# COLLEGE OF AGRICULTURAL SCIENCES



Many aspects of science, engineering, and economics are involved in the various professional goals of agricultural study and research. These broad fields of study extend throughout society and provide opportunities in such work and services as the invention, development, manufacture, and sale of agricultural machinery, equipment, and chemicals; processing and marketing of agricultural products; biological research, regulatory, and service work with the U.S. Department of Agriculture and other federal and state agencies; school, college, and extension teaching; scientific investigation in agricultural experiment stations, private industry, and foundations; corporate farm management; ornamental horticulture and nursery management; and consultation work for foreign governments.

The curricula in the College of Agricultural Sciences are planned to provide the student: (1) knowledge pertaining to a specific agricultural science, (2) fundamental training in other basic sciences, and (3) a broad, general educational experience. The curricula provide a flexible program of study designed to keep the student up to date on the rapid changes and improvements that are taking place in agriculture. A program of frequent counseling with a faculty adviser helps the student make steady progress toward achieving these educational goals.

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

Inspection trips to these facilities, to nearby agrichemical laboratories, and to commercial production, processing and marketing plants are scheduled in many of the advanced courses.

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

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

## DEAN'S SCHOLAR PROGRAM

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

## AGRICULTURAL EDUCATION

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

A degree in agricultural education qualifies the graduate to serve as a teacher of agricultural education in public or private secondary schools, as an instructor of adult classes in agriculture, or as an educational leader with state or federal agencies or private businesses. Other opportunities are to be found in educational administrative positions, production agriculture, the Agricultural Extension Service, the Soil Conservation Service, and various leadership posi-

tions in agricultural organizations and agencies. Those who continue agricultural education studies through graduate school may go into college and university teaching, research, and state, regional, or federal supervisory positions.

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

## DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE MAJOR: AGRICULTURAL EDUCATION

| CURRICULUM | | CREDITS* |
|---|---|---|
| **UNIVERSITY REQUIREMENTS** | | |
| ENGL 110 | Critical Reading and Writing** | 3 [1] |
| Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content # | | 3 [1-4] |
| **COLLEGE REQUIREMENTS** | | |
| ***Mathematics and Computer Science*** | | |
| Mathematics course | | 3 [1] |
| Computer Science course selected from CISC 105, EGTE 111, FREC 235, or equivalent | | 3 [2] |
| ***Agricultural and Biological Sciences*** | | 9-12 [1,2] |
| Minimum of one course outside the student's major in three of the following areas: Food and Resource Economics, Food Science, Agricultural Engineering, Animal Science, Entomology and Applied Ecology, Plant and Soil Sciences, or Biology. | | |
| ***Literature and Arts*** | | 9 [2] |
| Nine credits from English and/or Communication. | | |
| ***Social Sciences and Humanities*** | | 9 [2] |
| Minimum of one course in three of the following areas: Anthropology, Black American Studies, Criminal Justice, Economics, Education, Geography, History, Philosophy, Political Science, Psychology, Sociology, or Women's Studies. | | |
| ***Physical Sciences*** | | 8 [1] |
| Minimum of eight credits selected from one of the following areas: Chemistry, Physics, Geology, or Physical Science. | | |
| **MAJOR REQUIREMENTS** | | |
| **External to the College** | | |
| EDST 304 | Educational Psychology – Social Aspects | 3 [3] |
| EDST 305 | Educational Psychology – Cognitive Aspects | 3 [3] |
| EDDV 400 | Student Teaching | 6 [4] |
| One of the following three courses: | | |
| EDST 201 | Education and Society | 3 [2] |
| EDST 461 | Measurement Theory and Techniques for Classroom Teachers | 3 [3] |
| EDDV 620 | Foundations of Reading Instruction | 3 [3] |
| **Within the College** | | |
| A 2.75 index in at least thirty credits of technical agriculture from at least three departments in the college. | | 30 [3,4] |
| **Within the Department** | | |
| ***Professional Education*** | | |
| AGED 380 | Agricultural Education Materials and Approaches I | 3 [3] |
| AGED 381 | Agricultural Education Materials and Approaches II | 3 [3] |
| **ELECTIVES** | | |
| ***Electives*** | | 32-35 [1-4] |
| May include Military Science, Music, or Physical Education. (Only four credits of activity-type Physical Education and/or four credits of performing Music organization credit may be counted toward the degree.) | | |
| In order to graduate with a major in Agricultural Education, students must have a minimum of 40 credit hours of General Education. | | |
| **CREDITS TO TOTAL A MINIMUM OF** | | **130** |

## AGRICULTURAL ENGINEERING

Agricultural engineering technology is a part of the broad discipline of agricultural engineering that bridges two fields of applied sciences: agriculture and engineering. Agricultural engineering technology is the application of engineering techniques in such areas as production mechanization, energy, soil and water conservation, plant and animal environments, agricultural waste management, processing and storage, and building construction. This requires a knowledge of physical and natural sciences and technical skills to support engineering activities.

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

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

## DEGREE: BACHELOR OF APPLIED SCIENCE MAJOR: AGRICULTURAL ENGINEERING TECHNOLOGY

| CURRICULUM | | CREDITS* |
|---|---|---|
| **UNIVERSITY REQUIREMENTS** | | |
| ENGL 110 | Critical Reading and Writing** | 3 [1] |
| Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content # | | 3 [1-4] |
| **COLLEGE REQUIREMENTS** | | |
| ***Communications*** | | 6 [1-3] |
| Six credits selected to provide training in oral and written communications to include: | | |
| EGTE 365 | Junior Seminar | 1 [3] |
| A second writing course selected from the following: | | |
| ENGL 301 | Expository Writing | 3 [3] |
| ENGL 302 | Advanced Composition | 3 |
| ENGL 307 | News Writing and Editing | 3 |
| ENGL 312 | Written Communications in Business | 3 |
| ENGL 410 | Technical Writing | 3 |
| An oral communications course selected from the following: | | |
| COMM 200 | Introduction to Human Communication Systems | 3 [3] |
| COMM 255 | Fundamentals of Communication | 3 |
| COMM 312 | Oral Communication in Business | 3 |
| COMM 350 | Public Speaking | 3 |
| COMM 356 | Small Group Communication | 3 |
| ***Social Sciences and Humanities*** | | 15 [1-4] |
| Fifteen credits selected to provide an appreciation and understanding of our cultural heritage, interpersonal relationships, interrelationships between technology and society and a value system for sound decision making. | | |
| Nine credits to be selected from a minimum of three of the following areas: Anthropology, Art, Art History, Black American Studies, Criminal Justice, Economics, Education, English, Foreign Language, Geography, History, Music, Philosophy, Political Science, Psychology, Sociology, Theatre, or Women's Studies. | | |
| ***Basic Sciences and Mathematics*** | | 31 [1-3] |
| Thirty-one credits selected to provide fundamental knowledge about nature and its phenomena and mathematics including calculus as follows: | | |

*Superior figures indicate year or years in which the course is normally taken, i.e., [1]freshman year, [2]sophomore year, etc.
**Minimum grade of C- required.
#This requirement may be fulfilled through a course or courses taken to complete other degree requirements; it cannot be fulfilled by a course taken pass/fail. See page 23.

***Biology, Chemistry and Physics***

| | | |
|---|---|---|
| Biology/Life Science course | | 3 |
| CHEM 103 | General Chemistry | 4[2] |
| CHEM 104 | General Chemistry | 4[2] |
| PHYS 201 | General Physics | 4[2] |
| or | | |
| PHYS 207 | General Physics | 4 |
| PHYS 202 | General Physics | 4[2] |
| or | | |
| PHYS 208 | General Physics | 4 |

***Mathematics and Statistics***

A minimum of 12 credits in mathematics and statistics. Specific requirements are:

| | | |
|---|---|---|
| MATH 221 | Calculus I | 3[1] |
| or | | |
| MATH 241 | Analytic Geometry and Calculus A | 4 |
| MATH 222 | Calculus II | 3[2] |
| or | | |
| MATH 242 | Analytic Geometry and Calculus B | 4 |
| STAT 201 | Introduction to Statistics I | 3 |
| or | | |
| MATH 243 | Analytic Geometry and Calculus C | 4 |
| Elective Mathematics or Statistics Course at the 200 level or above | | 3[2] |

## MAJOR REQUIREMENTS†

***Technical Sciences*** 18[1-3]

Eighteen credits that deal with the application of engineering science subject matter to include one course in each of the following areas: Electricity, Fluid Mechanics, Statics, and Thermodynamics.

Specific requirements are:

| | | |
|---|---|---|
| EGTE 218 | Fundamentals of Hydraulic Systems | 4[1] |
| EGTE 244 | Electricity for Engineering Technology | 4[2] |
| EGTE 311 | Fundamentals of Thermodynamics | 3[2] |
| EGTE 454 | Rural/Light Industrial Buildings | 4 |

In addition, a course must be selected from one of the following areas: Dynamics, Electronics, Materials Technology, or Strength of Materials. The course may be selected from the following:

| | | |
|---|---|---|
| EGTE 344 | Electronics and Microprocessors | 3 |
| EGTE 435 | Machinery Design and Development | 3 |

***Technical Skills‡*** 12[1-3]

Twelve credits selected to provide skills and knowledge of appropriate methods, procedures and techniques and may include computer use, graphics, problem solving, processes, construction techniques, instrumentation techniques, production methods, field operations, plant operations, safety and maintenance to include:

Required:

| | | |
|---|---|---|
| EGTE 109 | Technical Drafting | 2 |
| EGTE 111 | Computer Applications in Engineering Technology | 3 |
| EGTE 113 | Land Surveying | 2 |
| EGTE 209 | Computer Aided Drafting | 3 |

Elective:

| | | |
|---|---|---|
| EGTE 344 | Electronics and Microprocessors | 3 |
| or | | |
| EGTE 443 | Instrumentation | 3 |
| or | | |
| EGTE 444 | Programmable Logic Control Systems§ | 3[4] |

***Technical Specialization*** 22[2-4]

Twenty-two credits selected from courses that involve technical design and electives. At least one course that emphasizes use of the computer as a problem-solving tool will be required.

Specific requirements are:

| | | |
|---|---|---|
| EGTE 331 | Mechanical Power Units | 4[3] |
| EGTE 431 | Machine Systems for Agriculture | 4[4] |
| EGTE 321 | Storm Water Management | 4[3] |
| EGTE 445 | Food Engineering Technology | 4[4] |

and two of the following:

| | | |
|---|---|---|
| EGTE 328 | Agricultural Waste Management Systems | 3[3] |
| EGTE 421 | Soil and Water Management Systems | 4[4] |
| EGTE 440 | Plant Layout and Materials Handling | 3[4] |
| EGTE 443 | Instrumentation | 3[4] |
| EGTE 444 | Programmable Logic Control Systems§ | 3[4] |
| EGTE 456 | Fundamentals of HVAC | 3[4] |
| AGEG 628 | Land Application of Wastes | 3[4] |

***Technical Support*** 19

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

Specific requirement:

| | | |
|---|---|---|
| PCSC 204 | Introduction to Soil Science | 4[2-3] |

Select one of the following: 3[2-3]

| | | |
|---|---|---|
| ENTO 201 | Wildlife Conservation | 3 |
| FREC 201 | Records and Accounts | 3 |
| FOSC 201/211 | Food Principals and Lab | 2/1 |
| ANSC 101 | Introduction to Animal Science | 3 |
| FREC 408 | Research Methods | 3 |

The remaining twelve credits may be satisfied in part or in total by additional course work in the Agricultural Engineering department or closely related subject matter, a double major within the College of Agricultural Sciences or relevant University-approved minor.

To graduate with a major in Agricultural Engineering Technology, students must attain a 2.0 index in Agricultural Engineering Technology courses.

### Electives

***Electives*** 1-2[1-4]

After required courses, sufficient elective credits must be taken to meet the minimum number of 130 credits. May include Military Science, Music, or Physical Education. (Only four credits of activity-type Physical Education and/or four credits of performing Music organization credit may be counted toward the degree.)

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

## ENGINEERING TECHNOLOGY

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

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

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

‡Note the following guidelines for technical skills:

1. A *maximum* of thirty semester hours will be permitted in this category
2. Selection of courses must be consistent with specialization
3. A maximum of six hours of drafting and one course in Computer-Aided Drafting can be applied toward degree requirements.
4. A maximum of eight hours of surveying and topographic mapping can be applied toward degree requirements.
5. A maximum of six hours of construction, production and other techniques, methods or operations i.e., construction, operation and production techniques, can be applied toward degree requirements.
6. After matriculation in the program, course work will normally be limited to instrumentation and computer use.

§EGTE 444 may only be used to fullfill either a Technical Skills Elective or a Technical Specialization Elective, but not both.

