

UNIVERSITY REQUIREMENTS
ENGL 110 Critical Reading and Writing (with minimum grade of C) 3
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content (see p. 22) 3

MAJOR REQUIREMENTS
Computer Science
Computer Science course (FREC 135 or equivalent) 3

Agricultural and Biological Sciences
One course in any of the following areas: Food and Resource Economics (except FREC 135), Food Science, Biore sources Engineering, or Animal Science (except ANSC 300) 3

Literature and Arts
Six credits selected from English, Art, Art History, Communication, Music, Theatre, or Foreign Language 6

Social Sciences and Humanities
A minimum of one course in three of the following areas: Anthropology, Black American Studies, Criminal Justice, Economics, Education, Geography, History, Philosophy, Political Science, Psychology, Sociology, or Women's Studies 9

CURRICULUM CREDITS

MAJOR: ENTOMOLOGY

CONCENTRATION: WILDLIFE CONSERVATION

DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE

GROUP I: 7-8 credits from the following:

CHEM 213 Elementary Organic Chemistry 3
CHEM 214 Elementary Biochemistry 3
BIOB 206 Physical Geography: Topography-Soils 5
GEOG 107 General Geology 3
PHYS 201 Introductory Physics I 3
PHYS 202 Introductory Physics II 3
PLSC 204 Introduction to Soil Science 3

GROUP II: 7-8 credits from the following:

AGRI 212 Oral Communication in Agriculture and Natural Resources 3

Agricultural and Biological Sciences 3-4

Literature and Arts
Three credits selected from English, Art, Art History, Communication, Music, Theatre, or Foreign Language 3

Social Sciences and Humanities
Minimum of one course in three of the following areas: Anthropology, Black American Studies, Criminal Justice, Economics, Education, Geography, History, Philosophy, Political Science, Psychology, Sociology, or Women's Studies 9

A minimum grade of C- is required for all ENTO credits used to satisfy departmental requirements.

MATH 115/171 Pre-Calculus or higher level 3
BISC 207 Introductory Biology I 4
BISC 208 Introductory Biology II 4
BISC 302 General Ecology 3
CHEM 101/102 General Chemistry or CHEM 103/104 General Chemistry 8

GROUP III: 7-8 credits from the following:

PLSC 101 Botany I 3
PLSC 201 Botany II 3
PLSC 202 Introductory Soil Science 3
PLSC 211 Herbaceous Landscape Plants 3
PLSC 212 Woody Landscape Plants 3
PLSC 303 Introductory Plant Pathology 3
PLSC 402 Plant Taxonomy 3

ELECTIVES

After required courses are completed, sufficient credits must be taken to meet the minimum credits required for the degree. Organic Chemistry, Biochemistry, Statistics, Physics, and additional writing courses are strongly recommended. Only two credits of activity-type Physical Education and performing Music may be counted toward the degree.

CREDITS TO TOTAL A MINIMUM OF 124

DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE
MAJOR: ENTOMOLOGY
CONCENTRATION: WILDLIFE CONSERVATION

CURRICULUM

CREDITS

UNIVERSITY REQUIREMENTS
ENGL 110 Critical Reading and Writing (with minimum grade of C) 3
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content (see p. 22) 3

MAJOR REQUIREMENTS
Computer Science course (FREC 135 or equivalent) 3
ENTOMOLOGY AND APPLIED ECOLOGY • COLLEGE OF AGRICULTURE AND NATURAL RESOURCES

PLANT PROTECTION

Because of mutual interests and problems in the field of pest management, the Department of Entomology and Applied Ecology and the Department of Plant and Soil Sciences offer a joint major, Plant Protection. In a world of expanding human population and increasing pressure on supplies of food and fiber, studies in plant pathology, entomology, and weed science can lead to a challenging and satisfying career that contributes to human welfare. This combined major allows students to study applied and basic aspects of insects, plant diseases, and weeds. It includes courses and field experience emphasizing recognition of pests and their symptoms, and strategies for pest management compatible with agriculture and the environment.

DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE
MAJOR: PLANT PROTECTION

CURRICULUM

UNIVERSITY REQUIREMENTS

ENGL 110 Critical Reading and Writing (with a minimum grade of C) ........................................... 3
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content (see p. 22)

MAJOR REQUIREMENTS

Computer Science

Computer Science course (FREC 135 or equivalent) ................................................................. 3

Agricultural and Biological Sciences

Minimum of one course in two of the following areas: Food and Resource Economics (except FREC 135), Food Science, Bioresources Engineering, Animal Science, Entomology and Applied Ecology, and Plant and Soil Sciences

Literature and Arts

Six credits selected from English, Art, Art History, Communication, Music, Theatre, or Foreign Language

Social Sciences and Humanities

Minimum of one course in three of the following areas: Anthropology, Black American Studies, Criminal Justice, Economics, Education, Geography, History, Philosophy, Political Science, Psychology, Sociology, or Women’s Studies

CURRICULUM CREDITS

MATH 115 Pre-Calculus or higher level ......................................................................................... 3
BISC 207/208 Introductory Biology I .......................................................................................... 8
CHEM 101/102 General Chemistry ............................................................................................ 8
CHEM 103/104 General Chemistry ............................................................................................ 8
ENTO 205 Elements of Entomology ............................................................................................ 3
ENTO 305 Entomology Laboratory ............................................................................................... 2
ENTO 406 Insect Identification—Taxonomy ............................................................................... 3
ENTO 411 Insect Pest Management ............................................................................................. 3
ENTO 465 Seminar ....................................................................................................................... 1
PLSC 101 Botany I ...................................................................................................................... 4
PLSC 201 Botany II ...................................................................................................................... 4
PLSC 303 Introductory Plant Pathology ....................................................................................... 4
PLSC 411 Diagnostic Plant Pathology ......................................................................................... 3
PLSC 470 Weed Biology and Control ......................................................................................... 4

ELECTIVES

A plant production course selected from PLSC 105, 133, 213, or 302 ......................................... 3-4
Nine additional ENTO and/or PLSC credits, plus 3 credits of related field experience, Independent Study, Research, or Field Experience ......................................................... 12

ELECTIVES

After required courses are completed, sufficient credits must be taken to meet the minimum credits required for the degree. Courses in Agriculture, Biology, and the Physical Sciences are recommended. Only two credits of activity-type Physical Education and performing Music may be counted toward the degree.

CREDITS TO TOTAL A MINIMUM OF ................................................................. 124

HONORS BACHELOR OF SCIENCE IN AGRICULTURE: ENTOMOLOGY AND APPLIED ECOLOGY

The recipient of this degree must complete:

1. All requirements for the Bachelor of Science: Entomology (either concentration).
2. All of the University’s generic requirements for the Honors Bachelor of Science degree (see page 30 of this catalog). Courses with the ENTO prefix taken at the 600-level or higher may be counted as Honors courses in the major. One 3- or 4-credit course in ANSC, PLSC, or BISC will, if taken as Honors, count toward the 12 Honors credits required in the major and/or in collateral disciplines.

REQUIREMENTS FOR A MINOR IN ENTOMOLOGY

The minor in entomology requires 18 credits of courses with an ENTO prefix, including: ENTO 205 and 305. A student may emphasize general entomology or wildlife conservation by proper choice of ENTO courses for the remaining 13 credits. A minimum grade of C- is required in all courses counting toward the minor. Credits for Special Problem, Independent Study, Research, and Field Experience do not count toward the minor.

CREDITS TO TOTAL A MINIMUM OF ................................................................. 124
FOOD AND RESOURCE ECONOMICS

The study of food and resource economics is concerned with agribusiness management, food marketing, and the economics of resource management and production in the agribusiness complex. Courses and curricula are designed to provide a thorough background in the principles of organization and management of agribusiness firms serving agriculture and food processing businesses. Food and resource economics also includes study of financing agricultural business firms, marketing and international trade of agricultural products, price analyses, economics of land utilization, and agricultural and environmental policies.

Two major programs are offered: (a) food and agribusiness management and (b) agricultural economics. The curricula differ in the amount of emphasis given to agricultural production, business and economics. Both curricula qualify the student for graduate work. The department also co-offers Natural Resource Management, an interdisciplinary major. A minor in Food and Agribusiness Management is available.

