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

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

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

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

DEAN'S SCHOLAR PROGRAM
Each year, the College of Agriculture and Natural Resources allows highly motivated undergraduate 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.

PREVETERINARY INSTRUCTION
Students in the College of Agriculture and Natural Resources who wish to prepare for entrance to a veterinary school should consult with the Department of Animal and Food Sciences. See the preveterinary undergraduate curriculum in department listing.

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

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

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

Telephone: (302) 831-2501
E-mail: kra@udel.edu
http://bluehen.ags.udel.edu/ssap/aged/aged_ag.htm

### DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE

#### MAJOR: AGRICULTURAL EDUCATION

<table>
<thead>
<tr>
<th>CURRICULUM</th>
<th>CREDITS</th>
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<tbody>
<tr>
<td>UNIVERSITY REQUIREMENTS</td>
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<tr>
<td>ENGL 110 Critical Reading and Writing</td>
<td>3</td>
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<td>(with minimum grade of C)</td>
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<tr>
<td>MAJOR REQUIREMENTS</td>
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<tr>
<td>Mathematics and Computer Science</td>
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<td>Mathematics course</td>
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<tr>
<td>Computer Science course (FREC 135, or</td>
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<td>equivalent)</td>
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<tr>
<td>Agricultural and Biological Sciences</td>
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<td>Minimum of one course in three of the</td>
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<tr>
<td>following areas: Animal &amp; Food</td>
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<td>Sciences, Biosources Engineering</td>
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<td>Food and Resource Economics (except</td>
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<tr>
<td>FREC 135), Entomology and Applied</td>
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<tr>
<td>Ecology, Plant and Soil Sciences,</td>
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<td>Biological Science</td>
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<tr>
<td>Literature and Arts</td>
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<tr>
<td>Nine credits from English and/or</td>
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<td>Communication, or courses cross-listed</td>
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<td>in these departments</td>
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<tr>
<td>Social Sciences and Humanities</td>
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<tr>
<td>Minimum of one course in three of the</td>
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<td>following areas: Anthropology,</td>
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<td>Black American Studies, Criminal</td>
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<td>Justice, Economics, Education,</td>
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<td>Geography, History, Philosophy,</td>
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<td>Political Science, Psychology,</td>
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<td>Sociology, Women’s Studies,</td>
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<td>or courses cross-listed in these</td>
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<td>departments</td>
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<td>Physical Sciences</td>
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<td>Minimum of eight credits selected from</td>
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<td>one of the following two-course</td>
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<td>sequences: CHEM 101/102 or 103/104</td>
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<td>PHYS 201/202 or 207/208</td>
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<td>GEOL 105/106</td>
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<td>SCEN 101/102</td>
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<td>Professional Studies</td>
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<td>AGED 380 Agricultural Education</td>
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<td>Materials and Approaches I</td>
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<td>AGED 381 Agricultural Education</td>
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<tr>
<td>Materials and Approaches II</td>
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<tr>
<td>EDST 201 Diversity in the Classroom</td>
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<td>(fulfills the University multicultural</td>
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<td>requirement)</td>
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<td>EDST 230 Introduction to Exceptional</td>
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<td>Children</td>
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<td>EDST 304 Educational Psychology -</td>
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<td>Social Aspects</td>
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<td>EDST 305 Educational Psychology -</td>
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<tr>
<td>Cognitive Aspects</td>
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<tr>
<td>EDDV 400 Student Teaching</td>
<td>9</td>
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</tbody>
</table>

The Agricultural Education program requires a 2.5 minimum overall G.P.A. for enrollment in EDDV 400, Student Teaching, a course required for the degree. The teacher education program advisor (see list on p. 176) should be consulted for other policies concerning qualifications for student teaching.

A minimum grade of C is required in all AGED and EDUC courses.

A 2.75 index in at least thirty credits of technical agriculture from at least three departments in the college.

### ELECTIVES

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

### CREDITS TO TOTAL A MINIMUM OF

| 130 |

### ANIMAL AND FOOD SCIENCES

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

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

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

Telephone: (302) 831-2508
E-mail: kra@udel.edu
http://bluehen.ags.udel.edu/anfs/anfs.htm
DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE
MAJOR: ANIMAL SCIENCE
CONCENTRATION: GENERAL ANIMAL SCIENCE

CURRICULUM

UNIVERSITY REQUIREMENTS

ENGL 110 Critical Reading and Writing (with minimum grade of C) .... 3
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content (see p. 57) .... 3

MAJOR REQUIREMENTS

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

Agricultural and Biological Sciences

Minimum of one course in two of the following areas: Food and Resources Economics (except FREC 135), Food Science, Bioreourses Engineering, Entomology and Applied Ecology, or Plant and Soil Sciences.

Literature and Arts

Six credits selected from English, Art, Art History, Communication, Music, Theatre, or Foreign Language, or courses cross-listed in these departments.

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, or courses cross-listed in these departments.

