COLLEGE OF AGRICULTURE AND NATURAL RESOURCES

- **Taking Courses Pass/Fail**
- **Dean's Scholar Program**
- **Preveterinary Instruction**
- **Agriculture and Natural Resources**
- **Agricultural and Technology Education**
- **Animal and Food Sciences**
- **Bioresources Engineering**
- **Entomology and Wildlife Ecology**
- **Food and Resource Economics**
- **Natural Resource Management**
- **Plant and Soil Sciences**
- **The Associate in Science Degree**

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 and technology education, animal science, engineering technology, entomology, environmental soil science, food and agribusiness management, food business management and technology, food science and technology, landscape horticulture, natural resource management, plant biology, plant protection, plant science, resource economics, statistics, and wildlife conservation.

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.

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 Arts and Sciences and 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.

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.

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.

DEGREE: BACHELOR OF SCIENCE
MAJOR: AGRICULTURE AND NATURAL RESOURCES

CURRICULUM		CREDITS
UNIVERSITY REQUIREMENTS		
ENGL 110	Critical Reading and Writing (minimum grade of C-)	3
Three credits in an approved course or courses stressing multi-cultural, ethnic, and/or gender-related content (see p 62-65)		3

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

Social Sciences and Humanities . . . 9
Minimum of one course in three of the following areas: Anthropology, Black American Studies, Criminal Justice, Economics, Education, Geography, History, Philosophy, Political Science, Psychology, Sociology, 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
PHYS 201/202 or 207/208
SCEN 101/102

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 350 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 and Technology Education, Animal Science, Entomology and Wildlife Ecology, Food Science, or Plant and Soil Sciences. A maximum of twelve credits of Special Problem/Independent Study/Field Experience credits in all areas may be counted toward the degree, with a maximum of six credits in any one department.

ELECTIVES

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

CREDITS TO TOTAL A MINIMUM OF 124

AGRICULTURAL AND TECHNOLOGY EDUCATION

Telephone: (302) 831-1320
E-mail: jrbacon@udel.edu
http://ag.udel.edu

This program offers a Bachelor of Science degree that qualifies the individual for teacher certification in two concentration areas, agricultural and natural resources education and technology education.

The Agricultural and Natural Resources Education concentration 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.

The Technology Education concentration supplies students with the basic knowledge and skills needed for the next millennium. Students study the resources, systems, and products of technology and their social and cultural impact in three focus areas: communications, physical, and bio-related. Communications covers graphics, photography, audio and video, drafting and design, electronic and telecommunications, desktop publishing, and other communications related topics. The physical area covers topics in construction, manufacturing, transportation, and other engineering-related subject matter. The bio-related area provides opportunities to study subjects related to biotechnology, environment technology, bioengineering, and other bio-related topics.

Both concentrations provide the pedagogical skills that give the student 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.

The curriculum in this major is arranged individually with the liaison professor in agricultural and technology education.

DEGREE: BACHELOR OF SCIENCE
MAJOR: AGRICULTURAL AND TECHNOLOGY EDUCATION

CURRICULUM CREDITS

UNIVERSITY REQUIREMENTS

ENGL 110 Critical Reading and Writing (with minimum grade of C-) . . . 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, or Biological Sciences.

Literature and Arts . . . 9
Nine 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

ATED 480 Career & Technical Education Materials & Approaches I . . . 3
ATED 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 (fulfills the University multicultural requirement) . . . 3
EDUC 400 Student Teaching . . . 9
EDUC 420 Reading in the Content Area . . . 1
EDUC 430 Classroom Management . . . 1
FREC 135 Introduction to Data Analysis . . . 3

The Agricultural and Technology Education 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 ATED 480 and ATED 481, and proof of having taken the Praxis II in the appropriate academic content area (Praxis II in Agriculture for Agricultural and Natural Resources Education, Praxis II in Technology for Technology Education). 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 be consulted for other policies concerning qualifications for student teaching.

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

In addition to completing the requirements of the core curriculum in Agricultural and Technology Education, students must complete the requirements for a concentration in Agricultural and Natural Resources Education or a concentration in Technology Education, as listed below.

DEGREE: BACHELOR OF SCIENCE
MAJOR: AGRICULTURAL AND TECHNOLOGY EDUCATION
CONCENTRATION: AGRICULTURAL AND NATURAL RESOURCES EDUCATION

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

MATH 114 (or higher level) 3

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

Technical Agriculture & Natural Resources Courses 30
A 2.75 index in at least thirty credits of technical agriculture and natural resources courses from at least three departments in the college. Students are to meet with their Agricultural and Technology Education advisor before selecting these courses.

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

CREDITS TO TOTAL A MINIMUM OF 124

DEGREE: BACHELOR OF SCIENCE
MAJOR: AGRICULTURAL AND TECHNOLOGY EDUCATION
CONCENTRATION: TECHNOLOGY EDUCATION

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

Mathematics 3
MATH 115 Pre-Calculus or higher level (MATH 221 strongly recommended; students taking MATH 115 will also need FREC 240 or equivalent.)

