In the College of Agriculture and Natural Resources, business, education, science and technology are used 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 provide a flexible program of study designed to educate students on the rapid changes and improvements in agriculture and natural resources. Frequent consultation with faculty advisors helps students progress toward achieving their educational goals. College faculty encourage and support students to pursue degrees with distinction, to take courses in the University Honors Program, and to participate in the Science and Engineering Scholars summer research program.

Undergraduate majors are offered in agriculture and natural resources, agricultural education, animal science, engineering technology, entomology, environmental soil science, food and agribusiness management, food science and technology, landscape horticulture, natural resource management, plant protection, plant science, resource economics, statistics, and wildlife conservation.

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**Taking Courses Pass/Fail**

Courses taken pass/fail cannot be used to complete major or group requirements in the College of Agriculture and Natural Resources. Pass/fail courses can be counted only as free electives.

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**Dean’s Scholar Program**

The Dean’s Scholar Program serves students whose clearly defined educational goals cannot be effectively achieved by pursuing the standard curricula for all existing majors, minors, and interdepartmental majors sponsored by the University. Driven by an overarching passion or curiosity that transcends typical disciplinary bounds and curricula, a Dean’s Scholar’s intellectual interests may lead to broad interdisciplinary explorations of an issue or to more intense, in-depth studies in a single field at a level akin to graduate work. In consultation with faculty advisors and the Assistant Dean of their college, Dean’s Scholars design an imaginative and rigorous individual plan of study to meet the total credit hours required for graduation. Dean’s Scholars in Agriculture and Natural Resources may qualify for Honors Degrees. Contact the Assistant Dean in the college or go to www.udel.edu/deansscholar/ for more information and the application.

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**Preveterinary Instruction**

Students 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 the Animal Science major.

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**Agriculture and Natural Resources**

**Telephone:** (302) 831-2508
**E-mail:** kra@udel.edu
**http://ag.udel.edu**

For the undergraduate with broad interests, the major in agriculture and natural resources is offered. The program is administered through the Office of the Academic Programs in the College of Agriculture and Natural Resources.

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**DEGREE: BACHELOR OF SCIENCE**

**MAJOR: AGRICULTURE AND NATURAL RESOURCES**

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**UNIVERSITY REQUIREMENTS**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 110</td>
<td>Critical Reading and Writing</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>[minimum grade of C]</td>
<td></td>
</tr>
<tr>
<td>First Year Experience (see page 68)</td>
<td>0.4</td>
<td></td>
</tr>
<tr>
<td>Discovery Learning Experience (see page 68)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Three credits in an approved course or courses stressing multi-cultural, ethnic, and/or gender-related content [see pages 68-70]</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

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71
MAJOR REQUIREMENTS

Mathematics and Computer Science
- Mathematics course (MATH 115 or higher) ............................................. 3
- Mastering the Freshman Year (AGRI 165) .......................................... 1
- Computer Science course (FREC 135 or equivalent) ............................. 3

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

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, Women's Studies, or courses cross-listed in these departments.

Physical Sciences ........................................................................... 8
- Minimum of eight credits selected from one of the following two-course sequences: CHEM 101/102 or 103/104

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

- A minimum of one course in oral communications chosen from the following: ......................................................... 3
  - AGRI 212 Oral Communication in Agriculture and Natural Resources
  - COMM 212 Oral Communication in Business
  - COMM 255 Fundamentals of Communication
  - COMM 330 Public Speaking

Literature and Arts ........................................................................ 6
- A minimum of six credits, other than those communications courses listed above, selected from English, Art, Art History, Communication, Music, Theatre, or Foreign Language, or courses cross-listed in these departments.

Within the college ........................................................................ 30
- Thirty additional credits from any of the following departments (fifteen credits of the 30 must be at the 300 level or higher):
  - Food and Resource Economics, Bioresources Engineering, Agricultural Education, Animal Science, Entomology and Wildlife Ecology, Food Science, Statistics, Agriculture, or Plant and Soil Sciences. A maximum of twelve credits of Special Problems/Independent Study/Field Experience may be counted toward the degree, with a maximum of six credits in any one department.

ELECTIVES

After required courses are completed, sufficient credits must be taken to meet the minimum credits required for the degree. Only four credits total of HESC 120 activity or performing Music credit may be counted toward the degree.

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

AGRICULTURAL EDUCATION

Telephone: (302) 831-4232
E-mail: pbarber@udel.edu
http://ag.udel.edu

This program offers a Bachelor of Science degree that qualifies the individual for teacher certification in agricultural and natural resources education. It provides students with an opportunity to gain a broad understanding and professional preparation in the areas of animal science, plant and soil sciences, food science, engineering technology, entomology and wildlife conservation, resource economics, agribusiness, natural resource management, and biotechnology. Students develop and practice their leadership skills through participation in FFA activities and other student organizations. Additionally, it provides pedagogical skills in a pragmatic hands-on program that uses an investigative, scientific, design-and-construct, and problem-solving approach to teaching. The curriculum is designed to allow students to teach in classroom and laboratory settings using modern technology and techniques.

DEGREE: BACHELOR OF SCIENCE
MAJOR: AGRICULTURAL EDUCATION

UNIVERSITY REQUIREMENTS

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

First Year Experience (see page 68) ................................. 0.4

Discovery Learning Experience (see page 68) .............. 3

MAJOR REQUIREMENTS

Agricultural and Biological Sciences .................................................. 9-12
- Minimum of one course in three of the following areas: Animal and Food Sciences, Engineering Technology, Food and Resource Economics (except FREC 135), Entomology and Wildlife Ecology, Plant and Soil Sciences, Statistics, or Biological Sciences.

Literature and Arts
- Nine credits from English, Art, Art History, Communication, Music, Theatre, 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, Women's Studies, or courses cross-listed in these departments.

Physical Sciences ........................................................................ 8
- Minimum of eight credits selected from one of the following two-course sequences: CHEM 101/102 or 103/104

Professional Studies

MATH 115 ........................................................................ 3
AGED 180 Introduction to Agricultural Education ...................... 3
AGED 280 FFA and Supervised Agricultural Experiences .......... 3
AGED 448 Student Teaching Portfolio ............................................. 3
AGED 480 Career & Technical Education Materials & Approaches I ......................................................... 3
AGED 481 Career & Technical Education Materials & Approaches II ............................................................ 3
EDUC 413 Adolescent Development & Educational Psychology .................. 4
EDUC 414 Teaching Exceptional Adolescents ..................................... 3
EDUC 419 Diversity in Secondary Education ................................... 3

(fulfills the University multicultural requirement)

EDUC 400 Student Teaching .......................................................... 9
EDUC 420 Reading in the Content Area ............................................ 3
EDUC 430 Classroom Management ................................................ 1

Technical Agriculture .................................................................... 30
- At least thirty credits of agriculture and natural resources courses from at least three departments in the college. Three credits must be FREC 135. Students are to meet with their Agricultural Education advisor before selecting these courses.

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

The Agricultural program requires a 2.5 minimum overall GPA, passing scores on the Praxis I test for all three subtests (reading, passing score=175; writing, passing score=173; and mathematics, passing score=174) prior to enrollment in AGED 480 and AGED 481, and proof of having taken the Praxis II test in the appropriate content area. A copy of the official score report must be submitted to the Delaware Center for Teacher Education, 200 Academy Street, during enrollment in EDUC 400 Student Teaching or no later than November 1 for January graduates and May 1 for June or summer graduates. An institutional recommendation for certification will not be issued until the candidate has presented the official score report. The teacher education program advisor should consult with other policies concerning qualifications for student teaching. A minimum grade of C is required in all AGED and EDUC courses and an overall major GPA of 3.0 (for all AGED and EDUC courses).
The Department of Animal and Food Sciences offers undergraduate programs leading to the Bachelor of Science degree, as well as 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: preveterinary medicine, animal biotechnology, applied animal science, and general animal science. 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. The preveterinary concentration is designed to meet not only the department, college, and University requirements for the BS degree, but also the admission requirements for many U.S. veterinary schools. 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 Science major.

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, food safety engineering, quality control and analysis, technical service and sales, with opportunities in regulatory agencies, education, and basic research. Students 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.

**DEGREE: BACHELOR OF SCIENCE**

**MAJOR: ANIMAL SCIENCE**

**CONCENTRATION: GENERAL ANIMAL SCIENCE**

**CURRICULUM**

**UNIVERSITY REQUIREMENTS**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 110</td>
<td>Critical Reading and Writing</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>[with minimum grade of C]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>First Year Experience (see page 68)</td>
<td>0.4</td>
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<tr>
<td></td>
<td>Discovery Learning Experience (see page 68)</td>
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<tr>
<td></td>
<td>Three credits in an approved course or courses</td>
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<tr>
<td></td>
<td>stressing multicultural, ethnic, and/or</td>
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</tr>
<tr>
<td></td>
<td>gender-related course content (see pages 68-70)</td>
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</tbody>
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**MAJOR REQUIREMENTS**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>AGRI 165</td>
<td>Mastering the Freshman Year</td>
<td>1</td>
</tr>
</tbody>
</table>

**Agricultural and Biological Sciences**

Minimum of one course in two of the following areas: Food and Resource Economics (except FREC 135), Food Science, Engineering Technology, Entomology and Wildlife Ecology, Statistics, Agriculture, or Plant and Soil Sciences.

**Literature and Arts**

Six credits from English, Art, Art History, Communication, Music, Theatre, 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, Women’s Studies, or courses cross-listed in these departments.

