Many aspects of science, engineering, business, and economics come together to form the agricultural sciences. Comprising nearly 25 percent of the nation's workforce, these broad fields of study extend throughout society and provide opportunities in areas such as the development, manufacture, and sale of agricultural machinery, equipment, and chemicals; processing and marketing of agricultural products; biological research; animal health; environmental research and regulation; corporate farm management; ornamental horticulture and nursery management; and consulting work for foreign governments.

The curricula in the College of Agricultural Sciences are planned to 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 that are taking place in agriculture. Frequent consultation with a faculty adviser helps the student make steady progress toward achieving these educational goals.

The college's offices, classrooms, and laboratories are housed in Townsend Hall, Worrillow Hall, Fischer Greenhouse Laboratory, and the O.A. Newton Building, located on the south campus 400-acre experimental farm. The Research and Educational Center at Georgetown provides additional facilities for investigation in broiler and swine production, vegetables, and field crops.

Field trips to these facilities, to nearby agrichemical laboratories, and to commercial production, processing and marketing plants are included in many of the college's advanced courses.

Major programs are offered in agricultural business management, agricultural economics, agricultural education, agricultural engineering technology, animal science, entomology, environmental soil science, food science, entomology/plant pathology, plant science, and general agriculture. Concentrations are available in wildlife conservation, general entomology, ornamental horticulture, agronomy, pathology, general plant science, preveterinary medicine, agricultural biotechnology, applied animal science, general animal science, production and management, resource economics and rural development, and food marketing.

A program in engineering technology is available for students who have completed an Associate Degree in Engineering Technology or related area. An attractive feature of this program, as well as of the general agriculture program, is that students may complete their degree requirements on the Newark campus or through the Parallel Program at Dover or Georgetown.

DEAN'S SCHOLAR PROGRAM

Each year, the College of Agricultural Sciences invites a number of 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

Varied opportunities are open to those who prepare themselves in this field. 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 are to be found in educational administrative positions, production agriculture, the Agricultural Extension Service, the Soil Conservation Service, and various leadership positions in agricultural organizations and agencies. Those who continue...
agricultural education studies through graduate school may go into college and university teaching, research, and state, regional, or federal supervisory positions.

Curricula in agricultural education are arranged individually with the liaison professor in agricultural education. Selected information in the section of this catalog on the College of Education may be helpful to the agricultural education major.

**DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE**

### MAJOR: AGRICULTURAL EDUCATION

**CREDITS**

<table>
<thead>
<tr>
<th>UNIVERSITY REQUIREMENTS</th>
<th>CREDITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 110 Critical Reading and Writing**</td>
<td>3.1</td>
</tr>
<tr>
<td>Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content #</td>
<td>3.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>COLLEGE REQUIREMENTS</th>
<th>CREDITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics and Computer Science</td>
<td>3.1</td>
</tr>
<tr>
<td>Agricultural and Biological Sciences</td>
<td>9.12.1</td>
</tr>
</tbody>
</table>

Minimum of one course outside the student's major in three of the following areas: Food and Resource Economics, Food Science, Agricultural Engineering, Animal Science, Entomology and Applied Ecology, Plant and Soil Sciences, or Biology

<table>
<thead>
<tr>
<th>Literature and Arts</th>
<th>9.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nine credits from English and/or Communication</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Social Sciences and Humanities</th>
<th>9.2</th>
</tr>
</thead>
<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></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Physical Sciences</th>
<th>8.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum of eight credits from one of the following areas: Chemistry, Physics, Geology, or Physical Science</td>
<td></td>
</tr>
</tbody>
</table>

### MAJOR REQUIREMENTS

<table>
<thead>
<tr>
<th>External to the College</th>
<th>CREDITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDST 201 Education in a Multicultural Society</td>
<td>3.2</td>
</tr>
<tr>
<td>EDST 230 Introduction to Exceptional Children</td>
<td>3.2</td>
</tr>
<tr>
<td>EDST 304 Educational Psychology - Social Aspects</td>
<td>3.3</td>
</tr>
<tr>
<td>EDST 305 Educational Psychology - Cognitive Aspects</td>
<td>3.3</td>
</tr>
<tr>
<td>EDVD 400 Student Teaching</td>
<td>6.1</td>
</tr>
</tbody>
</table>

The Agricultural Education program requires a certain minimum G.P.A. for enrollment in EDVD 400, Student Teaching, a course required for the degree. The teacher education program advisor (see list on p. 143) should be consulted for the exact G.P.A. requirements and other policies concerning qualifications for student teaching.

<table>
<thead>
<tr>
<th>Within the College</th>
<th>CREDITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>A 2.75 index in at least thirty credits of technical agriculture</td>
<td>30.3.4</td>
</tr>
<tr>
<td>from at least three departments in the college</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Within the Department</th>
<th>CREDITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional Education</td>
<td></td>
</tr>
<tr>
<td>AGED 380 Agricultural Education Materials and Approaches I</td>
<td>3.3</td>
</tr>
<tr>
<td>AGED 381 Agricultural Education Materials and Approaches II</td>
<td>3.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ELECTIVES</th>
<th>CREDITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>32-351</td>
<td></td>
</tr>
</tbody>
</table>

May include Military Science, Music, or Physical Education. (Only four credits of activity-type Physical Education and/or four credits of performing Music organization credit may be counted toward the degree.)

In order to graduate with a major in Agricultural Education, students must have a minimum of 40 credit hours of General Education.

| CREDITS TO TOTAL A MINIMUM OF | 130 |

---

**AGRICULTURAL ENGINEERING**

Agricultural engineering technology is a part of the broad discipline of agricultural engineering that bridges two fields of applied sciences: agriculture and engineering. Agricultural 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.

This agricultural engineering technology curriculum is designed to prepare students for engineering-related employment in agricultural industries. A scientific or business background may be obtained according to the student's interest through the selection of electives in the College of Agricultural Sciences and other colleges of the University. To graduate with a major in agricultural engineering technology, students must attain a 2.0 average in agricultural engineering technology courses. This is in addition to the University requirement for graduation that a 2.0 average be attained in all course work at the University.

The computer is a heavily used tool throughout the agricultural engineering technology curriculum. Students are urged to purchase a personal computer. Please contact the department chair for further information on computer specifications or the academic program.

**DEGREE: BACHELOR OF APPLIED SCIENCE**

### MAJOR: AGRICULTURAL ENGINEERING TECHNOLOGY

**CREDITS**

<table>
<thead>
<tr>
<th>UNIVERSITY REQUIREMENTS</th>
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</tr>
</thead>
<tbody>
<tr>
<td>ENGL 110 Critical Reading and Writing**</td>
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<tr>
<td>Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content #</td>
<td>3.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>COLLEGE REQUIREMENTS</th>
<th>CREDITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communications</td>
<td>6.13</td>
</tr>
<tr>
<td>Six credits selected to provide training in oral and written communications to include:</td>
<td></td>
</tr>
<tr>
<td>EGTE 365 Junior Seminar</td>
<td>1.3</td>
</tr>
<tr>
<td>A second writing course selected from the following:</td>
<td></td>
</tr>
<tr>
<td>ENGL 301 Expository Writing</td>
<td>3.3</td>
</tr>
<tr>
<td>ENGL 302 Advanced Composition</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 307 News Writing and Editing</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 312 Written Communications in Business</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 410 Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>An oral communications course selected from the following:</td>
<td></td>
</tr>
<tr>
<td>COMM 200 Introduction to Human Communication Systems</td>
<td>3.3</td>
</tr>
<tr>
<td>COMM 255 Fundamentals of Communication</td>
<td>3</td>
</tr>
<tr>
<td>COMM 312 Oral Communication in Business</td>
<td>3</td>
</tr>
<tr>
<td>COMM 350 Public Speaking</td>
<td>3</td>
</tr>
<tr>
<td>COMM 356 Small Group Communication</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Social Sciences and Humanities</th>
<th>15.14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fifteen credits selected to provide an appreciation and understanding of our cultural heritage, interpersonal relationships, interrelationships between technology and society and a value system for sound decision making</td>
<td></td>
</tr>
<tr>
<td>Nine credits to be selected from a minimum of three 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</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Basic Sciences and Mathematics</th>
<th>31.13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thirty-one credits selected to provide fundamental knowledge about nature and its phenomena and mathematics including calculus as follows:</td>
<td></td>
</tr>
</tbody>
</table>
ENGINEERING TECHNOLOGY

Engineering technology is part of the broad discipline of engineering, in which a knowledge of the mathematical and natural sciences is applied to utilize materials and forces for the benefit of mankind. Engineering technology requires the application of scientific and engineering knowledge combined with technical skills in support of engineering activities. Technical management, an integral part of the curriculum, provides basic management concepts utilized in engineering and production-related projects.

The engineering technology curriculum provides a student with a strong background in the basic sciences and the latest technological advances in engineering and management concepts. The engineering technologist is a problem solver and is applications oriented. The engineering technology curriculum prepares the engineering technologist to make independent judgments, to understand systems components, and to operate systems to achieve conceptual goals without jeopardizing their effectiveness, safety or cost. Close liaison is maintained between the educational programs and industry to give graduates the greatest opportunity for career development and to accommodate industry’s needs for competent manpower.