The major in food and agribusiness management is offered cooperatively with the College of Business and Economics. This curriculum prepares the student for a career in agribusiness sales and marketing, food wholesaling and retailing, international trade, resource management, market analysis, finance and banking, and commodity marketing (futures and options). A concentration in food marketing is offered as part of the food and agribusiness management major.

The major in agricultural economics emphasizes resource and environmental economics, quantitative methods, and agricultural marketing, and provides a solid foundation in economics and business. It prepares the student to work in the fields of agriculture, government, teaching, extension and research. A concentration in resource economics is offered as part of the agricultural economics major.

DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE
MAJOR: FOOD AND AGROBUSINESS MANAGEMENT

CURRICULUM

UNIVERSITY REQUIREMENTS
ENGL 110 Critical Reading and Writing (minimum grade C) 3
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content (see p. 22) 3

MAJOR REQUIREMENTS
Agricultural and Biological Sciences
Minimum of one course in three of the following areas: Biosources Engineering, Animal Science, Food Science, Entomology and Applied Ecology, Plant and Soil Sciences, or Biology 9

Social Sciences and Humanities
Minimum of one course in two of the following areas: Anthropology, Black American Studies, Criminal Justice, Education, Geography, History, Philosophy, Political Science, Psychology, Sociology, or Women's Studies 6

Physical Sciences
Minimum of eight credits selected from Chemistry, Physics, Geology, or Physical Science 8

MATH 115 Precalculus or higher level (MATH 221, MATH 230, and STAT 201 are strongly recommended) 3
ACCT 207/208 Accounting I and II 6
COMM 312 Oral Communication in Business 3
ENGL 312 Written Communications in Business 3
ECON 151 Introduction to Microeconomics: Price and Markets 3
ECON 152 Introduction to Macroeconomics: National Economy 3
BUAD 301 Introduction to Marketing 3
Two additional courses offered by the College of Business and Economics at the 300 or 400 level 6
One foreign language course 3-4
AGRI 165 Mastering the Freshman Year 3
FREC 110 Introduction to Food and Agribusiness Industry 1
FREC 135 Introduction to Data Analysis 3
FREC 150 Economics of Agriculture and Natural Resources 3
FREC 240 Quantitative Methods in Agricultural Economics 3
FREC 245 Strategic Selling and Buyer Communication 3

FOOD AND RESOURCE ECONOMICS

FREC 404 Food and Fiber Marketing 3
FREC 405 Management and Leadership Development 3
FREC 408 Research Methods I 3
FREC 409 Research Methods II 3
FREC 410 International Agricultural Trade and Marketing 3
FREC 430 Establishing and Managing a Food and Agribusiness Enterprise 3

A maximum of three credits of Independent Study in Food and Resource Economics and a maximum of six credits of Independent Study in all areas, including Food and Resource Economics, may be counted toward a degree. MATH 221 or higher (with a minimum grade of C+) can be used as a substitute course for MATH 115 and FREC 240.

ELECTIVES
After required courses are completed, sufficient credits must be taken to meet the minimum credits required for the degree. Only four credits of activity-type Physical Education and/or four credits of performing Music credit may be counted toward the degree. Included in the free electives are suggested Food and Resource Economics courses from the following areas:
Suggested Food and Agribusiness Management Electives:
FREC 312 Food Retailing and Product Management 3
FREC 332 Advanced Data Management 3
FREC 427 Agribusiness Financial Management 3
FREC 471 Futures and Options Markets 3
FREC 461 Agribusiness Internship 3

Suggested Resource Management Electives:
FREC 406 Agriculture and Natural Resource Policy 3
FREC 424 Resource Economics 3
FREC 429 Community Economic Development 3
FREC 444 Economics of Environmental Management 3
FREC 480 Geographic Information Systems in Natural Resource Management 3

Suggested Communications and Writing Electives:
ENGL 301 Expository Writing 3
ENGL 410 Technical Writing 3

CREDITS TO TOTAL A MINIMUM OF 128

DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE
MAJOR: FOOD AND AGROBUSINESS MANAGEMENT CONCENTRATION: FOOD MARKETING

The requirements for the major in Food and Agribusiness Management must be met. The following department courses are required for the concentration and may also be used as electives in the Food and Agribusiness Management major:
FREC 312 Food Retailing and Product Management 3
FREC 333 Advanced Data Management 3
FREC 427 Agribusiness Financial Management 3
FREC 471 Futures and Options Markets 3
Two Business Administration Courses at the 400 level 6
Two Business Administration Courses at the 400 level in marketing related areas. These are in addition to BUAD 301-Introduction to Marketing and two additional Business and Economics courses at the 300 and 400 level required by the Food and Agribusiness Management major.