The following courses are also required for the concentration:

ANSC 310 Animal Genetics Laboratory .... 1

Within the Concentration

All requirements for the General Animal Science program must be met

MAJOR: ANIMAL SCIENCE

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

DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE
MAJOR: ANIMAL SCIENCE
CONCENTRATION: AGRICULTURAL BIOTECHNOLOGY

All requirements for the General Animal Science program must be met

The following courses are also required for the concentration:

Within the Concentration

ANSC 270 Biotechnology: Science and Socioeconomic Issues .... 3
ANSC 310 Animal Genetics Laboratory .... 1
ANSC 466 Independent Study (Approved research project) .... 3
ANSC 570 Molecular Genetics .... 3
BISC 301 Molecular Biology of the Cell .... 4
BISC 371 Introduction to Microbiology .... 4
CHEM 321/322 Organic Chemistry .... 8
CHEM 527 Introductory Biochemistry .... 3

ELECTIVES

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

Recommended Electives

FREC 201 Records and Accounts .... 3
ANSC 270 Biotechnology: Science and Socioeconomic Issues .... 3
ANSC 399 Teaching Assistant .... 3
ANSC 431 Infection and Immunity in Animal Diseases .... 1
ANSC 635 Introduction to Virology .... 8
COMM 212 Oral Communication in Business .... 3
ENGL 312 Written Communications in Business .... 3
FREC 408 Research Methods .... 3

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

DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE
MAJOR: ANIMAL SCIENCE
CONCENTRATION: PREVETERINARY MEDICINE

All requirements for the General Animal Science program must be met.

The following courses are also required for the concentration:

Within the Concentration

ANSC 310 Animal Genetics Laboratory .... 1

ANSC 371 Introduction to Microbiology .... 4
CHEM 321/322 Organic Chemistry .... 8
CHEM 527 Introductory Biochemistry .... 3
CHEM 641/642 Biochemistry .... 3-6
PHYS 201/202 Introductory Physics I and II .... 8

ELECTIVES

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

Recommended Electives

FREC 201 Records and Accounts .... 3
ANSC 270 Biotechnology: Science and Socioeconomic Issues .... 3
ANSC 399 Teaching Assistant .... 3
ANSC 431 Infection and Immunity in Animal Diseases .... 1
ANSC 635 Introduction to Virology .... 8
COMM 212 Oral Communication in Business .... 3
ENGL 312 Written Communications in Business .... 3
FREC 408 Research Methods .... 3

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

63
DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE
MAJOR: ANIMAL SCIENCE
CONCENTRATION: APPLIED ANIMAL SCIENCE

All requirements for the General Animal Science program must be met. The following courses are also required for the concentration:

Within the Concentration

- ANCS 201 Behavior of Domestic Animals 3
- ANCS 441 Reproductive Physiology 3
- CHEM 213 Elementary Organic Chemistry 4
- CHEM 214/215 Elementary Biochemistry with Lab 4
- ENTO 205 Elements of Entomology 3
- FREC 150 Economics of Agriculture and Natural Resources 3
- FREC 201 Records and Accounts 3
- PLSC 151 Introduction to Crop Science 3
- PLSC 204 Introduction to Soil Science 3

Select one additional course from the following: 3-4

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

ELECTIVES

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

Recommended Electives

- ANCS 270 Biotechnology: Science and Socioeconomic Issues
- ANCS 399 Teaching Assistant
- ANCS 420 Equine Management
- ANCS 431 Infection and Immunity in Animal Diseases
- BISC 371 Introduction to Microbiology
- COMM 312 Oral Communication in Business
- ENGL 328 Agricultural Waste Management Systems
- FREC 153 Agricultural Salesmanship
- FREC 350 Farm Management
- PLSC 401 Agronomic Crop Science

CREDITS TO TOTAL A MINIMUM OF: 130

HONORS BACHELOR OF SCIENCE IN AGRICULTURE: ANIMAL SCIENCE

The recipient of this degree must complete:

1. All requirements for the Bachelor of Science in Agriculture: Animal Science (any concentration).
2. All the University generic requirements for the Honors degree (see page 43). Courses with the ANSC prefix taken at the 600-level or higher are considered to be Honors courses in the major. One 3- or 4-credit course in PLSC, ENTO, or BISC will, if taken as Honors, count toward the 12 Honors credits required in the major or in collateral disciplines.
3. A grade-point index of at least 3.400 in the major.

REQUIREMENTS FOR A MINOR IN ANIMAL SCIENCE

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

DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE
MAJOR: FOOD SCIENCE AND TECHNOLOGY
CONCENTRATION: FOOD SCIENCE

CURRICULUM

UNIVERSITY REQUIREMENTS

- ENGL 110 Critical Reading and Writing (with minimum grade of C) 3
- Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content (see p. 57).

MAJOR REQUIREMENTS

Agricultural and Biological Sciences 3-4

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

Literature and Arts 6

Six credits selected from English, Art, Art History, Communication, Music, Theatre, or Foreign Language, or courses cross-listed in these departments.

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, or courses cross-listed in these departments.