Physical Sciences 11-12
Minimum of eleven credits selected from one of the following course sequences:
CHEM 101/102 or 103/104 and a Physics course
PHYS 201/202 or 207/208 and a Chemistry course

Technology Courses 30
A 2.75 index in at least thirty credits of technology courses in the three focus areas: communications, physical, and bio-related, with at least six credit hours in each area. The remaining twelve credits are to be selected from one of the focus areas matching the student's interest. Students are to meet with their Agricultural and Technology Education advisor before selecting these courses.

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

CREDITS TO TOTAL A MINIMUM OF 124

ANIMAL AND FOOD SCIENCES

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

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 B.S. degree, but also the admission requirements of the U.S. veterinary schools to which students apply. Students are encouraged to participate in a broad realm of animal science research projects in the department through independent study/special problems courses. An Honors Degree option is offered for all the concentrations in the Animal 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 CREDITS

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

Three credits in an approved course or courses stressing multi-cultural, ethnic, and/or gender-related course content (see p. 62-65) 3

MAJOR REQUIREMENTS
AGRI 165 Mastering the Freshman Year 1
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, 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.

MATH 115 or higher . . . 3
BISC 207/208 Introductory Biology I and II . . . 8
CHEM 101/102 General Chemistry I and II
or
CHEM 103/104 General Chemistry I and II . . . 8
ANSC 101 Introduction to Animal Science . . . 3
ANSC 111 Animal Science Laboratory . . . 1
ANSC 140 Functional Anatomy . . . 4
ANSC 251 Livestock Nutrition and Feeding . . . 4
ANSC 265 Sophomore Seminar . . . 1
ANSC 300 Principles of Animal and Plant Genetics . . . 3
ANSC 332 Introduction to Animal Diseases . . . 3

One course from the following: . . . 3
ANSC 441 Reproductive Physiology of Domestic Animals
ANSC 442 Lactational Physiology
ANSC 445 Comparative Physiology of Domestic Animals
BISC 306 General Physiology

One course from the following: . . . 4
ANSC 404 Dairy Production
ANSC 417 Beef Cattle and Sheep Production
ANSC 418 Swine Production
ANSC 421 Poultry Production
ANSC 420 Equine Management

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

FREC 201 Records and Accounts
ANSC 270 Biotechnology: Science and Socioeconomic Issues
ANSC 399 Teaching Assistant
BISC 300 Introduction to Microbiology
COMM 350 Public Speaking
ENGL 312 Written Communications in Business

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

Three credits in an approved course or courses stressing multi-cultural, ethnic, and/or gender-related course content (see p. 62-65) . . . 3

MAJOR REQUIREMENTS

AGRI 165 Mastering the Freshman Year . . . 1
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, 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 101/102 General Chemistry I and II
or
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 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 Livestock Nutrition and Feeding . . . 4
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 436 Immunology of Domestic Animals
ANSC 624 Monogastric Nutrition
ANSC 633 Poultry Pathology
ANSC 635 Introduction to Virology
ANSC 644 Bioinformatics
ANSC 654 Advanced Ruminant Nutrition
BISC 601 Immunochemistry
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

Three credits in an approved course or courses stressing multi-cultural, ethnic, and/or gender-related course content (see p. 62-65) . . . 3

MAJOR REQUIREMENTS

AGRI 165 Mastering the Freshman Year . . . 1
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, 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	
or		
CHEM 103/104	General Chemistry I and II	8
CHEM 213	Elementary Organic Chemistry	4
CHEM 214/216	Elementary Biochemistry with Lab	4
ENWC 205	Elements of Entomology	3
FREC 150	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	Livestock Nutrition and Feeding	4
ANSC 265	Sophomore Seminar	1
ANSC 300	Principles of Animal and Plant Genetics	3
ANSC 332	Introduction to Animal Diseases	3

One course from the following: 3
ANSC 441 Reproductive Physiology of Domestic Animals
ANSC 442 Lactational Physiology
ANSC 445 Comparative Physiology of Domestic Animals
BISC 306 General Physiology

Two courses from the following: 8
ANSC 404 Dairy Production
ANSC 417 Beef Cattle and Sheep Production
ANSC 418 Swine Production
ANSC 420 Equine Management
ANSC 421 Poultry Production

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
ANSC 399 Teaching Assistant
ANSC 420 Equine Management
ANSC 436 Immunology of Domestic Animals
ANSC 438 Immunologic Techniques
BISC 300 Introduction to Microbiology
COMM 312 Oral Communication in Business
ENGL 312 Written Communications in Business
EGTE 328 Agricultural Waste Management Systems
FREC 350 Farm Management
PLSC 401 Agronomic Crop Science

CREDITS TO TOTAL A MINIMUM OF 124

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

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

Three credits in an approved course or courses stressing multi-cultural, ethnic, and/or gender-related course content (see p. 62-65) 3

MAJOR REQUIREMENTS
AGRI 165 Mastering the Freshman Year 1
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, 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 300	Introduction to Microbiology	4
CHEM 101/102	General Chemistry I and II	
or		
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 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	Livestock Nutrition and Feeding	4
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
ANSC 417 Beef Cattle and Sheep Production
ANSC 418 Swine Production
ANSC 420 Equine Management
ANSC 421 Poultry Production

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
ANSC 270 Biotechnology: Science and Socioeconomic Issues
ANSC 399 Teaching Assistant
ANSC 436 Immunology of Domestic Animals
ANSC 438 Immunologic Techniques
ANSC 635 Introduction to Virology
COMM 312 Oral Communication in Business
ENGL 312 Written Communications in Business
FREC 408 Research Methods

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 45). 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, ENWC, or BISC will, if taken as Honors, count toward the 12 Honors credits required in the major or in collateral disciplines.