CREDITS TO TOTAL A MINIMUM OF 128

REQUIREMENTS FOR A MINOR IN FOOD AND AGROBUSINESS MANAGEMENT

The minor in Food and Agribusiness Management requires 18 credits with the FREC prefix, including FREC 150 - Economics of Agriculture and Natural Resources. Students must also take five of the eight FREC courses listed below with a minimum of two courses in each area:

Marketing/Management Area:
FREC 345 Strategic Selling and Buyer Communication 3
FREC 404 Food and Fiber Marketing 3
FREC 405 Management and Leadership Development 3
FREC 471 Futures and Options Markets 3
Decision Analysis/International Trade Area:
FREC 406 Research Methods I 3
FREC 409 Research Methods II 3
FREC 410 International Agricultural Trade and Marketing 3
FREC 427 Agribusiness Financial Management 3

A minimum grade of C is required in all courses counting toward the minor.
DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE
MAJOR: AGRICULTURAL ECONOMICS

CURRICULUM

CREDITS

UNIVERSITY REQUIREMENTS

ENGL 110  Critical Reading and Writing (with a minimum grade of C) 3
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content (see p. 22) 3

MAJOR REQUIREMENTS

Agricultural and Biological Sciences 9
Minimum of one course in three of the following areas: Food Science, Bioreources Engineering, Animal Science, Entomology and Applied Ecology, Plant and Soil Sciences, or Biology

Social Sciences and Humanities 6
Minimum of one course in two of the following areas: Anthropology, Black American Studies, Criminal Justice, Education, Geography, History, Philosophy, Political Science, Psychology, Sociology, or Women's Studies

Physical Sciences 8
Minimum of eight credits selected from Chemistry, Physics, Geology, or Physical Science

MATH 115  Pre-Calculus (MATH 221 or higher is strongly recommended) 3
COMM 131  Oral Communication in Business 3
ENGL 110  Written Communications in Business 3
One foreign language course 3-4
ECON 151  Introduction to Microeconomics: Prices and Markets 3
ECON 152  Introduction to Macroeconomics: National Economy 3
ECON 302  Banking and Monetary Policy 3
ECON 300  Intermediate Microeconomic Theory 3
ECON 303  Intermediate Macroeconomic Theory 3

Two additional courses offered by the College of Business 6

and Economics at the 300-level or higher

Students interested in a minor in Economics should see “The Minor in Economics” in the College of Business and Economics curricula.

FREC 135  Introduction to Data Analysis 3
FREC 150  Economics of Agriculture and Natural Resources 3
FREC 201  Records and Accounts 3
FREC 240  Quantitative Methods in Agricultural Economics 3
Seven courses at the 400-level or above

CREDITS TO TOTAL A MINIMUM OF 124

PLANT AND SOIL SCIENCES

Plant and Soil Sciences includes disciplines of study that apply chemical, biological, and physical principles toward insuring adequate food supplies in a safe and aesthetic environment. Faculty in the department have active teaching and research programs in plant molecular biology, botany, anatomy, physiology, taxonomy, genetics-plant breeding, cell and tissue culture, pathology, ornamental horticulture, landscape design, crop and vegetable science, soil chemistry, soil management, soil physics, and soil microbiology. Undergraduate students often are involved in some aspect of these research programs, which strengthens and broadens their understanding of science.

Students can major in Plant Science, Landscape Horticulture, Plant Biology, or Environmental Soil Science. The department also co-offers the interdisciplinary majors Natural Resource Management and Plant Protection.

DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE
MAJOR: ENVIRONMENTAL SOIL SCIENCE

CURRICULUM

CREDITS

UNIVERSITY REQUIREMENTS

ENGL 110  Critical Reading and Writing (with a minimum grade of C) 3
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content (see p. 22) 3

MAJOR REQUIREMENTS

Computer Science
Computer Science course (FREC 135, or equivalent) 3

Agricultural and Biological Sciences
One course in any of the following areas: Animal Science, Food Science, Entomology and Applied Ecology, or Biology 3

Literature and Arts
Three credits selected from English, Art, Art History, Communication, Music, Theatre, or Foreign Language 3

Social Sciences and Humanities
Minimum of one course in two of the following areas: Anthropology, Black American Studies, Criminal Justice, Economics, Education, History, Philosophy, Political Science, Psychology, Sociology, or Women’s Studies 6

PLANT AND SOIL SCIENCES

The requirements for the major in Agricultural Economics must be met in addition, five of the following six FREC courses must be taken: 15-16

FREC 406  Agriculture and Natural Resource Policy
FREC 424  Resource Economics-Theory and Policy
FREC 429  Rural Economics Development-Thory and Policy
### DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE

**MAJOR: LANDSCAPE HORTICULTURE**

#### CURRICULUM

<table>
<thead>
<tr>
<th>UNIVERSITY REQUIREMENTS</th>
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<tbody>
<tr>
<td>ENGL 110</td>
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<td>3</td>
</tr>
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#### MAJOR REQUIREMENTS

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<tr>
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<tr>
<td>Mathematics course</td>
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<tr>
<td>Minimum of one course in three of the following areas: Anthropology, Black American Studies, Criminal Justice, Economics, Education, Geography, History, Philosophy, Political Science, Psychology, Sociology, or Women's Studies</td>
<td>9</td>
</tr>
</tbody>
</table>

| CHEM 101/102 General Chemistry I and II | 8 |
| or | |
| CHEM 103/104 General Chemistry I and II | 8 |
| CHEM 213 Organic Chemistry | 4 |
| EGTE 103 Land and Water Management | 3 |
| ENTO 205 Elements of Entomology | 3 |
| FREC 150 Economics of Agricultural and Natural Resources | 3 |
| PLSC 101 Botany I | 3 |
| PLSC 133 Ornamental Horticulture | 3 |
| PLSC 201 Botany II | 4 |
| PLSC 204 Introduction to Soil Science | 4 |
| PLSC 211 Herbaceous Landscape Plants | 4 |
| PLSC 212 Woody Landscape Plants | 4 |
| PLSC 213 Turf Establishment and Maintenance | 4 |
| PLSC 300 Principles of Animal and Plant Genetics | 3 |
| PLSC 303 Introductory Plant Pathology | 4 |
| PLSC 305 Environmental Soil Management | 4 |
| PLSC 332 Basic Landscape Design | 4 |
| PLSC 364 Ornamental Horticulture Internship | 3 |
| PLSC 366 Independent Study | 3 |
| PLSC 410 Introduction to Plant Physiology | 3 |
| PLSC 435 Issues in Horticulture | 3 |
| PLSC 470 Weed Biology and Control | 3 |

#### ELECTIVES

After required courses are completed, sufficient credits must be taken to meet the minimum credits required for the degree. May include the following suggested courses or other electives:

| PLSC 603 Soil Physics | 3 |
| PLSC 619 Soil Microbiology | 3 |

#### CREDITS TO TOTAL A MINIMUM OF 124

### DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE

**MAJOR: PLANT BIOLOGY**

#### CURRICULUM

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#### MAJOR REQUIREMENTS

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<td>Mathematics course</td>
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<tr>
<td>Computer Science course (FREC 135, or equivalent)</td>
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<tr>
<th>Agricultural and Biological Sciences</th>
<th>CREDITS</th>
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</thead>
<tbody>
<tr>
<td>One course in any of the following areas: Food Science, Bioresources Engineering, Animal Science, or Entomology and Applied Ecology</td>
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| CHEM 101/102 General Chemistry I and II | 8 |
| or | |
| CHEM 103/104 General Chemistry I and II | 8 |
| CHEM 213 Organic Chemistry | 4 |
| EGTE 103 Land and Water Management | 3 |
| ENTO 205 Elements of Entomology | 3 |
| FREC 150 Economics of Agricultural and Natural Resources | 3 |
| PLSC 101 Botany I | 3 |
| PLSC 133 Ornamental Horticulture | 3 |
| PLSC 201 Botany II | 4 |
| PLSC 204 Introduction to Soil Science | 4 |
| PLSC 211 Herbaceous Landscape Plants | 4 |
| PLSC 212 Woody Landscape Plants | 4 |
| PLSC 213 Turf Establishment and Maintenance | 4 |
| PLSC 300 Principles of Animal and Plant Genetics | 3 |
| PLSC 303 Introductory Plant Pathology | 4 |
| PLSC 305 Environmental Soil Management | 4 |
| PLSC 332 Basic Landscape Design | 4 |
| PLSC 364 Ornamental Horticulture Internship | 3 |
| PLSC 366 Independent Study | 3 |
| PLSC 410 Introduction to Plant Physiology | 3 |
| PLSC 435 Issues in Horticulture | 3 |
| PLSC 470 Weed Biology and Control | 3 |