Professional Studies

- CHEM 101/102 General Chemistry
- CHEM 103/104 General Chemistry
- CHEM 214 Elementary Biochemistry
- CHEM 527 Introductory Biochemistry
- PHYS 201/202 Introductory Physics I and II
- BISC 207/208 Introductory Biology I and II
- BISC 371 Introduction to Microbiology
- CHEM 321/322 Organic Chemistry
- NTD 200 Nutrition Concepts
- MATH 221/222 Calculus I and II
- MATH 241/242 Analytic Geometry and Calculus A and B
- FOSC 165 Seminar: Food Science
- FOSC 265 Seminar: Food Science
- FOSC 328 Food Chemistry
- FOSC 329 Food Analysis
- FOSC 359 Topics in Food Science
- FOSC 365 Seminar: Food Science
- FOSC 409 Food Processing I
- FOSC 410 Food Processing II
- FOSC 439 Food Microbiology
- FOSC 445 Food Engineering Technology
- FOSC 449 Food Biotechnology

ELECTIVES

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

Recommended Electives

- CHEM 220 Quantitative Analysis I
- CHEM 221 Quantitative Analysis Laboratory
- CHEM 418 Introductory Physical Chemistry
- CHEM 419 Introductory Physical Chemistry
- CHEM 445 Physical Chemistry Laboratory

CREDITS TO TOTAL A MINIMUM OF: 128

DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE
MAJOR: FOOD SCIENCE AND TECHNOLOGY
CONCENTRATION: FOOD TECHNOLOGY

CURRICULUM

UNIVERSITY REQUIREMENTS

- ENGL 110 Critical Reading and Writing (with minimum grade of C) 3
- Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content (see p. 57).
The minor in Food Science requires 15 food science credits and provides students in other degree programs with an opportunity to complete prerequisites and other science and math preparation.

REQUIREMENTS FOR A MINOR IN FOOD SCIENCE

The minor in food science requires 15 food science credits and provides students in other degree programs with an opportunity to complete prerequisites and other science and math preparation.
ENGL 312 Written Communications in Business 3
ENGL 410 Technical Writing 3

An oral communications course selected from: 3
AGRI 212 Oral Communications in Agriculture and Natural Resources 3
COMM 200 Introduction to Human Communication Systems 3
COMM 255 Fundamentals of Communication 3
COMM 312 Oral Communication in Business 3
COMM 330 Public Speaking 3
COMM 356 Small Group Communication 3

Social Sciences and Humanities
ECON 151 Introduction to Microeconomics 3
ECON 152 Introduction to Macroeconomics 3

Nine additional 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, or courses cross-listed in these departments 9

Basic Sciences and Mathematics
CHEM 103/104 General Chemistry I and II 8
PHYS 207/208 Fundamentals of Physics I and II 8
MATH 241/242/243 Analytic Geometry and Calculus A, B and C 12

Select one of the following Biology/Life Sciences options (I, II, or III): 7-8

I
BISC 207/208 Introductory Biology I and II 8

II
BISC 103/113 General Biology and
ENTO 201 Wildlife Conservation and Ecology

III
PLSC 101 Botany I and
ENTO 201 Wildlife Conservation and Ecology

Technical Sciences
EGTE 218 Fundamentals of Hydraulic Systems 4
EGTE 244 Electricity for Engineering Technology 4
EGTE 311 Fundamentals of Thermodynamics 3
EGTE 354 Rural/Light Industrial Buildings 4

Three credits selected from one of the following areas: 3

Dynamics, Electronics, Materials Technology, or Strength of Materials

EGTE courses that satisfy this requirement are:
EGTE 344 Electronics and Microprocessors 3
EGTE 435 Machinery Design and Development 3

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

Technical Specialization
EGTE 321 Storm-Water Management 4
EGTE 328 Waste Management Systems 3
EGTE 421 Bioresources Management Systems 4
EGTE 431 Mechanical Aspects of Biological and Natural Resources 4
EGTE 451 Senior Design 3

One of the following: 3-4

BREG 628 Land Application of Wastes 3
EGTE 331 Mechanical Power Units 3
EGTE 440 Plant Layout and Materials Handling 3
EGTE 444 Programmable Logic Control Systems 3
EGTE 445 Food Engineering Technology 3
EGTE 456 Fundamentals of HVAC 4

Technical Support
PLSC 204 Introduction to Soil Science 4

A minimum of three credits in biology/life sciences or natural resources, excluding courses used to satisfy the Biology, Chemistry, and Physics group 3

A minimum of eleven credits in the Bioresources Engineering Department or related courses approved by the student's advisor 11

To graduate with a major in Bioresources Engineering Technology, the student must attain an average 2.0 index in all courses with a BREG or EGTE prefix.

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

CREDITS TO TOTAL A MINIMUM OF 130

ENGINEERING TECHNOLOGY

Engineering technology is part of the broad discipline of engineering, in which a knowledge of the mathematical and natural sciences is applied in utilization of materials and forces. Engineering technology requires the application of scientific and engineering knowledge combined with technical skills in support of engineering activities.

The curriculum prepares the engineering technologist to make independent judgments and to design and manage systems and components to achieve conceptual goals with consideration of their effectiveness, safety or cost. Close liaison is maintained between the educational programs and employers to give graduates the greatest opportunity for career development.

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

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

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

DEGREE: BACHELOR OF APPLIED SCIENCE
MAJOR: ENGINEERING TECHNOLOGY

CORE CURRICULUM

CREDITS

UNIVERSITY REQUIREMENTS
ENGL 110 Critical Reading and Writing (with minimum grade of C) 3
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content (see p. 57). 3

MAJOR REQUIREMENTS

Communications
A second writing course selected from: 3
ENGL 301 Expository Writing
ENGL 302 Advanced Composition
ENGL 307 News Writing and Editing
ENGL 312 Written Communications in Business
ENGL 410 Technical Writing
An oral communications course selected from: 3
COMM 200 Introduction to Human Communication Systems
COMM 255 Fundamentals of Communication
COMM 312 Oral Communication in Business
COMM 330 Public Speaking
COMM 356 Small Group Communication
Social Sciences and Humanities
ECON 151 Introduction to Microeconomics 3
ECON 152 Introduction to Macroeconomics 3

Nine additional 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, or courses cross-listed in these departments.