**UNIVERSITY REQUIREMENTS**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 115 or higher</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>BISC 207/208</td>
<td>Introductory Biology I and II</td>
<td>8</td>
</tr>
<tr>
<td>CHEM 101/102</td>
<td>General Chemistry I and II</td>
<td></td>
</tr>
<tr>
<td>CHEM 103/104</td>
<td>General Chemistry I and II</td>
<td>8</td>
</tr>
<tr>
<td>ANSC 101</td>
<td>Introduction to Animal Science</td>
<td>3</td>
</tr>
<tr>
<td>ANSC 111</td>
<td>Animal Science Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>ANSC 140</td>
<td>Functional Anatomy</td>
<td>4</td>
</tr>
<tr>
<td>ANSC 251</td>
<td>Animal Nutrition</td>
<td>3</td>
</tr>
<tr>
<td>ANSC 252</td>
<td>Animal Nutrition Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>ANSC 265</td>
<td>Sophomore Seminar</td>
<td>1</td>
</tr>
<tr>
<td>ANSC 300</td>
<td>Principles of Animal and Plant Genetics</td>
<td>3</td>
</tr>
<tr>
<td>ANSC 332</td>
<td>Introduction to Animal Diseases</td>
<td>3</td>
</tr>
<tr>
<td>One course from the following:</td>
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<tr>
<td>ANSC 441</td>
<td>Reproductive Physiology of Domestic Animals</td>
<td>3</td>
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<tr>
<td>ANSC 442</td>
<td>Lactational Physiology</td>
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<tr>
<td>ANSC 443</td>
<td>Comparative Physiology of Domestic Animals</td>
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<tr>
<td>BISC 306</td>
<td>General Physiology</td>
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<tr>
<td>One course from the following:</td>
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<tr>
<td>ANSC 404</td>
<td>Dairy Production</td>
<td>4</td>
</tr>
<tr>
<td>ANSC 417</td>
<td>Beef Cattle and Sheep Production</td>
<td></td>
</tr>
<tr>
<td>ANSC 418</td>
<td>Swine Production</td>
<td></td>
</tr>
<tr>
<td>ANSC 421</td>
<td>Poultry Production</td>
<td></td>
</tr>
<tr>
<td>ANSC 420</td>
<td>Equine Management</td>
<td></td>
</tr>
</tbody>
</table>

Elective Animal Science courses for a total of 30 ANSC credits. 4.7

No more than five credits of ANSC 266, 366, 466, or 666 Special Problem/Independent Study may be used for the major. ANSC 399 may be taken one time for a maximum of 2 credits toward graduation.

**ELECTIVES**

After required courses are completed, sufficient credits must be taken to meet the minimum credits required for the degree. Only four credits of HESC 120 activity or four credits of performing Music credit may be counted toward the degree.

**RECOMMENDED ELECTIVES**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>FREC 201</td>
<td>Records and Accounts</td>
</tr>
<tr>
<td>ANSC 270</td>
<td>Biotechnology: Science and Socioeconomic Issues</td>
</tr>
<tr>
<td>ANSC 399</td>
<td>Teaching Assistant</td>
</tr>
<tr>
<td>BISC 300</td>
<td>Introduction to Microbiology</td>
</tr>
<tr>
<td>COMM 350</td>
<td>Public Speaking</td>
</tr>
<tr>
<td>ENGL 312</td>
<td>Written Communications in Business</td>
</tr>
</tbody>
</table>

CREDITS TO TOTAL A MINIMUM OF 124
DEGREE: BACHELOR OF SCIENCE
MAJOR: ANIMAL SCIENCE
CONCENTRATION: ANIMAL BIOTECHNOLOGY

UNIVERSITY REQUIREMENTS

ENGL 110 Critical Reading and Writing (with minimum grade of C) ........ 3
First Year Experience (see page 68) ........................................... 0-4
Discovery Learning Experience (see page 68) ............................... 3
Three credits in an approved course or courses stressing multi-cultural, ethnic, and/or gender-related course content (see pages 68-70) .................. 3

MAJOR REQUIREMENTS

AGRI 165 Mastering the Freshman Year .............................................. 1

Agricultural and Biological Sciences .............................................. 6-8
Minimum of one course in two of the following areas: Food and Resource Economics (except FREC 135), Food Science, Engineering Technology, Entomology and Wildlife Ecology (except ENWC 300), or Plant and Soil Sciences (except PLSC 300).

Literature and Arts ........................................................................ 6
Six credits from English, Art, Art History, Communication, Music, Theatre, 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, Women’s Studies, or courses cross-listed in these departments.

MATH 221 Calculus I ........................................................................ 3
BISC 207/208 Introductory Biology I and II ....................................... 8
BISC 401 Molecular Biology of the Cell ............................................ 4
CHEM 103/104 General Chemistry I and II ..................................... 8
CHEM 321/322 Organic Chemistry ................................................. 8

One of the following: .................................................................... 3-6

CHEM 527 Introductory Biochemistry
CHEM 214/216, 214/218, 214/216 Elementary Biochemistry
CHEM 641/642 Biochemistry

PHYS 201/202 Introductory Physics I and II ..................................... 8

ANSC 101 Introduction to Animal Science ....................................... 3
ANSC 111 Animal Science Laboratory ............................................ 1
ANSC 140 Functional Anatomy .................................................... 4
ANSC 251 Animal Nutrition .......................................................... 3
ANSC 252 Animal Nutrition Laboratory ........................................ 1
ANSC 265 Sophomore Seminar ..................................................... 1
ANSC 270 Biotechnology: Science and Socioeconomic Issues ........ 3
ANSC 300 Principles of Animal and Plant Genetics ........................ 3
ANSC 310 Animal Genetics Laboratory ........................................ 1
ANSC 332 Introduction to Animal Diseases .................................... 3
ANSC 466 Independent Study (Approved research project) .......... 3
ANSC 470 Principles of Molecular Genetics .................................... 3

One course from the following: ..................................................... 3-4

ANSC 436 Immunology of Domestic Animals
ANSC 445 Comparative Physiology of Domestic Animals
PLSC 300 Introduction to Microbiology

One course from the following: ..................................................... 4

ANSC 404 Dairy Production
ANSC 417 Beef Cattle and Sheep Production
ANSC 418 Swine Production
ANSC 420 Equine Management
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

ANSC 399 Teaching Assistant
ANSC 424 Nonruminant Nutrition
ANSC 435 Introduction to Animal Virology

ANSC 436 Immunology of Domestic Animals
ANSC 633 Poultry Pathology
ANSC 644 Bioinformatics
ANSC 654 Advanced Ruminant Nutrition
BISC 601 Immunology
BISC 602 Molecular Biology of the Cell
BISC 653 Recent Advances in Molecular Biology
BISC 654 Biochemical Genetics
BISC 658 Developmental Genetics
BISC 679 Virology
BISC 693 Human Genetics
CHEM 220 Quantitative Analysis
CHEM 418 Introductory Physical Chemistry
COMM 350 Public Speaking
ENGL 312 Written Communication in Business
FOSC 439/639 Food Microbiology
FOSC 449/649 Food Biotechnology

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

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

UNIVERSITY REQUIREMENTS

ENGL 110 Critical Reading and Writing (with minimum grade of C) ........ 3
First Year Experience (see page 68) .............................................. 0-4
Discovery Learning Experience (see page 68) ............................... 3
Three credits in an approved course or courses stressing multi-cultural, ethnic, and/or gender-related course content (see pages 68-70) ............. 3

MAJOR REQUIREMENTS

AGRI 165 Mastering the Freshman Year .............................................. 1

Agricultural and Biological Sciences .............................................. 6-8
Minimum of one course in two of the following areas: Food and Resource Economics (except FREC 135), Food Science, Engineering Technology, Entomology and Wildlife Ecology (except ENWC 300), or Plant and Soil Sciences (except PLSC 300).

Literature and Arts ........................................................................ 6
Six credits from English, Art, Art History, Communication, Music, Theatre, 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, Women’s Studies, or courses cross-listed in these departments.

MATH 115 or higher .......................................................... 3
BISC 207/208 Introductory Biology I and II ................................. 8
CHEM 101/102 General Chemistry I and II ............................... 8
CHEM 214/216, 214/218, 214/216 Elementary Biochemistry with Lab.. 4
ENWC 205 Elements of Entomology ......................................... 3
FREC 135 Economics of Agriculture and Natural Resources ....... 3
PLSC 151 Introduction to Crop Science ..................................... 3
PLSC 204 Introduction to Soil Science ....................................... 3

ANSC 101 Introduction to Animal Science ....................................... 3
ANSC 111 Animal Science Laboratory ............................................ 1
ANSC 140 Functional Anatomy .................................................... 4
ANSC 251 Animal Nutrition .......................................................... 3
ANSC 252 Animal Nutrition Laboratory ........................................ 1
ANSC 265 Sophomore Seminar ..................................................... 1
ANSC 270 Biotechnology: Science and Socioeconomic Issues ........ 3
ANSC 300 Principles of Animal and Plant Genetics ........................ 3
ANSC 310 Animal Genetics Laboratory ........................................ 1
ANSC 332 Introduction to Animal Diseases .................................... 3
ANSC 466 Independent Study (Approved research project) .......... 3
ANSC 470 Principles of Molecular Genetics .................................... 3

One course from the following: ..................................................... 3-4

ANSC 436 Immunology of Domestic Animals
ANSC 445 Comparative Physiology of Domestic Animals
BISC 300 Introduction to Microbiology

One course from the following: ..................................................... 4

ANSC 404 Dairy Production
ANSC 417 Beef Cattle and Sheep Production
ANSC 418 Swine Production
ANSC 420 Equine Management
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

ANSC 399 Teaching Assistant
ANSC 424 Nonruminant Nutrition
ANSC 435 Introduction to Animal Virology

ANSC 436 Immunology of Domestic Animals
ANSC 633 Poultry Pathology
ANSC 644 Bioinformatics
ANSC 654 Advanced Ruminant Nutrition
BISC 601 Immunology
BISC 602 Molecular Biology of the Cell
BISC 653 Recent Advances in Molecular Biology
BISC 654 Biochemical Genetics
BISC 658 Developmental Genetics
BISC 679 Virology
BISC 693 Human Genetics
CHEM 220 Quantitative Analysis
CHEM 418 Introductory Physical Chemistry
COMM 350 Public Speaking
ENGL 312 Written Communication in Business
FOSC 439/639 Food Microbiology
FOSC 449/649 Food Biotechnology

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

Elective Animal Science courses for a total of 30 ANSC credits.  0-3

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

Recommended Electives
ANSC 270  Biotechnology: Science and Socioeconomic Issues  3
ANSC 399  Teaching Assistant  3
ANSC 420  Equine Management  3
ANSC 436  Immunology of Domestic Animals  3
BISC 300  Introduction to Microbiology  3
COMM 212  Oral Communication in Business  3
ENGL 312  Written Communications in Business  3
EGTE 328  Agricultural Waste Management Systems  3
FREC 350  Farm Management  3
PLSC 401  Agronomic Crop Science  3

Credits to Total a Minimum Of.  124

Degree: Bachelor of Science
Major: Animal Science
Concentration: Pre-veterinary Medicine

University Requirements
ENGL 110  Critical Reading and Writing  (with minimum grade of C)  3
First Year Experience (see page 68)  0-4
Discovery Learning Experience (see page 68)  3

Three credits in an approved course or courses stressing multi-cultural, ethnic, and/or gender-related course content (see pages 68-70)  3

Major Requirements
AGRI 165  Mastering the Freshman Year  1

Agricultural and Biological Sciences  6-8
Minimum of one course in two of the following areas: Food and Resource Economics (except FREC 135), Food Science, Engineering Technology, Entomology and Wildlife Ecology (except ENVC 300), or Plant and Soil Sciences (except PLSC 300).