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

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

## DEGREE: BACHELOR OF APPLIED SCIENCE
## MAJOR: ENGINEERING TECHNOLOGY

| CURRICULUM | | CREDITS* |
|---|---|---|
| **UNIVERSITY REQUIREMENTS** | | |
| ENGL 110 | Critical Reading and Writing** | 3 [1] |
| Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content # | | 3 [1-4] |
| **COLLEGE REQUIREMENTS** | | |
| ***Communications*** | | 6 [1-3] |
| Six credits selected to provide training in oral and written communications to include: | | |
| A second writing course selected from the following: | | |
| ENGL 301 | Expository Writing | 3 [3] |
| ENGL 302 | Advanced Composition | 3 |
| ENGL 307 | News Writing and Editing | 3 |
| ENGL 312 | Written Communications in Business | 3 |
| ENGL 410 | Technical Writing | 3 |
| An oral communications course selected from the following: | | |
| COMM 200 | Introduction to Human Communication Systems | 3 [3] |
| COMM 255 | Fundamentals of Communication | 3 |
| COMM 312 | Oral Communication in Business | 3 |
| COMM 350 | Public Speaking | 3 |
| COMM 356 | Small Group Communication | 3 |
| ***Social Sciences and Humanities*** | | 15 [1-4] |
| Fifteen credits selected to provide an appreciation and understanding of our cultural heritage, interpersonal relationships, interrelationships between technology and society and a value system for sound decision making to include: | | |
| ECON 151 | Introduction to Microeconomics | 3 |
| ECON 152 | Introduction to Macroeconomics | 3 |
| Nine credits to be selected from a minimum of three of the following areas: Anthropology, Art, Art History, Black American Studies, Criminal Justice, Economics, Education, English, Foreign Language, Geography, History, Music, Philosophy, Political Science, Psychology, Sociology, Theatre or Women's Studies. | | 9 |
| ***Basic Sciences and Mathematics*** | | 31 [1-3] |
| Thirty-one credits selected to provide fundamental knowledge about nature and its phenomena and mathematics including calculus as follows: | | |
| ***Biology, Chemistry and Physics*** | | |
| Biology/Life Science course | | 3 |
| CHEM 103 | General Chemistry | 4 [2] |
| CHEM 104 | General Chemistry | 4 [2] |
| PHYS 201 | General Physics | 4 [2] |
| or | | |
| PHYS 207 | General Physics | 4 |
| PHYS 202 | General Physics | 4 [2] |
| or | | |
| PHYS 208 | General Physics | 4 |
| ***Mathematics and Statistics*** | | |
| A minimum of 12 credits in mathematics and statistics. Specific requirements are: | | |
| MATH 221 | Calculus I | 3 [1] |
| or | | |
| MATH 241 | Analytic Geometry and Calculus A | 4 |
| MATH 222 | Calculus II | 3 [2] |
| or | | |
| MATH 242 | Analytic Geometry and Calculus B | 4 |
| STAT 201 | Introduction to Statistics I | 3 |
| or | | |
| MATH 243 | Analytic Geometry and Calculus C | 4 |
| Elective Mathematics or Statistics course at the 200 level or above | | 3 |
| **MAJOR REQUIREMENTS†** | | |
| ***Technical Sciences*** | | 18 [1-3] |
| Eighteen credits that deal with the application of engineering science subject matter to include one course in each of the following areas: Electricity, Fluid Mechanics, Statics, and Thermodynamics. In addition, a course must be selected from one of the following areas: Dynamics, Electronics, Materials Technology, or Strength of Materials. | | |
| ***Technical Skills‡*** | | 12-30 [1-3] |
| A maximum of thirty credits selected to provide skills and knowledge of appropriate methods, procedures and techniques and may include computer use, graphics, problem solving, processes, construction techniques, instrumentation techniques, production methods, field operations, plant operations, safety and maintenance to include: | | |
| Instrumentation or microprocessors course | | 3 |
| FREC 235 | Introduction to Data Analysis | 3 |
| EGTE 111 | Computer Applications in Engineering Technology | 3 |
| ***Technical Specialization*** | | 9 [2-4] |
| A minimum of nine credits selected from courses that involve technical design and electives. Students must complete at least 48 semester hours in course work assigned to technical science, technical skills and technical specialization categories. At least one course that emphasizes use of the computer as a problem-solving tool will be required and will be selected from: | | |
| EGTE 321 | Storm Water Management | 4 |
| EGTE 331 | Mechanical Power Units | 4 |
| EGTE 456 | Fundamentals of HVAC | 3 |
| EGTE 435 | Machinery Design and Development | 3 |
| ***Technical Management*** | | 15 [2-4] |
| A minimum of fifteen credits selected to enhance the ability to understand the operation and management of companies and/or their production units to include: | | |
| FREC 201 | Records and Accounts | 3 |
| or | | |
| ACCT 207 | Accounting I | 3 |
| ACCT 208 | Accounting II | 3 |
| Accounting credits cannot exceed six of the fifteen credit hours. FREC 201 will not substitute for ACCT 207. ACCT 207 will substitute for FREC 201. | | |
| **ELECTIVES** | | |
| After required courses, sufficient elective credits must be taken to meet the minimum number of 130 credits. May include Military Science, Music, or Physical Education. (Only four credits of activity-type Physical Education and/or four credits of performing Music organization credit may be counted toward the degree.) | | |
| **CREDITS TO TOTAL A MINIMUM OF** | | **130** |

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

*Superior figures indicate year or years in which the course is normally taken, i.e., [1]freshman year, [2]sophomore year, etc.
**Minimum grade of C- required.
#This requirement may be fulfilled through a course or courses taken to complete other degree requirements; it cannot be fulfilled by a course taken pass/fail. See page 23.
†A course may be applied toward both the major requirements and a college requirement, but credits are counted only once toward the total credits for graduation.
‡Note the following guidelines for technical skills:
1. A *maximum* of thirty semester hours will be permitted in this category.
2. Selection of courses must be consistent with specialization.
3. A maximum of six hours of drafting and one course in Computer-Aided Drafting can be applied toward degree requirements.
4. A maximum of eight hours of surveying and topographic mapping can be applied toward degree requirements.
5. A maximum of six hours of construction, production and other techniques, methods or operations i.e., construction, operation and production techniques, can be applied toward degree requirements.
6. After matriculation in the program, course work will normally be limited to instrumentation and computer use.

# ANIMAL SCIENCE AND AGRICULTURAL BIOCHEMISTRY

Animal Science 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. Students interested in veterinary medicine have the opportunity to obtain preveterinary training required for admission to a veterinary school. Students interested in pursuing graduate studies in the animal sciences are well prepared by available course work and laboratory experiences.

Students are encouraged to participate in a broad realm of research projects under study in the department through independent study/special problems courses. Department faculty foster student involvement in the University Honors Programs through sponsorship of Science and Engineering Scholars and candidates for the Degree with Distinction. The teaching philosophy of the department faculty is to emphasize basic knowledge pertaining to animal science.

The department offers four areas of concentration within the major: preveterinary medicine, agricultural biotechnology, applied animal science, and general animal science. Animal health, management, nutrition, molecular biology and physiology constitute areas in which the animal science student may wish to specialize.

A curriculum for each concentration follows. The preveterinary concentration is designed to meet not only the department, college, and University requirements for the B.S. degree, but also the admission requirements of most veterinary schools to which students apply.

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

| CURRICULUM | | CREDITS* |
|---|---|---|
| **UNIVERSITY REQUIREMENTS** | | |
| ENGL 110 | Critical Reading and Writing** | 3 [1] |
| Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content # | | 3 [1-4] |
| **COLLEGE REQUIREMENTS** | | |
| ***Mathematics and Computer Science*** | | |
| Mathematics course (MATH 115 or higher level) | | 3 [1] |
| Computer Science course selected from CISC 105, EGTE 111, FREC 235, or equivalent | | 3 [2] |
| ***Agricultural and Biological Sciences*** | | 9-12 [2,3] |
| Minimum of one course outside the student's major in three of the following areas: Food and Resources Economics, Food Science, Agricultural Engineering, Entomology and Applied Ecology, Plant and Soil Sciences, or Biology. | | |
| ***Literature and Arts*** | | 6 [2,3] |
| Six credits selected from the general areas of English, Art, Art History, Communication, Music, Theatre, or Foreign Language. | | |
| ***Social Sciences and Humanities*** | | 9 [2,3] |
| Minimum of one course in three of the following areas: Anthropology, Black American Studies, Criminal Justice, Economics, Education, Geography, History, Philosophy, Political Science, Psychology, Sociology, or Women's Studies. | | |
| ***Physical Sciences*** | | 8 [1] |
| Minimum of eight credits selected from one of the following areas: Chemistry, Physics, Geology, or Physical Science. | | |
| **MAJOR REQUIREMENTS** | | |
| **External to the College** | | |
| BISC 207 | Introductory Biology I | 4 [1] |
| BISC 208 | Introductory Biology II | 4 [1] |
| CHEM 101 | General Chemistry | 4 [1] |
| or | | |
| CHEM 103 | General Chemistry | 4 [1] |
| CHEM 102 | General Chemistry | 4 [1] |
| or | | |
| CHEM 104 | General Chemistry | 4 [1] |
| **Within the Department** | | |
| ANSC 101 | Introduction to Animal Science | 3 [1] |
| ANSC 111 | Animal Science Laboratory | 1 [1] |
| ANSC 140 | Functional Anatomy | 4 [1] |
| ANSC 251 | Livestock Nutrition and Feeding | 3 [2] |
| ANSC 300 | Principles of Animal and Plant Genetics | 3 [3] |
| ANSC 332 | Introduction to Animal Diseases | 3 [3] |
| ANSC 345 | Comparative Physiology of Domestic Animals | 4 [3] |
| ANSC 465 | Seminar | 1 [4] |
| One course must be selected from the following: | | |
| ANSC 404 | Dairy Production | 3 [3-4] |
| ANSC 417 | Beef Cattle and Sheep Production | 3 [3-4] |
| ANSC 418 | Swine Production | 3 [3-4] |
| ANSC 421 | Poultry Production | 3 [3-4] |
| Animal Science courses | | 5 [3] |

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

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

**Within the Concentration**

| | | |
|---|---|---|
| ANSC 310 | Animal Genetics Laboratory | 1 [3] |
| BISC 371 | Introduction to Microbiology | 4 [3] |
| CHEM 321 | Organic Chemistry | 3 [2] |
| CHEM 325 | Organic Chemistry Laboratory | 1 [2] |
| CHEM 322 | Organic Chemistry | 3 [2] |
| CHEM 326 | Organic Chemistry Laboratory | 1 [2] |
| CHEM 527 | Introductory Biochemistry or equivalent | 3 [4] |
| MATH 221 | Calculus | 3 [1] |
| PHYS 201 | General Physics | 4 [3] |
| PHYS 202 | General Physics | 4 [3] |
| **ELECTIVES** | | |
| ***Electives*** | | 30-33 |

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

***Recommended Electives***

| | | |
|---|---|---|
| FREC 201 | Records and Accounts | 3 [2-4] |
| ANSC 270 | Biotechnology: Science and Socioeconomic Issues | 3 [2] |
| ANSC 431 | Infection and Immunity in Animal Diseases | 4 [4] |
| ANSC 446 | Environmental Physiology of Domestic Animals | 4 [3-4] |
| ANSC 452 | Advanced Comparative Animal Nutrition | 4 [3-4] |
| ANSC 635 | Introduction to Virology | 3 [4] |
| COMM 312 | Oral Communication in Business | 3 [2] |
| ENGL 312 | Written Communications in Business | 3 [2-4] |
| FREC 408 | Research Methods | 3 [3-4] |

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

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

| CURRICULUM | | CREDITS* |
|---|---|---|
| **UNIVERSITY REQUIREMENTS** | | |
| ENGL 110 | Critical Reading and Writing** | 3 [1] |
| Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content # | | 3 [1-4] |
| **COLLEGE REQUIREMENTS** | | |
| ***Mathematics and Computer Science*** | | |
| Mathematics course (MATH 115 or higher level) | | 3 [1] |
| Computer Science course selected from CISC 105, EGTE 111, FREC 235, or equivalent | | 3 [2] |

*Superior figures indicate year or years in which the course is normally taken, i.e., [1]freshman year, [2]sophomore year, etc.
**Minimum grade of C- required.
#This requirement may be fulfilled through a course or courses taken to complete other degree requirements; it cannot be fulfilled by a course taken pass/fail. See page 23.

***Agricultural and Biological Sciences*** ..... 9-12 [2,3]
Minimum of one course outside the student's major in three of the following areas: Food and Resources Economics, Food Science, Agricultural Engineering, Entomology and Applied Ecology, Plant and Soil Sciences, or Biology.

***Literature and Arts*** ..... 6 [2,3]
Six credits selected from the general areas of English, Art, Art History, Communication, Music, Theatre, or Foreign Language.

***Social Sciences and Humanities*** ..... 9 [2,3]
Minimum of one course in three of the following areas: Anthropology, Black American Studies, Criminal Justice, Economics, Education, Geography, History, Philosophy, Political Science, Psychology, Sociology, or Women's Studies.

***Physical Sciences*** ..... 8 [1]
Minimum of eight credits selected from one of the following areas: Chemistry, Physics, Geology, or Physical Science.