Basic Sciences and Mathematics
Biology/Life Science course 3
CHEM 103/104 General Chemistry 8
PHYS 201/202 Introductory Physics I and II 8
or
PHYS 207/208 Fundamentals of Physics I and II 8
MATH 221/222 Calculus I and II 6-8
or
MATH 241/242 Analytic Geometry and Calculus A and B 6-8
STAT 201 Introduction to Statistics I 3
or
MATH 243 Analytic Geometry and Calculus C 3-4

Elective Mathematics or Statistics course at the 200-level or above 3

To graduate with a major in engineering technology, a student must attain at least a 2.0 average in EGTE courses and must earn at least a C- in all prerequisite courses to qualify for admission to the next course. This requirement is in addition to the University requirement of a 2.0 grade-point average. A student must complete a minimum of 48 semester hours in course work assigned to technical science, technical skills and technical specialization categories.

Technical Sciences
EGTE 218 Fundamentals of Hydraulic Systems 4
EGTE 244 Electricity for Engineering Technology 4
EGTE 311 Fundamentals of Thermodynamics 3
EGTE 354 Rural/Light Industrial Buildings 4
Three credits selected from one of the following areas: Dynamics, Electronics, Material Technology or Strength of Materials 3

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

Technical Specialization
One of the following (cannot be satisfied by transfer credit): 3-4
EGTE 321 Storm Water Management
EGTE 331 Mechanical Power Units
EGTE 435 Machinery Design and Development
EGTE 456 Fundamentals of HVAC

Four of the following: 12-15
EGTE 321 Storm Water Management
EGTE 331 Mechanical Power Units
EGTE 344 Electronics and Microprocessors
EGTE 435 Machinery Design and Development
EGTE 440 Plant Layout and Materials Handling
EGTE 443 Instrumentation
EGTE 444 Programmable Logic Control Systems

EGTE 445 Food Engineering Technology
EGTE 456 Fundamentals of HVAC

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

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

CREDITS TO TOTAL A MINIMUM OF 130

CONCENTRATION: TECHNICAL MANAGEMENT

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

Technical Skills
EGTE 109 Technical Drafting 2
EGTE 111 Computer Application in Engineering Technology 3
EGTE 209 Computer Aided Drafting 3
Microcomputer course (EGTE 112 Personal Computers and Technology preferred) 3
Instrumentation or microprocessor course 3

Technical Specialization
One of the following (cannot be satisfied by transfer credit): 3-4
EGTE 321 Storm Water Management
EGTE 331 Mechanical Power Unit
EGTE 435 Machinery Design and Development
EGTE 456 Fundamentals of HVAC

Additional courses in technical design to bring the total technical specialization credits to a minimum of nine.

Technical Management
FREC 201 Records and Accounts 3
or
ACCT 207 Accounting I 3
Additional courses in technical management 12

Accounting credits cannot exceed six of the fifteen total credit hours. FREC 201 will substitute for ACCT 207. ACCT 207 will substitute for FREC 201. It is recommended that ACCT 207 and ACCT 208 be taken. Other courses can be selected from certain courses in Business Administration, Engineering Technology or Food and Resource Economics.

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

CREDITS TO TOTAL A MINIMUM OF 130

REQUIREMENTS FOR A MINOR IN ENGINEERING TECHNOLOGY

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

EGTE 109  Technical Drafting  2
EGTE 111  Computer Applications in Engineering Technology  3

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

**ENTOMOLOGY AND APPLIED ECOLOGY**

Entomology emphasizes the structure, physiology, behavior, 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 native species.

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

The faculty advisor and student jointly plan the course program according to the student's career objective. Course selection should be made in consultation with the academic advisor during the preregistration period of each term.

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**THE DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE MAJOR: WILDLIFE CONSERVATION**

**CURRICULUM**

**UNIVERSITY REQUIREMENTS**

ENGL 110  Critical Reading and Writing (with minimum grade of C-)  3
Three credits in an approved course or courses stressing  3
multicultural, ethnic, and/or gender-related content (see p. 57).

**MAJOR REQUIREMENTS**

**Computer Science**

Computer Science course (FREC 135 or equivalent)  3

**Agricultural and Biological Sciences**

One course in any of the following areas: Food and Resource Economics (except FREC 135), Food Science, Bioresources Engineering, or Animal Science (except ANSC 300).

**Literature and Arts**

Six credits selected from English, Art, Art History, Communication, Music, Theatre, or Foreign Language, or courses cross-listed with these departments.