Admission to the engineering technology major requires an Associate Degree in Engineering Technology or equivalent. The curriculum has been structured so that a student may pursue a B.A.S. degree on a full- or part-time basis. Students may complete degree requirements in Newark or through the University Parallel Program at Dover or Georgetown.

Because of mutual interests and problems in production, the ET major is jointly offered by the Department of Agricultural Engineer-
ing and the Department of Food and Resource Economics. Prospective students are urged to contact the ET adviser to evaluate their previous academic work prior to seeking formal admission to the program.

DEGREE: BACHELOR OF APPLIED SCIENCE
MAJOR: ENGINEERING TECHNOLOGY

CURRICULUM

UNIVERSITY REQUIREMENTS
ENGL 110 Critical Reading and Writing** 3
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content #

COLLEGE REQUIREMENTS
Communications
Six credits selected to provide training in oral and written communications to include:
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 the following:
COMM 200 Introduction to Human Communication Systems 3
COMM 255 Fundamentals of Communication 3
COMM 312 Oral Communication in Business 3
COMM 350 Public Speaking 3
COMM 356 Small Group Communication 3

Social Sciences and Humanities
Fifteen credits selected to provide an appreciation and understanding of our cultural heritage, interpersonal relationships, interrelationships between technology and society and a value system for sound decision making to include:
ECON 151 Introduction to Microeconomics: Prices and Markets 3
ECON 152 Introduction to Macroeconomics: National Economy 3
Nine credits to be selected from a minimum of three 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
Thirty-one credits selected to provide fundamental knowledge about nature and its phenomena and mathematics including calculus as follows:

Biology, Chemistry and Physics
Biological/Life Science course 3
CHEM 103 General Chemistry 4
CHEM 104 General Chemistry 4

PHYS 201 Introductory Physics I 4
or
PHYS 207 Fundamentals of Physics I 4

PHYS 202 Introductory Physics II 4
or
PHYS 208 Fundamentals of Physics II 4

Mathematics and Statistics
A minimum of 12 credits in mathematics and statistics Specific requirements are:
MATH 221 Calculus I 3
or
MATH 241 Analytic Geometry and Calculus A 4
MATH 222 Calculus II 3
or
MATH 242 Analytic Geometry and Calculus B 4
STAT 201 Introduction to Statistics I 3
or
MATH 243 Analytic Geometry and Calculus C 4
Elective Mathematics or Statistics course of the 200-level or above 3

MAJOR REQUIREMENTS†

Technical Sciences
Eighteen credits that deal with the application of engineering science subject matter to include one course in each of the following areas: Electricity, Fluid Mechanics, Statics, and Thermodynamics. In addition, a course must be selected from one of the following areas: Dynamics, Electronics, Materials Technology, or Strength of Materials

Technical Skills†
A maximum of thirty credits selected to provide skills and knowledge of appropriate methods, procedures and techniques and may include computer use, graphics, problem solving, processes, construction techniques, instrumentation techniques, production methods, field operations, plant operations, safety and maintenance to include:
Instrumentation or microprocessors course 3
EGTE 111 Computer Applications in Engineering Technology 3
EGTE 112 Personal Computers and Technology 3

Technical Specialization
A minimum of nine credits selected from courses that involve technical design and electives. Students must complete at least 48 semester hours in course work assigned to technical science, technical skills and technical specialization categories. At least one course that emphasizes use of the computer as a problem-solving tool will be required and will be selected from:
EGTE 321 Storm Water Management 4
EGTE 351 Mechanical Power Units 4
EGTE 456 Fundamentals of HVAC 3
EGTE 455 Machinery Design and Development 3

Technical Management
A minimum of fifteen credits selected to enhance the ability to understand the operation and management of companies and/or their production units to include:
FREC 201 Records and Accounts 3
or
ACCT 207 Accounting I 3
ACCT 208 Accounting II 3
Accounting credits cannot exceed six of fifteen credit hours. FREC 201 will not substitute for ACCT 207. ACCT 207 will substitute for FREC 201.

ELECTIVES
After required courses, sufficient elective credits must be taken to meet the minimum number of 130 credits. May include Military Science, Music, or Physical Education. (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

Students entering this major are expected to have an associate degree and transfer fifty credits or more

ANIMAL AND FOOD SCIENCES
The Department of Animal and Food Sciences offers undergraduate major and minor programs in Animal Science and in Food Science.

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: preveterinary 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 preveterinary training required for admission to veterinary school. Students are encouraged to participate in a broad realm of animal science research projects in the department through independent study/special problems courses.

The Food Science major is designed to provide students with a broad understanding and professional preparation in areas of food production, processing, evaluation, and distribution. These include positions within the food and allied industries, the government, and independent research institutions. The role of the food scientist in such positions may involve production and process development, engineering, quality control, technical service and sales, and regulatory service, education, or basic research. The food science research program has opportunities for students in three areas: (1) packaging, package product interaction, and food chemistry; (2) biotechnology, fermentations, and food microbiology; and (3) process engineering technology. Educational and research opportunities in biotechnology are fostered by the department’s Biotechnology Group. The program includes course work in life and chemical sciences, mathematics and engineering, plus independent research work on applied science problems. Students may join as members of the Institute of Food Technologists.

Department faculty foster student involvement in the University Honors Programs through sponsorship of Science and Engineering Scholars and candidates for the Degree with Distinction. The teaching philosophy of the department faculty is to emphasize basic knowledge pertaining to animal and food sciences.

A curriculum for each major/concentration follows; the minors in Animal Science and in Food Science are also described. The preveterinary 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.

**DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE**

**MAJOR: ANIMAL SCIENCE**

**CONCENTRATION: PREVETERINARY MEDICINE**

**COURSES**

**UNIVERSITY REQUIREMENTS**

<table>
<thead>
<tr>
<th>ENGL 110 Critical Reading and Writing**</th>
<th>Mathematics course (MATH 115 or higher level)</th>
<th>FREC 135, or equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content</td>
<td>3 credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content</td>
<td></td>
</tr>
</tbody>
</table>

**COLLEGE REQUIREMENTS**

<table>
<thead>
<tr>
<th>Mathematics and Computer Science</th>
<th>Agricultural and Biological Sciences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics course (MATH 115 or higher level)</td>
<td>Minimum of one course outside the student's major in three of the following areas: Food and Resource Economics, Food Science, Agricultural Engineering, Entomology and Applied Ecology, Plant and Soil Sciences, or Biology.</td>
</tr>
<tr>
<td>3 credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content</td>
<td>9-12 credits</td>
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</table>

**DEPARTMENT REQUIREMENTS**

<table>
<thead>
<tr>
<th>ENGL 110 Critical Reading and Writing**</th>
<th>Mathematics course (MATH 115 or higher level)</th>
<th>FREC 135, or equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content</td>
<td>3 credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content</td>
<td></td>
</tr>
</tbody>
</table>

**ELECTIVES**

**Electives**

May include Military Science, Music, or Physical Education. (Only four credits of activity-type Physical Education and/or four credits of performing Music organization credit may be counted toward the degree.)

**Recommended Electives**

<table>
<thead>
<tr>
<th>FREC 201 Records and Accounts</th>
<th>ANSC 270 Biotechnology: Science and Socioeconomic Issues</th>
<th>ANSC 451 Infection and Immunity in Animal Diseases</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 credits</td>
<td>3 credits</td>
<td>3 credits</td>
</tr>
</tbody>
</table>

**CREDITS TO TOTAL A MINIMUM OF 130**

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*Superior figures indicate year or years in which the course is normally taken, i.e., 1 freshman year, 2 sophomore year, etc.

**This requirement may be fulfilled through a course or courses taken to complete other degree requirements; it cannot be fulfilled by a course taken pass/fail. See page 21.
DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE
MAJOR: ANIMAL SCIENCE
CONCENTRATION: AGRICULTURAL BIOTECHNOLOGY

CURRICULUM

CREDITS*

UNIVERSITY REQUIREMENTS
ENGL 110 Critical Reading and Writing** 3 1

Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content#

COLLEGE REQUIREMENTS
Mathematics and Computer Science
Mathematics course (MATH 115 or higher level) 3 1

Computer Science course selected from CISC 105, EGTE 111, FREC 135, or equivalent

Agricultural and Biological Sciences
9 12 3

Minimum of one course outside the student’s major in three of the following areas: Food and Resources Economics, Food Science, Agricultural Engineering, Entomology and Applied Ecology, Plant and Soil Sciences, or Biology.

Literature and Arts
Six credits selected from the general areas of English, Art, Art History, Communication, Music, Theatre, or Foreign Language.

Social Sciences and Humanities
9 3

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 1

Minimum of eight credits selected from one of the following areas: Chemistry, Physics, Geology, or Physical Science.