## MAJOR REQUIREMENTS

### External to the College

BISC 207 Introductory Biology I ..... 4 [1]
BISC 208 Introductory Biology II ..... 4 [1]
CHEM 101 General Chemistry ..... 4 [1]
or
CHEM 103 General Chemistry ..... 4 [1]
CHEM 102 General Chemistry ..... 4 [1]
or
CHEM 104 General Chemistry ..... 4 [1]

### Within the Department

ANSC 101 Introduction to Animal Science ..... 3 [1]
ANSC 111 Animal Science Laboratory ..... 1 [1]
ANSC 140 Functional Anatomy ..... 4 [1]
ANSC 251 Livestock Nutrition and Feeding ..... 3 [2]
ANSC 300 Principles of Animal and Plant Genetics ..... 3 [3]
ANSC 332 Introduction to Animal Diseases ..... 3 [3]
ANSC 345 Comparative Physiology of Domestic Animals ..... 4 [3]
ANSC 465 Seminar ..... 1 [4]

One course must be selected from the following:
ANSC 404 Dairy Production ..... 3 [3-4]
ANSC 417 Beef Cattle and Sheep Production ..... 3 [3-4]
ANSC 418 Swine Production ..... 3 [3-4]
ANSC 421 Poultry Production ..... 3 [3-4]

Animal Science courses ..... 5 [3]

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

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

### Within the Concentration

ANSC 270 Biotechnology: Science and Socioeconomic Issues ..... 3 [2]
ANSC 310 Animal Genetics Laboratory ..... 1 [3]
ANSC 431 Infection and Immunity in Animal Diseases ..... 4 [4]
ANSC 466 Independent Study (Approved research project) ..... 3 [4]
ANSC 670 Molecular Genetics ..... 3 [4]
BISC 301 Molecular Biology of the Cell ..... 4 [2-3]
BISC 371 Introduction to Microbiology ..... 4 [2-3]
CHEM 321 Organic Chemistry ..... 3 [2]
CHEM 325 Organic Chemistry Laboratory ..... 1 [2]
CHEM 322 Organic Chemistry ..... 3 [2]
CHEM 326 Organic Chemistry Laboratory ..... 1 [2]
CHEM 527 Introductory Biochemistry ..... 3 [4]
or
CHEM 641 and CHEM 642 Biochemistry ..... 6 [4]
MATH 221 Calculus I ..... 3 [1]
PHYS 201 General Physics ..... 4 [3]
PHYS 202 General Physics ..... 4 [3]

Select a minimum of one course from the following:
ANSC 624 Monogastric Nutrition ..... 3 [4]
ANSC 633 Poultry Pathology ..... 3 [4]
ANSC 635 Introduction to Virology ..... 3 [4]
ANSC 643 Molecular Endocrinology ..... 3 [4]
ANSC 645 Avian Physiology ..... 4 [4]
ANSC 654 Ruminant Nutrition ..... 3 [4]

One additional course must be selected from the following:
BISC 601 Immunochemistry ..... 4 [4]
BISC 602 Molecular Biology of Animal Cells ..... 3 [4]
BISC 650 Bacterial Physiology ..... 3 [4]
BISC 653 Recent Advances in Molecular Biology ..... 3 [4]
BISC 654 Biochemical Genetics ..... 3 [4]
BISC 658 Developmental Genetics ..... 3 [4]
BISC 671 Immunobiology ..... 3 [4]
BISC 679 Virology ..... 3 [4]
BISC 693 Human Genetics ..... 3 [4]

## ELECTIVES

***Electives*** ..... 2-7
May include Military Science, Music, or Physical Education. (Only four credits of activity-type Physical Education and/or four credits of performing Music organization credit may be counted toward the degree.)

***Recommended Electives***

CHEM 220 Quantitative Analysis ..... 3 [2-4]
CHEM 418 Introductory Physical Chemistry ..... 3 [4]
COMM 350 Public Speaking ..... 3 [2]
ENGL 312 Written Communication in Business ..... 3 [2-4]
FOSC 439/639 Food Microbiology ..... 4 [4]
FOSC 449/649 Fermentation Technology ..... 4 [4]

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

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

CURRICULUM CREDITS*

## UNIVERSITY REQUIREMENTS

ENGL 110 Critical Reading and Writing** ..... 3 [1]
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content # ..... 3 [1-4]

## COLLEGE REQUIREMENTS

***Mathematics and Computer Science***
Mathematics course (MATH 115 or higher level) ..... 3 [1]
Computer Science course selected from CISC 105, EGTE 111, FREC 235, or equivalent ..... 3 [2]

***Agricultural and Biological Sciences*** ..... 9-12 [2,3]
Minimum of one course outside the student's major in three of the following areas: Food and Resources Economics, Food Science, Agricultural Engineering, Entomology and Applied Ecology, Plant and Soil Sciences, or Biology.

***Literature and Arts*** ..... 6 [2,3]
Six credits selected from the general areas of English, Art, Art History, Communication, Music, Theatre, or Foreign Language.

***Social Sciences and Humanities*** ..... 9 [2,3]
Minimum of one course in three of the following areas: Anthropology, Black American Studies, Criminal Justice, Economics, Education, Geography, History, Philosophy, Political Science, Psychology, Sociology, or Women's Studies.

***Physical Sciences*** ..... 8 [1]
Minimum of eight credits selected from one of the following areas: Chemistry, Physics, Geology, or Physical Science.

## MAJOR REQUIREMENTS

### External to the College

BISC 207 Introductory Biology I ..... 4 [1]
BISC 208 Introductory Biology II ..... 4 [1]
CHEM 101 General Chemistry ..... 4 [1]
or
CHEM 103 General Chemistry ..... 4 [1]
CHEM 102 General Chemistry ..... 4 [1]
or
CHEM 104 General Chemistry ..... 4 [1]

*Superior figures indicate year or years in which the course is normally taken, i.e., [1]freshman year, [2]sophomore year, etc.
**Minimum grade of C- required.
#This requirement may be fulfilled through a course or courses taken to complete other degree requirements; it cannot be fulfilled by a course taken pass/fail. See page 23.

### Within the Department

| | | |
|---|---|---|
| ANSC 101 | Introduction to Animal Science | 3[1] |
| ANSC 111 | Animal Science Laboratory | 1[1] |
| ANSC 140 | Functional Anatomy | 4[1] |
| ANSC 251 | Livestock Nutrition and Feeding | 3[2] |
| ANSC 300 | Principles of Animal and Plant Genetics | 3[3] |
| ANSC 332 | Introduction to Animal Diseases | 3[3] |
| ANSC 345 | Comparative Physiology of Domestic Animals | 4[3] |
| ANSC 465 | Seminar | 1[4] |

One course must be selected from the following:

| | | |
|---|---|---|
| ANSC 404 | Dairy Production | 3[3-4] |
| ANSC 417 | Beef Cattle and Sheep Production | 3[3-4] |
| ANSC 418 | Swine Production | 3[3-4] |
| ANSC 421 | Poultry Production | 3[3-4] |

Animal Science courses 5[3]

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

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

### Within the Concentration

| | | |
|---|---|---|
| FREC 120 | Elementary Agricultural Economics | 3[1] |
| FREC 201 | Records and Accounts | 3[2-3] |
| ANSC 201 | Behavior of Domestic Animals | 3 |
| ANSC 441 | Reproductive Physiology | 3[4] |
| ANSC 446 | Environmental Physiology of Domestic Animals | 4[4] |
| ANSC 452 | Advanced Comparative Animal Nutrition | 4[4] |
| CHEM 213 | Elementary Organic Chemistry | 4[2] |
| CHEM 214 | Elementary Biochemistry | 3[2] |
| CHEM 216 | Elementary Biochemistry Laboratory | 1[2] |
| ENTO 205 | Elements of Entomology | 3[2-3] |
| PLSC 151 | Introduction to Crop Science | 3[2-3] |
| PLSC 204 | Introduction to Soil Science | 3[2-3] |

Select a minimum of three courses from the following:

| | | |
|---|---|---|
| ANSC 404 | Dairy Production | 3[3-4] |
| ANSC 417 | Beef Cattle and Sheep Production | 3[3-4] |
| ANSC 418 | Swine Production | 3[3-4] |
| ANSC 420 | Equine Management | 3[3-4] |
| ANSC 421 | Poultry Production | 3[3-4] |

### ELECTIVES

***Electives*** 21-24

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

***Recommended Electives***

| | | |
|---|---|---|
| FREC 153 | Agricultural Salesmanship | 3[1-2] |
| FREC 350 | Farm Management | 3[3-4] |
| EGTE 328 | Agricultural Waste Management Systems | 3[3-4] |
| ANSC 270 | Biotechnology: Science and Socioeconomic Issues | 3[2] |
| ANSC 431 | Infection and Immunity in Animal Diseases | 4[4] |
| BISC 371 | Introduction to Microbiology | 4[3] |
| COMM 312 | Oral Communication in Business | 3[3] |
| ENGL 312 | Written Communications in Business | 3[2-4] |
| PLSC 401 | Agronomic Crop Science | 3[4] |

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

## DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE
## MAJOR: ANIMAL SCIENCE
## CONCENTRATION: GENERAL ANIMAL SCIENCE

CURRICULUM CREDITS*

### UNIVERSITY REQUIREMENTS

| | | |
|---|---|---|
| ENGL 110 | Critical Reading and Writing** | 3[1] |
| Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content # | | 3[1-4] |

### COLLEGE REQUIREMENTS

***Mathematics and Computer Science***

Mathematics course (MATH 115 or higher level) 3[1]

Computer Science course selected from CISC 105, EGTE 111, FREC 235, or equivalent 3[2]

***Agricultural and Biological Sciences*** 9-12[2,3]

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

***Literature and Arts*** 6[2,3]

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

***Social Sciences and Humanities*** 9[2,3]

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

***Physical Sciences*** 8[1]

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

### MAJOR REQUIREMENTS

### External to the College

| | | |
|---|---|---|
| BISC 207 | Introductory Biology I | 4[1] |
| BISC 208 | Introductory Biology II | 4[1] |
| CHEM 101 | General Chemistry | 4[1] |
| or | | |
| CHEM 103 | General Chemistry | 4[1] |
| CHEM 102 | General Chemistry | 4[1] |
| or | | |
| CHEM 104 | General Chemistry | 4[1] |

### Within the Department

| | | |
|---|---|---|
| ANSC 101 | Introduction to Animal Science | 3[1] |
| ANSC 111 | Animal Science Laboratory | 1[1] |
| ANSC 140 | Functional Anatomy | 4[1] |
| ANSC 251 | Livestock Nutrition and Feeding | 3[2] |
| ANSC 300 | Principles of Animal and Plant Genetics | 3[3] |
| ANSC 332 | Introduction to Animal Diseases | 3[3] |
| ANSC 345 | Comparative Physiology of Domestic Animals | 4[3] |
| ANSC 465 | Seminar | 1[4] |

One course must be selected from the following:

| | | |
|---|---|---|
| ANSC 404 | Dairy Production | 3[3-4] |
| ANSC 417 | Beef Cattle and Sheep Production | 3[3-4] |
| ANSC 418 | Swine Production | 3[3-4] |
| ANSC 421 | Poultry Production | 3[3-4] |

Animal Science courses 5[3]

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

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

### ELECTIVES

***Electives*** 58-61

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

***Recommended Electives***

| | | |
|---|---|---|
| FREC 201 | Records and Accounts | 3[2-3] |
| ANSC 270 | Biotechnology: Science and Socioeconomic Issues | 3[2] |
| ANSC 420 | Equine Management | 3[3-4] |
| BISC 371 | Introduction to Microbiology | 4[3] |
| COMM 350 | Public Speaking | 3[2] |
| ENGL 312 | Written Communications in Business | 3[2-4] |

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

## REQUIREMENTS FOR A MINOR IN ANIMAL SCIENCE

The minor in animal science requires 16-18 credits in animal science including the following: ANSC 101; 111; 251; 332; one course from ANSC 201, 431, 441, or 446; and one course from ANSC 404, 417, 418, 420, and 421.

*Superior figures indicate year or years in which the course is normally taken, i.e., [1]freshman year, [2]sophomore year, etc.
**Minimum grade of C- required.
#This requirement may be fulfilled through a course or courses taken to complete other degree requirements; it cannot be fulfilled by a course taken pass/fail. See page 23.

# ENTOMOLOGY AND APPLIED ECOLOGY

Entomology emphasizes the structure, physiology, behavior, development, ecology, classification, and control of insects. Applied ecology utilizes practical methods to manage interrelationships of organisms with each other and their nonliving environment. Pest management and wildlife conservation are examples of applied ecology.

Entomology is a separate field of biology because insects are the most varied and abundant animals on earth and because they are vitally important to humans. They profoundly influence ecosystems as prey, predators, parasites, and pollinators. The variety of insects challenges students to understand how insects tolerate environmental conditions, find food, reproduce, and grow. Insects are studied in many basic areas of biology such as ecology, behavior, physiology, genetics, and evolution. They are of increasing concern to conservation biology.

Some insects attack and damage plants, animals, structures, and stored products or transmit disease agents. Others pollinate plants or attack plants and animal pests. These factors have prompted a search for ways to manipulate insect populations. Heavy reliance on poisons to limit insect numbers has created new problems. Applied entomology now seeks practical, ecologically sound methods for insect population management.

Wildlife conservation is the effort to perpetuate free-living, breeding populations of non-domestic species. The biology of species and threats to their existence must be understood. This knowledge is used to design and execute plans to manage ecosystems or populations. Government develops and enforces conservation laws and regulations. Advocacy, education, and mass communication also are part of wildlife conservation.

The Department offers two concentrations in the major. Students can focus their biological interest on insects in the *General Entomology Concentration*. This program requires basic sciences as well as specialty courses on insects. Some flexibility in insect, plant science, and biology courses permits students to emphasize pest management or insect biology. The *Wildlife Conservation Concentration* is for students with interests in the biological aspects of environmental science, e.g., conservation, wildlife biology, or ecology. It requires basic sciences, specialty courses in vertebrates, insects, plants, and conservation and other supporting courses. The curriculum's flexibility accommodates career goals ranging from research to nature education, conservation advocacy and wildlife management.

Faculty teach and conduct research. Students are often involved in aspects of these research programs. The faculty strive to cultivate inquiring attitudes and problem-solving skills in students and emphasize study in biology and other sciences. Students are encouraged to be broadly educated through exposure to the social sciences, humanities, and arts and to develop good writing and speaking skills. The department prepares students for knowledgeable participation in society whether or not they ultimately choose a career in entomology or wildlife conservation.