**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, or courses cross-listed with these departments.

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

**PROFESSIONAL STUDIES**

MATH 115, 171 or higher  4
BISC 207/208  Introductory Biology I and II  8
BISC 302  General Ecology  3

**ELECTIVES**

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

**CREDITS TO TOTAL A MINIMUM OF.......................... 124**
HONORS BACHELOR OF SCIENCE IN AGRICULTURE: ENTOMOLOGY OR WILDLIFE CONSERVATION

The recipient of this degree must complete:

1. All requirements for the Bachelor of Science: Entomology or Wildlife Conservation.

2. All of the University’s generic requirements for the Honors Bachelor’s degree (see page 43 of this catalog). Courses with the ENTO prefix taken at the 600-level or higher may be counted as Honors courses in the major. One 3- or 4-credit course in ANSC, PLSC, or BISC will, if taken as Honors, count toward the 12 Honors credits required in the major and/or in collateral disciplines.

REQUIREMENTS FOR A MINOR IN ENTOMOLOGY

The minor in entomology requires 18 credits of courses including ENTO 205, 305, and 406. The remaining 10 credits must come from ENTO 214, 224, 315, 405, 408, 411, or 440. Any substitutions require prior approval of the Department Chair. 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.

REQUIREMENTS FOR A MINOR IN WILDLIFE CONSERVATION

The minor in wildlife conservation requires 18 credits of courses including ENTO 201, 325 and three courses from among ENTO 205, 305, 318, 406, 418, 424, and 425, of which one must be at the 400-level. Remaining credits may be from any of the 300- and 400-level courses listed above or any other 300- or higher-level ENTO course with content primarily focused on taxonomy, ecology, or conservation. Any substitutions require prior approval of the Department Chair. 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.
PLANT PROTECTION

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

DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE
MAJOR: PLANT PROTECTION

CURRICULUM

UNIVERSITY REQUIREMENTS

ENGL 110 Critical Reading and Writing (with a minimum grade of C) .................................................. 3
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content (see p. 57) .................................................. 3

MAJOR REQUIREMENTS

Computer Science

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

Agricultural and Biological Sciences

Minimum of one course in two of the following areas: Food and Resource Economics (except FREC 135), Food Science, Bioresources Engineering, Animal Science, Entomology and Applied Ecology, and Plant and Soil Sciences. .......................... 6-8

Literature and Arts

Six credits selected from English, Art, Art History, Communication, Music, Theatre, or Foreign Language, or courses cross-listed with these departments .................................................. 6

Social Sciences and Humanities

Minimum of one course in three of the following areas: Anthropology, Black American Studies, Criminal Justice, Economics, Education, Geography, History, Philosophy, Political Science, Psychology, Sociology, or Women's Studies, or courses cross-listed with these departments .................................................. 9

Professional Studies

MATH 115/171 Pre-Calculus or higher level .................................................. 3
BISC 207/208 Introductory Biology I and II .................................................. 8
CHEM 101/102 General Chemistry or CHEM 103/104 General Chemistry .................................................. 8
ENTO 205 Elements of Entomology .................................................. 3
ENTO 305 Entomology Laboratory .................................................. 3
ENTO 406 Insect Identification—Taxonomy .................................................. 3
ENTO 411 Insect Pest Management .................................................. 3
ENTO 465 Seminar .................................................. 1
PLSC 101 Botany I .................................................. 4
PLSC 201 Botany II .................................................. 4
PLSC 303 Introductory Plant Pathology .................................................. 4
PLSC 411 Diagnostic Plant Pathology .................................................. 3
PLSC 470 Weed Biology and Control .................................................. 4
A plant production course selected from PLSC 105, 133, 213, or 302, or 34 .................................................. 3
Nine additional ENTO and/or PLSC credits, plus 3 credits of related Internship, Independent Study, Research or Field Experience. .................................................. 12

ELECTIVES

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

The choice of department in which to complete the remaining credits provides the student with the opportunity to emphasize applied entomology, plant pathology, or weed science in his or her program. Students should complete their programs with electives that will provide an education best suited to their goals. Course selection should be made in consultation with the academic advisor during the preregistration period of each term.

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

FOOD AND RESOURCE ECONOMICS

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

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

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

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

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

CURRICULUM

UNIVERSITY REQUIREMENTS

ENGL 110 Critical Reading and Writing (minimum grade C) .................................................. 3
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content (see p. 57) .................................................. 3

MAJOR REQUIREMENTS

Agricultural and Biological Sciences

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

Physical Sciences

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

Professional Studies

MATH 115 Pre-Calculus or higher level (MATH 221, MATH 230, and STAT 201 are strongly recommended) .................................................. 3
ACCT 207/208 Accounting I and II .................................................. 6
COMM 312 Oral Communication in Business .................................................. 3
ENGL 312 Written Communications in Business .................................................. 3
ECON 151 Introduction to Microeconomics: Prices and Markets .................................................. 3
ECON 152 Introduction to Microeconomics: National Economy .................................................. 3
BUAD 301 Introduction to Marketing .................................................. 3
Two additional courses offered by the College of Business and Economics at the 300 or 400 level .................................................. 6
One foreign language course .................................................. 3
AGRI 165 Mastering the Freshman Year .................................................. 1
FREC 110 Introduction to Food and Agribusiness Industry ....................... 1
FREC 135 Introduction to Data Analysis ................................................ 3
FREC 150 Economics of Agriculture and Natural Resources ..................... 3
FREC 240 Quantitative Methods in Agricultural Economics ..................... 3
FREC 345 Strategic Selling and Buyer Communication .................................. 3
FREC 404 Food and Fiber Marketing .................................................... 3
FREC 405 Management and Leadership Development .............................. 3
FREC 408 Research Methods I .................................................................. 3
FREC 409 Research Methods II .................................................................. 3
FREC 410 International Agricultural Trade and Marketing ....................... 3
FREC 430 Establishing and Managing a Food and Agribusiness Enterprise .... 3