Literature and Arts  6
Six credits from English, Art, Art History, Communication, Music, Theatre, 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, Women’s Studies, or courses cross-listed in these departments.

One of the following:  3-6
CHEM 527  Introduction to Microbiology  4
CHEM 321/322  General Chemistry I and II  4
CHEM 321/322  Organic Chemistry  4

One of the following:  8
PHYS 201/202  Introductory Physics I and II  8

ANSC 101  Introduction to Animal Science  3
ANSC 111  Animal Science Laboratory  1
ANSC 140  Functional Anatomy  1
ANSC 251  Animal Nutrition  4
ANSC 252  Animal Nutrition Laboratory  2
ANSC 265  Sophomore Seminar  1
ANSC 300  Principles of Animal and Plant Genetics  3
ANSC 310  Animal Genetics Laboratory  1
ANSC 332  Introduction to Animal Diseases  3
ANSC 445  Comparative Physiology of Domestic Animals  3

One course from the following:  4
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

Elective Animal Science courses for a total of 30 ANSC credits.  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  2
ANSC 270  Biotechnology: Science and Socioeconomic Issues  3
ANSC 399  Teaching Assistant  3
ANSC 436  Immunology of Domestic Animals  3
ANSC 635  Introduction to Virology  3
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.  124

Honors Bachelor of Science: Animal Science

The recipient of this degree must complete:
1. All requirements for the Bachelor of Science: Animal Science (any concentration).
2. All the University requirements for the Honors degree (see page 52).
3. 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, ENVC, or BISC will, if taken as Honors, count toward the 12 Honors credits required in the major or in collaborative disciplines.

Minor in Animal Science

The minor in animal science requires 19 credits in animal science including:
ANSC 101, 111, 140, 251, 252; one course from ANSC 404, 417, 418, 420, 421; and one course from ANSC 332, 345, 441, 436, and 454.

Degree: Bachelor of Science
Major: Food Science and Technology
Concentration: Food Science

Curriculum

University Requirements
ENGL 110  Critical Reading and Writing  (with minimum grade of C)  3
First Year Experience (see page 68)  0-4
Discovery Learning Experience (see page 68)  3

Three credits in an approved course or courses stressing multi-cultural, ethnic, and/or gender-related course content (see pages 68-70)  3

Major Requirements
AGRI 165  Mastering the Freshman Year  1

Agricultural and Biological Sciences  3-4
One course in any of the following areas: Engineering Technology, Animal Science, Entomology and Wildlife Ecology, or Plant and Soil Sciences.

Literature and Arts  6
Six credits from English, Art, Art History, Communication, Music, Theatre, 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, Women’s Studies, or courses cross-listed in these departments.

Professional Studies

75
**MAJOR REQUIREMENTS**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 103/104</td>
<td>General Chemistry</td>
<td>8</td>
</tr>
<tr>
<td>CHEM 214</td>
<td>Elementary Biochemistry</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 527</td>
<td>Introductory Biochemistry</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 201/202</td>
<td>Introductory Physics I and II</td>
<td>8</td>
</tr>
<tr>
<td>BISC 207/208</td>
<td>Introductory Biology I and II</td>
<td>8</td>
</tr>
<tr>
<td>BISC 300</td>
<td>Introduction to Microbiology</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 220</td>
<td>Quantitative Analysis I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 221</td>
<td>Quantitative Analysis Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 321/322</td>
<td>Organic Chemistry</td>
<td>8</td>
</tr>
<tr>
<td>CHEM 418</td>
<td>Introductory Physical Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>NTD 200</td>
<td>Nutrition Concepts</td>
<td>3</td>
</tr>
<tr>
<td>MATH 221/222</td>
<td>Calculus I and II</td>
<td>12</td>
</tr>
<tr>
<td>or</td>
<td>MATH 241/242 Analytic Geometry and Calculus A and B</td>
<td>6-8</td>
</tr>
<tr>
<td>FREC 135</td>
<td>Introduction to Data Analysis</td>
<td>3</td>
</tr>
<tr>
<td>FREC 408</td>
<td>Research Methods</td>
<td>3</td>
</tr>
<tr>
<td>FOSC 102</td>
<td>Food for Thought</td>
<td>3</td>
</tr>
<tr>
<td>FOSC 265</td>
<td>Seminar: Food Science</td>
<td>1</td>
</tr>
<tr>
<td>FOSC 305</td>
<td>Food Science</td>
<td>3</td>
</tr>
<tr>
<td>FOSC 328</td>
<td>Food Chemistry</td>
<td>4</td>
</tr>
<tr>
<td>FOSC 329</td>
<td>Food Analysis</td>
<td>4</td>
</tr>
<tr>
<td>FOSC 359</td>
<td>Topics in Food Science</td>
<td>1</td>
</tr>
<tr>
<td>FOSC 409</td>
<td>Food Processing</td>
<td>4</td>
</tr>
<tr>
<td>FOSC 411</td>
<td>Food Science Capstone</td>
<td>4</td>
</tr>
<tr>
<td>FOSC 439</td>
<td>Food Microbiology</td>
<td>4</td>
</tr>
<tr>
<td>FOSC 445</td>
<td>Food Engineering Technology</td>
<td>4</td>
</tr>
<tr>
<td>FOSC 449</td>
<td>Food Biotechnology</td>
<td>4</td>
</tr>
</tbody>
</table>

A minimum grade of C must be achieved for credits to count toward the fulfillment of 36 credits in FOSC. A maximum of four credits of Special Problem/Independent Study (FOSC x66) may count toward the fulfillment of the degree. FOSC 399, Teaching Assistant, may be taken one time allowing a maximum of 2 credits toward graduation.

**ELECTIVES**

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

**Recommended Electives**

- CHEM 419 Introductory Physical Chemistry
- CHEM 445 Physical Chemistry Laboratory

**CREDITS TO TOTAL A MINIMUM OF 124**

**DEGREE: BACHELOR OF SCIENCE**

**MAJOR: FOOD SCIENCE AND TECHNOLOGY**

**CONCENTRATION: FOOD TECHNOLOGY**

**CURRICULUM**

<table>
<thead>
<tr>
<th>UNIVERSITY REQUIREMENTS</th>
<th>CREDITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 110 Critical Reading and Writing (with minimum grade of C)</td>
<td>3</td>
</tr>
<tr>
<td>First Year Experience (see page 68)</td>
<td>0.4</td>
</tr>
<tr>
<td>Discovery Learning Experience (see page 68)</td>
<td>3</td>
</tr>
<tr>
<td>Three credits in an approved course or courses stressing multi-cultural, ethnic, and/or gender-related course content (see pages 68-70)</td>
<td>3</td>
</tr>
</tbody>
</table>

**MAJOR REQUIREMENTS**

- AGRI 165 Mastering the Freshman Year | 1 |
- **Agricultural and Biological Sciences** | 3-4 |
  - One course from any of the following areas: Engineering Technology, Animal Science, Entomology and Wildlife Ecology, or Plant and Soil Sciences.
- **Literature and Arts** | 6 |
  - Six credits selected from English, Art, Art History, Communication, Music, Theatre, Foreign Language, or any 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, Women’s Studies, or any courses cross-listed in these departments.

**Professional Studies**

- CHEM 101/102 General Chemistry | 8 |
- CHEM 213 Elementary Organic Chemistry | 4 |
- CHEM 214/216 Elementary Biochemistry with Lab | 4 |
- CHEM 222 Quantitative Analysis | 3 |
- CHEM 221 Quantitative Analysis Laboratory | 1 |
- PHYS 104 Elementary Physics | 3 |
- BISC 207/208 Introductory Biology I and II | 8 |
- BISC 220 Introduction to Microbiology | 4 |
- NT 200 Nutrition Concepts | 3 |
- MATH 221/222 Calculus I and II | 6 |
- FREC 135 Introduction to Data Analysis | 3 |
- FREC 408 Research Methods | 3 |
- FOSC 102 Food for Thought | 3 |
- FOSC 265 Seminar: Food Science | 1 |
- FOSC 305 Food Science | 3 |
- FOSC 328 Food Chemistry | 4 |
- FOSC 329 Food Analysis | 4 |
- FOSC 359 Topics in Food Science | 1 |
- FOSC 409 Food Processing | 4 |
- FOSC 411 Food Science Capstone | 4 |
- FOSC 439 Food Microbiology | 4 |
- FOSC 445 Food Engineering Technology | 4 |
- FOSC 449 Food Biotechnology | 4 |

A minimum grade of C must be achieved for credits to count toward the fulfillment of 36 credits in FOSC. A maximum of four credits of Special Problem/Independent Study (FOSC x66) may count toward the fulfillment of the degree. FOSC 399, Teaching Assistant, may be taken one time allowing a maximum of 2 credits toward graduation.