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

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

| CURRICULUM | | CREDITS* |
|---|---|---|
| **UNIVERSITY REQUIREMENTS** | | |
| ENGL 110 | Critical Reading and Writing** | 3 [1] |
| Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content # | | 3 [1-4] |
| **COLLEGE REQUIREMENTS** | | |
| ***Mathematics and Computer Science*** | | |
| Mathematics course (MATH 115, 171 or higher level) | | 3 [1] |
| Computer Science course selected from CISC 105, EGTE 111, FREC 235, or equivalent | | 3 [1] |
| ***Agricultural and Biological Sciences*** | | 9-12 [1-3] |
| Minimum of one course outside the student's major in three of the following areas: Food and Resource Economics, Food Science, Agricultural Engineering, Animal Science, Plant and Soil Sciences, or Biology. | | |
| ***Literature and Arts*** | | 6 [1-3] |
| Six credits selected from the general areas of English, Art, Art History, Communication, Music, Theatre, or Foreign Language | | |
| ***Social Sciences and Humanities*** | | 9 [1-3] |
| Minimum of one course in three of the following areas: Anthropology, Black American Studies, Criminal Justice, Economics, Education, Geography, History, Philosophy, Political Science, Psychology, Sociology, or Women's Studies. | | |
| ***Physical Sciences*** | | 8 [1] |
| Minimum of eight credits selected from one of the following areas: Chemistry, Physics, Geology, or Physical Science. | | |
| **MAJOR REQUIREMENTS†** | | |
| **Within or External to the College** | | |
| AGRI 211 | Literature of Agricultural and Life Sciences | 1 [1,2] |
| BISC 207 | Introductory Biology I | 4 [1,2] |
| BISC 208 | Introductory Biology II | 4 [1,2] |
| BISC 302 | General Ecology | 3 [3] |
| CHEM 101 | General Chemistry | 4 [1] |
| or | | |
| CHEM 103 | General Chemistry | 4 [1] |
| CHEM 102 | General Chemistry | 4 [1] |
| or | | |
| CHEM 104 | General Chemistry | 4 [1] |
| Nine credits from the following: | | 9 [3,4] |
| Biology (BISC) courses at or above 300 level and the following PLSC courses: | | |
| PLSC 151 | Introduction to Crop Science | 3 |
| PLSC 201 | Botany II | 4 |
| PLSC 204 | Introduction to Soil Science | 4 |
| PLSC 211 | Herbaceous Landscape Plants | 3 |
| PLSC 212 | Woody Landscape Plants | 4 |
| PLSC 303 | Introductory Plant Pathology | 4 |
| PLSC 402 | Plant Taxonomy | 3 |
| **Within the Department*** ** | | |
| ENTO 205 | Elements of Entomology | 3 [1] |
| ENTO 305 | Entomology Laboratory | 2 [1,2] |
| ENTO 406 | Insect Identification—Taxonomy | 3 [2,3] |
| ENTO 465 | Seminar | 1 [4] |
| **Within the Concentration*** ** | | |
| ENTO 300 | Principles of Animal and Plant Genetics | 3 [3,4] |
| ENTO 405 | Insect Structure and Function | 4 [4] |
| ENTO 408 | Field Taxonomy | 2 [3,4] |
| ENTO courses (may include 3 credits maximum of Independent Study, Research, and Field Experience.) | | 6 [2-4] |
| **ELECTIVES** | | |
| ***Electives*** | | 30 [2-4] |
| May include Military Science, Music, or Physical Education. (Only two | | |

*Superior figures indicate year or years in which the course is normally taken, i.e., [1]freshman year, [2]sophomore year, etc.
**Minimum grade of C- required.
#This requirement may be fulfilled through a course or courses taken to complete other degree requirements; it cannot be fulfilled by a course taken pass/fail. See page 23
†A course may be applied toward both the major requirement and a college requirement, but credits are counted only once toward the total credits for graduation.
***A grade of C or better is required for all ENTO credits used to satisfy departmental requirements.

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

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

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

| CURRICULUM | | CREDITS* |
|---|---|---|
| **UNIVERSITY REQUIREMENTS** | | |
| ENGL 110 | Critical Reading and Writing** | 3 [1] |
| Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content # | | 3 [1-4] |
| **COLLEGE REQUIREMENTS** | | |
| ***Mathematics and Computer Science*** | | |
| Mathematics course (MATH 115, 171 or higher level) | | 3 [1] |
| Computer Science course selected from CISC 105, EGTE 111, FREC 235, or equivalent | | 3 [1] |
| ***Agricultural and Biological Sciences*** | | 9-12 [1,3] |
| Minimum of one course outside the student's major in three of the following areas: Animal Science, Food and Resource Economics, Food Science, Agricultural Engineering, Plant and Soil Science or Biology. | | |
| ***Literature and Arts*** | | 6 [1-3] |
| Six credits selected from the general areas of English, Art, Art History, Communication, Music, Theatre, or Foreign Language. | | |
| ***Social Sciences and Humanities*** | | 9 [1-3] |
| Minimum of one course in three of the following areas: Anthropology, Black American Studies, Criminal Justice, Economics, Education, Geography, History, Philosophy, Political Science, Psychology, Sociology, or Women's Studies. | | |
| ***Physical Sciences*** | | 8 [1] |
| Minimum of eight credits selected from one of the following areas: Chemistry, Physics, Geology, or Physical Science. | | |
| **MAJOR REQUIREMENTS†** | | |
| **Within or External to the College** | | |
| AGRI 211 | Literature of Agricultural and Life Sciences | 1 [1,2] |
| BISC 207 | Introductory Biology I | 4 [1,2] |
| BISC 208 | Introductory Biology II | 4 [1,2] |
| BISC 302 | General Ecology | 3 [3] |
| CHEM 101 | General Chemistry | 4 [1] |
| or | | |
| CHEM 103 | General Chemistry | 4 [1] |
| CHEM 102 | General Chemistry | 4 [1] |
| or | | |
| CHEM 104 | General Chemistry | 4 [1] |
| **Within the Department*** ** | | |
| ENTO 205 | Elements of Entomology | 3 [1,2] |
| ENTO 305 | Entomology Laboratory | 2 [1,2] |
| ENTO 406 | Insect Identification—Taxonomy | 3 [2,3] |
| ENTO 465 | Seminar | 1 [4] |
| **Within the Concentration*** ** | | |
| ENTO 201 | Wildlife Conservation and Ecology | 3 [1,2] |
| ENTO 325 | Wildlife Management | 3 [2,3] |
| ENTO 318 | Taxonomy of Birds | 2 [2,3] |
| ENTO 418 | Avian Biology | 2 [3,4] |
| ENTO 425 | Mammalogy | 3 [3,4] |
| ENTO courses (may include 3 credits maximum of Independent Study, Research, and Field Experience) | | 5 [2-4] |

**GROUP I** — 8 credits from the following (or higher levels of CHEM and PHYS):

| | | |
|---|---|---|
| CHEM 213 | Elementary Organic Chemistry | 4 [2,3] |
| CHEM 214 | Elementary Biochemistry | 3 [2,3] |
| CHEM 216 | Elementary Biochemistry Laboratory | 1 [2,3] |
| GEOG 206 | Physical Geography: Topography-Soils | 3 [2-4] |
| GEOL 107 | General Geology | 4 [2-4] |
| PHYS 201 | General Physics | 4 [2-4] |
| PHYS 202 | General Physics | 4 [2-4] |
| PLSC 204 | Introduction to Soil Science | 4 [2-4] |

**GROUP II** — 8 credits from the following:

| | | |
|---|---|---|
| ANSC 140 | Functional Anatomy of Domestic Animals | 4 [2-4] |
| BISC 301 | Molecular Biology of the Cell | 4 [3,4] |
| BISC 303 | Genetic and Evolutionary Biology | 4 [3,4] |
| BISC 305 | Cell Biology | 4 [3,4] |
| BISC 306 | General Physiology | 4 [3,4] |
| BISC 312 | General Ecology Lab | 1 [3,4] |
| BISC 324 | Invertebrate Zoology | 4 [3,4] |
| BISC 371 | Introduction to Microbiology | 4 [2-4] |
| BISC 442 | Vertebrate Morphology | 4 [3,4] |
| BISC 494 | Experimental Ecology | 3 [3,4] |
| BISC 495 | Evolution | 3 [3,4] |
| BISC 680 | Vertebrate Natural History | 4 [4] |
| ENTO 300 | Principles of Animal and Plant Genetics | 3 [3,4] |
| ENTO 310 | Animal and Plant Genetics Laboratory | 1 [3,4] |
| (same as PLSC 300, 310; may not count for both Group II and III) | | |

**GROUP III** — 6 credits from the following:

| | | |
|---|---|---|
| BISC 440 | Natural History of Plants | 4 [3,4] |
| PLSC 101 | Botany I | 4 [2,3] |
| PLSC 201 | Botany II | 4 [2,3] |
| PLSC 300 | Principles of Animal and Plant Genetics | 3 [3,4] |
| PLSC 310 | Animal and Plant Genetics Lab | 1 [3,4] |
| (same as ENTO 300, 310; may not count for both Group II and III) | | |
| PLSC 402 | Plant Taxonomy | 3 [3,4] |
| PLSC 410 | Introduction to Plant Physiology | 3 [3,4] |

**GROUP IV** — 6 credits from the following:

Only 3 may count toward the College Literature and Arts Group Requirement.

| | | |
|---|---|---|
| COMM 255 | Fundamentals of Communication | 3 [2-4] |
| COMM 312 | Oral Communication in Business | 3 [2-4] |
| COMM 350 | Public Speaking | 3 [2-4] |
| ENGL 301 | Expository Writing | 3 [2-4] |
| ENGL 307 | News Writing and Editing | 3 [2-4] |
| ENGL 309 | Feature and Magazine Writing | 3 [2-4] |
| ENGL 312 | Written Communications in Business | 3 [2-4] |
| ENGL 410 | Technical Writing | 3 [3,4] |
| THEA 102 | Introduction to Performance | 3 [2-4] |
| THEA 204 | Introduction to Voice and Speech | 3 [2-4] |
| THEA 220 | Movement and Non-Verbal Communication I | 3 [2-4] |

**GROUP V** — 6 credits from the following or higher-levels in addition to college math and computer requirements:

| | | |
|---|---|---|
| AGEG 111 | Computer Applications in Engineering Technology | 3 [2-4] |
| or | | |
| CISC 105 | General Computer Science | 3 [2-4] |
| or | | |
| GEOG 250 | Computer Methods in Geography | 4 [2-4] |
| FREC 408 | Research Methods | 3 [3,4] |
| MATH 221 | Calculus I | 3 [1-3] |
| MATH 222 | Calculus II | 3 [2,3] |
| MATH 230 | Finite Mathematics with Applications | 3 [3,4] |
| STAT 201 | Introduction to Statistics I | 3 [3,4] |
| STAT 202 | Introduction to Statistics II | 3 [3,4] |

**GROUP VI** — 6 credits from the following:

| | | |
|---|---|---|
| ECON 151 | Introduction to Microeconomics | 3 [2-4] |
| or | | |
| FREC 120 | Elementary Agricultural Economics | 3 [1,2] |
| (Either of two previous courses is prerequisite to FREC 424, 444) | | |
| FREC 424 | Resource Economics: Theory and Policy | 3 [4] |
| FREC 444 | Economics of Environmental Management | 3 [4] |
| GEOL 234 | Earth Resources and Ecology | 3 [2-4] |
| GEOL 421 | Environmental and Applied Geology | 3 [3,4] |
| GEOG 235 | Conservation of Natural Resources | 3 [2-4] |
| GEOG 236 | Conservation: Global Issues | 3 [2-4] |
| POSC 105 | The American Political System | 3 [1-4] |

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

**Minimum grade of C- required.

#This requirement may be fulfilled through a course or courses taken to complete other degree requirements; it cannot be fulfilled by a course taken pass/fail. See page 23

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

***A grade of C or better is required for all ENTO credits used to satisfy departmental requirements.

| | | |
|---|---|---|
| POSC 220 | Introduction to Public Policy | 3 [2-4] |
| POSC 350 | Politics and the Environment | 3 [2-4] |
| SOCI 210 | Population Problems | 3 [2-4] |

**ELECTIVES**

***Electives*** ..... 12-24

Number of elective credits depends on number of courses chosen for concentration groups that also satisfy college requirements. May include Military Science, Music, or Physical Education. (Only four credits of activity-type Physical Education and/or four credits of performing Music organization credit may be counted toward the degree.)

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

Students should complete their programs with electives that broaden their views of the world and strengthen their preparation for a career. Organic chemistry, biochemistry, statistics, and additional writing courses are strongly recommended. A list of suggested courses and other information is available in the department office. Course selection should be made in consultation with the academic adviser during the preregistration period of each term.

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

## REQUIREMENTS FOR A MINOR IN ENTOMOLOGY

The minor in entomology requires 15 credits of courses with an ENTO prefix, including: ENTO 205, 305, and 406. A student may emphasize general entomology or wildlife conservation by proper choice of ENTO courses for the remaining 7 credits. A minimum grade of C is required in all courses counting toward the minor. Credits for Special Problem, Independent Study, Research, and Field Experience do not count toward the minor.