MINOR IN ANIMAL SCIENCE

The minor in animal science requires 19 credits in animal science including: ANSC 101; 111; 140; 251; one course from ANSC 404, 417, 418, 420, and 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 CREDITS

UNIVERSITY REQUIREMENTS

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

Three credits in an approved course or courses stressing multi-cultural, ethnic, and/or gender-related course content (see p. 62-65) . . . 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 selected 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

CHEM 101/102 General Chemistry
or
CHEM 103/104 General Chemistry . . . 8
CHEM 214 Elementary Biochemistry
or
CHEM 527 Introductory Biochemistry . . . 3
PHYS 201/202 Introductory Physics I and II . . . 8
BISC 207/208 Introductory Biology I and II . . . 8
BISC 300 Introduction to Microbiology . . . 4
CHEM 220 Quantitative Analysis I . . . 3
CHEM 221 Quantitative Analysis Laboratory . . . 1
CHEM 321/322 Organic Chemistry . . . 8
CHEM 418 Introductory Physical Chemistry . . . 3
NTDT 200 Nutrition Concepts . . . 3
MATH 221/222 Calculus I and II
or
MATH 241/242 Analytic Geometry and Calculus A and B . . . 6-8
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 120 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 CREDITS

UNIVERSITY REQUIREMENTS

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

Three credits in an approved course or courses stressing multi-cultural, ethnic, and/or gender-related course content (see p. 62-65) . . . 3

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 220 Quantitative Analysis . . . 3
CHEM 221 Quantitative Analysis Laboratory . . . 1
PHYS 104 Elementary Physics . . . 3
BISC 207/208 Introductory Biology I and II . . . 8
BISC 300 Introduction to Microbiology . . . 4
NTDT 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 45). 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 305/306 (3 cr), 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 305/306 Food Science & Laboratory 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

BIORESOURCES ENGINEERING

Telephone: (302)831-2468
http://ag.udel.edu

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.

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

DEGREE: BACHELOR OF SCIENCE
MAJOR: ENGINEERING TECHNOLOGY

CURRICULUM CREDITS

UNIVERSITY REQUIREMENTS
ENGL 110 Critical Reading and Writing 3

Three credits in an approved course or courses stressing multi-cultural, ethnic, and/or gender-related course content (see p. 62-65) . . . 3

MAJOR REQUIREMENTS
Communications
A second writing course selected from: 3
ENGL 301 Expository Writing
ENGL 302 Advanced Composition
ENGL 307 News Writing and Editing
ENGL 312 Written Communications in Business
ENGL 410 Technical Writing

An oral communications course selected from: 3
COMM 255 Fundamentals of Communication
COMM 312 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 6
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.

DEGREE: BACHELOR OF SCIENCE
MAJOR: ENGINEERING TECHNOLOGY
CONCENTRATION: APPLIED ELECTRONICS AND CONTROLS

CURRICULUM CREDITS

UNIVERSITY REQUIREMENTS
ENGL 110 Critical Reading and Writing 3

Three credits in an approved course or courses stressing multi-cultural, ethnic, and/or gender-related course content (see p 62-65) 3

MAJOR REQUIREMENTS
Communications
A second writing course selected from: 3
ENGL 301 Expository Writing
ENGL 302 Advanced Composition
ENGL 307 News Writing and Editing
ENGL 312 Written Communications in Business
ENGL 410 Technical Writing

An oral communications course selected from: 3
COMM 255 Fundamentals of Communication
COMM 312 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 6
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 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
CPEG 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 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.

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

CURRICULUM CREDITS

UNIVERSITY REQUIREMENTS
ENGL 110 Critical Reading and Writing 3

Three credits in an approved course or courses stressing multi-cultural, ethnic, and/or gender-related course content (see p 62-65) 3

MAJOR REQUIREMENTS
Communications
A second writing course selected from: 3
ENGL 301 Expository Writing
ENGL 302 Advanced Composition
ENGL 307 News Writing and Editing
ENGL 312 Written Communications in Business
ENGL 410 Technical Writing

An oral communications course selected from: 3
COMM 255 Fundamentals of Communication
COMM 312 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 6
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 credits to bring total MATH credits at 201 level above to 12 credits . . . . . 4 or 6

Technical Skills

EGTE 104	Introduction to Surveying	1
EGTE 115	Introduction to Computer Based Problem Solving	4
EGTE 209	Technical and Computer-Aided Drafting	3
EGTE 223	Surveying	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

EGTE 312	Fundamentals of Soil Mechanics	3
EGTE 321	Storm Water Management	4
EGTE 416	Project Economic Analysis	3
EGTE 417	Project Management	3
EGTE 454	Wood and Steel Structures	3
EGTE 455	Concrete and Masonry Structures	3
Approved Technical Specialization electives		12

Technical Specialization electives will include a 3 credit capstone experience selected from EGTE 450, EGTE 451, EGTE 466 or UNIV 401/402.