**ELECTIVES**

After required courses are completed, sufficient credits must be taken to meet the minimum credits required for the degree. Only two credits of HESC activity, four credits of Music credits, or 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 124**

**HONORS BACHELOR OF SCIENCE:**

**FOOD SCIENCE AND TECHNOLOGY**

The recipient of this degree must complete:

1. All requirements for the Bachelor of Science: Food Science and Technology (either concentration).
2. All the University requirements for the Honors degree (see page 52).

Courses in Food Science taken at the 600-level or higher are considered to be Honors courses in the major. One 3-or 4-credit required course in a related technical area will, if taken as Honors, count toward the total of Honors credits required in the major or in collateral disciplines.

**MINOR IN FOOD SCIENCE**

The minor in food science requires 15 food science credits. Course selection depends on completion of prerequisites and other science and math preparation.

1. The minor in Food Science requires a minimum of 15 food science credits, including FOSC 305 and any 3 other FOSC courses above the 300 level.
2. A C grade or 2.00 or higher is required in all FOSC courses.
3. Successful completion of MATH 221/222 Calculus I and II [6 credits] mathematics courses is required prior to taking food science courses for the minor.

- FOSC 305 Food Science | 3 |
- Select any 3 courses from: | 12 |
  - FOSC 328 Food Chemistry |
  - FOSC 329 Food Analysis |
  - FOSC 409 Food Processing |
  - FOSC 411 Food Science Capstone |
  - FOSC 439 Food Microbiology |
  - FOSC 445 Food Engineering Technology |
  - FOSC 449 Food Biotechnology |

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.

**CREDITS TO TOTAL A MINIMUM OF 15**
The Bioresources Engineering Department offers an undergraduate major in Engineering Technology that is accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology (TAC of ABET).

ENGINEERING TECHNOLOGY

Engineering technology is part of the broad discipline of engineering, in which 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 and cost. Close liaison is maintained between the educational programs and employers to give graduates the greatest opportunity for career development.

Within the major in engineering technology, two optional concentrations are available. The applied electronics and controls concentration includes coursework in digital systems, instrumentation, controls, PLC’s, and courses that focus on communication and networks, or manufacturing. The construction technology and technical management concentration provides courses in soil mechanics, storm water management, wood and steel and concrete and masonry as well as courses in project management and economic analysis. Both concentrations allow the student to focus their studies with more in-depth courses in areas of their interest.

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

To graduate with a major in engineering technology, a student must attain at least 25 credits in the program. 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 and cost. Close liaison is maintained between the educational programs and employers to give graduates the greatest opportunity for career development.

DEGREE: BACHELOR OF SCIENCE
MAJOR: ENGINEERING TECHNOLOGY

CURRICULUM

UNIVERSITY REQUIREMENTS
ENGL 110 Critical Reading and Writing ................................................. 3
First Year Experience (see page 68) .................................................. 0.4
Discovery Learning Experience (see page 68) .................................... 3
Three credits in an approved course or courses stressing multi-cultural, ethnic, and/or gender-related course content (see pages 68-70). 3

MAJOR REQUIREMENTS
EGTE 160 New Student Seminar ............................................................. 0

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

ENGINEERING TECHNOLOGY

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

UNIVERSITY REQUIREMENTS
ENGL 110 Critical Reading and Writing ................................................. 3
First Year Experience (see page 68) .................................................. 0.4
Discovery Learning Experience (see page 68) .................................... 3
Three credits in an approved course or courses stressing multi-cultural, ethnic, and/or gender-related course content (see pages 68-70). 3

COMM 212 Oral Communication in Business
COMM 255 Fundamentals of Communication
COMM 350 Public Speaking
AGRI 212 Oral Communications in Agriculture and Natural Resources

Social Sciences and Humanities
ECON 151 Introduction to Microeconomics ........................................... 3
ECON 152 Introduction to Macroeconomics ......................................... 3
Six additional credits to be selected from:
Anthropology, Art, Art History, Black American Studies, Criminal Justice,
Economics, Education, English, Foreign Language, Geography, History, Music,
Philosophy, Political Science, Psychology, Sociology, Theatre, Women’s Studies, or
courses cross-listed in these departments.

Basic Sciences and Mathematics
Biology/Life Science course ................................................................. 3 or 4
CHEM 103/104 General Chemistry ..................................................... 8
PHYS 201/202 Introductory Physics I and II or
PHYS 207/208 Fundamentals of Physics I and II (recommended) .......... 8
MATH 117 Precalculus for Scientists and Engineers ......................... 4
MATH 221/222 Calculus I and II (with permission of advisor) or
MATH 241/242 Calculus A and B ....................................................... 6 or 8

Additional MATH course to bring total MATH credits at 201 level above to 12 credits ......................................................... 4 or 6

Technical Skills
EGTE 115 Introduction to Computer Based Problem Solving .............. 4
EGTE 209 Technical and Computer Aided Drafting .............................. 3
Technical Skills elective ..................................................................... 3

Technical Sciences
EGTE 215 Applied Fluid Mechanics .................................................... 4
EGTE 231 Fundamentals of Statics and Strength of Materials .......... 4
EGTE 244 Electricity for Engineering Technology ............................... 4
EGTE 311 Fundamentals of Thermodynamics .................................. 3

Technical Specialization
25 to 31 credits of EGTE or engineering courses at the 300 or 400 level from a
departmental approved list including a 3 credit capstone experience selected from
EGTE 450, EGTE 451, EGTE 466 or UNIV 401/402. At least 15 credits must be
EGTE courses. A minor in a technical or business subject area is strongly
encouraged. With a minor, the requirements for a technical specialization are a
minimum of 25 credits ................................................................. 31 to 25

Technical Support
9 to 15 credits of course work selected to support the student’s career objectives.
Subject to approval of the faculty ...................................................... 9 to 15

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

Enrollment in EGTE 300 and 400 level courses is limited to majors with Junior or
Senior standing, or permission of the instructor.

To graduate with a major in engineering technology, a student must attain at least a
2.0 average in ETGE 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 technical sciences, technical skills
and technical specialization.
MAJOR REQUIREMENTS
EGTE 165 New Student Seminar .............................................. 0

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 255 Fundamentals of Communication
COMM 212 Oral Communication in Business
COMM 350 Public Speaking
AGRI 212 Oral Communications in Agriculture and Natural Resources

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

Six additional credits to be selected from
Anthropology, Art, Art History, Black American Studies, Criminal Justice, Economics, Education, English, Foreign Language, Geography, History, Music, Philosophy, Political Science, Psychology, Sociology, Theatre, Women’s Studies, or courses cross-listed in these departments.

Basic Sciences and Mathematics
Biology/Life Science course .................................................. 3 or 4
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 (recommended) .... 8
MATH 117 Precalculus for Scientists and Engineers ................. 4
MATH 221/222 Calculus I and II (with permission of advisor) ....... 8
MATH 241/242 Calculus A and B ............................................. 8 or

Additional MATH credits to bring total MATH credits at 201 level above to 12 credits .................................................. 4 or 6

Technical Skills
EGTE 115 Introduction to Computer Based Problem Solving ........ 4
MEEG 202 Computer-Aided Engineering Design ...................... 3

Technical Sciences
EGTE 215 Applied Fluid Mechanics ....................................... 4
EGTE 231 Fundamentals of Statics and Strength of Materials ....... 4
EGTE 244 Electricity for Engineering Technology ....................... 4
EGTE 311 Fundamentals of Thermodynamics .............................. 3

Technical Specialization
CFEG 202 Introduction to Digital Systems .............................. 4
EGTE 245 Analog Electronics ................................................ 3
EGTE 443 Instrumentation .................................................... 3
EGTE 444 PLC Applications .................................................. 3
EGTE 449 Applied Controls .................................................. 3

Technical Specialization electives including a 3 credit capstone experience selected from EGTE 450, EGTE 451, EGTE 466 or UNIV 401/402, with a focus in an area such as computer architecture, communication and networks, or manufacturing, subject to approval by the student’s faculty advisor. A University minor may also be selected as the focus. ............................................. 16

Technical Support
An additional computer programming language ....................... 3
Approved Technical Support Electives ..................................... 8

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

Enrollment in EGTE 300 and 400 level courses is limited to majors with Junior or Senior standing, or permission of the instructor.

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 technical sciences, technical skills and technical specialization.

DEGREE: BACHELOR OF SCIENCE
MAJOR: ENGINEERING TECHNOLOGY
CONCENTRATION: CONSTRUCTION TECHNOLOGY AND TECHNICAL MANAGEMENT

CURRICULUM CREDITS

UNIVERSITY REQUIREMENTS
ENGL 110 Critical Reading and Writing .................................... 3

First Year Experience (see page 68) ...................................... 0.4
Discovery Learning Experience (see page 68) ........................... 3

Three credits in an approved course or courses stressing multi-cultural, ethnic, and/or gender-related course content (see pages 68-70). 3

MAJOR REQUIREMENTS
EGTE 165 New Student Seminar .............................................. 0

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 255 Fundamentals of Communication
COMM 212 Oral Communication in Business
COMM 350 Public Speaking
AGRI 212 Oral Communications in Agriculture and Natural Resources

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

Six additional credits to be selected from
Anthropology, Art, Art History, Black American Studies, Criminal Justice, Economics, Education, English, Foreign Language, Geography, History, Music, Philosophy, Political Science, Psychology, Sociology, Theatre, Women’s Studies, or courses cross-listed in these departments.

Basic Sciences and Mathematics
Biology/Life Science course .................................................. 3 or 4
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 (recommended) .... 8
MATH 117 Precalculus for Scientists and Engineers ................. 4
MATH 221/222 Calculus I and II (with permission of advisor) ....... 8 or
MATH 241/242 Calculus A and B ............................................. 8 or

Additional MATH credits to bring total MATH credits at 201 level above to 12 credits .................................................. 4 or 6

Technical Skills
EGTE 115 Introduction to Computer Based Problem Solving ........ 4
MEEG 202 Computer-Aided Engineering Design ...................... 3

Technical Sciences
EGTE 215 Applied Fluid Mechanics ....................................... 4
EGTE 231 Fundamentals of Statics and Strength of Materials ....... 4
EGTE 244 Electricity for Engineering Technology ....................... 4
EGTE 311 Fundamentals of Thermodynamics .............................. 3

Technical Specialization
CFEG 202 Introduction to Digital Systems .............................. 4
EGTE 245 Analog Electronics ................................................ 3
EGTE 443 Instrumentation .................................................... 3
EGTE 444 PLC Applications .................................................. 3
EGTE 449 Applied Controls .................................................. 3

Technical Specialization electives including a 3 credit capstone experience selected from EGTE 450, EGTE 451, EGTE 466 or UNIV 401/402. 12
Technical Support
ACCT 207 or FREC 211. .................................................... 3
Technical Support electives appropriate to the student's professional goals, subject
to approval by the student's faculty advisor. .................................... 5

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

Enrollment in EGTE 300 and 400 level courses is limited to majors with Junior or
Senior standing, or permission of the instructor.