MAJOR REQUIREMENTS

External to the College
BISC 207 Introductory Biology I 4 3

BISC 208 Introductory Biology II 4 3

CHEM 101 General Chemistry 4 1

CHEM 103 General Chemistry 4 3

CHEM 102 General Chemistry 4 1

CHEM 104 General Chemistry 4 1

Within the Department
ANSC 101 Introduction to Animal Science 3 1

ANSC 111 Animal Science Laboratory 1 1

ANSC 140 Functional Anatomy 4 3

ANSC 251 Livestock Nutrition and Feeding 4 3

ANSC 300 Principles of Animal and Plant Genetics 3 3

ANSC 332 Introduction to Animal Diseases 3 3

ANSC 345 Comparative Physiology of Domestic Animals 4 3

ANSC 465 Seminar 4 1

One course must be selected from the following:
ANSC 404 Dairy Production
ANSC 417 Beef Cattle and Sheep Production
ANSC 418 Swine Production
ANSC 421 Poultry Production

Animal Science courses
5 3

No more than five credits of ANSC 266, 366, 466 or 666 Special Problem/Independent Study may be used for the major.

Credit toward the major will be granted for only two of the following:
ANSC 221, 322, 342, or 420

Within the Concentration
ANSC 270 Biotechnology: Science and Socioeconomic Issues 3 2

ANSC 310 Animal Genetics Laboratory 3 3

ANSC 431 Infection and Immunity in Animal Diseases 4 3

ANSC 466 Independent Study (Approved research project) 5 3

ANSC 520 Molecular Genetics 3 4

BISC 301 Molecular Biology of the Cell 4 3

BISC 371 Introduction to Microbiology 4 3

CHEM 321 Organic Chemistry 3 3

CHEM 325 Organic Chemistry Laboratory 1 1

CHEM 327 Organic Chemistry 3 3

CHEM 328 Organic Chemistry Laboratory 1 1

CHEM 329 Organic Chemistry Laboratory 1 1

CHEM 527 Introductory Biochemistry 3 3

or

CHEM 641 and CHEM 642 Biochemistry 4 3

MATH 221 Calculus I 3 3

PHYS 201 Introductory Physics I 4 3

PHYS 202 Introductory Physics II 4 3

Select a minimum of one course from the following:
ANSC 624 Monogastric Nutrition 3 4

ANSC 633 Poultry Pathology 3 4

ANSC 635 Introduction to Virology 3 4

ANSC 643 Molecular Endocrinology 3 4

ANSC 645 Avian Physiology 3 4

ANSC 654 Ruminant Nutrition 3 4

One additional course must be selected from the following:
BISC 601 Immunology
BISC 602 Molecular Biology of Animal Cells
BISC 650 Bacterial Physiology
BISC 663 Recent Advances in Molecular Biology
BISC 654 Biochemical Genetics
BISC 658 Developmental Genetics
BISC 671 Immunobiology
BISC 679 Virology
BISC 693 Human Genetics

ELECTIVES

Electives
2 7

May include Military Science, Music, or Physical Education. (Only four credits of activity-type Physical Education and/or four credits of performing Music organization credit may be counted toward the degree.)

Recommended Electives
CHEM 220 Quantitative Analysis 3 4

CHEM 418 Introductory Physical Chemistry 3 4

COMM 350 Public Speaking 3 2

ENGL 312 Written Communication in Business 3 2

FREC 409/639 Food Microbiology 4 4

FOSC 449/649 Fermentation Technology 4 4

CREDITS TO TOTAL A MINIMUM OF 130

DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE
MAJOR: ANIMAL SCIENCE
CONCENTRATION: APPLIED ANIMAL SCIENCE

CURRICULUM

CREDITS*

UNIVERSITY REQUIREMENTS
ENGL 110 Critical Reading and Writing** 3 1

Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content#

COLLEGE REQUIREMENTS
Mathematics and Computer Science
Mathematics course (MATH 115 or higher level) 3 1

Computer Science course selected from CISC 105, EGTE 111, FREC 135, or equivalent

Agricultural and Biological Sciences
9 12 3

Minimum of one course outside the student’s major in three of the following areas: Food and Resources Economics, Food Science, Agricultural Engineering, Entomology and Applied Ecology, Plant and Soil Sciences, or Biology.

Literature and Arts
Six credits selected from the general areas of English, Art, Art History, Communication, Music, Theatre, or Foreign Language.

Social Sciences and Humanities
9 3

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.

* Superior figures indicate year or years in which the course is normally taken, i.e., 1 freshman year, 2 sophomore year, etc.

** Minimum grade of C required.

# This requirement may be fulfilled through a course or courses taken to complete other degree requirements; it cannot be fulfilled by a course taken pass/fail. See page 21.
**Physical Sciences**

Minimum of eight credits selected from one of the following areas: Chemistry, Physics, Geology, or Physical Science.

**MAJOR REQUIREMENTS**

External to the College

- BISC 207 Introductory Biology I ......................................................... 4
- BISC 208 Introductory Biology II ..................................................... 4
- CHEM 101 General Chemistry ......................................................... 4
  or
- CHEM 103 General Chemistry ......................................................... 4
- CHEM 102 General Chemistry ......................................................... 4
  or
- CHEM 104 General Chemistry ......................................................... 4

Within the Department

- ANSC 101 Introduction to Animal Science ........................................ 3
- ANSC 111 Animal Science Laboratory ............................................. 1
- ANSC 142 Behavioral Anatomy .......................................................... 1
- ANSC 251 Livestock Nutrition and Feeding ....................................... 4
- ANSC 300 Principles of Animal and Plant Genetics ................................ 3
- ANSC 332 Introduction to Animal Diseases .................................... 3
- ANSC 345 Comparative Physiology of Domestic Animals ....................... 3
- ANSC 465 Seminar ........................................................................... 1

One course must be selected from the following:

- ANSC 404 Dairy Production ................................................................ 3
  or
- ANSC 417 Beef Cattle and Sheep Production ........................................ 3
  or
- ANSC 418 Swine Production ............................................................ 3
  or
- ANSC 421 Poultry Production .......................................................... 3

Animal Science courses .................................................................. 5

No more than five credits of ANSC 266, 366, 466, or 666 Special Problem/Independent Study may be used for the major.

Credit toward the major will be granted for only two of the following:

- ANSC 221, 322, 342, or 420.

**With the Concentration**

- FREC 150 Economics of Agriculture and Natural Resources ........... 3
- FREC 201 Records and Accounts ..................................................... 3
- ANSC 201 Behavior of Domestic Animals ........................................ 3
- ANSC 441 Reproductive Physiology .................................................. 3
- ANSC 446 Environmental Physiology of Domestic Animals ............... 4
- ANSC 452 Advanced Comparative Animal Nutrition ......................... 4
- CHEM 212 Organic Chemistry ........................................................... 4
- CHEM 214 Elementary Biochemistry ............................................... 3
- CHEM 216 Elementary Biochemistry Laboratory ................................. 1
- ENTO 205 Elements of Entomology ................................................. 3
- PLSC 151 Introduction to Crop Science ............................................ 3
- PLSC 204 Introduction to Soil Science ............................................. 3

Select a minimum of three courses from the following:

- ANSC 404 Dairy Production ............................................................ 3
- ANSC 417 Beef Cattle and Sheep Production ........................................ 3
- ANSC 418 Swine Production ............................................................ 3
- ANSC 420 Equine Management ....................................................... 3
- ANSC 421 Poultry Production .......................................................... 3

**ELECTIVES**

- Electives ......................................................................................... 21-24

May include Military Science, Music, or Physical Education. [Only four credits of activity-type Physical Education and/or four credits of performing Music organization credit may be counted toward the degree.]

**Recommended Electives**

- FREC 153 Agricultural Salesmanship ............................................... 3
- FREC 350 Farm Management ............................................................ 3
- EGTE 328 Agricultural Waste Management Systems ................... 3
- ANSC 270 Biotechnology: Science and Socioeconomic Issues .......... 3
- ANSC 431 Infection and Immunity in Animal Diseases ................... 4
- BISC 371 Introduction to Microbiology ............................................ 4
- COMM 312 Oral Communication in Business .................................. 3
- ENGL 312 Written Communications in Business .......................... 3
- PLSC 401 Agronomic Crop Science .................................................. 3

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

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**DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE**

**MAJOR: ANIMAL SCIENCE**

**CONCENTRATION: GENERAL ANIMAL SCIENCE**

**CURRICULUM**

**CREDITS**

**UNIVERSITY REQUIREMENTS**

- ENGL 110 Critical Reading and Writing** ........................................ 3
- Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content #

**COLLEGE REQUIREMENTS**

- Mathematics and Computer Science
  - Mathematics course (MATH 115 or higher level) .......................... 3
  - Computer Science course selected from CISC 105, EGTE 111, FREC 135, or equivalent

- Agricultural and Biological Sciences ............................................. 9
  - Minimum of one course outside the student's major in three of the following areas: Food and Resources Economics, Food Science, Agricultural Engineering, Entomology and Applied Ecology, Plant and Soil Sciences, or Biology

- Literature and Arts
  - Six credits selected from the general areas of 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

- Physical Sciences
  - Minimum of eight credits selected from one of the following areas: Chemistry, Physics, Geology, or Physical Science.