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

ELECTIVES
After required courses are completed, sufficient credits must be taken to meet the minimum credits required for the degree. Only four credits of activity-type Physical Education and/or four credits of performing Music credit may be counted toward the degree. Included in the free electives are suggested Food and Resource Economics courses from the following areas:

Suggested Food and Agribusiness Management Electives:
FREC 312 Food Retailing and Product Management .................................. 3
FREC 335 Advanced Data Management .................................................. 3
FREC 427 Agribusiness Financial Management ....................................... 3
FREC 471 Futures and Options Markets .................................................. 3
FREC 480 Geographic Information Systems in Natural Resource Management .......................................................... 3

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

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

CREDITS TO TOTAL A MINIMUM OF .................................................................. 128

DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE
MAJOR: AGRICULTURAL ECONOMICS

The requirements for the major in Food and Agribusiness Management must be met. The following department courses are required for the concentration and may also be used as electives in the Food and Agribusiness Management major:

FREC 312 Food Retailing and Product Management .................................. 3
FREC 335 Advanced Data Management .................................................. 3
FREC 427 Agribusiness Financial Management ....................................... 3
FREC 471 Futures and Options Markets .................................................. 3

Two Business Administration Courses at the 400-level in marketing related areas These are in addition to BUAD 301-Intro-duction to Marketing and two additional Business and Economics courses at the 300 and 400 level required by the Food and Agribusiness Management major.

CREDITS TO TOTAL A MINIMUM OF .................................................................. 128

REQUIREMENTS FOR A MINOR IN FOOD AND AGRIBUSINESS MANAGEMENT

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

Marketing/Management Area:
FREC 345 Strategic Selling and Buyer Communication .................................. 3
FREC 404 Food and Fiber Marketing .......................................................... 3
FREC 405 Management and Leadership Development .................................. 3
FREC 471 Futures and Options Markets .................................................... 3

Decision Analysis/International Trade Area:
FREC 408 Research Methods I .................................................................. 3
FREC 409 Research Methods II .................................................................. 3
FREC 410 International Agricultural Trade and Marketing ....................... 3
FREC 427 Agribusiness Financial Management ....................................... 3

A minimum grade of C is required in all courses counting toward the minor.

DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE
MAJOR: AGRICULTURAL ECONOMICS

CURRICULUM

UNIVERSITY REQUIREMENTS

ENGL 110 Critical Reading and Writing (with a minimum grade of C) ............. 3
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content (see p. 57).

MAJOR REQUIREMENTS

Agricultural and Biological Sciences

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

Social Sciences and Humanities

Minimum of one course in two of the following areas: Anthropology, Black American Studies, Criminal Justice, Education, Geography, History, Philosophy, Political Science, Psychology, Sociology, or Women's Studies, or courses cross-listed in these departments.

Physical Sciences

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

Professional Studies

MATH 115 PreCalculus (MATH 221 or higher is strongly recommended) .......... 3
ECON 151 Introduction to Microeconomics: Prices and Markets .................. 3
ENGL 312 Written Communications in Business ........................................ 3
ENGL 410 Technical Writing ....................................................................... 3

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

Two additional courses offered by the College of Business and Economics at the 300-level or higher

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

FREC 135 Introduction to Data Analysis .................................................... 3
FREC 150 Economics of Agriculture and Natural Resources ..................... 3
FREC 201 Records and Accounts ............................................................... 3
FREC 240 Quantitative Methods in Agricultural Economics ..................... 3

Seven courses at the 400-level or above with at least two in each of the following three general areas: 21-22

1. Marketing/International Trade
FREC 404 Food and Fiber Marketing .................................................... 3
FREC 410 International Agricultural Trade and Marketing ....................... 3
FREC 427 Agribusiness Financial Management ....................................... 3

2. Production/Management
FREC 406 Agriculture and Natural Resource Policy .................................. 3
FREC 408 Research Methods I ................................................................. 3
FREC 427 Agribusiness Financial Management ....................................... 3

3. Resources/Development
FREC 424 Resource Economics ............................................................... 3
FREC 429 Community Economic Development ....................................... 3
FREC 444 Economics of Environmental Management ............................ 3

A maximum of three credits of Independent Study in Food and Resource Economics and a maximum of six credits of Independent Study in all areas, including Food and Resource Economics, may be counted toward a degree.

ELECTIVES

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

CREDITS TO TOTAL A MINIMUM OF .................................................................. 124
DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE
MAJOR: AGRICULTURAL ECONOMICS

The requirements for the major in Agricultural Economics must be met.
In addition, five of the following six FREC courses must be taken: 15-16
FREC 406 Agriculture and Natural Resource Policy
FREC 424 Resource Economics—Theory and Policy
FREC 429 Rural Economics Development—Theory and Policy
FREC 444 Economics of Environmental Management
FREC 450 Environmental Law and Policy
FREC 480 Geographic Information Systems

FREC courses required for the Agricultural Economics major may be used to satisfy requirements for the Resource Economics concentration.