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 technical sciences, technical skills
and technical specialization.

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 a minimum of 20
credits in engineering technology courses in accordance with the requirements
listed here. Before taking each engineering technology course, the student must
satisfy required prerequisites for the course. A grade point average of at least 2.0
is required in the 20 credits of engineering technology courses for the minor.

The required engineering technology courses are:

EGTE 115 Introduction to Computer Based
Problem Solving .......................................................... 4

One course from the following list:

EGTE 215 Applied Fluid Mechanics .................................. 4
EGTE 231 Fundamentals of Statics and Strength of Materials ........ 4
EGTE 244 Electricity for Engineering Technology ................. 4

Furthermore, additional courses must be completed so that EGTE credits total 20,
of which at least 6 credits must be at the 300-level or above. All engineering
technology courses shall be selected with the approval of an advisor in the
Department of Biosources Engineering to meet each student’s objectives. For
students interested in environmental issues, courses could include: EGTE 103,
104, 215, and 328; for those interested in electronics: EGTE 244, 245, 443,
444, and 449. For students interested in construction technology, courses could
include: EGTE 104, 223, 312, 416, 454, 455 and 456. Courses can also be
chosen to give the student's minor an emphasis in other areas such as
manufacturing or management.

ENTOMOLOGY AND WILDLIFE ECOLOGY

Telephone: (302) 831-2508
E-mail: kra@udel.edu
http://ag.udel.edu
Faculty Listing: http://ag.udel.edu/ent/wc/faculty/facultyStaff.htm

Entomology emphasizes the structure, physiology, behavior,
development, ecology, classification, and management of insects.
Wildlife ecology broadly includes the biology and ecology of all
species and their conservation. Wildlife conservation is the broad
effort to perpetuate free-living, breeding populations of species in
their native habitats. The department views all non-domesticated
species as wildlife.

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 areas. The
curriculum’s flexibility accommodates career goals ranging from
research to nature education, conservation advocacy and wildlife
management. Meeting the requirements for the Wildlife Conservation
major should provide the student with the minimum educational
requirements for certification as an Associate Wildlife Biologist by
The Wildlife Society, a professional society. 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 interests and career objective. Course
selection should be made in consultation with the academic advisor
during the preregistration period of each term.

University of Delaware students in other majors who wish to
transfer to or add entomology or wildlife conservation majors must
have a UD grade point average of at least 2.25. In addition,
completion of the major must be the stated intention of the student
and a realistic possibility before the student’s intended graduation
date. Students with a GPA below 2.25 are invited to contact the
department for advisement on course selection appropriate to the
desired major while improving their GPA.

DEGREE: BACHELOR OF SCIENCE
MAJOR: ENTOMOLOGY

CURRICULUM

UNIVERSITY REQUIREMENTS
ENGL 110 Critical Reading and Writing
(with minimum grade of C) ........................................... 3
First Year Experience (see page 68) ............................... 0.4
Discovery Learning Experience (see page 68) ................. 3

Three credits in an approved course or courses stressing multi-cultural, ethnic,
and/or gender-related course content (see pages 68-70) ......... 3

MAJOR REQUIREMENTS

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

Agricultural and Biological Sciences ................................ 6-8
Minimum of one course in two of the following areas: Food and Resource
Economics (except FREC 135), Food Science, Engineering Technology, Animal
Science (except ANSC 300), Statistics, Agriculture, or Plant and Soil Sciences.

Literature and Arts ................................................................ 6
Six credits selected from English, Art, Art History, Communication, Music, Theatre,
Foreign Language, or courses cross-listed with 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, Women’s Studies, or courses
cross-listed with these departments.

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

Professional Studies

MATH 115 Pre-Calculus or higher level. ............................... 3
BISC 207 Introductory Biology I .................................... 4
BISC 208 Introductory Biology II ................................... 4
BISC 302 General Ecology ............................................. 3

CHEM 101/102 General Chemistry or
CHEM 103/104 General Chemistry .................... 3

ENWC 165 New Student Seminar ................................. 1
ENWC 205 Elements of Entomology ......................... 3
ENWC 215 Entomology Laboratory ........................... 2
ENWC 300 Principles of Animal and Plant Genetics ....... 3
ENWC 403 Insect Structure and Function .................. 4
ENWC 406 Insect Identification-Taxonomy ............... 3
ENWC 408 Field Taxonomy .......................................... 3
ENWC 465 Senior Capstone Experience .................... 1
ENWC courses may include 3 credits maximum of Independent Study, Research,
and must include one regularly scheduled course with content focused on insects;
Field Experience. .................................6
Nine credits from any of the following: .................9
Any BISC XXX course or courses at or above 300-level (except BISC 302 and 321)
PLSC 151 Introduction to Crop Science
PLSC 201 Botany II
PLSC 204 Introduction to Soil Science
PLSC 211 Herbsceous Landscape Plants
PLSC 212 Woody Landscape Plants
PLSC 303 Introductory Plant Pathology
PLSC 404 Plant Taxonomy

ELECTIVES
Beyond required courses, 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 HESC activity or performing music may be counted toward the degree.

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

PLANT PROTECTION

Because of mutual interests and problems in the field of pest management, the Department of Entomology and Wildlife 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. Courses and field experience emphasize recognition of pests and their symptoms and strategies for pest management compatible with agriculture and the environment.

DEGREE: BACHELOR OF SCIENCE
MAJOR: PLANT PROTECTION

CURRICULUM

UNIVERSITY REQUIREMENTS
ENGL 110 Critical Reading and Writing (with a minimum grade of C) ..................3
First Year Experience (see page 68) .............................................. 0-4
Discovery Learning Experience (see page 68) ....................................3
Three credits in an approved course or courses stressing multi-cultural, ethnic, and/or gender-related course content (see pages 68-70) ............3

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

Agricultural and Biological Sciences: ...........................6-8
Minimum of one course in two of the following areas: Food and Resource Economics (except FREC 135), Food Science, Engineering Technology, Animal Science, Entomology and Wildlife Ecology, Statistics, Agriculture or Plant and Soil Sciences.

Literature and Arts
Six credits selected from English, Art, Art History, Communication, Music, Theatre, 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, Women’s Studies, or courses cross-listed with these departments. ....9

Professional Studies
MATH 115 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
ENWC 205 Elements of Entomology ................................................3
ENWC 305 Entomology Laboratory ...............................................2
ENWC 406 Insect Identification—Taxonomy ..................................3

ENWC 411 Insect Pest Management ..............................................3
ENWC 465 Senior Capstone Experience ......................................1
PLSC 101 Botany I ........................................................................4
PLSC 201 Botany II ........................................................................4
PLSC 303 Introductory Plant Pathology ........................................4
PLSC 411 Diagnostic Plant Pathology ..........................................3

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

ELECTIVES
Beyond required courses, sufficient credits must be taken to meet the minimum credits required for the degree. Courses in agriculture, biology, statistics, and the physical sciences and additional writing courses are recommended. Only two credits of HESC activity or 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

DEGREE: BACHELOR OF SCIENCE
MAJOR: WILDLIFE CONSERVATION

CURRICULUM

UNIVERSITY REQUIREMENTS
ENGL 110 Critical Reading and Writing (with a minimum grade of C) ..................3
First Year Experience (see page 68) .............................................. 0-4
Discovery Learning Experience (see page 68) ....................................3

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

Agricultural and Biological Sciences: ...........................3-4
One course in any of the following areas: Food and Resource Economics (except FREC 135), Food Science, Engineering Technology, or Animal Science (except ANSC 300).

Literature and Arts
Three credits (not from Group II) from English, Art, Art History, Communication, Music, Theatre, Foreign Language, or courses cross-listed with these departments. ....3

Social Sciences and Humanities
Minimum of one course (not from Group III) in three of the following areas: Anthropology, Black American Studies, Criminal Justice, Economics, Education, Geography, History, Political Science, Psychology, Sociology, Women’s Studies, or courses cross-listed with these departments. ....9

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

Professional Studies
MATH 115, 221, or 241 ....................................................... 3-4
BISC 207/208 Introductory Biology I and II ..................................8
BISC 302 General Ecology .................................................... 3
CHEM 101/102 General Chemistry or CHEM 103/104 General Chemistry .................................8
ENWC 165 New Student Seminar ................................................1
ENWC 201 Wildlife Conservation and Ecology .............................3
ENWC 205 Elements of Entomology ............................................3
ENWC 300 Principles of Animal and Plant Genetics .....................3
ENWC 325 Wildlife Management .............................................3
ENWC 406 Insect Identification—Taxonomy ................................3
ENWC 415 Wildlife Research Techniques ...................................3
ENWC 418 Ornithology ..........................................................3
ENWC 425 Mammalogy ..........................................................3

80
MINOR IN ENTOMOLOGY

The minor in entomology requires 16 credits of ENWC courses including ENWC 201, 205, 325, and at least 6 additional credits from courses focused primarily on insects. 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.

MINOR IN WILDLIFE CONSERVATION

The minor in wildlife conservation requires 18 credits of ENWC courses including ENWC 201, 205, 325 and one course from among ENWC 418, 424, and 425. Additionally, BISC 302 is a prerequisite for ENWC 325 and this prerequisite is strictly enforced. 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. Admission to the Minor in Wildlife Conservation requires: (1) a minimum GPA of 2.75; (2) prior completion or current enrollment in ENWC 201; and (3) at least 45 credits of coursework remaining to complete the BS or BA, independent of the minor. Students should note that WC majors have priority and sometimes may fill some courses required for the minor. Therefore, the Department cannot guarantee that a student will be able to complete all courses necessary or desired for the minor.