**MAJOR REQUIREMENTS**

External to the College

- BISC 207 Introductory Biology I ..................................................... 4
- BISC 208 Introductory Biology II ..................................................... 4
- CHEM 101 General Chemistry ......................................................... 4
  or
- CHEM 103 General Chemistry ......................................................... 4
- CHEM 102 General Chemistry ......................................................... 4
  or
- CHEM 104 General Chemistry ......................................................... 4

Within the Department

- ANSC 101 Introduction to Animal Science ........................................ 3
- ANSC 111 Animal Science Laboratory ............................................. 1
- ANSC 142 Behavioral Anatomy .......................................................... 1
- ANSC 251 Livestock Nutrition and Feeding ....................................... 4
- ANSC 300 Principles of Animal and Plant Genetics ................................ 3
- ANSC 332 Introduction to Animal Diseases .................................... 3
- ANSC 345 Comparative Physiology of Domestic Animals ....................... 3
- ANSC 465 Seminar ........................................................................... 1

One course must be selected from the following:

- ANSC 404 Dairy Production ............................................................ 3
  or
- ANSC 417 Beef Cattle and Sheep Production ........................................ 3
  or
- ANSC 418 Swine Production ............................................................ 3
  or
- ANSC 421 Poultry Production .......................................................... 3

Select a minimum of three courses from the following:

- ANSC 404 Dairy Production ............................................................ 3
- ANSC 417 Beef Cattle and Sheep Production ........................................ 3
- ANSC 418 Swine Production ............................................................ 3
- ANSC 420 Equine Management ....................................................... 3
- ANSC 421 Poultry Production .......................................................... 3

**ELECTIVES**

- Electives ......................................................................................... 58-61

May include Military Science, Music, or Physical Education. [Only four credits of activity-type Physical Education and/or four credits of performing Music organization credit may be counted toward the degree.]
**COLLEGE OF AGRICULTURAL SCIENCES • ANIMAL AND FOOD SCIENCES**

**Recommended Electives**
- FREC 201 Records and Accounts 3
- ANSC 270 Biotechnology: Science and Socioeconomic Issues 3
- ANSC 240 Equine Management 3.24
- BISC 371 Introduction to Microbiology 3
- COMM 350 Public Speaking 3
- ENOL 312 Written Communications in Business 3

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

**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, 441, or 446; and one course from ANSC 404, 417, 418, 420, and 421.

**DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE**

**MAJOR: FOOD SCIENCE**

**CURRICULUM**

<table>
<thead>
<tr>
<th>Mathematics and Computer Science</th>
<th>Credits*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics course</td>
<td>3</td>
</tr>
<tr>
<td>Computer Science course selected from CISC 105, EGTE 111</td>
<td>3</td>
</tr>
<tr>
<td>FREC 135, or equivalent</td>
<td></td>
</tr>
</tbody>
</table>

**Agricultural and Biological Sciences**

Minimum of one course outside the student’s major in three of the following areas: Food and Resource Economics, Agricultural Engineering, Animal Science, Entomology and Applied Ecology, Plant and Soil Sciences, or Biology

**Literature and Arts**

Six credits selected from the general areas of 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

**Physical Sciences**

Minimum of eight credits selected from one of the following areas: Chemistry, Physics, Geology, or Physical Science

**MAJOR REQUIREMENTS**

**External to the College**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 103 General Chemistry</td>
<td>4¹</td>
</tr>
<tr>
<td>CHEM 104 General Chemistry</td>
<td>4¹</td>
</tr>
<tr>
<td>CHEM 214 Elementary Biochemistry</td>
<td>3²</td>
</tr>
<tr>
<td>CHEM 220 Quantitative Analysis I</td>
<td>3²</td>
</tr>
<tr>
<td>CHEM 221 Quantitative Analysis Laboratory</td>
<td>1²</td>
</tr>
<tr>
<td>PHYS 201 Introductory Physics I</td>
<td>4²</td>
</tr>
<tr>
<td>PHYS 202 Introductory Physics II</td>
<td>4²</td>
</tr>
<tr>
<td>BISC 207 Introductory Biology I</td>
<td>4¹</td>
</tr>
<tr>
<td>BISC 208 Introductory Biology II</td>
<td>4¹</td>
</tr>
<tr>
<td>BISC 371 Introduction to Microbiology</td>
<td>4²</td>
</tr>
<tr>
<td>CHEM 321 Organic Chemistry</td>
<td>3²</td>
</tr>
<tr>
<td>CHEM 325 Organic Chemistry Laboratory</td>
<td>1²</td>
</tr>
<tr>
<td>CHEM 322 Organic Chemistry</td>
<td>3²</td>
</tr>
<tr>
<td>CHEM 326 Organic Chemistry Laboratory</td>
<td>1²</td>
</tr>
<tr>
<td>CHEM 418 Introductory Physical Chemistry</td>
<td>3³</td>
</tr>
<tr>
<td>CHEM 419 Introductory Physical Chemistry</td>
<td>3³</td>
</tr>
<tr>
<td>or CHEM 527 Introductory Biochemistry</td>
<td>3³</td>
</tr>
<tr>
<td>CHEM 445 Physical Chemistry Laboratory</td>
<td>1³</td>
</tr>
<tr>
<td>NDTD 200 Nutrition Concepts</td>
<td>3¹</td>
</tr>
<tr>
<td>ECON 151 Introduction to Microeconomics: Prices and Markets</td>
<td>3¹</td>
</tr>
</tbody>
</table>

**PSYC 201 General Psychology** 3¹
**MATH 221 Calculus I** 3¹
**or MATH 241 Analytic Geometry and Calculus A** 4
**MATH 222 Calculus II** 3¹
**or MATH 242 Analytic Geometry and Calculus B** 4

**Within the College**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FREC 135 Introduction to Data Analysis</td>
<td>3¹</td>
</tr>
<tr>
<td>FREC 408 Research Methods</td>
<td>3¹</td>
</tr>
</tbody>
</table>

**ELECTIVES**

**Electives**

May include Military Science, Music, or Physical Education. (Only two credits of activity-type Physical Education and four credits of Music organization credits and four credits of 100- and 200-level courses in Military Science/Air Force may be counted toward the degree)

**CREDITS TO TOTAL A MINIMUM OF .................................................. 132**

**MINOR IN FOOD SCIENCE**

The following minor in food science requires application and admission to the program and successful completion of 15 food science credits. The minor in Food Science provides students in other degree programs with an opportunity to acquaint themselves with food science. Completion of the minor will provide the student with a basic understanding of this complex technology which includes sciences as diverse as microbiology and engineering. Since Food Science is a multidisciplinary applied science, any student in any curriculum may minor in food science; however, the exact course requirements will be determined by the FSC minor adviser. Course selection would depend on completion of prerequisites and other science and math preparation.

**Student Eligibility Requirements**

1. The minor is awarded only to students who have applied and been admitted to the program
2. A C grade or 2.00 or higher is required in all FOSC courses for the minor in Food Science. The minor in Food Science requires a minimum of 15 food science credits. Required FOSC 305/306 (3), and any 3 other FOSC courses
3. Successful completion of mathematics courses are required prior to taking food science courses for the minor

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 221 Calculus I (3)</td>
<td></td>
</tr>
<tr>
<td>MATH 222 Calculus II (3)</td>
<td></td>
</tr>
</tbody>
</table>

**Number of credits required: 15**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOSC 305/306 Food Science &amp; Laboratory</td>
<td>3</td>
</tr>
</tbody>
</table>

Select any 3 courses (12 credits) from:

- FOSC 409 Food Processing I | 4 |
- FOSC 410 Food Processing II | 4 |
FOSC 428 Food Chemistry ................................. 4
FOSC 429 Food Analysis .................................... 4
FOSC 439 Food Microbiology ................................. 4
FOSC 445 Food Engineering Technology .................. 4
FOSC 446 Food Process Engineering Technology I ...... 4
FOSC 449 Food Biotechnology .............................. 4

Prerequisites may be waived. Permission of instructor to register is based on individual student academic record and major. See a food science faculty member for advisement on readiness for specific FOSC courses and course selection for the minor.

CREDITS TO TOTAL A MINIMUM OF ........................................ 15

ENTOMOLOGY AND APPLIED ECOLOGY

Entomology emphasizes the structure, physiology, behavior, development, 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 insect, plant science, and biology courses 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.

The faculty adviser and student jointly plan the course program, according to the student's career objective. Successful students enter research, teaching, business, or public service positions. They frequently pursue graduate degrees in entomology, physiology, genetics, ecology, wildlife conservation, or biology to expand their career opportunities. Admission to graduate study requires strong academic performance and a solid background in the sciences.

DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE
MAJOR: ENTOMOLOGY
CONCENTRATION: GENERAL ENTOMOLOGY

CURRICULUM

CREDITS*

UNIVERSITY REQUIREMENTS

ENGL 110 Critical Reading and Writing** ........................ 3
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content # .............................. 3

COLLEGE REQUIREMENTS

Mathematics and Computer Science

Mathematics course (MATH 115, 171 or higher level) .................. 3
Computer Science course selected from CISC 105, EGTE 111, FREC 135, or equivalent .......................... 3

Agricultural and Biological Sciences ............................ 9

Minimum of one course outside the student's major in three of the following areas: Food and Resource Economics, Food Science, Agricultural Engineering, Animal Science, Plant and Soil Sciences, or Biology

Literature and Arts .................................................. 6

Six credits selected from the general areas of English, Art, Art History, Communication, Music, Theatre, or Foreign Language

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 areas: Chemistry, Physics, Geology, or Physical Science.