One of the following Communication courses: 3

| AGRI 212 Oral Communication in Agricultural Sciences | 3 |
| COMA 312 Oral Communication in Business | 3 |
| COMM 350 Public Speaking | 3 |
| ENGL 312 Written Communication in Business | 3 |
| ENGL 410 Technical Writing | 3 |

### CREDITS TO TOTAL A MINIMUM OF 124

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**NOTE:** The above text is a simplified representation of the information provided in the image. It may not capture all details or nuances present in the original document. The table structure and formatting have been adapted for readability.
NATURAL RESOURCE MANAGEMENT • COLLEGE OF AGRICULTURE AND NATURAL RESOURCES

DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE
MAJOR: PLANT SCIENCE

CURRICULUM

UNIVERSITY REQUIREMENTS
ENGL 110 Critical Reading and Writing (minimum grade C) ............................................. 3
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content (see p 22) ............................................. 3
MAJOR REQUIREMENTS
Mathematics and Computer Science
Mathematics course ............................................................................................................. 3
Computer Science course (FREC 135 or equivalent) .............................................................. 3
Agricultural and Biological Sciences
Minimum of one course in three of the following areas: Food and Resource Economics, Food Science, Bioreources Engineering, Animal Science, Food Science, Entomology and Applied Ecology, or Biology ............................................. 9-12
Literature and Arts
Six credits selected from English, Art, Art History, Communication, Music, Theatre, or Foreign Language ............................................. 6
Social Sciences and Humanities
Minimum of one course in three of the following areas: Anthropology, Black American Studies, Criminal Justice, Economics, Education, Geography, History, Philosophy, Political Science, Psychology, Sociology, or Women’s Studies ............................................. 9

A course may be applied toward both the major requirements and a college requirement, but credits are counted only once toward graduation.

CHEM 101/102 General Chemistry I and II or
CHEM 103/104 General Chemistry I and II ........................................................................... 8
CHEM 213 Elementary Organic Chemistry ............................................................................. 4
One of the following: .................................................................................................................. 3-4
PHYS 101 Introduction to Physics
GEOL 105 General Geology
CHEM 214 Elementary Biochemistry
PLSC 101 Botany I .................................................................................................................. 4
PLSC 201 Botany II .................................................................................................................. 4
PLSC 204 Introduction to Soil Science ...................................................................................... 4
PLSC 300 Principles of Animal and Plant Genetics ................................................................. 3
PLSC 303 Introductory Plant Pathology .................................................................................... 4
PLSC 305 Environmental Soil Management ......................................................................... 4
PLSC 410 Introduction to Plant Physiology ............................................................................ 3

ELECTIVES
After required courses are completed, sufficient credits must be taken to meet the minimum credits required for the degree. Only two credits of activity-type Physical Education and/or two credits of performing Music organization credit may be counted toward the degree.

CREDITS TO TOTAL A MINIMUM OF ............................................................................ 124

NATURAL RESOURCE MANAGEMENT

Natural Resource Management is an interdepartmental major administered by the Departments of Entomology and Applied Ecology, Food and Resource Economics, and Plant and Soil Sciences. The purpose of the major is to teach an understanding of the social, physical, economic, legal, and political problems of managing the use and perpetuation of natural resources in the 21st century, together with the skills and capabilities to address those problems in the public or private forums. It combines education in the basic and applied biological and physical sciences with the fundamentals of public policy formulation.