FOOD AND RESOURCE ECONOMICS

Telephone: (302) 831-1318
E-mail: hastings@udel.edu
http://ag.udel.edu
Faculty Listing: http://ag.udel.edu/frec/faculty/facultyStaff.htm

Food and Resource Economics is concerned with agribusiness management, food marketing, and the economics of resource management and production. Courses are designed to provide a thorough background in the principles of organization and management of agribusiness firms, and includes study of financing agricultural business firms, marketing and international trade of agricultural products, price analyses, economics of land use, and agricultural and environmental policies.

Undergraduate majors are offered in Food and Agribusiness Management, Resource Economics, and Statistics. The curricula differ in the amount of emphasis given to agricultural production, business and economics. All the curricula may qualify the student for graduate work. The department also co-offers Natural Resource Management, an interdisciplinary major. Minors in Food and Agribusiness Management, Resource Economics, Statistics, and Operations Research are also available.

The major in food and agribusiness management is offered cooperatively with the Alfred Lerner 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, or commodity marketing (futures and options). A concentration in food marketing is offered.

The major in resource economics emphasizes theory, quantitative methods, and policy, 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 environmental economics is offered as part of the resource economics major.
DEGREE: BACHELOR OF SCIENCE  
MAJOR: FOOD AND AGRIBUSINESS MANAGEMENT

CURRICULUM                  CREDITS

UNIVERSITY REQUIREMENTS
ENGL 110  Critical Reading and Writing  (minimum grade C) .................................... 3
First Year Experience (see page 68) ........................................... 0.4
Discovery Learning Experience (see page 68) ........................................... 3
Three credits in an approved course or courses stressing multi-cultural, ethnic, and/or gender-related course content (see pages 68-70) ................. 3

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

Social Sciences and Humanities .................................................... 6
Minimum of one course in two of the following areas: Anthropology, Black American Studies, Criminal Justice, Education, Geography, History, Philosophy, Political Science, Psychology, Sociology, Women’s Studies, or courses cross-listed in these departments.

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

Professional Studies
MATH 115  Pre-Calculus or higher level (MATH 221, MATH 230, and MATH 201 are strongly recommended) .................................... 3
ACCT 207/208  Accounting I and II .......................................................... 6
COMM 212  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 at the 300 or 400 level. ...................................................... 6
One foreign language course ................................................................ 3-4
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 305  Management and Leadership Development ...................... 3
FREC 316  Economics of Biotechnology and New Technologies ......... 3
FREC 345  Strategic Selling and Buyer Communication ..................... 3
FREC 404  Food and Fiber Marketing .................................................. 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 HESC 120 activity or four credits of performing Music credit may be counted toward the degree.

Suggested Food and Agribusiness Management Electives:
FREC 212  Food Retailing and Consumer Behavior ............................ 3
FREC 335  Advanced Data Management ............................................ 3
FREC 427  Agribusiness Financial Management .................................. 3
FREC 464  Agribusiness Internship .................................................... 3
FREC 471  Futures and Options Markets ............................................. 4

Suggested Resource Management Electives:
FREC 464  Agriculture and Natural Resource Policy ......................... 3
FREC 424  Resource Economics ....................................................... 3
FREC 429  Community Economic Development ................................ 3

FOREC 444  Economics of Environmental Management
FOREC 480  Geographic Information Systems in Natural Resource Management

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

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

HONORS BACHELOR OF SCIENCE: FOOD AND AGRIBUSINESS MANAGEMENT

The recipient of this degree must complete:
1. All requirements for the Bachelor of Science: Food and Agricultural Business Management.
2. All the University requirements for the Honors degree (see page 52). Courses at the 600-level that satisfy requirements for the major will be considered to be honors courses for the degree.

DEGREE: BACHELOR OF SCIENCE  
MAJOR: FOOD AND AGRIBUSINESS MANAGEMENT  
CONCENTRATION: FOOD MARKETING

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

FREC 212  Food Retailing and Consumer Behavior .................................... 3
FREC 335  Advanced Data Management ............................................ 3
FREC 427  Agribusiness Financial Management .................................. 3
FREC 471  Futures and Options Markets ............................................. 4
Two Business Administration Courses at the 400-level in marketing related areas. These are in addition to BUAD 301-Introduction to Marketing and two additional Business and Economics courses at the 300 and 400 level required by the Food and Agribusiness Management major ...................................................... 6

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

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 take five of the nine FREC courses listed below with a minimum of two courses in each area:

Marketing/Management Area:
FREC 305  Management and Leadership Development ...................... 3
FREC 316  Economics of Biotechnology and New Technologies .......... 3
FREC 345  Strategic Selling and Buyer Communication ..................... 3
FREC 404  Food and Fiber Marketing .................................................. 3
FREC 471  Futures and Options Markets ............................................. 4

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  
MAJOR: RESOURCE ECONOMICS

CURRICULUM                  CREDITS

UNIVERSITY REQUIREMENTS
ENGL 110  Critical Reading and Writing  (with a minimum grade of C) .................................... 3
First Year Experience (see page 68) ............................................. 0.4
Discovery Learning Experience (see page 68) ........................................... 3
Three credits in an approved course or courses stressing multi-cultural, ethnic, and/or gender-related course content (see pages 68-70) ................. 3
MAJOR REQUIREMENTS

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

Minimum of one course in three of the following areas: Food Science, Engineering Technology, Animal Science, Entomology and Wildlife Ecology, Plant and Soil Sciences, Statistics, Agriculture, or Biology.

Social Sciences and Humanities ............................... 6

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

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

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

Professional Studies

MATH 115 Pre-Calculus .......................... 3
(MATH 221 or higher is strongly recommended)

COMM 212 Oral Communication in Business .......................... 3

ENGL 312 Written Communications in Business .......................... 3

One foreign language course .......................... 3-4

ECON 151 Introduction to Microeconomics: Prices and Markets .......................... 3

ECON 152 Introduction to Macroeconomics: National Economy .......................... 3

ECON 300 Intermediate Microeconomic Theory .......................... 3

ECON 302 Banking and Monetary Policy .......................... 3

ECON 303 Intermediate Macroeconomic Theory .......................... 3

Two additional courses offered by the College of Business and Economics at the 300-level or higher .......................... 6

Students interested in an Economics minor should see the College of Business and Economics section in this catalog.

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 areas: .......................... 21:22

1. Theory

FREC 404 Food and Fiber Marketing

FREC 410 International Agricultural Trade and Marketing

FREC 424 Resource Economics

FREC 444 Economics and Environmental Management

FREC 471 Futures and Options Markets

2. Methods

FREC 408 Research Methods I

FREC 409 Research Methods II

FREC 427 Agribusiness Financial Management

FREC 480 Geographic Information Systems in Natural Resource Management

3. Policy

FREC 406 Agriculture and Natural Resource Policy

FREC 420 Agriculture in Economic Development

FREC 429 Community Economic Development

FREC 450 Topics in Environmental Law

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 may be counted toward the 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 Performing Music credit may be counted toward the degree.

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

HONORS BACHELOR OF SCIENCE:

RESOURCE ECONOMICS

The recipient of this degree must complete:

1. All requirements for the Bachelor of Science: Resource Economics.

2. All the University requirements for the Honors degree (see page 52).

Courses at the 600-level that satisfy requirements for the major will be considered to be honors courses for the degree.

DEGREE: BACHELOR OF SCIENCE

MAJOR: RESOURCE ECONOMICS

CONCENTRATION: ENVIRONMENTAL ECONOMICS

The requirements for the major in Resource Economics must be met.

In addition, five of the following FREC courses must be taken: .......................... 15-16

FREC 406 Agriculture and Natural Resource Policy

FREC 424 Resource Economics—Theory and Policy

FREC 429 Community Economic Development

FREC 444 Economics of Environmental Management

FREC 450 Environmental Law and Policy

FREC 480 Geographic Information Systems in Natural Resource Management

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

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

ECON 306 Economic Theory of Politics

ECON 408 Economics of Law

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

DEGREE: BACHELOR OF SCIENCE

MAJOR: RESOURCE ECONOMICS

CONCENTRATION: SUSTAINABLE DEVELOPMENT

The requirements for the major in Resource Economics must be met.

In addition, the following six courses must be taken: .......................... 18

FREC 100 Sustainable Development

FREC 410 International Agricultural Trade and Marketing

FREC 424 Resource Economics

FREC 444 Economics of Environmental Management

ENWC 201 Wildlife Conservation and Ecology

ANTH 350 Development and Underdevelopment

ECON 311 Economics of Developing Countries

GEOG 422 Resources, Development, and the Environment

POSC 311 Politics of Developing Nations

SOCI 460 Women in International Development

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

MINOR IN RESOURCE ECONOMICS

The minor in Resource Economics requires 18 credits. Students must take FREC 150 and five of the FREC courses listed below, with a minimum of one course in each area:

1. Theory

FREC 404 Food and Fiber Marketing

FREC 410 International Agricultural Trade and Marketing

FREC 424 Resource Economics

FREC 444 Economics of Environmental Management

FREC 471 Futures and Options Markets

2. Methods

FREC 408 Research Methods I

FREC 409 Research Methods II

FREC 427 Agribusiness Financial Management

FREC 480 Geographic Information Systems in Natural Resource Management

3. Policy

FREC 406 Agriculture and Natural Resource Policy

FREC 420 Agriculture in Economic Development

FREC 429 Community Economic Development

FREC 450 Topics in Environmental Law

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

Statistics is the science of data - the collection, management, analysis and interpretation of data. Statistical methodology is used in virtually every professional field as a way to conduct research and make important decisions. These include the pure sciences such as biology, chemistry and physics, as well as engineering, business, and the social sciences (economics, political science, psychology, and sociology). The Statistics major is based on a combination of a core set of theoretical and methods courses in statistics, as well as opportunities for taking courses in fields of application. The core course work is designed to prepare students for advanced study in statistics by emphasizing a foundation in probability and mathematical statistics, as well as courses in statistical methods such as design and regression. Students also will take courses that build an area of statistical application. The area of application may well be a minor or a second major.