Technical Support

ACCT 207 or FREC 201		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 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.

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 Bioresources 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

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 will 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		CREDITS
UNIVERSITY REQUIREMENTS		
ENGL 110	Critical Reading and Writing (with minimum grade of C-)	3
Three credits in an approved course or courses stressing multi-cultural, ethnic, and/or gender-related course content (see p. 62-65)		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), 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 115/171	Pre-Calculus or higher level	3

BISC 207 Introductory Biology I . . . 4
BISC 208 Introductory Biology II . . . 4
BISC 302 General Ecology . . . 3

CHEM 101/102 General Chemistry
or
CHEM 103/104 General Chemistry . . . 8
ENWC 165 New Student Seminar . . . 1
ENWC 205 Elements of Entomology . . . 3
ENWC 305 Entomology Laboratory . . . 2
ENWC 406 Insect Identification-Taxonomy . . . 3
ENWC 465 Senior Seminar . . . 1
ENWC 300 Principles of Animal and Plant Genetics . . . 3
ENWC 405 Insect Structure and Function . . . 4
ENWC 408 Field Taxonomy . . . 3

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 Herbaceous Landscape Plants
PLSC 212 Woody Landscape Plants
PLSC 303 Introductory Plant Pathology
PLSC 402 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 and 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 CREDITS

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

Three credits in an approved course or courses stressing multi-cultural, ethnic, and/or gender-related course content (see p. 62-65) . . . 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, and 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.

Professional Studies
MATH 115/171 Pre-Calculus or higher level . . . 3
BISC 207/208 Introductory Biology I and II . . . 8
CHEM 101/102 General Chemistry
or
CHEM 103/104 General Chemistry . . . 8
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 Seminar . . . 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 CREDITS

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

Three credits in an approved course or courses stressing multi cultural, ethnic, and/or gender-related course content (see p. 62-65) . . . 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 . . . 3
Three credits (not from Group II) 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 (not from Group III) 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, 171, 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
or		
BISC 403	Genetics and Evolutionary Biology	3
ENWC 318	Taxonomy of Birds	2
ENWC 325	Wildlife Management	3
ENWC 406	Insect Identification–Taxonomy	3
ENWC 415	Wildlife Research Techniques	3
ENWC 418	Avian Biology	3
ENWC 425	Mammalogy	3
ENWC 465	Senior Seminar	1
ENWC credit	(may include UNIV 400 or any ENWC course 200-level or above (except X66 and x68) May double count with Group I or III as as appropriate)	3
ECON 151	Introduction to Microeconomics: Prices and Markets (may double count in Soc. Sci. Group)	3
or		
FREC 150	Economics of Agriculture and Natural Resources (may double count for Ag & Biological Sciences Group)	3
FREC 408	Research Methods I	3
or		
STAT 200	Basic Statistical Practice	3
PLSC 101	Botany I	4
PLSC 204	Introduction to Soil Science	3
PLSC 212	Woody Landscape Plants	4
or		
PLSC 344	Forest Ecology (same as ENWC 344)	2
or		
PLSC 402	Plant Taxonomy	3

GROUP I: 10 credits from the following 10

ANSC 140	Functional Anatomy of Domestic Animals
BISC 300	Introduction to Microbiology
BISC 305	Cell Physiology
BISC 306	General Physiology
BISC 442	Vertebrate Morphology
BISC 480	Vertebrate Natural History
BISC 495	Evolution
BISC 637	Population Ecology
ENWC 310	Animal and Plant Genetics Laboratory
ENWC 408	Insect Field Taxonomy
ENWC 424	Herpetology
ENWC 444	Conservation of Tropical Biodiversity
ENWC 452	Conservation of African Wildlife
MAST 627	Marine Biology
MAST 629	Ichthyology

GROUP II: 9 credits from the following: 9

AGRI 212	Oral Communication in Agriculture and Natural Resources
COMM 312	Oral Communication in Business
COMM 350	Public Speaking
ENGL 301	Expository Writing
ENGL 307	News Writing and Editing
ENGL 309	Feature and Magazine Writing
ENGL 312	Written Communications in Business
ENGL 410	Technical Writing
THEA 204	Introduction to Voice and Speech
UNIV 402	Senior Thesis (requires completed thesis)

GROUP III: 6 credits from the following: . . 6

ENWC 413	Human Dimensions in Wildlife Conservation
ENWC 450	Debates in Conservation Biology
ENWC 453	Community-based Conservation
FREC 444	Economics of Environmental Management
FREC 450	Topics in Environmental Law
GEOG 236	Conservation: Global Issues
PHIL 448	Environmental Ethics
POSC 350	Politics and the Environment

ELECTIVES

Beyond required courses, sufficient credits must be taken to meet the minimum credits required for the degree. Calculus, organic chemistry, biochemistry, geographic information systems, and physics are strongly recommended. Only two credits of HESC 120 activity and performing music may be counted toward the degree.