MAJOR REQUIREMENTS†

Within or External to the College

AGRI 211 Literature of Agricultural and Life Sciences .... 1
BISC 207 Introductory Biology I ................................ 1
BISC 208 Introductory Biology II ................................ 1
BISC 302 General Ecology ....................................... 3
CHEM 101 General Chemistry ...................................... 4
CHEM 103 General Chemistry ...................................... 4
CHEM 102 General Chemistry ...................................... 4
CHEM 104 General Chemistry ...................................... 4

Nine credits from the following: ................................. 9

Biology (BISC) courses at or above 300 level and the following PLSC courses: .......................... 4
PLSC 151 Introduction to Crop Science
PLSC 201 Botany I .................................................. 4
PLSC 204 Introduction to Soil Science .......................... 4
PLSC 211 Herbaceous Landscape Plants ......................... 4
PLSC 212 Woody Landscape Plants ............................. 4
PLSC 303 Introductory Plant Pathology .................................................. 4
PLSC 402 Plant Taxonomy .......................................... 3

Within the Department***

ENTO 205 Elements of Entomology ................................ 3
ENTO 305 Entomology Laboratory .................................. 2
ENTO 405 Insect Identification-Taxonomy ..................... 3
ENTO 465 Seminar ..................................................... 1

Within the Concentration***

ENTO 300 Principles of Animal and Plant Genetics ......... 3
ENTO 405 Insect Structure and Function ......................... 3
ENTO 408 Field Taxonomy .......................................... 3

ENTO courses (may include 3 credits maximum of Independent Study, Research, and Field Experience) ............................................. 6

ELECTIVES

Electives

May include Military Science, Music, or Physical Education (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

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

CURRICULUM

CREDITS*

UNIVERSITY REQUIREMENTS

ENGL 110 Critical Reading and Writing** ........................ 3
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content # .............................. 3

COLLEGE REQUIREMENTS

Mathematics and Computer Science

Mathematics course (MATH 115, 171 or higher level) .................. 3
Computer Science course selected from CISC 105, EGTE 111, FREC 135, or equivalent .......................... 3

Agricultural and Biological Sciences ............................ 9

Minimum of one course outside the student's major in three of the following areas: Animal Science, Food and Resource Economics, Food Science, Agricultural Engineering, Plant and Soil Science or Biology.

* Superior figures indicate year or years in which the course is normally taken, i.e., 1=freshman year, 2=sophomore year, etc.
** Minimum grade of C required.
# This requirement may be fulfilled through a course or courses taken to complete other degree requirements. It cannot be fulfilled by a course taken pass/fail. See page 21
1A course may be applied toward both the major requirement and a college requirement, but credits are counted only once toward the total credits for graduation.
*** A grade of C or better is required for all ENTO credits used to satisfy departmental requirements

55
The minor in entomology requires 15 credits of courses with an emphasis on general entomology or wildlife conservation by proper selection. A minimum grade of C is required for all ENTO credits used to satisfy departmental requirements.

**REQUIREMENTS FOR A MINOR IN ENTOMOLOGY**

The minor in entomology requires 15 credits of courses with an ENTO prefix, including: ENTO 205, 305, and 406. A student may emphasize general entomology or wildlife conservation by proper selection.
choice of ENTO courses for the remaining 7 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.

ENTOMOLOGY/PLANT PATHOLOGY

Because of mutual interests and problems in the field of plant protection, the Department of Entomology and Applied Ecology and the Department of Plant and Soil Sciences offer a joint major, entomology/plant pathology (EPP). In a world of expanding population and increasing pressure on supplies of food and fiber, both plant pathology and entomology offer the challenge and satisfaction of a career that contributes to human welfare. This combined major allows students to study both insects and plant diseases. It includes courses emphasizing recognition of pests and their symptoms and strategies for pest management compatible with the agricultural system and the environment.

Students majoring in EPP are neither entomology nor plant science majors and therefore are not subject to any special requirements of either department.

DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE

MAJOR: ENTOMOLOGY/PLANT PATHOLOGY

COLLEGE REQUIREMENTS

Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content #

Within the Departments

ENTO 205 Elements of Entomology
ENTO 305 Entomology Laboratory
ENTO 406 Insect Identification—Taxonomy
ENTO 408 Field Taxonomy
ENTO 411 Economic Entomology

PLSC 101 Botany I
PLSC 201 Botany II
PLSC 303 Introductory Plant Pathology
PLSC 411 Diagnostic Plant Pathology

Sixteen credits from Entomology and Applied Ecology and/or Plant Science (may include 3 credits maximum of Independent Study, Research and Field Experience)

ELECTIVES

Electives

2 9 2

Courses in Agriculture, Biology, and the Physical Sciences are recommended. (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

The choice of department in which to complete the remaining credits provides the student with the opportunity to emphasize either applied entomology or plant pathology in his or her program. Students should complete their programs with electives that will provide an education best suited to their goals. Course election should be made in consultation with the academic adviser during the preregistration period of each term. This program should include other courses in agriculture, biology, and physical sciences. A list of suggested courses and other information is available in the Department of Entomology and Applied Ecology and in the Department of Plant and Soil Sciences office.

FOOD AND RESOURCE ECONOMICS

The study of food and resource economics is concerned with the economics of production, marketing and resource management in the agricultural-business 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) agricultural business 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 curriculum in agricultural business 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 agricultural business management major.

The curriculum in agricultural economics emphasizes resource and environmental economics, production economics 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. Two concentrations are offered as part of the agricultural economics major: production and management, and resource economics and rural development.
DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE
MAJOR: AGRICULTURAL BUSINESS MANAGEMENT

CURRICULUM

UNIVERSITY REQUIREMENTS

ENGL 110 Critical Reading and Writing** 3
Multicultural, ethnic, and/or gender-related content #

COLLEGE REQUIREMENTS

Mathematics and Computer Science
Mathematics course (MATH 115 or higher level)† 3
Computer Science course (FREC 135 or equivalent) 3

Agricultural and Biological Sciences 9.12 1.2

Minimum of one course outside the student's major in three of the following areas: Food and Resource Economics, Food Science, Agricultural Engineering, Animal Science, Entomology and Applied Ecology, Plant and Soil Sciences, or Biology

Literature and Arts
Six credits selected from the general areas of 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.

Physical Sciences

Minimum of eight credits selected from one of the following areas:
Chemistry, Physics, Geology, or Physical Science.

MAJOR REQUIREMENTS

External to the College

ACCT 207 Accounting I 3
ACCT 208 Accounting II 3
COMM 312 Oral Communication in Business 3
ENGL 312 Written Communications in Business 3
ECON 151 Introduction to Microeconomics: Prices 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 6.4

Within the Department

FREC 125 Elementary Agricultural Economics: Applications 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 465 Seminar 1
Seven courses at the 400-level or above with at least two in each of the following general areas:

1. Marketing/International Trade

FREC 404 Food and Fiber Marketing 3
FREC 410 International Agricultural Trade and Marketing 3
FREC 441 Futures and Options Markets 3

2. Production/Management

FREC 403 Production Economics 3
FREC 406 Agricultural Policy 3
FREC 408 Research Methods 3
FREC 427 Agribusiness Financial Management 3

3. Resources/Development

FREC 420 Agriculture in Economic Development 3
FREC 424 Resource Economics Theory and Policy 3
FREC 429 Rural Development Theory and Policy 3
FREC 444 Economics of Environmental Management 3

FREC 405, FREC 435, FREC 630, and Independent Study may not be counted in the seven courses.

A maximum of three credits of Independent Study in Food and Resource Economics and a maximum of six credits of Independent Study may not be counted toward a degree.

Study in all areas, including Food and Resource Economics, may be counted toward a degree.

ELECTIVES

Electives 32.36 1.4
May include Military Science, Music, or Physical Education. (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

DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE
MAJOR: AGRICULTURAL BUSINESS MANAGEMENT
CONCENTRATION: FOOD MARKETING

CURRICULUM

UNIVERSITY REQUIREMENTS

ENGL 110 Critical Reading and Writing** 3
Multicultural, ethnic, and/or gender-related content #

COLLEGE REQUIREMENTS

Mathematics and Computer Science
Mathematics course (MATH 115 or higher level)† 3
Computer Science course (FREC 135 or equivalent) 3

Agricultural and Biological Sciences 9.12 1.2

Minimum of one course outside the student's major in three of the following areas: Food and Resource Economics, Food Science, Agricultural Engineering, Animal Science, Entomology and Applied Ecology, Plant and Soil Sciences, or Biology.

Literature and Arts
Six credits selected from the general areas of 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.

Physical Sciences

Minimum of eight credits selected from one of the following areas: Chemistry, Physics, Geology, or Physical Science.