DEGREE: BACHELOR OF SCIENCE
MAJOR: STATISTICS

UNIVERSITY REQUIREMENTS
ENGL 110 Critical Reading and Writing (minimum grade C) 3
First Year Experience (see page 68) 0-4
Discovery Learning Experience (see page 68) 3

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

Literature and Arts 9
Nine credits from English, Art, Art History, Communication, Music, Theatre, Foreign Language, or courses cross-listed in these departments. Three credits must be in either AGR1212 or COMM212.

Social Sciences and Humanities 6
Minimum of one course in two of the following areas: Anthropology, Black American Studies, Criminal Justice, Education, Geography, History, Philosophy, Political Science, Psychology, Sociology, Women’s Studies, or courses cross-listed in these departments.

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

Professional Studies
STAT 200 or STAT 408 3
MATH 210 Discrete Mathematics I 3
MATH 243 Analytic Geometry and Calculus B 4
MATH 245 An Introduction to Proof 3
MATH 249 Elementary Linear Algebra 3
MATH 401 Introduction to Real Analysis 3
MATH 426 Introduction to Numerical Analysis and Algorithmic Computation 3
STAT 370 Introduction to Statistical Analysis I 3
STAT 371 Introduction to Statistical Analysis II 3
FREC 409 Research Methods II 3
STAT 409 Regression and Experimental Design 3

ELECTIVES
Three credits from the following 3
Any course satisfying the College of Arts and Sciences Second Writing Course requirement. Recommended courses are: ENGL 301 Expository Writing, ENGL 312 Written Communications in Business, ENGL 410 Technical Writing, ENGL 415 Writing in the Professions.

MINOR IN STATISTICS
A student seeking a minor in statistics must obtain permission from the chairperson of the Department of Food and Resource Economics. Course requirements include STAT 370, STAT 371, STAT 611 Regression Analysis, and FREC 674 cross-listed as STAT 674 Applied Data Base Management. Three additional credit hours in statistics are required above STAT 371. Credit toward the minor will not be given for STAT 475. A minimum grade of C is required in all courses counting toward the minor.

MINOR IN OPERATIONS RESEARCH
The Operations Research Minor is designed to provide students with quantitatively based decision-making skills as well as exposure to a broad variety of applications. A student seeking a minor in Operations Research must obtain permission from the chair or his/her designee in the Department of Food and Resource Economics. 18 credit hours are required for the minor.

RECOMMENDED COURSES
STAT 370 Introduction to Statistical Analysis I
ORES 401 An Introduction to Operations Research
FREC 335 Advanced Data Management
FREC 409 Research Methods II
FREC 674 Applied Data Base Management
MATH 389 Graph Theory
MATH 529 Linear Programming–Applications and Methods
ECON 415 Economic Forecasting
NATURAL RESOURCE MANAGEMENT

Interested students should contact Dr. Steven Hastings, 209 Townsend Hall (302-831-1318).
http://ag.udel.edu

Natural Resource Management is an interdepartmental major administered by the Departments of Entomology and Wildlife 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 together with the skills and capabilities to address those problems in 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.

DEGREE: BACHELOR OF SCIENCE
MAJOR: NATURAL RESOURCE MANAGEMENT

CURRICULUM   CREDITS

UNIVERSITY REQUIREMENTS
ENGL 110 Critical Reading and Writing (minimum grade of C) 3

First Year Experience (see page 68) 0-4

Discovery Learning Experience (see page 68) 3

Three credits in an approved course or courses stressing multi-cultural, ethnic, and/or gender-related course content (see pages 68-70) 3

MAJOR REQUIREMENTS
Literature and Arts 6
Six credits selected from English, Art, Art History, Communication, Music, Theatre, Foreign Language, or courses cross-listed in these departments.

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

Professional Studies
AGRI 165 Mastering the Freshman Year or any equivalent Department freshman seminar 1
BISC 207/208 Introductory Biology I and II 4-8
PLSC 101 Botany I 4
CHEM 101/102 General Chemistry I and II 8
or
CHEM 103/104 General Chemistry I and II 8
ECON 151 Introduction to Microeconomics 3
ECON 152 Introduction to Macroeconomics 3
ENWC 201 Wildlife Conservation and Ecology 3
MATH 221/222 Calculus I and II 6
FREC 135 Introduction to Data Analysis 3
FREC 150 Economics of Agriculture and Natural Resources 3
FREC 424 Resource Economics: Theory and Policy 3
FREC 444 Economics of Environmental Management 3
FREC 480 Geographic Information Systems in Natural Resource Management 4
PLSC 201 Botany II 4
PLSC 204 Introduction to Soil Science 3
PLSC 205 Introduction to Soil Science Laboratory 1

GROUP I: Communications:
6 credits from the following 6
(including a minimum of 3 of the credits in oral communication)
Any course satisfying the College of Arts and Sciences second writing course requirement. Recommended courses are: ENGL 301-Expository Writing, ENGL 312-Written Communications in Business, ENGL 410-Technical Writing, ENGL 415-Writing in the Professions.
AGRI 212 Oral Communication in Agriculture and Natural Resources
FREC 345 Strategic Selling and Buyer Communication
UNIV 401/402 Senior Thesis (Any student successfully completing a Senior Thesis may count three credits toward the writing course requirement of this group.)

GROUP II: Chemistry/Physics:
8 credits from: 8
CHEM 213 Elementary Organic Chemistry
CHEM 214 Elementary Biochemistry
CHEM 216 Elementary Biochemistry Laboratory
CHEM 220 Quantitative Analysis
CHEM 221 Quantitative Analysis Laboratory
CHEM 321 Organic Chemistry
CHEM 322 Organic Chemistry
PHYS 201 Introductory Physics I
PHYS 202 Introductory Physics II

GROUP III: Statistics:
6 credits from: 6
FREC 408/409 Research Methods I and II or
MATH 201/202 Introduction to Statistics I and II

GROUP IV: Ecosystems:
6 credits from: 6
BISC 300 Introduction to Microbiology
ENWC 205 Elements of Entomology
ENWC 215 Entomology Laboratory
ENWC 406 Insect Identification - Taxonomy
ENWC 318 Taxonomy of Birds
ENWC 418 Avian Biology
ENWC 425 Mammalogy
ENWC 426 Aquatic Insects
PLSC 212 Woody Landscape Plants
PLSC 303 Introductory Plant Pathology
PLSC 404 Plant Taxonomy

GROUP V: Plants and Animals:
6 credits from: 6
BISC 300 Introduction to Microbiology
ENWC 205 Elements of Entomology
ENWC 215 Entomology Laboratory
ENWC 406 Insect Identification - Taxonomy
ENWC 318 Taxonomy of Birds
ENWC 418 Avian Biology
ENWC 425 Mammalogy
ENWC 426 Aquatic Insects
PLSC 212 Woody Landscape Plants
PLSC 303 Introductory Plant Pathology
PLSC 404 Plant Taxonomy

GROUP VI: Land and Water Management:
6 credits from: 6
EGTE 103 Land and Water Management
EGTE 104 Introduction to Land Surveying
EGTE 328 Waste Management Systems
GEOG 107 General Geology
GEOG 109 Physical Geography: Climatic Processes
GEOG 106 Physical Geography: Land Surface Processes
GEOG 220 Meteorology
GEOG 320 Water and Society

GROUP VII: Natural Resource/Environmental Policy:
12 credits from: 12
(including a minimum of six credits from FREC choices)
ENGL 306 Public Choice

UNIVERSITY REQUIREMENTS
CURRICULUM CREDITS

DEGREE: BACHELOR OF SCIENCE MAJOR: ENVIRONMENTAL SOIL SCIENCE

CURRICULUM CREDITS

ECON 332 Public Finance and Fiscal Policy 3
ECON 360 Government and Business 3
EGTE 416 Project Economics Analysis 3
FREC 406 Agriculture and Natural Resource Policy 3
FREC 429 Community Economic Development 3
FREC 450 Environmental Law and Policy 3
POSC 220 Introduction to Public Policy 3
POSC 350 Politics and the Environment 3

GROUP VIII: Ethics:
3 credits from: ................................................................. 3
PHIL 200 Business Ethics
PHIL 202 Contemporary Moral Problems
PHIL 203 Ethics
PHIL 340 Cross Cultural Environmental Ethics
PHIL 448 Environmental Ethics

ELECTIVES
After required courses are completed, sufficient credits must be taken to meet the
minimum credits required for the degree. Only four credits of performing Music credit may be counted
toward the degree.

CREDITS TO TOTAL A MINIMUM OF: 130

HONORS BACHELOR OF SCIENCE: NATURAL RESOURCE MANAGEMENT

The recipient of this degree must complete:
1. All requirements for the Bachelor of Science: Natural Resource Management.
2. All of the University’s requirements for the Honors Baccalaureate degree
   (see page 52). Courses at the 600-level that satisfy requirements in the
   major will be considered to be Honors courses for the degree.

PLANT AND SOIL SCIENCES

Telephone: (302) 831-2531
E-mail: dfrey@udel.edu
http://ag.udel.edu
Faculty Listing: http://ag.udel.edu/plsc/faculty/facultyStaff.htm

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 teaching and research projects 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, or
Environmental Soil Science. Minors are offered in Environmental
Soil Science and Landscape Horticulture. The department also
offers the interdisciplinary majors Natural Resource Management and
Plant Protection.

MAJOR REQUIREMENTS
AGRICULTURAL AND BIOLOGICAL SCIENCES 6-8
Two courses in any of the following areas: Animal Science, Food Science, Food
and Resource Economics (except FREC 135), Entomology and Wildlife Ecology,
Agricultural Education, Agriculture, Statistics, or Biology.

LITERATURE AND ARTS 3
Three credits selected from English, Art, Art History, Communication, Music,
Theatre, Foreign Language, or courses cross-listed in these departments.