CREDITS TO TOTAL A MINIMUM OF 124

HONORS BACHELOR OF SCIENCE: ENTOMOLOGY OR WILDLIFE CONSERVATION

The recipient of this degree must complete:

1. All requirements for the Bachelor of Science: Entomology or Wildlife Conservation.
2. All of the University's requirements for the Honors Baccalaureate degree (see page 45 of this catalog). Courses with the ENWC prefix taken at the 600-level or higher may be counted as Honors courses in the major. One 3- or 4-credit course in ANSC, PLSC, or BISC will, if taken as Honors, count toward the 12 Honors credits required in the major and/or in collateral disciplines.

MINOR IN ENTOMOLOGY

The minor in entomology requires 18 credits of ENWC courses including ENWC 205, 305, 406, and 408. 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, 325 and three courses from among ENWC 205, 305, 318, 406, 418, 424, and 425, of which one must be at the 400-level. Remaining credits may be from any of the 300- and 400-level courses listed above or any other 300- or higher level ENWC course with content primarily focused on taxonomy, ecology, or conservation. Any substitutions require prior approval of the Department Chair. A minimum grade of C- is required in all courses counting toward the minor. Credits for Special Problem, Independent Study, Research, and Field Experience do not count toward the minor. 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 B.S. or B.A., 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 can not guarantee that a student will be able to complete all courses necessary or desired for the minor. Without BISC 302 some upper level courses such as ENWC 325 may be difficult to complete satisfactorily.

FOOD AND RESOURCE ECONOMICS

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

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, food business management and technology, and statistics. The curricula differ in the amount of emphasis given to agricultural production, business and economics. All the curricula 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
Three credits in an approved course or courses stressing multi-cultural, ethnic, and/or gender-related course content (see p. 62-65)		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 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 312	Oral Communication in Business	3
ENGL 312	Written Communications in Business	3
ECON 151	Introduction to Microeconomics:Prices and Markets	3
ECON 152	Introduction to Macroeconomics:National Economy	3
BUAD 301	Introduction to Marketing	3
Two additional courses offered by the College of Business and Economics 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
FREC 335 Advanced Data Management
FREC 427 Agribusiness Financial Management
FREC 464 Agribusiness Internship
FREC 471 Futures and Options Markets

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

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

CREDITS TO TOTAL A MINIMUM OF 128

HONORS BACHELOR OF SCIENCE: FOOD AND AGRICULTURAL BUSINESS 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 45). 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 eight FREC courses listed below with a minimum of two courses in each area:

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

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

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

FOOD BUSINESS MANAGEMENT AND TECHNOLOGY

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

Food business management and technology is an interdepartmental undergraduate major administered by the Departments of Animal and Food Sciences and Food and Resource Economics. This degree program provides students with a strong background encompassing major elements necessary for working in the food sector, especially in positions where liaison among technical

and nontechnical groups is important. The combination of fields represented in the curriculum leads to a better overall understanding of the food industry from product development and quality control to sales and marketing. In addition to working in the food and agribusiness industries, students will also be prepared for careers in government or further study in a graduate program.

DEGREE: BACHELOR OF SCIENCE
MAJOR: FOOD BUSINESS MANAGEMENT AND TECHNOLOGY

CURRICULUM CREDITS

UNIVERSITY REQUIREMENTS
ENGL 110 Critical Reading and Writing (minimum grade C-) 3
Three credits in an approved course or courses stressing multi-cultural, ethnic, and/or gender-related course content (see p. 62-65) 3

MAJOR REQUIREMENTS
Agricultural and Biological Sciences 10-12
BISC 207 Introductory Biology I 4

Minimum of one course outside the student's major in two 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 courses cross-listed with those 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 those departments.

Physical Sciences 8
Minimum of eight credits, selected from one of the following two-course sequences:
CHEM 101 and 102 General Chemistry I and II
CHEM 103 and 104 General Chemistry I and II

Professional Studies
MATH 221 (or higher level) 3
FREC 135 (FREC 335 recommended) 3
AGRI 165 Mastering the Freshman Year 1
FREC 150 Economics of Agriculture and Natural Resources 3
FREC 212 Food Retailing and Product Management 3
FREC 305 Management and Leadership Development 3
FREC 316 Economics of Biotechnology and New Technology 3
FREC 345 Strategic Selling and Buyer Communication 3
FREC 404 Food and Fiber Marketing 3
FREC 408 Research Methods I 3
FOSC 102 Food for Thought 3
FOSC 305 Food Science 3
FOSC 409 Food Processing 4
FOSC 411 Food Science Capstone 4
NTDT 200 Nutrition Concepts 3

Two of the following three courses: 11-12
FOSC 328 Food Chemistry
FOSC 439 Food Microbiology
FOSC 449 Food Biotechnology

One of the following two courses: 3
NTDT 321 Quantity Food Production and Service
NTDT 322 Management of Food and Nutrition Services

ELECTIVES
After required courses are completed, sufficient credit 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 towards the degree. Suggested courses include:
FREC 409 Research Methods II
FREC 410 International Agricultural Trade and Marketing
FREC 430 Establishing and Managing a Food and Agribusiness Enterprise
BISC 208 Biology II
BISC 300 Introduction to Microbiology
CHEM 213 Elementary Organic Chemistry
CHEM 214 Elementary Biochemistry (strongly recommended if taking FOSC 328)
HRIM 217 Catering Management
HRIM 218 Beverage Management

CREDITS TO TOTAL A MINIMUM OF 124

DEGREE: BACHELOR OF SCIENCE
MAJOR: RESOURCE ECONOMICS

CURRICULUM CREDITS

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

Three credits in an approved course or courses stressing multi-cultural, ethnic, and/or gender-related course content (see p. 62-65) 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, 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 selected from Chemistry, Physics, Geology, or Physical Science.