MAJOR REQUIREMENTS

External to the College

ACCT 207 Accounting I 3
ACCT 208 Accounting II 3
COMM 312 Oral Communication in Business 3
ENGL 312 Written Communications in Business 3
ECON 151 Introduction to Microeconomics: Prices 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 6.4

Within the Department

FREC 125 Elementary Agricultural Economics: Applications 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 465 Seminar 1
Seven courses at the 400-level or above with at least two in each of the following general areas:

1. Marketing/International Trade

FREC 404 Food and Fiber Marketing 3
FREC 410 International Agricultural Trade and Marketing 3
FREC 441 Futures and Options Markets 3

2. Production/Management

FREC 403 Production Economics 3
FREC 406 Agricultural Policy 3
FREC 408 Research Methods 3
FREC 427 Agribusiness Financial Management 3

3. Resources/Development

FREC 420 Agriculture in Economic Development 3
FREC 424 Resource Economics Theory and Policy 3
FREC 429 Rural Development Theory and Policy 3
FREC 444 Economics of Environmental Management 3

FREC 405, FREC 435, FREC 630, and Independent Study may not be counted in the seven courses.

A maximum of three credits of Independent Study in Food and Resource Economics and a maximum of six credits of Independent Study may not be counted toward a degree.

Study in all areas, including Food and Resource Economics, may be counted toward a degree.

ELECTIVES

Electives 32.36 1.4
May include Military Science, Music, or Physical Education. (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
FOOD AND RESOURCE ECONOMICS • COLLEGE OF AGRICULTURAL SCIENCES

3. Resources/Development
FREC 420 Agriculture in Economic Development 3.4
FREC 424 Resource Economics Theory and Policy 3.4
FREC 429 Rural Development Theory and Policy 3.4
FREC 444 Economics of Environmental Management 3.4
FREC 405, FREC 435, FREC 630 and Independent Study may not be counted in the seven courses.

The requirement for the major in Agricultural Business management must be met. The following department courses are required for the concentration and may also be used to meet the area requirements for the Agricultural Business Management major:
FREC 404 Food and Fiber Marketing 3
FREC 408 Research Methods 3
FREC 410 International Agricultural Trade and Marketing 3
FREC 427 Agribusiness Financial Management 3
FREC 441 Futures and Options Markets 4
In addition, the following courses are required:
FREC 405 Management and Leadership Development 3

Two Business Administration courses at the 400-level in marketing related areas. These are in addition to BUAD 301—Introduction to Marketing and the two additional Business and Economics courses required by the Agricultural Business Management major.

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.

ELECTIVES
After required courses are completed, sufficient elective credits must be taken to meet the minimum credit requirement for the degree. A minimum grade of C is required in all courses counting toward the minor. Credits for FREC 405, FREC 435, FREC 630, Independent Study and Field Experience do not apply.

A minimum grade of C is required in all courses counting toward the minor. Credits for FREC 405, FREC 435, FREC 630, Independent Study and Field Experience do not apply.

DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE
MAJOR: AGRICULTURAL ECONOMICS

CURRICULUM

UNIVERSITY REQUIREMENTS
ENGL 110 Critical Reading and Writing 3
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content #

COLLEGE REQUIREMENTS
Mathematics and Computer Science
Mathematics course (MATH 115 or higher level)† 3
Computer Science course (FREC 135 or equivalent) 3

Agricultural and Biological Sciences
Minimum of one course outside the student’s major in three of the following areas: Food and Resource Economics, Food, Science, Agricultural Engineering, Animal Science, Entomology and Applied Ecology, Plant and Soil Sciences, or Biology.

Literature and Arts
Six credits selected from the general areas of 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.

Physical Sciences
Minimum of eight credits selected from one of the following areas: Chemistry, Physics, Geology, or Physical Science

MAJOR REQUIREMENTS
External to the College
COMM 312 Oral Communication in Business 3
ENGL 312 Written Communications in Business 3
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 304 Intermediate Macroeconomic Theory 3

Agricultural and Biological Sciences
Minimum of one course outside the student’s major in three of the following areas: Food and Resource Economics, Food, Science, Agricultural Engineering, Animal Science, Entomology and Applied Ecology, Plant and Soil Sciences, or Biology.

Within the Department
FREC 125 Elementary Agricultural Economics: Applications 3
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
FREC 465 Seminar 3

Seven courses at the 400-level or above with at least two in each of the following general areas:
1. Marketing/International Trade
FREC 404 Food and Fiber Marketing 3
FREC 410 International Agricultural Trade and Marketing 3
FREC 441 Futures and Options Markets 3

2. Production/Management
FREC 305 Production Economics 3
FREC 408 Research Methods 3
FREC 427 Agribusiness Financial Management 3

3. Resource/Development
FREC 420 Agriculture in Economic Development 3
FREC 424 Resource Economics Theory and Policy 3
FREC 429 Rural Economic Development Theory and Policy 3
FREC 444 Economics of Environmental Management 3

A minimum grade of C is required in all courses counting toward the minor. Credits for FREC 405, FREC 435, FREC 630, Independent Study and Field Experience do not apply.

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*Superior figures indicate year or years in which the course is normally taken, i.e., 1freshman year, 2 sophomore year, etc.
**Minimum grade of C required.
#This requirement may be fulfilled through a course or courses taken to complete other degree requirements; it cannot be fulfilled by a course taken pass/fail. See page 21.
†MATH 221, MATH 230 and STAT 201 are strongly suggested.
§Students can qualify for a minor in Economics if they take an additional 400-level Economics course and obtain a grade of C or better in all Economics courses.
[see "The Minor in Economics" in the College of Business and Economics curricula]
Students can qualify for a minor in Economics if they take an additional 400-level Economics course and obtain a grade of C or better in all Economics courses.

The following general areas:

- MATH 221, MATH 230, and STAT 201 are strongly suggested.
- FREC 135 Introduction to Data Analysis ...
- FREC 240 Quantitative Methods in Agricultural Economics
- ENGL 312 Written Communications in Business
- ECON 152 Introduction to Macroeconomics: National Economy
- ECON 151 Introduction to Microeconomics: Prices and Markets
- FREC 410 International Agricultural Trade and Marketing
- FREC 441 Futures and Options Markets
- FREC 403 Production Economics
- FREC 406 Agricultural Policy
- FREC 409 Research Methods
- FREC 427 Agribusiness Financial Management
- FREC 420 Agriculture in Economic Development
- FREC 424 Resource Economics-Theory and Policy
- FREC 419 Rural Economic Development: Theory and Policy
- FREC 444 Economics of Environmental Management

The requirements for the major in Agricultural Economics must be met in addition, the following courses must be taken:

- FREC 350 Farm Management
- FREC 403 Production in Economics

Agricultural Economics (FREC) courses required for the Agricultural Economics major may be used to satisfy requirements for the Production and Management concentration.

In addition to the Business and Economics courses required for the Agricultural Economics major, the following courses must be taken:

- BUAD 309 Management and Organizational Behavior
- BUAD 382 International Business Management
- ECON 415 Economic Forecasting
- STAT 201 Introduction to Statistics I
- STAT 202 Introduction to Statistics II

FREC 405, FREC 435, FREC 630, and Independent Study may not be counted in the seven courses.

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.

**ELECTIVES**

- Electives: 29-33 credits
- May include Military Science, Music, or Physical Education. (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

**DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE**

**MAJOR: AGRICULTURAL ECONOMICS**

**CONCENTRATION: PRODUCTION AND MANAGEMENT**

**CURRICULUM**

**CREDITS**

**UNIVERSITY REQUIREMENTS**

- ENGL 110 Critical Reading and Writing**
  
- Three credits in an approved course or courses stressing multicultural, ethnic, and/gender-related content#

**COLLEGE REQUIREMENTS**

**Mathematics and Computer Science**

- Mathematics course [MATH 115 or higher level]†
  
- Computer Science course (FREC 135 or equivalent)

**Agricultural and Biological Sciences**

- Minimum of one course outside the student's major in three of the following areas: Food and Resource Economics, Food Science, Agricultural Engineering, Animal Science, Entomology, and Applied Ecology, Plant and Soil Sciences, and Biology

**Literature and Arts**

- Six credits selected from the general areas of English, Art, Art History, Communication, Music, Theatre, or Foreign Languages

**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, Women's Studies

**Physical Sciences**

- Minimum of eight credits selected from one of the following areas: Chemistry, Physics, Geology, or Physical Science

**MAJOR REQUIREMENTS**

**External to the College**

- COMM 312 Oral Communication in Business
  
- ENGL 312 Written Communications in Business

**Within the Department**

- FREC 125 Elementary Agricultural Economics: Applications
  
- FREC 135 Introduction to Data Analysis
  
- FREC 150 Economics of Agriculture and Natural Resources
  
- FREC 201 Records and Accounts
  
- FREC 420 Quantitative Methods in Agricultural Economics
  
- FREC 465 Seminar

- Seven courses at the 400-level or above with at least two in each of the following general areas:
  
  1. Marketing/International Trade
  
  2. Production/Management

**ELECTIVES**

- Electives: 11-15 credits

- May include Military Science, Music, or Physical Education. (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

**DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE**

**MAJOR: AGRICULTURAL ECONOMICS**

**CONCENTRATION: RESOURCE ECONOMICS AND RURAL DEVELOPMENT**

**CURRICULUM**

**CREDITS**

**UNIVERSITY REQUIREMENTS**

- ENGL 110 Critical Reading and Writing**

- Three credits in an approved course or courses stressing multicultural, ethnic, and/gender-related content#

**COLLEGE REQUIREMENTS**

**Mathematics and Computer Science**

- Mathematics course [MATH 115 or higher level]†

- Computer Science course (FREC 135 or equivalent)

**Agricultural and Biological Sciences**

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

- Chemistry, Physics, Geology, or Physical Science

**MAJOR REQUIREMENTS**

**External to the College**

- COMM 312 Oral Communication in Business

**Within the Department**

- FREC 125 Elementary Agricultural Economics: Applications
  
- FREC 135 Introduction to Data Analysis
  
- FREC 150 Economics of Agriculture and Natural Resources
  
- FREC 201 Records and Accounts
  
- FREC 420 Quantitative Methods in Agricultural Economics
  
- FREC 465 Seminar

- Seven courses at the 400-level or above with at least two in each of the following general areas:
  
  1. Marketing/International Trade
  
  2. Production/Management

  3. Resources/Development

FREC 405, FREC 435, FREC 630, and Independent Study may not be counted in the seven courses.