The curriculum includes courses to help students understand the natural sciences, mathematics and statistics, economics and public policy; appreciate the world’s biodiversity; communicate effectively; use computers to manage information; and solve “real world” problems. Students will also have a broad interdisciplinary education in the arts, humanities, social sciences and environmental ethics.

Interested students should contact Dr. Steven Hastings, 229 Townsend Hall (302-831-1318).

DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE
MAJOR: NATURAL RESOURCE MANAGEMENT

CURRICULUM

UNIVERSITY REQUIREMENTS
ENGL 110 Critical Reading and Writing (minimum grade C) ............................................. 3
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content (see p 22) ............................................. 3
MAJOR REQUIREMENTS
Literature and Arts
Six credits selected from English, Art, Art History, Communication, Music, Theatre, or Foreign Language ............................................. 6
Social Sciences and Humanities
Minimum of one course in two of the following areas: Anthropology, Black American Studies, Criminal Justice, Education, Geography, History, Philosophy, Political Science, Psychology, Sociology, or Women’s Studies ............................................. 6
AGRI 165 Mastering the Freshman Year (or any equivalent Department freshman seminar) ............................................................................. 1
BISC 207/208 Introductory Biology I and II or
PLSC 101 Botany I .................................................................................................................. 4-8
CHEM 101/102 General Chemistry I and II or
CHEM 103/104 General Chemistry I and II ........................................................................... 8
ECON 151 Introduction to Microeconomics ........................................................................... 3
ECON 152 Introduction to Macroeconomics ......................................................................... 3
ENTO 201 Wildlife Conservation and Ecology ...................................................................... 3
MATH 221/222 Calculus I and II ............................................................................................ 6
FREC 135 Introduction to Data Analysis .................................................................................. 3
FREC 150 Economics of Agriculture and Natural Resources .................................................. 3
FREC 424 Resource Economics: Theory and Policy ............................................................. 3
FREC 444 Economics of Environmental Management ........................................................... 3
FREC 480 Geographic Information Systems in Natural Resource Management ......................... 4
PLSC 201 Botany II .................................................................................................................. 4
PLSC 204 Introduction to Soil Science .................................................................................... 4

GROUP I: Communications: 6 credits from the following: (including a minimum of three credits in oral communications)
Any course satisfying the College of Arts and Science second writing course requirement. Recommended courses are: ENGL 301-Expository Writing, ENGL 312-Written Communications in Business, ENGL 410-Technical Writing, ENGL 415-Writing in the Professions
AGRI 212 Oral Communication in Agriculture and Natural Resources
FREC 345 Strategic Selling and Buyer Communication
UNIV 401/402 Senior Thesis (Any student successfully completing a Senior Thesis may count three credits toward the writing course requirement of this group)

GROUP II: Chemistry/Physics: 8 credits from:
CHEM 213 Elementary Organic Chemistry ............................................................................. 8
CHEM 214 Elementary Biochemistry

CREDITS TO TOTAL A MINIMUM OF ............................................................................ 124
GENERAL AGRICULTURE

For the student with broad interests, the major in general agriculture is offered.

DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE
MAJOR: GENERAL AGRICULTURE

CURRICULUM

UNIVERSITY REQUIREMENTS

ENGL 110 Critical Reading and Writing (Minimum grade C) .................................... 3
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content [see p. 22]

MAJOR REQUIREMENTS

Mathematics and Computer Science
Mathematics course ................................................................................. 3
Computer Science course [FREC 135 or equivalent] ............................. 3

Agricultural and Biological Sciences ....................................................... 9-12

Minimum of one course in three of the following areas: Food and Resource Economics, Food Science, Bioresources Engineering, Animal Science, Entomology and Applied Ecology, Plant and Soil Sciences, or Biology

Social Sciences and Humanities ................................................................. 9

Minimum of one course in three of the following areas: Anthropology, Black American Studies, Criminal Justice, Economics, Education, Geography, History, Philosophy, Political Science, Psychology, Sociology, or Women’s Studies

Physical Sciences .......................................................................................... 8

Minimum of eight credits selected from one of the following two-course sequences:
CHEM 101/102 or 103/104
PHYS 201/202 or 207/208
GEOL 105 and 106