Professional Studies
MATH 115 Pre-Calculus (MATH 221 or higher is strongly recommended) 3
COMM 312 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, including Food and Resource Economics, may be counted toward a degree.

ELECTIVES
After required courses are completed, sufficient credits must be taken to meet the minimum credits required for the degree. Only four credits of HESC 120 activity or 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 45). 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 Rural Economics Development-Theory and Policy
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

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

DEGREE: BACHELOR OF SCIENCE
MAJOR: STATISTICS

CURRICULUM CREDITS

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

Three credits in an approved course or courses stressing multi-cultural, ethnic, and/or gender-related course content (see p. 62-65) 3

COLLEGE REQUIREMENTS
Skill Requirements
Writing: (minimum grade C-) 3
A second writing course involving significant writing experience including two *papers with a combined minimum* of 3,000 words to be submitted for extended faculty critique of both composition and content. This course must be taken after completion of 60 credit hours. Appropriate writing courses are normally designated in the semester's Registration Booklet. (See list of courses approved for second writing requirement, page 91-93.)

Foreign Language: 0-12
Completion of the intermediate-level course (107 or 112) in a given language. Number of credits needed and initial placement will depend on number of years of *high school study of foreign language*. Students with four or more years of high school work in a single foreign language may attempt to fulfill the requirement in that language by taking an exemption examination. French, Russian or German is recommended.

Breadth Requirements (See page 93-98)
A total of twenty-one credits 21
from Groups A, B and C is required with a minimum of six credits in each group. The six credits from each group could be from the same area.
Group A: Understanding and appreciation of the creative arts and humanities
Group B: The study of culture and institutions over time
Group C: Empirically based study of human beings and their environment

MAJOR REQUIREMENTS
A grade of C- or better is required for all major courses and related work. Students lacking adequate preparation for MATH 242 should begin with MATH 241.
MATH 205 Statistical Methods. 4
MATH 210 Discrete Mathematics I 3
MATH 242 *Analytic Geometry and Calculus B* 4
MATH 243 Analytic Geometry and Calculus C 4
MATH 245 Concepts of Analysis 3
MATH 349 Elementary Linear Algebra 3
MATH 302 Ordinary Differential Equations 3
MATH 426 Introduction to Numerical Analysis and Algorithmic Computation 3
MATH 401 Introduction to Real Analysis 3
STAT 370 Introduction to Statistical Analysis I 3
STAT 371 *Introduction to Statistical Analysis II* 3
STAT 418 Sampling Methods 3
STAT 420 Data Analysis and Nonparametric Statistics 3
STAT 611 Regression Analysis 3
STAT 615 Design and Analysis of Experiments 3

One of the following: 3
STAT 616 Design and Analysis of Experiments II
STAT 617 Multivariate Methods
STAT 618 *Sampling Techniques*
ENGL 312 Written Communications in Business 3

Two-semester sequence of laboratory science 8
(Courses designed for non-majors in a discipline are not appropriate.)

One of the following options (A, B, or C): 6-9
Option A (for students with previous experience with a programming language)
CISC 181 Introduction to Computer Science
and
CISC 220 Data Structures

Option B (for students with no previous experience with a programming language)
CISC 105 General Computer Science
and
CISC 181 Introduction to Computer Science
and
CISC 220 Data Structures

Option C (for students with no previous experience with a programming language)
CISC 105 General Computer Science
and
CISC 120 Object Oriented Programming in C++
and
CISC 220 Data Structures

Area of application: 15
This program requires a fifteen-credit area of application outside the department. Students must meet regularly with the advisor to develop it.

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

CREDITS TO TOTAL A MINIMUM OF 128

MINOR IN STATISTICS

A student seeking a minor in statistics must obtain permission from the chairperson or his/her designee in 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 of his/her designee in the Department of Food and Resource Economics. 18 credit hours are required for the minor.

Required courses: (6 hours)
ORES 401 An Introduction to Operations Research
STAT 370 Introduction to Statistical Analysis I

Remaining four courses are to be selected from the following list:
STAT 371 Introduction to Statistical Analysis II
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
BUAD 306 Operations Management
CIEG 482 Systems Design and Operation
CIEG 486* Engineering Management
EGTE 401 Introduction to Quality Control
EGTE 402 Quality Control Applications
EGTE 416* Project Economic Analysis
EGTE 417 Project Management

*Only 1 of CIEG 486 and EGTE 416 can be counted towards the minor. A minimum grade of C is required in all courses counting toward the minor.