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.

**ELECTIVES**

- Electives: 11-15 credits

- May include Military Science, Music, or Physical Education. (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

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* Superior figures indicate year or years in which the course is normally taken, i.e., Freshman year, Sophomore year, etc.
* Minimum grade of C required.
* This requirement may be fulfilled through a course or courses taken to complete other degree requirements; it cannot be fulfilled by a course taken pass/fail. See page 21.
* MATH 211, MATH 230, and STAT 201 are strongly suggested.
* Students can qualify for a minor in Economics if they take an additional 400-level Economics course and obtain a grade of C- or better in all Economics courses (see "The Minor in Economics" in the College of Business and Economics curricula).
Physical Sciences
Minimum of eight credits selected from one of the following areas: Chemistry, Physics, Geology, or Physical Science.

MAJOR REQUIREMENTS
External to the College
COMM 312 Oral Communication in Business 3.4
ENGL 312 Written Communications in Business 3.3
ECON 151 Introduction to Microeconomics: Prices and Markets 3.2
ECON 152 Introduction to Macroeconomics: National Economy 3.1
ECON 302 Banking and Monetary Policy 3.4
ECON 300 Intermediate Microeconomic Theory 3.4
ECON 303 Intermediate Macroeconomic Theory 3.4
Two additional courses offered by the College of Business and Economics at the 300-level or higher 6.4

Within the Department
FREC 125 Elementary Agricultural Economics: Applications 1
FREC 135 Introduction to Data Analysis 3.1
FREC 150 Economics of Agriculture and Natural Resources 3.1
FREC 240 Records and Accounts 3.2
FREC 240 Quantitative Methods in Agricultural Economics 3.2
FREC 465 Seminar 1.4

Seven courses at the 400-level or above with at least two in each of the following general areas:

1. Marketing/International Trade
FREC 404 Food and Fiber Marketing 3.4
FREC 410 International Agricultural Trade and Marketing 3.4
FREC 441 Futures and Options Markets 4.3

2. Production/Management
FREC 403 Production Economics 3.4
FREC 406 Agricultural Policy 3.4
FREC 408 Research Methods 3.4
FREC 427 Agribusiness Financial Management 3.4

3. Resources/Development
FREC 420 Agriculture in Economic Development 3.4
FREC 424 Resource Economics-Theory and Policy 3.4
FREC 429 Rural Economics Development-Theory and Policy 3.4
FREC 444 Economics of Environmental Management 3.4

The requirements for the major in Agricultural Economics must be met in addition, the following courses must be taken:

FREC 429 Resource Economics-Theory and Policy 3.4
FREC 444 Economics of Environmental Management 3.4

Agricultural Economics (FREC) courses required for the Agricultural Economics major may be used to satisfy requirements for the Resource Economics and Rural Development concentration.

One course in Geography 3.1

In addition to the Business and Economics courses required for the Agricultural Economics major, four of the following courses, with at least one in each area, must be taken:

1. Political Economy
ECON 306 Economic Theory of Politics 3.4
ECON 311 Economics of Developing Countries 3.4
ECON 408 Economics of Law 3.4
ECON 411 Economics of Growth and Development 3.4

2. Quantitative Methods
ECON 413 Economic Forecasting 3.4
ECON 422 Econometric Methods and Models I 3.4
ECON 423 Econometric Methods and Models II 3.4
ECON 426 Mathematical Econometrics 3.4

3. Applications
ECON 432 Economics of the Public Sector 3.4
ECON 475 Economics of Natural Resources 3.4
ECON 477 Benefit-Cost Analysis 3.4
FREC 405, FREC 423, FREC 630, and Independent Study may not be counted in the seven courses

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.

ELECTIVES

May include Military Science, Music, or Physical Education. (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

PLANT AND SOIL SCIENCES

The requirements for the major in Agricultural Economics must be met in addition, the following courses must be taken:

FREC 135, or equivalent

Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content 3.4

COLLEGE REQUIREMENTS

Mathematics and Computer Science
Mathematics course 3.1
Computer Science course selected from CISC 105, EGET 111, FREC 135, or equivalent 3.4

Agricultural and Biological Sciences
Minimum of one course outside the student's major in three of the following areas: Food and Resource Economics, Food Science, Agricultural Engineering, Animal Science, Entomology and AppliedEcology, or Biology

Literature and Arts
Six credits selected from the general areas of 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

DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE MAJOR: PLANT SCIENCE CONCENTRATION: GENERAL PLANT SCIENCE

UNIVERSITY REQUIREMENTS

ENGL 110 Critical Reading and Writing** 3.1
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content 3.4

COLLEGE REQUIREMENTS

Mathematics and Computer Science
Mathematics course 3.1
Computer Science course selected from CISC 105, EGET 111, FREC 135, or equivalent 3.4

Agricultural and Biological Sciences
Minimum of one course outside the student's major in three of the following areas: Food and Resource Economics, Food Science, Agricultural Engineering, Animal Science, Entomology and AppliedEcology, or Biology

Literature and Arts
Six credits selected from the general areas of 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

CREDITS*
Physical Sciences
Minimum of eight credits selected from one of the following areas: Chemistry, Physics, Geology, or Physical Science

**MAJOR REQUIREMENTS**

Chemistry, Geology, or Physical Science

**EXTERNAL TO THE MAJOR REQUIREMENTS**

- CHEM 101 General Chemistry
- CHEM 103 General Chemistry
- CHEM 102 General Chemistry
- CHEM 104 General Chemistry
- CHEM 213 General Chemistry

**CHEM 101: General Chemistry**

- Introduction to Physical Chemistry 
- Environmental Soil Management
- Introduction to Plant Physiology

**CHEM 103: General Chemistry**

- Principles of Animal and Plant Genetics
- Introductory Plant Pathology
- Environmental Soil Management
- Introduction to Plant Physiology

**CHEM 104: General Chemistry**

- Principles of Animal and Plant Genetics
- Introductory Plant Pathology
- Environmental Soil Management
- Introduction to Plant Physiology

**CHEM 213: General Chemistry**

- Principles of Animal and Plant Genetics
- Introductory Plant Pathology
- Environmental Soil Management
- Introduction to Plant Physiology

**CHEM 214: General Chemistry**

- Principles of Animal and Plant Genetics
- Introductory Plant Pathology
- Environmental Soil Management
- Introduction to Plant Physiology

**WITHIN THE DEPARTMENT**

- PLSC 101 Botany I
- PLSC 201 Botany II
- PLSC 201 Introduction to Soil Science
- PLSC 300 Principles of Animal and Plant Genetics
- PLSC 302 Introductory Plant Pathology
- PLSC 305 Environmental Soil Management
- PLSC 410 Introduction to Plant Physiology

**ELECTIVES**

- Select a minimum of 12 credits from the following:
  - PLSC 302 Vegetable Science
  - PLSC 303 Basic Landscape Design
  - PLSC 402 Plant Taxonomy
  - PLSC 403 Nursery and Garden Center Management
  - PLSC 411 Diagnostic Plant Pathology
  - PLSC 417 Greenhouse Management
  - PLSC 602 Physiological Plant Productivity
  - PLSC 607 Plant and Soil Water Relations
  - PLSC 615 Vascular Plant Anatomy
  - PLSC 621 Plants and Design
  - PLSC 623 Plant Cell and Tissue Culture

**ELECTIVES**

- May include Military Science, Music, or Physical Education (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

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**DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE**

**MAJOR: PLANT SCIENCE**

**CONCENTRATION: ORNAMENTAL HORTICULTURE**

**CREDITS**

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**CURRICULUM**

- ENGL 110 Critical Reading and Writing**
- Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content #

**COLLEGE REQUIREMENTS**

- Mathematics and Computer Science
- Computer Science course selected from CISC 105, EGTE 111, FREC 135, or equivalent

**AGRICULTURAL AND BIOLOGICAL SCIENCES**

- Minimum of one course outside the student's major in three of the following areas: Agriculture, Animal Science, Entomology, and Applied Ecology, or Biology

**LITERATURE AND ARTS**

- Six credits selected from the general areas of English, Art, Art History, Communication, Music, Theatre, or Foreign Language