Two additional courses from the College of Business and Economics as required for the Agricultural Economics major plus an additional course (three courses total) must all be taken from the following courses: 9

ECON 306 Economic Theory of Politics
ECON 311 Economics of Developing Countries
ECON 408 Economics of Law
ECON 411 Economics of Growth and Development
ECON 415 Economic Forecasting
ECON 422 Econometric Methods and Models I
ECON 423 Econometric Methods and Models II
ECON 426 Mathematical Economic Analysis
ECON 433 Economics of the Public Sector
ECON 475 Economics of Natural Resources
ECON 477 Benefit-Cost Analysis

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

GENERAL AGRICULTURE

For the undergraduate student with broad interests, the major in general agriculture is offered. This program is administered through the Office of the Dean of Agriculture and Natural Resources.

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http://bluehen.ags.udel.edu/genag/genag.htm

DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE
MAJOR: GENERAL AGRICULTURE

CURRICULUM

UNIVERSITY REQUIREMENTS
ENGL 110 Critical Reading and Writing (Minimum grade C) ............... 3
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content (see p. 57).

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

Agricultural and Biological Sciences
Minimum of one course in three of the following areas: Food and Resource Economics (except FREC 125), Food Science, Bioreources Engineering, Animal Science, Entomology and Applied Ecology, Plant and Soil Sciences ......................................................... 9-12

Social Sciences and Humanities
Minimum of one course in three of the following areas: Anthropology, Black American Studies, Criminal Justice, Economics, Geography, History, Philosophy, Political Science, Psychology, Sociology, or Women’s Studies, or courses cross-listed in these departments .................................................. 9

Physical Sciences
Minimum of eight credits selected from one of the following two-course sequences: 8
CHEM 101/102 or 103/104
PHYS 201/202 or 207/208
GEOL 105 and 106

Communications
A minimum of one course in written communications chosen from the following: 3
ENGL 301 Expository Writing

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

NATURAL RESOURCE MANAGEMENT

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

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

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

http://bluehen.ags.udel.edu/ssap/nrm/nrm_cg.htm
PLANT AND SOIL SCIENCES

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

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

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http://bluehen.ags.udel.edu/plsc/plsc.html

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

CURRICULUM

UNIVERSITY REQUIREMENTS
ENGL 110 Critical Reading and Writing (minimum grade C-) ............................................. 3
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content (see p. 57) ......................................................... 3

MAJOR REQUIREMENTS

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

Agricultural and Biological Sciences

One course in any of the following areas: Animal Science, Food Science, Entomology and Applied Ecology, or Biology ................................................................. 3-4

Literature and Arts
Three credits selected from English, Art, Art History, Communication, Music, Theatre, or Foreign Language, or courses cross-listed in these departments ................................................................. 3

Social Sciences and Humanities
Minimum of one course in two of the following areas: Anthropology, Black American Studies, Criminal Justice, Economics, Education, History, Philosophy, Political Science, Psychology, Sociology, or Women's Studies or courses cross-listed in these departments ................................................................. 6
Computer Science course (FREC 135, or equivalent)

Mathematics and Computer Science

MAJOR REQUIREMENTS

UNIVERSITY REQUIREMENTS
ENGL 110 Critical Reading and Writing (minimum grade C) 3
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content (see p. 57) 3

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

DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE

MAJOR: LANDSCAPE HORTICULTURE

CREDITS TO TOTAL A MINIMUM OF 124

REQUIREMENTS FOR A MINOR IN ENVIRONMENTAL SOIL SCIENCE

The minor in Environmental Soil Science is open to students in any major and requires a total of 17-18 credits, as follows:

PLSC 204 Introduction to Soil Science 4
PLSC 305 Environmental Soil Management 4

Three of the following five courses:

PLSC 151 Introduction to Crop Science 3
PLSC 319 Environmental Soil Microbiology 4
PLSC 401 Agronomic Crop Science 4
PLSC 438 Fate and Transport of Contaminants in Soil 3
PLSC 608 Soil Chemistry 3

One of the following two courses: 3-4
FREC 480 Geographic Information Systems in Natural Resource Management or
GEOG 372 Geographic Information Systems

Three of the following four courses: 8-9
EGTE 103 Land and Water Management
EGTE 113 Land Surveying
EGTE 326 Agricultural Waste Management
FREC 150 Economics of Agriculture and Natural Resources

ELECTIVES

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

BISC 321 Environmental Biology
FREC 444 Economics of Environmental Management
GEOG 235 Conservation of Natural Resources
GEOG 415 General Geomorphology
GEOG 428 Hydrogeology
GEOG 421 Environmental and Applied Geology
PLSC 303 Introductory Plant Pathology
PLSC 403 Soil Physics
PLSC 407 Plant and Soil Water Relations
PLSC 419 Soil Microbiology
PSOC 350 Politics and the Environment

CREDITS TO TOTAL A MINIMUM OF 124

REQUIREMENTS FOR A MINOR IN LANDSCAPE HORTICULTURE

The minor in Landscape Horticulture is open to students in any major and requires a total of 17-18 credits, as follows:

PLSC 151 Botany I 3
PLSC 133 Ornamental Horticulture 3
PLSC 211 Herbaceous Landscape Plants 3
PLSC 212 Woody Landscape Plants 4

One of the following Communication courses:

CNST 200 Consumer Economics
CNST 242 Consumer Movement in Perspective
CNST 242 Consumer Movement in Perspective

One of the following business-related courses:

ACCT 207 Accounting
ACCT 352 Law and Social Issues in Business

One of the following Social Sciences and Humanities courses:

Che 103 General Chemistry I and II 8
CHEM 213 Organic Chemistry
EGTE 103 Land and Water Management
ENTO 205 Elements of Entomology

FREC 150 Economics of Agricultural and Natural Resources 3
PLSC 101 Botany I 4
PLSC 133 Ornamental Horticulture 3
PLSC 201 Botany II 4
PLSC 204 Introduction to Soil Science 4
PLSC 211 Herbaceous Landscape Plants 3
PLSC 212 Woody Landscape Plants 4
PLSC 213 Turf Establishment and Maintenance 4
PLSC 303 Introductory Plant Pathology 4
PLSC 305 Environmental Soil Management 4
PLSC 332 Basic Landscape Design 4
PLSC 364 Ornamental Horticulture Internship 4

PLSC 366 Independent Study 3
PLSC 410 Introduction to Plant Physiology 3
PLSC 455 Issues in Horticulture 3
PLSC 470 Weed Biology and Control 3

One of the following Communication courses:

COM 212 Oral Communication in Agricultural Sciences
COMM 312 Oral Communication in Business
COMM 350 Public Speaking
ENGL 312 Written Communication in Business
ENGL 410 Technical Writing

One of the following business-related courses:

ACCT 207 Accounting
ACCT 352 Law and Social Issues in Business

CREDITS TO TOTAL A MINIMUM OF 124
DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE
MAJOR: PLANT BIOLOGY

CURRICULUM

CREDITS

UNIVERSITY REQUIREMENTS

ENGL 110 Critical Reading and Writing (minimum grade C) 3
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content (see p. 57)

MAJOR REQUIREMENTS

Mathematics and Computer Science

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

Agricultural and Biological Sciences

One course in any of the following areas: Food Science, Bioresources Engineering, Animal Science, or Entomology and Applied Ecology

Literature and Arts

Three credits selected from English, Art, Art History, Communication, Music, Theatre, or Foreign Language, or courses cross-listed in these departments

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 or courses cross-listed in these departments

Professional Studies

One of the following courses:
BISC 207 Introduction to Biology I 4
BISC 371 Introduction to Microbiology 4
CHEM 101/102 General Chemistry I and II 8
or
CHEM 103/104 General Chemistry I and II 8
CHEM 213 Organic Chemistry 3
CHEM 321/322 Organic Chemistry 4
One of the following courses:
AGRI 112 Oral Communication in Ag Sciences
AGRI 120 Oral Communication in Business
AGRI 310 Public Speaking
ENGL 312 Written Communications in Business
ENGL 410 Technical Writing
RISC 101 Botany I 4
RISC 201 Botany II 4
RISC 304 Introduction to Soil Science 4
RISC 300 Principles of Plant and Animal Genetics 3
RISC 303 Introductory Plant Pathology 4
RISC 306 Introduction to Plant Molecular Biology 4
RISC 410 Introduction to Plant Physiology 3
RISC 435 Plant Development Biology 3
FREC 408 Research Methods 3
ENTO 465 Seminar 1
Other Life Science Courses:
Minimum of four courses with at least six credits at the 400-level or above. See advisor for list of approved courses in various interest areas

ELECTIVES

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

Suggested courses include:
PHYS 201 or higher Introductory Physics
(Recommended for students interested in graduate school)
CHEM 220/221 Quantitative Analysis

CREDITS TO TOTAL A MINIMUM OF: 124

DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE
MAJOR: PLANT SCIENCE

CURRICULUM

CREDITS

UNIVERSITY REQUIREMENTS

ENGL 110 Critical Reading and Writing (minimum grade C) 3
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content (see p. 57)

MAJOR REQUIREMENTS

Mathematics and Computer Science

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

Agricultural and Biological Sciences

Minimum of one course in three of the following areas: Food and Resource Economics (except FREC 135), Food Science, Biore sources Engineering, Animal Science, Food Science, Entomology and Applied Ecology, or Biology

Literature and Arts

Six credits selected from English, Art, Art History, Communication, Music, Theatre, or Foreign Language, or courses cross-listed in these departments

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, or courses cross-listed in these departments

Professional Studies

One of the following courses:
AGRI 112 Oral Communication in Ag Sciences
AGRI 120 Oral Communication in Business
AGRI 310 Public Speaking
ENGL 312 Written Communications in Business
ENGL 410 Technical Writing
RISC 101 Botany I 4
RISC 201 Botany II 4
RISC 304 Introduction to Soil Science 4
RISC 300 Principles of Plant and Animal Genetics 3
RISC 303 Introductory Plant Pathology 4
RISC 306 Introduction to Plant Molecular Biology 4
RISC 410 Introduction to Plant Physiology 3
One of the following courses:
PHYS 101 Introduction to Physics
GEOL 103 General Geology
CHEM 111/112 General Chemistry I and II
CHEM 213 Organic Chemistry 3

ELECTIVES

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

CREDITS TO TOTAL A MINIMUM OF: 124
THE ASSOCIATE IN SCIENCE DEGREE

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

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

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

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