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

Three credits in an approved course or courses stressing multi-cultural, ethnic, and/or gender-related course content (see p. 62-65) 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
or
PLSC 101 Botany I 4-8
CHEM 101/102 General Chemistry I and II
or
CHEM 103/104 General Chemistry I and II 8
ECON 151 Introduction to Microeconomics 3
ECON 152 Introduction to Macroeconomics 3
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 three 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 302 General Ecology
ENWC 325 Wildlife Management
ENWC/ PLSC 440 Integrated Disease and Pest Management
or
ENWC 411 Insect Pest Management
GEOG 235 Conservation of Natural Resources
or
GEOG 236 Conservation: Global Issues
or
GEOG 230 Humans and Earth Ecosystem
PLSC 305 Environmental Soil Management

GROUP V: Plants and Animals:
6 credits from: 6
BISC 300 Introduction to Microbiology
ENWC 205 Elements of Entomology
ENWC 305 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 402 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
GEOL 107 General Geology
GEOG 101 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):
ECON 306 Public Choice
ECON 332 Public Finance and Fiscal Policy
ECON 360 Government and Business
EGTE 416 Project Economics Analysis
FREC 406 Agriculture and Natural Resource Policy
FREC 429 Community Economic Development
FREC 450 Environmental Law and Policy
POSC 220 Introduction to Public Policy
POSC 350 Politics and the Environment

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 HESC 120 activity or 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. 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) 831-2508
E-mail: kra@udel.edu
http://ag.udel.edu

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

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

DEGREE: BACHELOR OF SCIENCE
MAJOR: ENVIRONMENTAL SOIL SCIENCE

CURRICULUM CREDITS

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

Three credits in an approved course or courses stressing multi-cultural, ethnic, and/or gender-related course content (see p 62-65) 3

MAJOR REQUIREMENTS
Computer Science
Computer Science course (FREC135 or equivalent) 3

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, 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 220 Meteorology 3
GEOL 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 Environmental Soil Management 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: 7
EGTE 103 Land and Water Management
EGTE 104 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
GEOL 415 General Geomorphology
GEOL 421 Environmental and Applied Geology
GEOL 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

MINOR IN ENVIRONMENTAL SOIL SCIENCE

The minor in Environmental Soil Science is open to students in any major and requires a total of 17-18 credits, as follows:
PLSC 204 Introduction to Soil Science 3
PLSC 205 Introduction to Soil Science Lab 1
PLSC 305 Environmental Soil Management 4

Three of the following five courses: 9-10
PLSC 151 Introduction to Crop Science
PLSC 319 Environmental Soil Microbiology
PLSC 401 Agronomic Crop Science
PLSC 603 Soil Physics
PLSC 608 Environmental Soil Chemistry

DEGREE: BACHELOR OF SCIENCE
MAJOR: LANDSCAPE HORTICULTURE

CURRICULUM CREDITS

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

Three credits in an approved course or courses stressing multi-cultural, ethnic, and/or gender-related course content (see p. 62-65) 3

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

Literature and Arts 3
Three 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
CHEM 101/102 General Chemistry I and II
or
CHEM 103/104 General Chemistry I and II 8
CHEM 213 Organic Chemistry 4
EGTE 103 Land and Water Management 3
ENWC 205 Elements of Entomology 3
FREC 150 Economics of Agriculture and Natural Resources 3
PLSC 101 Botany I 4
PLSC 133 Ornamental Horticulture 3
PLSC 201 Botany II 4
PLSC 204 Introduction to Soil Science 3
PLSC 205 Introduction to Soil Science Lab 1
PLSC 211 Herbaceous Landscape Plants 3
PLSC 212 Woody Landscape Plants 4
PLSC 300 Principles of Animal and Plant Genetics 3
PLSC 303 Introductory Plant Pathology 4
PLSC 305 Environmental Soil Management 4
PLSC 313 Turf Establishment and Maintenance 4
PLSC 332 Basic Landscape Design 4
PLSC 364 Ornamental Horticulture Internship
or
PLSC 366 Independent Study 3
PLSC 410 Introduction to Plant Physiology 3
PLSC 455 Issues in Horticulture 3

One of the following Communication courses: 3
AGRI 212 Oral Communication in Agriculture and Natural Resources
COMM 312 Oral Communication in Business
COMM 350 Public Speaking
ENGL 312 Written Communication in Business
ENGL 410 Technical Writing

One of the following business-related courses: 3
ACCT 207 Accounting
ACCT 352 Law and Social Issues in Business
CNST 200 Consumer Economics
CNST 242 Consumer Movement in Perspective
ECON 151 Introduction to Microeconomics
ECON 152 Introduction to Macroeconomics
FREC 201 Records and Accounts
FREC 212 Food Retailing and Product Management
FREC 302 Management of Agribusiness Firms
FREC 404 Food and Fiber Marketing
FREC 406 Agricultural and Natural Resource Policy
FREC 430 Establishing and Managing a Food and Agribusiness Enterprise
PHIL 200 Business Ethics
PLSC 403 Nursery and Garden Center Management
POSC 220 Introduction to Public Policy
POSC 301 State and Local Government

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 and performing Music credit may be counted toward the degree.