## ENTOMOLOGY/PLANT PATHOLOGY

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

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

## DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE
## MAJOR: ENTOMOLOGY/PLANT PATHOLOGY

CURRICULUM — CREDITS*

**UNIVERSITY REQUIREMENTS**

| | | |
|---|---|---|
| ENGL 110 | Critical Reading and Writing** | 3 [1] |
| Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content.# | | 3 [1-4] |

**COLLEGE REQUIREMENTS**

***Mathematics and Computer Science***

| | |
|---|---|
| Mathematics course (MATH 115 or higher level) | 3 [1] |
| Computer Science course selected from CISC 105, EGTE 111, FREC 235, or equivalent | 3 [2] |

***Agricultural and Biological Sciences*** ..... 9-12 [1-3]

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

***Literature and Arts*** ..... 6 [1-3]

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

***Social Sciences and Humanities*** ..... 9 [1-3]

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

***Physical Sciences*** ..... 8 [1]

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

**MAJOR REQUIREMENTS**

**External to the College**

| | | |
|---|---|---|
| BISC 207 | Introductory Biology I | 4 [3] |
| BISC 208 | Introductory Biology II | 4 [3] |
| CHEM 101 | General Chemistry | 4 [2] |
| or | | |
| CHEM 103 | General Chemistry | 4 |
| CHEM 102 | General Chemistry | 4 [2] |
| or | | |
| CHEM 104 | General Chemistry | 4 |

**Within the College**

| | | |
|---|---|---|
| AGRI 211 | Literature of the Agricultural and Life Sciences | 1 [2] |

**Within the Departments**

| | | |
|---|---|---|
| ENTO 205 | Elements of Entomology | 3 [1] |
| ENTO 305 | Entomology Laboratory | 2 [2] |
| ENTO 406 | Insect Identification—Taxonomy | 3 [3,4] |
| ENTO 408 | Field Taxonomy | 2 [3,4] |
| ENTO 411 | Economic Entomology | 3 [3,4] |
| ENTO 465 | Seminar | 1 [4] |
| PLSC 101 | Botany I | 4 [1] |
| PLSC 201 | Botany II | 4 [1] |
| PLSC 303 | Introductory Plant Pathology | 4 [3] |
| PLSC 411 | Diagnostic Plant Pathology | 2 [4] |
| PLSC 412 | Diagnostic Plant Pathology Laboratory | 1-6 [4] |
| Sixteen credits from Entomology and Applied Ecology and/or Plant Science (may include 3 credits maximum of Independent Study, Research and Field Experience.) | | 16 [3] |

**ELECTIVES**

***Electives*** ..... 26-29 [2-4]

Courses in Agriculture, Biology, and the Physical Sciences are recommended. (Only two credits of activity-type Physical Education and/or two credits of performing Music organization credit may be counted toward the degree.)

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

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

The curriculum will prepare the student for graduate study in entomology, plant pathology or related areas or direct entry into vari-

*Superior figures indicate year or years in which the course is normally taken, i.e., [1]freshman year, [2]sophomore year, etc.
**Minimum grade of C- required.
#This requirement may be fulfilled through a course or courses taken to complete other degree requirements; it cannot be fulfilled by a course taken pass/fail. See page 23.

ous agricultural industries, research, or government service where pest management and plant protection are important. For federal employment, a student must have 16 credits in entomology to qualify for a GS-5 rating as an entomologist. To qualify as a GS-5 as a plant pathologist, a student must have 10 plant pathology credits and 20 credits in basic botany or plant science.

## FOOD AND RESOURCE ECONOMICS

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

Two major programs are offered: (a) agricultural business management and (b) agricultural economics. The curricula differ in the amount of emphasis given to agricultural production, business and economics. Both curricula qualify the student for graduate work.

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

The curriculum in agricultural economics emphasizes resource and environmental economics, production economics and agricultural marketing, and provides a solid foundation in economics and business. It prepares the student to work in the fields of agriculture, government, teaching, extension and research. Two concentrations are offered as part of the agricultural economics major: production and management, and resource economics and rural development.

### DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE MAJOR: AGRICULTURAL BUSINESS MANAGEMENT

| CURRICULUM | CREDITS* |
|---|---|
| **UNIVERSITY REQUIREMENTS** | |
| ENGL 110 Critical Reading and Writing** | 3 [1] |
| Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content # | 3 [1-4] |
| **COLLEGE REQUIREMENTS** | |
| ***Mathematics and Computer Science*** | |
| Mathematics course (MATH 115 or higher level)† | 3 [1] |
| Computer Science course (FREC 235 or equivalent) | 3 [1] |
| ***Agricultural and Biological Sciences*** | 9-12 [1,2] |
| Minimum of one course outside the student's major in three of the following areas: Food and Resource Economics, Food Science, Agricultural Engineering, Animal Science, Entomology and Applied Ecology, Plant and Soil Sciences, or Biology. | |
| ***Literature and Arts*** | 6 [2] |
| Six credits selected from the general areas of English, Art, Art History, Communication, Music, Theatre, or Foreign Language. | |
| ***Social Sciences and Humanities*** | 9 [2] |
| Minimum of one course in three of the following areas: Anthropology, Black American Studies, Criminal Justice, Economics, Education, Geography, History, Philosophy, Political Science, Psychology, Sociology, or Women's Studies. | |
| ***Physical Sciences*** | 8 [1] |
| Minimum of eight credits selected from one of the following areas: Chemistry, Physics, Geology, or Physical Science. | |
| **MAJOR REQUIREMENTS** | |
| **External to the College** | |
| ACCT 207 Accounting I | 3 [3] |
| ACCT 208 Accounting II | 3 [3] |
| COMM 312 Oral Communication in Business | 3 [4] |
| ENGL 312 Written Communications in Business | 3 [3] |
| ECON 151 Introduction to Microeconomics | 3 [3] |
| ECON 152 Introduction to Macroeconomics | 3 [3] |
| BUAD 301 Introduction to Marketing | 3 [3,4] |
| Two additional courses offered by the College of Business and Economics. | 6 [3,4] |
| **Within the Department** | |
| FREC 120 Elementary Agricultural Economics | 3 [1] |
| FREC 125 Elementary Agricultural Economics: Applications | 1 [1] |
| FREC 235 Introduction to Data Analysis | 3 [1] |
| FREC 240 Quantitative Methods in Agricultural Economics | 3 [2] |
| FREC 465 Seminar | 1 [4] |
| Seven courses at the 400 level or above with at least two in each of the following general areas: | |
| 1. Marketing/International Trade | |
| FREC 404 Food Marketing | 3 [3,4] |
| FREC 410 International Agricultural Trade | 3 [3,4] |
| FREC 441 Futures Markets in Agriculture | 4 [3,4] |
| 2. Production/Management | |
| FREC 403 Production Economics | 3 [3,4] |
| FREC 406 Agricultural Policy | 3 [3,4] |
| FREC 408 Research Methods | 3 [3,4] |
| FREC 427 Agricultural Finance | 3 [3,4] |
| 3. Resources/Development | |
| FREC 420 Agriculture in Economic Development | 3 [3,4] |
| FREC 424 Resource Economics Theory and Policy | 3 [3,4] |
| FREC 429 Rural Development Theory and Policy | 3 [3,4] |
| FREC 444 Economics of Environmental Management | 3 [3,4] |
| FREC 405, FREC 435, FREC 630, and Independent Study may not be counted in the seven courses. | |
| A maximum of three credits of Independent Study in Food and Resource Economics and a maximum of six credits of Independent Study in all areas, including Food and Resource Economics, may be counted toward a degree. | |
| **ELECTIVES** | |
| ***Electives*** | 32-36 [1-4] |
| May include Military Science, Music, or Physical Education. (Only four credits of activity-type Physical Education and/or four credits of performing Music organization credit may be counted toward the degree.) | |
| **CREDITS TO TOTAL A MINIMUM OF** | **130** |

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

| CURRICULUM | CREDITS* |
|---|---|
| **UNIVERSITY REQUIREMENTS** | |
| ENGL 110 Critical Reading and Writing** | 3 [1] |
| Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content # | 3 [1-4] |
| **COLLEGE REQUIREMENTS** | |
| ***Mathematics and Computer Science*** | |
| Mathematics course (MATH 115 or higher level)† | 3 [1] |
| Computer Science course (FREC 235 or equivalent) | 3 [1] |

*Superior figures indicate year or years in which the course is normally taken, i.e., [1]freshman year, [2]sophomore year, etc.
**Minimum grade of C- required.
#This requirement may be fulfilled through a course or courses taken to complete other degree requirements; it cannot be fulfilled by a course taken pass/fail: See page 23.
†MATH 221, MATH 230 and STAT 201 are strongly suggested.

***Agricultural and Biological Sciences*** ..... 9-12 [1,2]
Minimum of one course outside the student's major in three of the following areas: Food and Resource Economics, Food Science, Agricultural Engineering, Animal Science, Entomology and Applied Ecology, Plant and Soil Sciences, or Biology.

***Literature and Arts*** ..... 6 [2]
Six credits selected from the general areas of English, Art, Art History, Communication, Music, Theatre, or Foreign Language.

***Social Sciences and Humanities*** ..... 9 [2]
Minimum of one course in three of the following areas: Anthropology, Black American Studies, Criminal Justice, Economics, Education, Geography, History, Philosophy, Political Science, Psychology, Sociology, or Women's Studies.

***Physical Sciences*** ..... 8 [1]
Minimum of eight credits selected from one of the following areas: Chemistry, Physics, Geology, or Physical Science.

## MAJOR REQUIREMENTS

### External to the College

| | | |
|---|---|---|
| ACCT 207 | Accounting I | 3 [3] |
| ACCT 208 | Accounting II | 3 [3] |
| COMM 312 | Oral Communication in Business | 3 [4] |
| ENGL 312 | Written Communications in Business | 3 [3] |
| ECON 151 | Introduction to Microeconomics | 3 [3] |
| ECON 152 | Introduction to Macroeconomics | 3 [3] |
| BUAD 301 | Introduction to Marketing | 3 [3,4] |
| Two additional courses offered by the College of Business and Economics | | 6 [3,4] |

### Within the Department

| | | |
|---|---|---|
| FREC 120 | Elementary Agricultural Economics | 3 [1] |
| FREC 125 | Elementary Agricultural Economics: Applications | 1 [1] |
| FREC 235 | Introduction to Data Analysis | 3 [1] |
| FREC 240 | Quantitative Methods in Agricultural Economics | 3 [2] |
| FREC 465 | Seminar | 1 [4] |

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

1. Marketing/International Trade

| | | |
|---|---|---|
| FREC 404 | Food Marketing | 3 [3,4] |
| FREC 410 | International Agricultural Trade | 3 [3,4] |
| FREC 441 | Futures Markets in Agriculture | 4 [3,4] |

2. Production/Management

| | | |
|---|---|---|
| FREC 403 | Production Economics | 3 [3,4] |
| FREC 406 | Agricultural Policy | 3 [3,4] |
| FREC 408 | Research Methods | 3 [3,4] |
| FREC 427 | Agricultural Finance | 3 [3,4] |

3. Resources/Development

| | | |
|---|---|---|
| FREC 420 | Agriculture in Economic Development | 3 [3,4] |
| FREC 424 | Resource Economics Theory and Policy | 3 [3,4] |
| FREC 429 | Rural Development Theory and Policy | 3 [3,4] |
| FREC 444 | Economics of Environmental Management | 3 [3,4] |

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

The requirement for the major in Agricultural Business management must be met. The following department courses are required for the concentration and may also be used to meet the area requirements for the Agricultural Business Management major:

| | | |
|---|---|---|
| FREC 404 | Food Marketing | 3 |
| FREC 408 | Research Methods | 3 |
| FREC 410 | International Agricultural Trade | 3 |
| FREC 427 | Agricultural Finance | 3 |
| FREC 441 | Futures Markets in Agriculture | 4 |

In addition, the following courses are required:

| | | |
|---|---|---|
| FREC 405 | Food Marketing Management | 3 |

Three Business Administration courses at the 300 or 400 level in marketing related areas. These are in addition to BUAD 301–Introduction to Marketing and the two additional Business and Economics courses required by the Agricultural Business Management major.

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

## ELECTIVES

***Electives***
After required courses are completed, sufficient elective credits must be taken to meet the minimum credit requirement for the degree. May include Military Science, Music, or Physical Education. (Only four credits of activity-type Physical Education and/or four credits of performing Music organization credit may be counted toward the degree.)

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

## REQUIREMENTS FOR A MINOR IN AGRICULTURAL BUSINESS MANAGEMENT/AGRICULTURAL ECONOMICS

The minor in Agricultural Business Management/ Agricultural Economics requires 18 credits of courses with the FREC prefix including FREC 120 and FREC 201. Four additional courses are required including at least one course from each of the following three areas:

| CURRICULUM | | CREDITS |
|---|---|---|
| **1. Marketing/International Trade** | | |
| FREC 312 | Food Retailing and Wholesaling | 3 |
| FREC 404 | Food Marketing | 3 |
| FREC 410 | International Agricultural Trade | 3 |
| FREC 441 | Futures Markets in Agriculture | 4 |
| **2. Production/Management** | | |
| FREC 350 | Farm Management | 3 |
| FREC 403 | Agricultural Production Economics | 3 |
| FREC 406 | Agricultural Policy | 3 |
| FREC 408 | Research Methods | 3 |
| FREC 427 | Agricultural Finance | 3 |
| **3. Resource/Development** | | |
| FREC 420 | Agriculture in Economic Development | 3 |
| FREC 424 | Resource Economics: Theory and Policy | 3 |
| FREC 429 | Rural Economic Development Theory and Policy | 3 |
| FREC 444 | Economics of Environmental Management | 3 |

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

## DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE
## MAJOR: AGRICULTURAL ECONOMICS

| CURRICULUM | | CREDITS* |
|---|---|---|
| **UNIVERSITY REQUIREMENTS** | | |
| ENGL 110 | Critical Reading and Writing** | 3 [1] |
| Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content # | | 3 [1-4] |
| **COLLEGE REQUIREMENTS** | | |
| ***Mathematics and Computer Science*** | | |
| Mathematics course (MATH 115 or higher level)† | | 3 [1] |
| Computer Science course (FREC 235 or equivalent) | | 3 [1] |
| ***Agricultural and Biological Sciences*** | | 9-12 [1,2] |
| Minimum of one course outside the student's major in three of the following areas: Food and Resource Economics, Food Science, Agricultural Engineering, Animal Science, Entomology and Applied Ecology, Plant and Soil Sciences, or Biology. | | |
| ***Literature and Arts*** | | 6 [2] |
| Six credits selected from the general areas of English, Art, Art History, Communication, Music, Theatre, or Foreign Language. | | |
| ***Social Sciences and Humanities*** | | 9 [2] |
| Minimum of one course in three of the following areas: Anthropology, Black American Studies, Criminal Justice, Economics, Education, Geography, History, Philosophy, Political Science, Psychology, Sociology, or Women's Studies. | | |

*Superior figures indicate year or years in which the course is normally taken, i e , [1]freshman year, [2]sophomore year, etc.
**Minimum grade of C- required.
#This requirement may be fulfilled through a course or courses taken to complete other degree requirements; it cannot be fulfilled by a course taken pass/fail. See page 23
†MATH 221, MATH 230 and STAT 201 are strongly suggested.