A minimum of one course in written communications chosen from the following: ............................................ 3
ENGL 301 Expository Writing
ENGL 302 Advanced Composition
ENGL 312 Written Communications in Business
ENGL 410 Technical Writing

A minimum of one course in oral communications chosen from the following: ............................................ 3
AGRI 212 Oral Communication
COMM 200 Introduction to Human Communication Systems
COMM 255 Fundamentals of Communication
COMM 312 Oral Communication in Business
COMM 350 Public Speaking
COMM 356 Small Group Communication

Within the college

Thirty additional credits from any of the following departments: .............................. 30
Food and Resource Economics, Bioresources Engineering, Animal Science, Entomology and Applied Ecology, Food Science, or Plant and Soil Sciences. Fifteen of the 30 credits must be in courses specifically required by other majors in the college | A maximum of twelve credits of Special Problem/Independent Study credits in all areas may be counted toward the degree, with a maximum of six credits in any one department

ELECTIVES

After required courses are completed, sufficient credits must be taken to meet the minimum credits required for the degree. Only four credits of activity-type Physical Education and/or four credits of performing Music credit may be counted toward the degree

CREDITS TO TOTAL A MINIMUM OF ........................................................................ 130

PREVETERINARY INSTRUCTION

Students in the College of Agriculture and Natural Resources who wish to prepare for entrance to a veterinary school should consult with the Department of Animal and Food Sciences. See curriculum in department listing.
THE ASSOCIATE IN SCIENCE DEGREE

A two-year Associate in Science (A.S.) degree is offered by the College of Agriculture and Natural Resources. This degree is ideal for students interested in agriculture who desire to spend only two years working toward a degree or who are unsure of their plans for higher education. Admission requirements for the associate degree are the same as for the baccalaureate degree.

The Associate in Science offers an extremely flexible curriculum. The student must complete a minimum of 62 credit hours, with at least 30 of the credits earned within at least four of the five departments in the college. A minimum of 32 credits for the degree must be earned at the University of Delaware. In addition, the recipient must be in good academic standing (have a minimum grade point average of 2.0). A candidate must apply for the associate degree during the academic term in which all requirements for the degree are to be completed and must, at the time of application, be enrolled in the college. Later application requires the approval of the student’s dean.

Although not necessarily recommended, a student could take all 62 credits in agricultural courses. A better approach would be for the student to take some course work in the areas of physical science, social science, English, and mathematics, along with his or her courses in agriculture. This approach would allow the student to more easily complete a B.S. degree program at a later date if desired.

For those students in Kent and Sussex Counties, the first year could be taken in Dover or Georgetown in the University Parallel Program at the Delaware Technical & Community College. This option would require careful planning, since 30 credits of agricultural courses would be needed in the second year at the College of Agriculture and Natural Resources in Newark.

OTHER COLLEGE RESOURCES

Cooperative Extension System. The Delaware Cooperative Extension System is a part of a nationwide system whose mission is to enable people to improve their lives and communities by developing learning partnerships that put knowledge to work. It serves as an educational resource to the people of Delaware for extending research results and advances in technology.

A major thrust of the Cooperative Extension system is to target programs to address critical national issues. The accelerating expansion of technology, the deteriorating economic situation in portions of the agricultural sector, and the dynamic social conditions faced by many Americans, rural and metropolitan, require the Extension to reassess priorities and continuously adapt programs and activities to meet human needs.

Undergraduate students find opportunities to work with Extension specialists to gain practical experience in dealing with the public and in providing information to the public on a wide variety of agriculturally related topics.

Agricultural Experiment Station. The Experiment Station serves as the college’s research arm, conducting research, fundamental and applied, in all phases of agriculture and rural life. By performing this function, it not only contributes to increased and efficient production and to improved marketing of agricultural products, but it serves to stabilize production by developing practices and techniques designed to protect crops and livestock against diseases, pests, and certain physical forces of nature. A majority of the professors in the College of Agriculture and Natural Resources have appointments in the Experiment Station.

Students find many opportunities to work with these professors in independent study projects that introduce them to biological, economic, and engineering technology research in the agricultural disciplines. Advanced undergraduates often gain valuable experience working for a professor in a laboratory or in the field on Experiment Station-sponsored research.