CREDITS TO TOTAL A MINIMUM OF 124

MINOR IN LANDSCAPE HORTICULTURE

The minor in Landscape Horticulture is open to students in any major and requires a total of 17-18 credits, as follows:
PLSC 101 Botany I 4
PLSC 133 Ornamental Horticulture 3
PLSC 211 Herbaceous Landscape Plants 3
PLSC 212 Woody Landscape Plants 4

One of the following five courses: 3-4
PLSC 204 Introduction to Soil Science
PLSC 313 Turf Establishment and Maintenance
PLSC 331 Landscape Construction
PLSC 332 Landscape Design
PLSC 422 Plant Propagation

DEGREE: BACHELOR OF SCIENCE
MAJOR: PLANT BIOLOGY

CURRICULUM CREDITS

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

Three credits in an approved course or courses stressing multi-cultural, ethnic, and/or gender-related course content (see p. 62-65) 3

MAJOR REQUIREMENTS

Mathematics and Computer Science

Mathematics course . . . 3
Computer Science course (FREC135 or equivalent) . . . 3

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

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 . . . 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

BISC 207 Introductory Biology I . . . 4
BISC 300 Introduction to Microbiology . . . 4
CHEM 101/102 General Chemistry I and II
or
CHEM 103/104 General Chemistry I and II . . . 8
CHEM 213 Elementary Organic Chemistry
or
CHEM 321/322 Organic Chemistry . . . 4-8

One of the following: . . . 3-8
CHEM 214/216 Elementary Biochemistry and Lab
CHEM 527 Biochemistry
CHEM 641/642 Biochemistry

One of the following Communication courses: . . . 3
AGRI 212 Oral Communication in Agriculture and Natural Resources
COMM 312 Oral Communication in Business
COMM 350 Public Speaking
ENGL 312 Written Communications in Business
ENGL 410 Technical Writing

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 Plant and Animal Genetics . . . 3
PLSC 303 Introductory Plant Pathology . . . 4
PLSC 306 Introduction to Plant Molecular Biology . . . 4
PLSC 410 Introduction to Plant Physiology . . . 3
PLSC 435 Plant Development Biology . . . 3
FREC 408 Research Methods . . . 3
ENWC 465 Seminar . . . 1

Other Life Science Courses . . . 12
Minimum of four courses, with at least six credits at the 400-level or above. See advisor for list of approved courses in various interest areas.

ELECTIVES

After required courses are completed, sufficient credits must be taken to meet the minimum credits required for the degree. Only two credits of HESC 120 activity or performing Music credit may be counted toward the degree.
Suggested courses include:
PHYS 201 or higher Introductory Physics
(Recommended for students interested in graduate school)
CHEM220/221 Quantitative Analysis

CREDITS TO TOTAL A MINIMUM OF . . . 124

MINOR IN PLANT BIOLOGY

The minor in Plant Biology is open to students in any major and requires a minimum of 15 credits from the following:

PLSC 101 Botany I . . . 4
PLSC 201 Botany II . . . 4
PLSC 204 Introduction to Soil Science . . . 4
PLSC 300 Principles of Animal and Plant Genetics . . . 3
PLSC 303 Introductory Plant Pathology . . . 4
PLSC 306 Introduction to Plant Molecular Biology . . . 3
PLSC 402 Plant Taxonomy . . . 3
PLSC 410 Plant Physiology . . . 3
PLSC 411 Diagnostic Plant Pathology . . . 3
PLSC 414 Plant Cell and Tissue Culture . . . 4
PLSC 416 Plant Virology . . . 4
PLSC 435 Plant Developmental Biology . . . 3
PLSC 440 Integrated Pest and Disease Management . . . 3
PLSC 444 The Physiology of Plant Stress . . . 3
PLSC 602 Physiological Plant Productivity . . . 3
PLSC 605 Plant Breeding . . . 3
PLSC 607 Plant and Soil Water Relations . . . 3
PLSC 615 Vascular Plant Anatomy . . . 3

DEGREE: BACHELOR OF SCIENCE
MAJOR: PLANT SCIENCE

CURRICULUM CREDITS

UNIVERSITY REQUIREMENTS

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

Three credits in an approved course or courses stressing multi-cultural, ethnic, and/or gender-related course content (see p. 62-65) . . . 3

MAJOR REQUIREMENTS

Mathematics and Computer Science

Mathematics course . . . 3
Computer Science course (FREC135 or equivalent) . . . 3

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

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

CHEM 101/102 General Chemistry I and II
or
CHEM 103/104 General Chemistry I and II . . . 8
CHEM 213 Elementary Organic Chemistry . . . 4
One of the following: . . . 3-4
PHYS 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 Environmental Soil Management . . . 4
PLSC 410 Introduction to Plant Physiology . . . 3

ELECTIVES

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

CREDITS TO TOTAL A MINIMUM OF . . . 124

THE ASSOCIATE IN SCIENCE DEGREE

The College of Agriculture and Natural Resources offers a two-year Associate in Science (A.S.) degree. 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 course work in the areas of physical science, social science, English, and mathematics, along with his or her courses in agriculture. This approach would allow the student to more easily complete a B.S. degree program at a later date.