***Physical Sciences*** ..... 8 [1,2]
Minimum of eight credits selected from one of the following areas: Chemistry, Physics, Geology, or Physical Science

**MAJOR REQUIREMENTS**

**External to the College**

| | | |
|---|---|---|
| COMM 312 | Oral Communication in Business | 3 [4] |
| ENGL 312 | Written Communications in Business | 3 [3] |
| ECON 151 | Introduction to Microeconomics | 3 [3] |
| ECON 152 | Introduction to Macroeconomics | 3 [3] |
| ECON 302 | Money, Credit and Banking | 3 [3,4] |
| ECON 300 | Intermediate Microeconomic Theory | 3 [3,4] |
| ECON 303 | Intermediate Macroeconomic Theory | 3 [3,4] |
| Two additional courses offered by the College of Business and Economics at the 300 level or higher ‡ | | 6 [3,4] |

**Within the Department**

| | | |
|---|---|---|
| FREC 120 | Elementary Agricultural Economics | 3 [1] |
| FREC 125 | Elementary Agricultural Economics: Applications | 1 [1] |
| FREC 201 | Records and Accounts | 3 [2] |
| FREC 235 | Introduction to Data Analysis | 3 [1] |
| FREC 240 | Quantitative Methods in Agricultural Economics | 3 [2] |
| FREC 465 | Seminar | 1 [4] |

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

1. Marketing/International Trade

| | | |
|---|---|---|
| FREC 404 | Food Marketing | 3 [3,4] |
| FREC 410 | International Agricultural Trade | 3 [3,4] |
| FREC 441 | Futures Markets in Agriculture | 4 [3,4] |

2. Production/Management

| | | |
|---|---|---|
| FREC 403 | Production Economics | 3 [3,4] |
| FREC 406 | Agricultural Policy | 3 [3,4] |
| FREC 408 | Research Methods | 3 [3,4] |
| FREC 427 | Agricultural Finance | 3 [3,4] |

3. Resources/Development

| | | |
|---|---|---|
| FREC 420 | Agriculture in Economic Development | 3 [3,4] |
| FREC 424 | Resource Economics–Theory and Policy | 3 [3,4] |
| FREC 429 | Rural Economic Development–Theory and Policy | 3 [3,4] |
| FREC 444 | Economics of Environmental Management | 3 [3,4] |

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

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

**ELECTIVES**

***Electives*** ..... 29-33 [1-4]
May include Military Science, Music, or Physical Education. (Only four credits of activity-type Physical Education and/or four credits of performing Music organization credit may be counted toward the degree.)

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

## DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE
## MAJOR: AGRICULTURAL ECONOMICS
## CONCENTRATION: PRODUCTION AND MANAGEMENT

CURRICULUM — CREDITS*

**UNIVERSITY REQUIREMENTS**

| | | |
|---|---|---|
| ENGL 110 | Critical Reading and Writing** | 3 [1] |
| Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content # | | 3 [1-4] |

**COLLEGE REQUIREMENTS**

***Mathematics and Computer Science***

| | | |
|---|---|---|
| Mathematics course (MATH 115 or higher level)† | | 3 [1] |
| Computer Science course (FREC 235 or equivalent) | | 3 [1] |

***Agricultural and Biological Sciences*** ..... 9-12 [1,2]
Minimum of one course outside the student's major in three of the following areas: Food and Resource Economics, Food Science, Agricultural Engineering, Animal Science, Entomology and Applied Ecology, Plant and Soil Sciences, or Biology

***Literature and Arts*** ..... 6 [2]
Six credits selected from the general areas of English, Art, Art History, Communication, Music, Theatre, or Foreign Language

***Social Sciences and Humanities*** ..... 9 [2]
Minimum of one course in three of the following areas: Anthropology, Black American Studies, Criminal Justice, Economics, Education, Geography, History, Philosophy, Political Science, Psychology, Sociology, or Women's Studies

***Physical Sciences*** ..... 8 [1,2]
Minimum of eight credits selected from one of the following areas: Chemistry, Physics, Geology, or Physical Science

**MAJOR REQUIREMENTS**

**External to the College**

| | | |
|---|---|---|
| COMM 312 | Oral Communication in Business | 3 [4] |
| ENGL 312 | Written Communications in Business | 3 [3] |
| ECON 151 | Introduction to Microeconomics | 3 [1,2] |
| ECON 152 | Introduction to Macroeconomics | 3 [1,2] |
| ECON 302 | Money, Credit and Banking | 3 [3,4] |
| ECON 300 | Intermediate Microeconomic Theory | 3 [3,4] |
| ECON 303 | Intermediate Macroeconomic Theory | 3 [3,4] |
| Two additional courses offered by the College of Business and Economics at the 300 level or higher ‡ | | 6 [3,4] |

**Within the Department**

| | | |
|---|---|---|
| FREC 120 | Elementary Agricultural Economics | 3 [1] |
| FREC 125 | Elementary Agricultural Economics: Applications | 1 [1] |
| FREC 201 | Records and Accounts | 3 [2] |
| FREC 235 | Introduction to Data Analysis | 3 [1] |
| FREC 240 | Quantitative Methods in Agricultural Economics | 3 [2] |
| FREC 465 | Seminar | 1 [4] |

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

1. Marketing/International Trade

| | | |
|---|---|---|
| FREC 404 | Food Marketing | 3 [3,4] |
| FREC 410 | International Agricultural Trade | 3 [3,4] |
| FREC 441 | Futures Markets in Agriculture | 4 [3,4] |

2. Production/Management

| | | |
|---|---|---|
| FREC 403 | Production Economics | 3 [3,4] |
| FREC 406 | Agricultural Policy | 3 [3,4] |
| FREC 408 | Research Methods | 3 [3,4] |
| FREC 427 | Agricultural Finance | 3 [3,4] |

3. Resources/Development

| | | |
|---|---|---|
| FREC 420 | Agriculture in Economic Development | 3 [3,4] |
| FREC 424 | Resource Economics–Theory and Policy | 3 [3,4] |
| FREC 429 | Rural Economic Development–Theory and Policy | 3 [3,4] |
| FREC 444 | Economics of Environmental Management | 3 [3,4] |

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

| | | |
|---|---|---|
| FREC 350 | Farm Management | 3 [3] |
| FREC 403 | Production in Economics | 3 [3,4] |

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

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

| | | |
|---|---|---|
| BUAD 309 | Management and Organizational Behavior | 3 [3,4] |
| BUAD 382 | International Business Management | 3 [3,4] |
| ECON 415 | Economic Forecasting | 3 [3,4] |
| STAT 201 | Introduction to Statistics I | 3 [1,2] |
| STAT 202 | Introduction to Statistics II | 3 [1,2] |

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

*Superior figures indicate year or years in which the course is normally taken, i.e., [1]freshman year, [2]sophomore year, etc.
**Minimum grade of C- required.
#This requirement may be fulfilled through a course or courses taken to complete other degree requirements; it cannot be fulfilled by a course taken pass/fail. See page 23
†MATH 221, MATH 230 and STAT 201 are strongly suggested
‡Students can qualify for a minor in Economics if they take an additional 400-level Economics course and obtain a grade of C- or better in all Economics courses. (see "The Minor in Economics" in the College of Business and Economics curricula)

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

**ELECTIVES**

***Electives*** ..... 11-15 [1-4]

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

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

## DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE
## MAJOR: AGRICULTURAL ECONOMICS
## CONCENTRATION: RESOURCE ECONOMICS AND RURAL DEVELOPMENT

| CURRICULUM | | CREDITS* |
|---|---|---|
| **UNIVERSITY REQUIREMENTS** | | |
| ENGL 110 | Critical Reading and Writing** | 3 [1] |
| Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content # | | 3 [1-4] |
| **COLLEGE REQUIREMENTS** | | |
| ***Mathematics and Computer Science*** | | |
| Mathematics course (MATH 115 or higher level)† | | 3 [1] |
| Computer Science course (FREC 235 or equivalent) | | 3 [1] |
| ***Agricultural and Biological Sciences*** | | 9-12 [1,2] |
| Minimum of one course outside the student's major in three of the following areas: Food and Resource Economics, Food Science, Agricultural Engineering, Animal Science, Entomology and Applied Ecology, Plant and Soil Sciences, or Biology. | | |
| ***Literature and Arts*** | | 6 [2] |
| Six credits selected from the general areas of English, Art, Art History, Communication, Music, Theatre, or Foreign Language. | | |
| ***Social Sciences and Humanities*** | | 9 [2] |
| Minimum of one course in three of the following areas: Anthropology, Black American Studies, Criminal Justice, Economics, Education, Geography, History, Philosophy, Political Science, Psychology, Sociology, or Women's Studies. | | |
| ***Physical Sciences*** | | 8 [1] |
| Minimum of eight credits selected from one of the following areas: Chemistry, Physics, Geology, or Physical Science. | | |
| **MAJOR REQUIREMENTS** | | |
| **External to the College** | | |
| COMM 312 | Oral Communication in Business | 3 [4] |
| ENGL 312 | Written Communications in Business | 3 [3] |
| ECON 151 | Introduction to Microeconomics | 3 [1,2] |
| ECON 152 | Introduction to Macroeconomics | 3 [1,2] |
| ECON 302 | Money, Credit and Banking | 3 [3,4] |
| ECON 300 | Intermediate Microeconomic Theory | 3 [3,4] |
| ECON 303 | Intermediate Macroeconomic Theory | 3 [3,4] |
| Two additional courses offered by the College of Business and Economics at the 300 level or higher.‡ | | 6 [3,4] |
| **Within the Department** | | |
| FREC 120 | Elementary Agricultural Economics | 3 [1] |
| FREC 125 | Elementary Agricultural Economics: Applications | 1 [1] |
| FREC 201 | Records and Accounts | 3 [2] |
| FREC 235 | Introduction to Data Analysis | 3 [1] |
| FREC 240 | Quantitative Methods in Agricultural Economics | 3 [2] |
| FREC 465 | Seminar | 1 [4] |

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

| | | |
|---|---|---|
| 1. Marketing/International Trade | | |
| FREC 404 | Food Marketing | 3 [3,4] |
| FREC 410 | International Agricultural Trade | 3 [3,4] |
| FREC 441 | Futures Markets in Agriculture | 4 [3,4] |
| 2. Production/Management | | |
| FREC 403 | Production Economics | 3 [3,4] |
| FREC 406 | Agricultural Policy | 3 [3,4] |
| FREC 408 | Research Methods | 3 [3,4] |
| FREC 427 | Agricultural Finance | 3 [3,4] |
| 3. Resources/Development | | |
| FREC 420 | Agriculture in Economic Development | 3 [3,4] |
| FREC 424 | Resource Economics–Theory and Policy | 3 [3,4] |
| FREC 429 | Rural Economic Development–Theory and Policy | 3 [3,4] |
| FREC 444 | Economics of Environmental Management | 3 [3,4] |

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

| | | |
|---|---|---|
| FREC 424 | Resource Economics–Theory and Policy | 3 [3,4] |
| FREC 429 | Rural Economics Development-Theory and Policy | 3 [3,4] |
| FREC 444 | Economics of Environmental Management | 3 [3,4] |

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

One course in Geography ..... 3 [1-4]

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

| | | |
|---|---|---|
| 1. Political Economy | | |
| ECON 306 | Public Choice | 3 [3,4] |
| ECON 311 | Economic Growth and Development Policy | 3 [3,4] |
| ECON 408 | Economics of Law | 3 [3,4] |
| ECON 411 | Economics of Growth and Development | 3 [3,4] |
| 2. Quantitative Methods | | |
| ECON 415 | Economic Forecasting | 3 [3,4] |
| ECON 422 | Introduction to Econometrics | 3 [3,4] |
| ECON 423 | Econometric Applications | 3 [3,4] |
| ECON 426 | Introduction to Mathematical Economics | 3 [3,4] |
| 3. Applications | | |
| ECON 433 | Economics of the Public Sector | 3 [3,4] |
| ECON 475 | Economics of Natural Resources | 3 [3,4] |
| ECON 477 | Benefit-Cost Analysis | 3 [3,4] |

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

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

**ELECTIVES**

***Electives*** ..... 14-18 [1-4]

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

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

## FOOD SCIENCE

The Food Science major is designed to provide students with a broad understanding and professional preparation in areas of food production, processing, evaluation, and distribution. These include positions within the food and allied industries, the government, and independent research institutions. The role of the food scientist in such positions may involve production and process development, engineering, quality control, technical service and sales, and regulatory service, education, or basic research. The food science research program has opportunities for students in three areas: (1) packaging, package product interaction, and food chemistry; (2) biotechnology, fermentations, and food microbiology; and

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

**Minimum grade of C- required.

#This requirement may be fulfilled through a course or courses taken to complete other degree requirements; it cannot be fulfilled by a course taken pass/fail See page 23

†MATH 221, MATH 230 and STAT 201 are strongly suggested.