**SOCIALLY 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 areas: Chemistry, Physics, Geology, or Physical Science

**MAJOR REQUIREMENTS**

- External to the College
  - CHEM 101 General Chemistry
  - CHEM 102 General Chemistry
  - CHEM 103 General Chemistry
  - CHEM 104 General Chemistry
  - CHEM 213 General Chemistry
  - CHEM 214 General Chemistry

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**WITHIN THE DEPARTMENT**

- PLSC 101 Botany I
- PLSC 201 Botany II
- PLSC 204 Introduction to Soil Science
- PLSC 300 Principles of Animal and Plant Genetics
- PLSC 302 Introductory Plant Pathology
- PLSC 305 Environmental Soil Management
- PLSC 410 Introduction to Plant Physiology

**ELECTIVES**

- Select a minimum of 12 credits from the following:
  - PLSC 302 Vegetable Science
  - PLSC 303 Basic Landscape Design
  - PLSC 402 Plant Taxonomy
  - PLSC 403 Nursery and Garden Center Management
  - PLSC 411 Diagnostic Plant Pathology
  - PLSC 417 Greenhouse Management
  - PLSC 602 Physiological Plant Productivity
  - PLSC 607 Plant and Soil Water Relations
  - PLSC 615 Vascular Plant Anatomy
  - PLSC 621 Plants and Design
  - PLSC 623 Plant Cell and Tissue Culture

**CREDITS TO TOTAL A MINIMUM OF:** 124

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**DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE**

**MAJOR: PLANT SCIENCE**

**CONCENTRATION: AGRONOMY**

**CREDITS**

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**CURRICULUM**

- ENGL 110 Critical Reading and Writing**
- Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content #

**COLLEGE REQUIREMENTS**

- Mathematics and Computer Science
- Computer Science course selected from CISC 105, EGTE 111, FREC 135, or equivalent

**AGRICULTURAL AND BIOLOGICAL SCIENCES**

- Minimum of one course outside the student's major in three of the following areas: Agriculture, Animal Science, Entomology, and Applied Ecology, or Biology

**LITERATURE AND ARTS**

- Six credits selected from the general areas of English, Art, Art History, Communication, Music, Theatre, or Foreign Language

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*Superior figures indicate year or years in which the course is normally taken. e.g., 1 freshmna year, 2 sophomore year, etc.

**Minimum grade of C- required.

#This requirement may be fulfilled through a course or courses taken to complete other degree requirements; it cannot be fulfilled by a course taken pass/fail. See page 21.

†A course may be applied toward both the major requirements and a college requirement, but credits are counted only once toward the total credits for graduation.
Social Sciences and Humanities
Minimum of one course in three of the following areas: Anthropology, 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 areas: Chemistry, Physics, Geology, or Physical Science.

MAJOR REQUIREMENTS
External to the College
CHEM 101 General Chemistry
or CHEM 103 General Chemistry
or CHEM 102 General Chemistry
or CHEM 104 General Chemistry
CHEM 213 Elementary Organic Chemistry
One of the following three courses:
PHYS 101 Introduction to Physics
GEOL 105 General Geology
CHEM 214 Elementary Biochemistry

Within the Department
PLSC 101 Botany I
PLSC 201 Botany II
PLSC 204 Introduction to Soil Science
PLSC 300 Principles of Animal and Plant Genetics
PLSC 303 Introductory Plant Pathology
PLSC 305 Environmental Soil Management
PLSC 410 Introduction to Plant Physiology

Within the Concentration
Group One: Required courses
PLSC 151 Introduction to Crop Science
PLSC 401 Agronomic Crop Science
PLSC 411 Diagnostic Plant Pathology
CHEM 214 Elementary Biochemistry
CHEM 216 Introductory Biochemistry Laboratory
ENTO 205 Elements of Entomology
ENTO 305 Entomology Laboratory

Group Two: Select a minimum of 12 credits in consultation with your faculty adviser

ELECTIVES
Electives
May include Military Science, Music, or Physical Education. (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 MINIMUM OF 124

DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE
MAJOR: PLANT SCIENCE
CONCENTRATION: PATHOLOGY

CURRICULUM

UNIVERSITY REQUIREMENTS
ENGL 110 Critical Reading and Writing**
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content#

COLLEGE REQUIREMENTS†
Mathematics and Computer Science
Mathematics course
Computer Science course selected from CIS 105, EGET 111, FREC 135, or equivalent

Agricultural and Biological Sciences
Minimum of one course outside the student's major in three of the following areas: Food and Resource Economics, Food Science, Agricultural Engineering, Animal Science, Entomology and Applied Ecology, or Biology

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

CURRICULUM

UNIVERSITY REQUIREMENTS
ENGL 110 Critical Reading and Writing**
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content#

*Superior figures indicate year or years in which the course is normally taken, i.e., 1freshman year, 2sophomore year, etc
**Minimum grade of C required.
#This requirement may be fulfilled through a course or courses taken to complete other degree requirements; it cannot be fulfilled by a course taken pass/fail. See page 21.
†A course may be applied toward both the major requirements and a college requirement, but credits are counted only once toward the total credits for graduation.

PLANT AND SOIL SCIENCES • COLLEGE OF AGRICULTURAL SCIENCES
# ELECTIVES

**Electives**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BISC 221</td>
<td>Environmental Biology</td>
<td>3</td>
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<tr>
<td>FREC 135</td>
<td>Introduction to Data Analysis</td>
<td>3</td>
</tr>
<tr>
<td>FREC 444</td>
<td>Economics of Environmental Management</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 255</td>
<td>Conservation of Natural Resources</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 413</td>
<td>General Geomorphology</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 428</td>
<td>Hydrogeology</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 421</td>
<td>Environmental and Applied Geology</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 603</td>
<td>Soil Physics</td>
<td>3</td>
</tr>
<tr>
<td>POSC 350</td>
<td>Politics and the Environment</td>
<td>3</td>
</tr>
</tbody>
</table>

**CREDITS TO TOTAL A MINIMUM OF** 124

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*Superior figures indicate year or years in which the course is normally taken, i.e., 1 freshman year, 2 sophomore year, etc.

*Minimum grade of C required.

**This requirement may be fulfilled through a course or courses taken to complete other degree requirements; it cannot be fulfilled by a course taken on a pass/fail basis. See page 21.

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

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### GENERAL AGRICULTURE

For the student who does not wish to specialize in one field, the major in general agriculture is offered.

### DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE

#### MAJOR: GENERAL AGRICULTURE

**CURRICULUM**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ENGL 110</td>
<td>Critical Reading and Writing**</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 204</td>
<td>Land Surveying</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 212</td>
<td>Agricultural Waste Management</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 305</td>
<td>Environmental Soil Management</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 401</td>
<td>Agrometeorology</td>
<td>3</td>
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<tr>
<td>PLSC 601</td>
<td>Agricultural Economics</td>
<td>3</td>
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<tr>
<td>COMM 202</td>
<td>Introduction to Human Communication Systems</td>
<td>3</td>
</tr>
<tr>
<td>COMM 255</td>
<td>Fundamentals of Communication</td>
<td>3</td>
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<tr>
<td>COMM 312</td>
<td>Oral Communication in Business</td>
<td>3</td>
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<tr>
<td>COMM 350</td>
<td>Public Speaking</td>
<td>3</td>
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<tr>
<td>COMM 356</td>
<td>Small Group Communication</td>
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<tr>
<td>FERG 251</td>
<td>General Agriculture Economics</td>
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<tr>
<td>FERG 252</td>
<td>Introduction to Crop Science</td>
<td>3</td>
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<tr>
<td>FERG 253</td>
<td>Introduction to Soil Science</td>
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</tr>
<tr>
<td>FERG 254</td>
<td>Introduction to Plant Pathology</td>
<td>3</td>
</tr>
<tr>
<td>FERG 255</td>
<td>Environmental Soil Management</td>
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PREVETERINARY INSTRUCTION

Students in the College of Agricultural Sciences who desire to prepare for entrance to a veterinary school should consult with the Chair of the Department of Animal Science and Agricultural Biochemistry. 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 Agricultural Sciences. 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 those for the baccalaureate degree.

The Associate in Science as offered by the College of Agricultural Sciences provides a student the opportunity to follow an extremely flexible curriculum. The basic requirements are that the student must complete a minimum of 62 credit hours, with at least 30 of the credits earned within at least four of the six departments in the college. A minimum of 32 credits for the degree must be earned at the University of Delaware. In addition, to obtain the degree 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.

The flexibility of the curriculum allows students to select only those courses that they and their academic adviser deem most important to their career objective and to complete a program in two years. For example, it would allow students with an interest in horticulture careers to enroll in predominantly plant science and/or horticulture courses to build a program geared to their specific needs. Animal science, agribusiness, entomology, and agricultural engineering technology are all potential areas in addition to plant science.

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 Agricultural Sciences in Newark.

There is no special application form for the associate degree program. Students would make application as if they were planning to work toward a B.S. degree in General Agriculture. Then, upon arriving on campus they would inform the college adviser that they plan to work toward an associate degree.

OTHER COLLEGE RESOURCES

Cooperative Extension System. The Delaware Cooperative Extension System is part of a nationwide system whose mission is to improve American agriculture and to strengthen American families and communities through the dissemination and application of research-generated knowledge and leadership techniques. 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 Agricultural Sciences 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.