SOCIAL SCIENCES AND HUMANITIES 6
Minimum of one course in two of the following areas: Anthropology, Black
American Studies, Criminal Justice, Economics, Education, History, Philosophy,
Political Science, Psychology, Sociology, Women’s Studies or courses cross-listed in
these departments.

PROFESSIONAL STUDIES
CHEM 101/102 General Chemistry I and II or
CHEM 103/104 General Chemistry I and II 8
CHEM 213 Organic Chemistry 4
CHEM 220/221 Quantitative Analysis with Lab 4
ENGL 410 Technical Writing 3
GEOG 107 General Geology I 4
MATH 221 Calculus I 3
PHYS 201 Introductory Physics I 4
PLSC 101 Botany I 4
PLSC 151 Introduction to Crop Science 3
PLSC 204 Introduction to Soil Science 3
PLSC 205 Introduction to Soil Science Lab 1
PLSC 305 Soil Fertility and Plant Nutrition 4
PLSC 319 Environmental Soil Microbiology 4
PLSC 401 Agronomic Crop Science 3
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 courses: 8-9
EGTE 103 Land and Water Management
BREG 113 Introduction to Land Surveying
EGTE 328 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 421 Environmental and Applied Geology
GEOG 428 Hydrogeology
PLSC 303 Introductory Plant Pathology
PLSC 603 Soil Physics
PLSC 607 Plant and Soil Water Relations
PLSC 619 Soil Microbiology
POSC 350 Politics and the Environment

Only two credits of HESC 120 activity or performing Music credit may be counted
toward the degree.

CREDITS TO TOTAL A MINIMUM OF: 124

HONORS BACHELOR OF SCIENCE: ENVIRONMENTAL SOIL SCIENCE

The recipient of this degree must complete:
1. All requirements for the Bachelor of Science: Environmental Soil Science.
2. All of the University’s requirements for the Honors Baccalaureate degree
   (see page 52). Courses at the 600-level that satisfy requirements in the
   major will be considered to be Honors courses for the degree.

DEGREE: BACHELOR OF SCIENCE MAJOR: ENVIRONMENTAL SOIL SCIENCE

CURRICULUM CREDITS

ENGL 110 Critical Reading and Writing 3
(minimum grade of C) .................................................. 3
First Year Experience (see page 68) ....................... 0.4
Discovery Learning Experience (see page 68) .......... 3

Three credits in an approved course or courses stressing multi-cultural, ethnic, and/or gender-related course content (see pages 68-70) ........................................ 3
### 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:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLSC 101 Botany I</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 133 Ornamental Horticulture</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 212 Woody Landscape Plants</td>
<td>4</td>
</tr>
<tr>
<td>PLSC 305 Soil Fertility and Plant Nutrition</td>
<td>4</td>
</tr>
<tr>
<td>PLSC 422 Plant Propagation</td>
<td></td>
</tr>
</tbody>
</table>

Three of the following five courses: 9-10

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLSC 422 Plant Propagation</td>
<td></td>
</tr>
<tr>
<td>PLSC 212 Woody Landscape Plants</td>
<td>4</td>
</tr>
<tr>
<td>PLSC 305 Soil Fertility and Plant Nutrition</td>
<td>4</td>
</tr>
<tr>
<td>PLSC 422 Plant Propagation</td>
<td></td>
</tr>
<tr>
<td>PLSC 305 Soil Fertility and Plant Nutrition</td>
<td>4</td>
</tr>
</tbody>
</table>

### DEGREE: BACHELOR OF SCIENCE

#### MAJOR: LANDSCAPE HORTICULTURE

#### UNIVERSITY REQUIREMENTS

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 110 Critical Reading and Writing</td>
<td>3</td>
</tr>
<tr>
<td>First Year Experience (see page 68)</td>
<td>0.4</td>
</tr>
<tr>
<td>Discovery Learning Experience (see page 68)</td>
<td>3</td>
</tr>
</tbody>
</table>

Three credits in an approved course or courses stressing multi-cultural, ethnic, or gender-related course content (see pages 68-70) 3

#### MAJOR REQUIREMENTS

##### Mathematics

Mathematics course 3

##### Literature and Arts

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

##### Social Sciences and Humanities

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

##### Professional Studies

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 101/102 General Chemistry I and II</td>
<td>8</td>
</tr>
<tr>
<td>CHEM 213 Organic Chemistry</td>
<td>4</td>
</tr>
<tr>
<td>EOTE 103 Land and Water Management</td>
<td>3</td>
</tr>
<tr>
<td>ENVC 205 Elements of Entomology</td>
<td>3</td>
</tr>
<tr>
<td>FREC 150 Economics of Agriculture and Natural Resources</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 101 Botany I</td>
<td>4</td>
</tr>
<tr>
<td>PLSC 133 Ornamental Horticulture</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 201 Botany II</td>
<td>4</td>
</tr>
<tr>
<td>PLSC 204 Introduction to Soil Science</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 205 Introduction to Soil Science Lab</td>
<td>1</td>
</tr>
<tr>
<td>PLSC 211 Herbaceous Landscape Plants</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 212 Woody Landscape Plants</td>
<td>4</td>
</tr>
<tr>
<td>PLSC 300 Principles of Animal and Plant Genetics</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 303 Introductory Plant Pathology</td>
<td>4</td>
</tr>
<tr>
<td>PLSC 305 Soil Fertility and Plant Nutrition</td>
<td>4</td>
</tr>
<tr>
<td>PLSC 313 Turf Establishment and Maintenance</td>
<td>4</td>
</tr>
<tr>
<td>PLSC 332 Basic Landscape Design</td>
<td>4</td>
</tr>
<tr>
<td>PLSC 364 Ornamental Horticulture Internship</td>
<td>4</td>
</tr>
<tr>
<td>or PLSC 366 Independent Study</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 410 Introduction to Plant Physiology</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 455 Issues in Plant and Soil Sciences</td>
<td>3</td>
</tr>
</tbody>
</table>

One of the following Communication courses: 3

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGRI 212 Oral Communication in Agriculture and Natural Resources</td>
<td>3</td>
</tr>
<tr>
<td>COMM 212 Oral Communication in Business</td>
<td></td>
</tr>
<tr>
<td>COMM 350 Public Speaking</td>
<td></td>
</tr>
<tr>
<td>ENGL 312 Written Communication in Business</td>
<td></td>
</tr>
<tr>
<td>ENGL 410 Technical Writing</td>
<td></td>
</tr>
</tbody>
</table>

One of the following business-related courses: 3

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 207 Accounting</td>
<td></td>
</tr>
</tbody>
</table>

### 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:

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<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>PLSC 101 Botany I</td>
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</tr>
<tr>
<td>PLSC 133 Ornamental Horticulture</td>
<td>3</td>
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<tr>
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<td>3</td>
</tr>
<tr>
<td>PLSC 212 Woody Landscape Plants</td>
<td>4</td>
</tr>
<tr>
<td>PLSC 313 Turf Establishment and Maintenance</td>
<td>4</td>
</tr>
</tbody>
</table>

One of the following five courses: 3-4

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLSC 204 Introduction to Soil Science</td>
<td></td>
</tr>
<tr>
<td>PLSC 313 Turf Establishment and Maintenance</td>
<td>4</td>
</tr>
<tr>
<td>PLSC 313 Turf Establishment and Maintenance</td>
<td>4</td>
</tr>
<tr>
<td>PLSC 332 Landscape Construction</td>
<td></td>
</tr>
<tr>
<td>PLSC 332 Landscape Construction</td>
<td></td>
</tr>
<tr>
<td>PLSC 422 Plant Propagation</td>
<td></td>
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</tbody>
</table>

### DEGREE: BACHELOR OF SCIENCE

#### MAJOR: PLANT SCIENCE

#### UNIVERSITY REQUIREMENTS

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 110 Critical Reading and Writing</td>
<td>3</td>
</tr>
<tr>
<td>First Year Experience (see page 68)</td>
<td>0.4</td>
</tr>
<tr>
<td>Discovery Learning Experience (see page 68)</td>
<td>3</td>
</tr>
</tbody>
</table>

Three credits in an approved course or courses stressing multi-cultural, ethnic, or gender-related course content (see pages 68-70) 3

#### MAJOR REQUIREMENTS

##### Mathematics

Mathematics course 3

### Agricultural and Biological Sciences


##### Literature and Arts

Six credits from English, Art, Art History, Communication, Music, Theatre, 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, Women’s Studies, or courses cross-listed in these departments.

**Professional Studies**

- CHEM 101/102  General Chemistry I and II  8
- CHEM 103/104  General Chemistry I and II  4
- CHEM 213  Elementary Organic Chemistry  4
- One of the following:  3-4
  - PHYS 201  Introduction to Physics
  - GEOL 107  General Geology
  - CHEM 214  Elementary Biochemistry
  - GEOG 255  Applied Climatology
- PLSC 101  Botany I  4
- PLSC 201  Botany II  4
- PLSC 204  Introduction to Soil Science  3
- PLSC 205  Introduction to Soil Science Lab  1
- PLSC 300  Principles of Animal and Plant Genetics  3
- PLSC 303  Introductory Plant Pathology  4
- PLSC 305  Soil Fertility and Plant Nutrition  4
- PLSC 410  Introduction to Plant Physiology  3

**ELECTIVES**

After required courses are completed, sufficient credits must be taken to meet the minimum credits required for the degree. Only two credits of HESC 120 activity or two credits of performing Music credit may be counted toward the degree.

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

**HONORS BACHELOR OF SCIENCE:**

**PLANT SCIENCE**

The recipient of this degree must complete:

1. All requirements for the Bachelor of Science: Plant Science.
2. All of the University’s requirements for the Honors Baccalaureate degree (see page 52). Courses at the 600-level that satisfy requirements in the major will be considered to be Honors courses for the degree.

**THE ASSOCIATE IN SCIENCE DEGREE**

The College of Agriculture and Natural Resources offers a two-year Associate in Science (AS) degree in Newark. 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 have a minimum GPA 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.

Although not 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 BS degree program at a later date.