‡Students can qualify for a minor in Economics if they take an additional 400-level Economics course and obtain a grade of C- or better in all Economics courses. (see "The Minor in Economics" in the College of Business and Economics curricula)

(3) process engineering technology. Educational and research opportunities in biotechnology are fostered by the department's Biotechnology Group. The program includes course work in life and chemical sciences, mathematics and engineering, plus independent research work on applied science problems. A minimum of a 2.00 GPA is required for graduation. Students may join as members of the Institute of Food Technologists.

## DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE MAJOR: FOOD SCIENCE

| CURRICULUM | | CREDITS* |
|---|---|---|
| **UNIVERSITY REQUIREMENTS** | | |
| ENGL 110 | Critical Reading and Writing** | 3 [1] |
| Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content # | | 3 [1-4] |
| **COLLEGE REQUIREMENTS†** | | |
| ***Mathematics and Computer Science*** | | |
| Mathematics course | | 3 [1] |
| Computer Science course selected from CISC 105, EGTE 111, FREC 235, or equivalent | | 3 [2] |
| ***Agricultural and Biological Sciences*** | | 9-12 [1,2] |
| Minimum of one course outside the student's major in three of the following areas: Food and Resource Economics, Agricultural Engineering, Animal Science, Entomology and Applied Ecology, Plant and Soil Sciences, or Biology | | |
| ***Literature and Arts*** | | 6 [2] |
| Six credits selected from the general areas of English, Art, Art History, Communication, Music, Theatre, or Foreign Language | | |
| ***Social Sciences and Humanities*** | | 9 [2] |
| Minimum of one course in three of the following areas: Anthropology, Black American Studies, Criminal Justice, Economics, Education, Geography, History, Philosophy, Political Science, Psychology, Sociology, or Women's Studies | | |
| ***Physical Sciences*** | | 8 [1] |
| Minimum of eight credits selected from one of the following areas: Chemistry, Physics, Geology, or Physical Science | | |
| **MAJOR REQUIREMENTS†** | | |
| **External to the College** | | |
| CHEM 103 | General Chemistry | 4 [1] |
| CHEM 104 | General Chemistry | 4 [1] |
| CHEM 214 | Elementary Biochemistry | 3 [2] |
| CHEM 220 | Quantitative Analysis I | 3 [2] |
| CHEM 221 | Quantitative Analysis Laboratory | 1 [2] |
| PHYS 201 | General Physics | 4 [2] |
| PHYS 202 | General Physics | 4 [2] |
| BISC 207 | Introductory Biology I | 4 [1] |
| BISC 208 | Introductory Biology II | 4 [1] |
| BISC 371 | Introduction to Microbiology | 4 [2] |
| CHEM 321 | Organic Chemistry | 3 [2] |
| CHEM 325 | Organic Chemistry Laboratory | 1 [2] |
| CHEM 322 | Organic Chemistry | 3 [2] |
| CHEM 326 | Organic Chemistry Laboratory | 1 [2] |
| CHEM 418 | Introductory Physical Chemistry | 3 [3] |
| CHEM 419 | Introductory Physical Chemistry | 3 [3] |
| CHEM 445 | Physical Chemistry Laboratory | 1 [3] |
| NTDT 200 | Nutrition Concepts | 3 [1] |
| ECON 151 | Introduction to Microeconomics | 3 [1] |
| PSYC 201 | General Psychology | 3 [1] |
| MATH 221 | Calculus I | 3 [1] |
| or | | |
| MATH 241 | Analytic Geometry and Calculus A | 4 |
| MATH 222 | Calculus II | 3 [1] |
| or | | |
| MATH 242 | Analytic Geometry and Calculus B | 4 |
| **Within the College** | | |
| FREC 235 | Introduction to Data Analysis | 3 [1] |
| FREC 408 | Research Methods | 3 [3] |

**Within the Department**

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

| | | |
|---|---|---|
| FOSC 265 | Seminar: Food Science | 2 [1] |
| FOSC 359 | Topics in Food Science | 1 [2] |
| FOSC 365 | Seminar: Food Science | 1 [2] |
| FOSC 409 | Food Processing I | 4 [4] |
| FOSC 410 | Food Processing II | 4 [4] |
| FOSC 428 | Food Chemistry | 4 [3] |
| FOSC 429 | Food Analysis | 4 [3] |
| FOSC 439 | Food Microbiology | 4 [3] |
| FOSC 445 | Food Engineering Technology | 4 [4] |
| FOSC 446 | Food Processing Engineering Technology | 4 [4] |
| FOSC 449 | Food Biotechnology | 4 [4] |
| **ELECTIVES** | | |
| Electives | | 2-4 [3] |
| May include Military Science, Music, or Physical Education. (Only two credits of activity-type Physical Education and four credits of Music organization credits and four credits of 100- and 200-level courses in Military Science/Air Force may be counted toward the degree.) | | |
| **CREDITS TO TOTAL A MINIMUM OF** | | **132** |

## MINOR IN FOOD SCIENCE

The following minor in food science requires application and admission to the program and successful completion of 19 food science credits. The minor in Food Science provides students in other degree programs with an opportunity to acquaint themselves with food science. Completion of the minor will provide the student with a basic understanding of this complex technology which includes sciences as diverse as microbiology and engineering. Since Food Science is a multidisciplinary applied science, any student in any curriculum may minor in food science; however, the exact course requirements will be determined by the FSC minor adviser. Course selection would depend on completion of prerequisites and other science and math preparation.

**Student Eligibility Requirements**

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

   MATH 221 Calculus I (3) and
   MATH 222 Calculus II (3)

**Number of credits required: 15**

| | | |
|---|---|---|
| FOSC 305/306 | Food Science & Laboratory | 3 |
| **Select any 3 courses (12 credits) from:** | | |
| FOSC 409 | Food Processing I | 4 |
| FOSC 410 | Food Processing II | 4 |
| FOSC 428 | Food Chemistry | 4 |
| FOSC 429 | Food Analysis | 4 |
| FOSC 439 | Food Microbiology | 4 |
| FOSC 445 | Food Engineering Technology | 4 |
| FOSC 446 | Food Process Engineering Technology I | 4 |
| FOSC 449 | Food Biotechnology | 4 |

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

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

*Superior figures indicate year or years in which the course is normally taken, i.e., [1]freshman year, [2]sophomore year, etc.
**Minimum grade of C- required.
#This requirement may be fulfilled through a course or courses taken to complete other degree requirements; it cannot be fulfilled by a course taken pass/fail. See page 23.
†A course may be applied toward both the major requirements and a college requirement, but credits are counted only once toward the total credits for graduation.

## PLANT AND SOIL SCIENCES

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 pursue a program of study leading to the degree Bachelor of Science in Agriculture. They can major in Plant Science and select one of four areas of concentration: general plant science, ornamental horticulture, agronomy, or pathology, or they can major in Environmental Soil Science.

Each candidate for a degree must earn a minimum of 124 credits; achieve a minimum cumulative grade point average of 2.00 on all work undertaken at the University of Delaware, and fulfill the course requirements of the degree program.

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

| CURRICULUM | | CREDITS* |
|---|---|---|
| **UNIVERSITY REQUIREMENTS** | | |
| ENGL 110 | Critical Reading and Writing** | 3 [1] |
| Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content # | | 3 [1-4] |
| **COLLEGE REQUIREMENTS†** | | |
| ***Mathematics and Computer Science*** | | |
| Mathematics course | | 3 [1] |
| Computer Science course selected from CISC 105, EGTE 111, FREC 235, or equivalent | | 3 [1] |
| ***Agricultural and Biological Sciences*** | | 9-12 [1,2] |
| Minimum of one course outside the student's major in three of the following areas: Food and Resource Economics, Food Science, Agricultural Engineering, Animal Science, Entomology and Applied Ecology, or Biology | | |
| ***Literature and Arts*** | | 6 [2] |
| Six credits selected from the general areas of English, Art, Art History, Communication, Music, Theatre, or Foreign Language | | |
| ***Social Sciences and Humanities*** | | 9 [2] |
| Minimum of one course in three of the following areas: Anthropology, Black American Studies, Criminal Justice, Economics, Education, Geography, History, Philosophy, Political Science, Psychology, Sociology, or Women's Studies | | |
| ***Physical Sciences*** | | 8 [1] |
| Minimum of eight credits selected from one of the following areas: Chemistry, Physics, Geology, or Physical Science | | |
| **MAJOR REQUIREMENTS†** | | |
| **External to the College** | | |
| CHEM 101 | General Chemistry | 4 [1] |
| or | | |
| CHEM 103 | General Chemistry | 4 [1] |
| CHEM 102 | General Chemistry | 4 [1] |
| or | | |
| CHEM 104 | General Chemistry | 4 [1] |
| CHEM 213 | Elementary Organic Chemistry | 4 [2] |
| One of the following three courses: | | |
| PHYS 101 | Introduction to Physics | 4 [2] |
| GEOL 105 | General Geology | 4 [2] |
| CHEM 214 | Elementary Biochemistry | 3 [2] |
| **Within the Department** | | |
| PLSC 101 | Botany I | 4 [2] |
| PLSC 201 | Botany II | 4 [2] |
| PLSC 204 | Introduction to Soil Science | 4 [3] |
| PLSC 300 | Principles of Animal and Plant Genetics | 3 [3] |
| PLSC 303 | Introductory Plant Pathology | 4 [3] |
| PLSC 305 | Soil Fertility and Plant Nutrition | 4 [3] |
| PLSC 410 | Introduction to Plant Physiology | 3 [4] |
| **ELECTIVES** | | |
| ***Electives*** | | 46-50 [1-4] |
| May include Military Science, Music, or Physical Education. (Only two credits of activity-type Physical Education and/or two credits of performing Music organization credit may be counted toward the degree.) | | |
| **CREDITS TO TOTAL A MINIMUM OF** | | **124** |

### DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE
### MAJOR: PLANT SCIENCE
### CONCENTRATION: ORNAMENTAL HORTICULTURE

| CURRICULUM | | CREDITS* |
|---|---|---|
| **UNIVERSITY REQUIREMENTS** | | |
| ENGL 110 | Critical Reading and Writing** | 3 [1] |
| Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content # | | 3 [1-4] |
| **COLLEGE REQUIREMENTS†** | | |
| ***Mathematics and Computer Science*** | | |
| Mathematics course | | 3 [1] |
| Computer Science course selected from CISC 105, EGTE 111, FREC 235, or equivalent | | 3 [1] |
| ***Agricultural and Biological Sciences*** | | 9-12 [1,2] |
| Minimum of one course outside the student's major in three of the following areas: Food and Resource Economics, Food Science, Agricultural Engineering, Animal Science, Entomology and Applied Ecology, or Biology | | |
| ***Literature and Arts*** | | 6 [2] |
| Six credits selected from the general areas of English, Art, Art History, Communication, Music, Theatre, or Foreign Language | | |
| ***Social Sciences and Humanities*** | | 9 [2] |
| Minimum of one course in three of the following areas: Anthropology, Black American Studies, Criminal Justice, Economics, Education, Geography, History, Philosophy, Political Science, Psychology, Sociology, or Women's Studies | | |
| ***Physical Sciences*** | | 8 [1] |
| Minimum of eight credits selected from one of the following areas: Chemistry, Physics, Geology, or Physical Science | | |
| **MAJOR REQUIREMENTS†** | | |
| **External to the College** | | |
| CHEM 101 | General Chemistry | 4 [1] |
| or | | |
| CHEM 103 | General Chemistry | 4 [1] |
| CHEM 102 | General Chemistry | 4 [1] |
| or | | |
| CHEM 104 | General Chemistry | 4 [1] |
| CHEM 213 | Elementary Organic Chemistry | 4 [2] |
| One of the following three courses: | | |
| PHYS 101 | Introduction to Physics | 4 [2] |
| GEOL 105 | General Geology | 4 [2] |
| CHEM 214 | Elementary Biochemistry | 3 [2] |
| **Within the Department** | | |
| PLSC 101 | Botany I | 4 [2] |
| PLSC 201 | Botany II | 4 [2] |
| PLSC 204 | Introduction to Soil Science | 4 [2] |
| PLSC 300 | Principles of Animal and Plant Genetics | 3 [3] |

*Superior figures indicate year or years in which the course is normally taken, i.e., [1]freshman year, [2]sophomore year, etc.
**Minimum grade of C- required.
#This requirement may be fulfilled through a course or courses taken to complete other degree requirements; it cannot be fulfilled by a course taken pass/fail. See page 23
†A course may be applied toward both the major requirements and a college requirement, but credits are counted only once toward the total credits for graduation.

| | | |
|---|---|---|
| PLSC 303 | Introductory Plant Pathology | 4[3] |
| PLSC 305 | Soil Fertility and Plant Nutrition | 4[3] |
| PLSC 410 | Introduction to Plant Physiology | 3[4] |

**Within the Concentration**

***Group One:*** *Required courses*

| | | |
|---|---|---|
| PLSC 133 | Ornamental Horticulture | 3[1] |
| PLSC 211 | Herbaceous Landscape Plants | 3[2] |
| PLSC 212 | Woody Landscape Plants | 3[2] |
| PLSC 422 | Plant Propagation | 3[4] |
| ENTO 205 | Elements of Entomology | 3[2] |
| ENTO 305 | Entomology Laboratory | 2[3] |

***Group Two:*** *Select a minimum of 12 credits from the following:*

| | | |
|---|---|---|
| PLSC 302 | Vegetable Science | 3[3] |
| PLSC 332 | Basic Landscape Design I | 4[3] |
| PLSC 402 | Plant Taxonomy | 3[3,4] |
| PLSC 403 | Nursery and Garden Center Management | 3[3,4] |
| PLSC 411 | Diagnostic Plant Pathology | 2[3,4] |
| PLSC 412 | Diagnostic Plant Pathology Laboratory | 1-6[3,4] |
| PLSC 417 | Greenhouse Management | 4[3,4] |
| PLSC 602 | Physiological Plant Productivity | 3[4] |
| PLSC 607 | Plant and Soil Water Relations | 3[4] |
| PLSC 615 | Vascular Plant Anatomy | 3[4] |
| PLSC 621 | Plants and Design | 3[4] |
| PLSC 623 | Plant Cell and Tissue Culture | 3[4] |

**ELECTIVES**

***Electives*** 17-21[1-4]

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

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

## DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE
## MAJOR: PLANT SCIENCE
## CONCENTRATION: AGRONOMY

CURRICULUM — CREDITS*

**UNIVERSITY REQUIREMENTS**

| | | |
|---|---|---|
| ENGL 110 | Critical Reading and Writing** | 3[1] |
| Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content # | | 3[1-4] |

**COLLEGE REQUIREMENTS†**

***Mathematics and Computer Science***

| | |
|---|---|
| Mathematics course | 3[1] |
| Computer Science course selected from CISC 105, EGTE 111, FREC 235, or equivalent | 3[1] |

***Agricultural and Biological Sciences*** 9-12[1,2]

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

***Literature and Arts*** 6[2]

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

***Social Sciences and Humanities*** 9[2]

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

***Physical Sciences*** 8[1]

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

**MAJOR REQUIREMENTS†**

**External to the College**

| | | |
|---|---|---|
| CHEM 101 | General Chemistry | 4[1] |
| or | | |
| CHEM 103 | General Chemistry | 4[1] |
| CHEM 102 | General Chemistry | 4[1] |
| or | | |
| CHEM 104 | General Chemistry | 4[1] |
| CHEM 213 | Elementary Organic Chemistry | 4[2] |

One of the following three courses:

| | | |
|---|---|---|
| PHYS 101 | Introduction to Physics | 4[2] |
| GEOL 105 | General Geology | 4[2] |
| CHEM 214 | Elementary Biochemistry | 3[2] |

**Within the Department**

| | | |
|---|---|---|
| PLSC 101 | Botany I | 4[2] |
| PLSC 201 | Botany II | 4[2] |
| PLSC 204 | Introduction to Soil Science | 4[3] |
| PLSC 300 | Principles of Animal and Plant Genetics | 3[3] |
| PLSC 303 | Introductory Plant Pathology | 4[3] |
| PLSC 305 | Soil Fertility and Plant Nutrition | 4[3] |
| PLSC 410 | Introduction to Plant Physiology | 3[4] |

**Within the Concentration**

***Group one:*** *Required courses*

| | | |
|---|---|---|
| PLSC 151 | Introduction to Crop Science | 3[1] |
| PLSC 401 | Agronomic Crop Science | 3[4] |
| PLSC 411 | Diagnostic Plant Pathology‡ | 2[3,4] |
| PLSC 412 | Diagnostic Plant Pathology Laboratory‡ | 1-6[3,4] |
| CHEM 214 | Elementary Biochemistry | 3[2] |
| CHEM 216 | Elementary Biochemistry Laboratory | 1[1,2] |
| ENTO 205 | Elements of Entomology‡ | 3[2] |
| ENTO 305 | Entomology Laboratory | 2[3] |

***Group Two:*** *Select a minimum of 12 credits in consultation with your faculty adviser* 12[3,4]

**ELECTIVES**

***Electives*** 11-20[1-4]

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

**CREDITS TO TOTAL MINIMUM OF..... 124**

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

CURRICULUM — CREDITS*

**UNIVERSITY REQUIREMENTS**

| | | |
|---|---|---|
| ENGL 110 | Critical Reading and Writing** | 3[1] |
| Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content # | | 3[1-4] |

**COLLEGE REQUIREMENTS†**

***Mathematics and Computer Science***

| | |
|---|---|
| Mathematics course | 3[1] |
| Computer Science course selected from CISC 105, EGTE 111, FREC 235, or equivalent | 3[1] |

***Agricultural and Biological Sciences*** 9-12[1,2]

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

***Literature and Arts*** 6[2]

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

***Social Sciences and Humanities*** 9[2]

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

***Physical Sciences*** 8[1]

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

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

**Minimum grade of C- required.

#This requirement may be fulfilled through a course or courses taken to complete other degree requirements; it cannot be fulfilled by a course taken pass/fail. See page 23.

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

**MAJOR REQUIREMENTS†**

**External to the College**

| | | |
|---|---|---|
| CHEM 101 | General Chemistry | 4[1] |
| or | | |
| CHEM 103 | General Chemistry | 4[1] |
| CHEM 102 | General Chemistry | 4[1] |
| or | | |
| CHEM 104 | General Chemistry | 4[1] |
| CHEM 213 | Elementary Organic Chemistry | 4[2] |

One of the following three courses:

| | | |
|---|---|---|
| PHYS 101 | Introduction to Physics | 4[2] |
| GEOL 105 | General Geology | 4[2] |
| CHEM 214 | Elementary Biochemistry | 3[2] |

**Within the Department**

| | | |
|---|---|---|
| PLSC 101 | Botany I | 4[2] |
| PLSC 201 | Botany II | 4[2] |
| PLSC 204 | Introduction to Soil Science | 4[3] |
| PLSC 300 | Principles of Animal and Plant Genetics | 3[3] |
| PLSC 303 | Introductory Plant Pathology | 4[3] |
| PLSC 305 | Soil Fertility and Plant Nutrition | 4[3] |
| PLSC 410 | Introduction to Plant Physiology | 3[4] |

**Within the Concentration**

***Group one:*** *Required courses*

| | | |
|---|---|---|
| BISC 207 | Introductory Biology I | 4[2] |
| BISC 208 | Introductory Biology II | 4[2] |
| BISC 371 | Introduction to Microbiology | 4[3] |
| ENTO 305 | Entomology Laboratory | 2[3] |

***Group Two:*** *Select a minimum of 12 credits from the following:*

| | | |
|---|---|---|
| PLSC 401 | Agronomic Crop Science | 3[4] |
| PLSC 411 | Diagnostic Plant Pathology | 2[3,4] |
| PLSC 412 | Diagnostic Plant Pathology Laboratory | 1-6[3,4] |
| PLSC 413 | Principles of Plant Disease Control | 3[3,4] |
| PLSC 429 | Introductory Mycology | 4[3,4] |
| PLSC 602 | Physiological Plant Productivity | 3[3,4] |
| PLSC 605 | Plant Breeding | 3[3,4] |
| PLSC 607 | Plant and Soil Water Relations | 3[3,4] |
| PLSC 609 | Plant Microtechnique | 3[3,4] |
| PLSC 623 | Plant Cell and Tissue Culture | 3[3,4] |
| ENTO 465 | Seminar | 1[3,4] |

**ELECTIVES**

***Electives*** ..... 20-24[1-4]

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

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

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

CURRICULUM — CREDITS*

**UNIVERSITY REQUIREMENTS**

| | | |
|---|---|---|
| ENGL 110 | Critical Reading and Writing** | 3[1] |
| Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content.# | | 3[1-4] |

**COLLEGE REQUIREMENTS†**

***Mathematics and Computer Science***

| | |
|---|---|
| Mathematics course | 3[1] |
| Computer Science course selected from CISC 105, EGTE 111, FREC 235, or equivalent | 3[1] |

***Agricultural and Biological Sciences*** ..... 9-12[1,2]

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

***Literature and Arts*** ..... 6[2]

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

***Social Sciences and Humanities*** ..... 9[2]

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

***Physical Sciences*** ..... 8[1]

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

**MAJOR REQUIREMENTS†**

**External to the College**

| | | |
|---|---|---|
| CHEM 101 | General Chemistry | 4[1] |
| or | | |
| CHEM 103 | General Chemistry | 4[1] |
| CHEM 102 | General Chemistry | 4[1] |
| or | | |
| CHEM 104 | General Chemistry | 4[1] |
| CHEM 213 | Organic Chemistry | 4[2] |
| CHEM 220 | Quantitative Analysis | 3[2] |
| CHEM 221 | Quantitative Analysis Laboratory | 1[2] |
| ENGL 410 | Technical Writing | 3[4] |
| GEOG 220 | Meteorology | 3[2] |
| GEOL 107 | General Geology I | 4[1] |
| MATH 221 | Calculus I | 3[1] |
| PHYS 201 | General Physics | 4[2] |

**Within the College**

| | | |
|---|---|---|
| EGTE 103 | Land and Water Management | 2[1] |
| EGTE 113 | Land Surveying | 2[1] |
| EGTE 328 | Agricultural Waste Management | 3[3] |
| FREC 120 | Elementary Agricultural Economics | 3[1] |

**Within the Department**

| | | |
|---|---|---|
| PLSC 101 | Botany I | 4[1] |
| PLSC 151 | Introduction to Crop Science | 3[1] |
| PLSC 204 | Introduction to Soil Science | 4[2] |
| PLSC 303 | Introductory Plant Pathology | 4[3] |
| PLSC 305 | Soil Fertility and Plant Nutrition | 4[2] |
| PLSC 401 | Agronomic Crop Science | 3[3] |
| PLSC 608 | Soil Chemistry | 3[4] |
| PLSC 619 | Soil Microbiology | 3[4] |

**ELECTIVES**

***Electives*** ..... 14-17[2,3,4]

May include the following suggested courses or other electives.

| | | |
|---|---|---|
| BISC 321 | Environmental Biology | 3[3] |
| FREC 235 | Introduction to Data Analysis | 3[1] |
| FREC 444 | Economics of Environmental Management | 3[4] |
| GEOG 235 | Conservation of Natural Resources | 3[2] |
| GEOL 415 | General Geomorphology | 3[3,4] |
| GEOL 428 | Hydrogeology | 3[3] |
| GEOL 421 | Environmental and Applied Geology | 3[4] |
| PLSC 603 | Soil Physics | 3[4] |
| POSC 350 | Politics and the Environment | 3[4] |

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

## GENERAL AGRICULTURE

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

## DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE MAJOR: GENERAL AGRICULTURE

CURRICULUM — CREDITS*

**UNIVERSITY REQUIREMENTS**

| | | |
|---|---|---|
| ENGL 110 | Critical Reading and Writing** | 3[1] |
| Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content.# | | 3[1-4] |

*Superior figures indicate year or years in which the course is normally taken, i.e., [1]freshman year, [2]sophomore year, etc.
**Minimum grade of C- required.
#This requirement may be fulfilled through a course or courses taken to complete other degree requirements; it cannot be fulfilled by a course taken pass/fail. See page 23.
†A course may be applied toward both the major requirements and a college requirement, but credits are counted only once toward the total credits for graduation.

**COLLEGE REQUIREMENTS**

***Mathematics and Computer Science***

Mathematics course ..... 3 [1]
Computer Science course selected from CISC 105, EGTE 111, FREC 235, or equivalent ..... 3 [1]

***Agricultural and Biological Sciences*** ..... 9-12 [1,2]
Minimum of one course outside the student's major in three of the following areas: Food and Resource Economics, Food Science, Agricultural Engineering, Animal Science, Entomology and Applied Ecology, Plant and Soil Sciences, or Biology.

***Literature and Arts*** ..... 6 [2]
Six credits selected from the general areas of English, Art, Art History Communication, Music, Theatre, or Foreign Language

***Social Sciences and Humanities*** ..... 9 [2]
Minimum of one course in three of the following areas: Anthropology, Black American Studies, Criminal Justice, Economics, Education, Geography, History, Philosophy, Political Science, Psychology, Sociology, or Women's Studies.

***Physical Sciences*** ..... 8 [1]
Minimum of eight credits selected from one of the following areas: Chemistry, Physics, Geology.

**External to the college**

A minimum of one course in written communications chosen from the following:

| | | |
|---|---|---|
| ENGL 301 | Problems in Composition | 3 [3,4] |
| ENGL 302 | Advanced Composition | 3 |
| ENGL 312 | Written Communications in Business | 3 |
| ENGL 410 | Technical Writing | 3 |

A minimum of one course in oral communications chosen from the following:

| | | |
|---|---|---|
| COMM 200 | Introduction to Human Communication Systems | 3 [3,4] |
| COMM 255 | Fundamentals of Communication | 3 |
| COMM 312 | Oral Communication in Business | 3 |
| COMM 350 | Public Speaking | 3 |
| COMM 356 | Small Group Communication | 3 |

**Within the college**

Thirty additional credits from any of the following departments: ..... 30 [3,4]
Food and Resource Economics, Agricultural Engineering, Agriculture, Animal Science and Agricultural Biochemistry, Entomology and Applied Ecology, or Plant and Soil Sciences. (Fifteen of the 30 credits must be in agriculture courses specifically required by other majors in the college.) A maximum of twelve credits of Special Problem/Independent Study credits in all areas may be counted toward the degree, with a maximum of six credits in any one department.

**ELECTIVES**

***Electives*** ..... 56-59 [1-4]
May include Military Science, Music, or Physical Education. (Only four credits of activity-type Physical Education and/or four credits of performing Music organization credit may be counted toward the degree.)

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

## PREVETERINARY INSTRUCTION

Students in the College of Agricultural Sciences who desire to prepare for entrance to a veterinary school should consult with the Chair of the Department of Animal Science and Agricultural Biochemistry. See curriculum in department listing.

## THE ASSOCIATE IN SCIENCE DEGREE

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

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

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

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

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

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

## OTHER COLLEGE RESOURCES

***Cooperative Extension System.*** The Delaware Cooperative Extension System is part of a nationwide system whose mission is to improve American agriculture and to strengthen American families and communities through the dissemination and application of research-generated knowledge and leadership techniques. It serves as an educational resource to the people of Delaware for extending research results and advances in technology.

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

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

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

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