



# COLLEGE OF AGRICULTURAL SCIENCES

- Dean's Scholar Program
- Agricultural Education
- Agricultural Engineering
- Animal Science and Agricultural Biochemistry
- Engineering Technology
- Entomology and Applied Ecology
- Entomology/Plant Pathology
- Food and Resource Economics
- Food Science
- Plant and Soil Sciences
- General Agriculture
- Preveterinary Instruction
- The Associate in Science Degree
- Other College Resources

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 vocations in such work and services as the invention, development, manufacture, and sale of agricultural machinery, equipment, and chemicals; processing and marketing of farm 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 objective of the College of Agricultural Sciences is to prepare students for this great variety of career opportunity in individual enterprise, teaching, and public service. The curricula 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, Worrlow Hall, 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 agricultural 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, food science, entomology/plant pathology, plant and soil sciences, and general agriculture. Concentrations are available in wildlife conservation, landscape horticulture, preveterinary medicine, agricultural biotechnology, applied animal science, and general animal science.

A newly instituted 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.

The Department of Food Science is located in the College of Agricultural Sciences. The Food Science major is for students with interest and ability in the sciences, particularly chemistry. The food scientist applies chemistry, microbiology, engineering and other basic and applied sciences to the production, processing, preservation, evaluation, distribution, storage, sanitation, and marketing of foods.

A great deal of responsibility is placed upon the student and the faculty adviser to explore different agricul-

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### **IDENTIFICATION CARDS**

The I.D. card is the student's official University identification. It is issued to each full- and part-time undergradu-

ate student upon matriculation and must be in the student's possession at all times. The I.D. card is not transferable. It is the property of the University and must be surrendered upon request. It becomes void upon withdrawal and must be returned to the I.D. Systems Office in 011A Hulihan Hall. Loss of an I.D. card should be reported promptly to the I.D. Systems Office so that a new card can be prepared. A charge is made for a replacement I.D. card.

tural fields beyond those represented by the courses required for the freshman and sophomore years. In the final two years, courses should be selected with a view to filling gaps in the student's knowledge and experience and avoiding too narrow a specialization. Selection of courses in several different subject matter areas is strongly recommended in order that adequate preparation may be made to meet the diversified demands of most positions in agriculture.

Students electing agricultural education will have as their adviser the liaison professor for the College of Agricultural Sciences and the College of Education. Selected information in the section of this catalog on the College of Education may be helpful to those students interested in agricultural education.

## 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. Two types of programs are available. One qualifies the individual for certification by the State Department of Public Instruction as a comprehensive vocational agriculture instructor. The other meets Delaware requirements for an agricultural specialist. With proper planning early in a student's program, it is possible to satisfy the requirements for both certificates. Some students may find it desirable to major in a particular area of agricultural sciences and include agricultural education courses in their bachelor's program, while others may desire to double major.

A degree in agricultural education qualifies the graduate to serve as an instructor of agriculture in public or private secondary schools, as an instructor of adult classes in agriculture, or as an educational leader with state or feder-

al agencies or private businesses. Other opportunities are to be found in educational administrative positions, farming, the Agricultural Extension Service, the Soil Conservation Service, and various leadership positions in farmers' 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

E 110 Critical Reading and Writing .....	3 <sup>1</sup>
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content.#	3 <sup>1,4</sup>

#### COLLEGE REQUIREMENTS

<i>Mathematics and Computer Science</i>	
Mathematics course .....	3 <sup>1</sup>
Computer Science course selected from CIS 105, ACE 111, AEC 235, or equivalent .....	3 <sup>2</sup>
<i>Agricultural and Biological Sciences</i> .....	9-12 <sup>1,2</sup>
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 .....	
<i>Literature and Arts</i> .....	9 <sup>2</sup>
Nine credits from English and/or Communication .....	
<i>Social Sciences and Humanities</i> .....	9 <sup>2</sup>
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 .....	
<i>Physical Sciences</i> .....	8 <sup>1</sup>
Minimum of eight credits selected from one of the following areas: Chemistry, Physics, Geology, or Physical Science .....	

#### MAJOR REQUIREMENTS

<b>External to the College</b>	
EDS 304 Psychological Foundations of Education .....	3 <sup>3</sup>
EDS 302 Educational Psychology .....	3 <sup>3</sup>
EDD 400 Student Teaching .....	6 <sup>4</sup>
One of the following three courses:	
EDS 201 Education in American Society .....	3 <sup>2</sup>
EDS 461 Measurement Theory and Techniques for Classroom Teachers .....	3 <sup>3</sup>
EDD 623 Teaching Upper-Level Reading .....	3 <sup>3</sup>
<b>Within the College</b>	
A 2.75 index in at least thirty credits of technical agriculture from at least three departments in the college .....	30 <sup>3,4</sup>

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

#This requirement may be fulfilled through a course taken to complete major, group, breadth, or elective requirements. See page 24.

**Within the Department***Professional Education*

AED 380 Agricultural Education Materials and Approaches I .....	3 <sup>3</sup>
AED 381 Agricultural Education Materials and Approaches II .....	3 <sup>3</sup>

**ELECTIVES**

Electives .....	32-35 <sup>1,4</sup>
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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 SCIENCE IN AGRICULTURE  
MAJOR: AGRICULTURAL ENGINEERING TECHNOLOGY****CURRICULUM****CREDITS\*****UNIVERSITY REQUIREMENTS**

E 110 Critical Reading and Writing .....	3 <sup>1</sup>
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content.#	3 <sup>1,4</sup>

**COLLEGE REQUIREMENTS**

<i>Mathematics and Computer Science</i>	
Mathematics course .....	3-4 <sup>1</sup>
Computer Science course selected from CIS 105, AGE 111, AEC 235, or equivalent	3 <sup>1</sup>
<i>Agricultural and Biological Sciences</i> .....	10-12 <sup>1,3</sup>
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.	
<i>Literature and Arts</i> .....	6 <sup>2</sup>
Six credits selected from the general areas of English, Art, Art History, Communication, Music, Theatre, or Foreign Language.	
<i>Social Sciences and Humanities</i> .....	9 <sup>2</sup>
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.	
<i>Physical Sciences</i> .....	8 <sup>1</sup>
Minimum of eight credits selected from one of the following areas: Chemistry, Physics, Geology, or Physical Science.	

**MAJOR REQUIREMENTS†****External to the College**

<i>Chemistry and Physics</i>	
C 103 General Chemistry .....	4 <sup>2</sup>
C 104 General Chemistry .....	4 <sup>2</sup>
PS 201 General Physics .....	4 <sup>2</sup>
or	
PS 207 General Physics .....	4
PS 202 General Physics .....	4 <sup>2</sup>
or	
PS 208 General Physics .....	4
<i>Mathematics and Statistics</i>	
A minimum of 12 credits in mathematics and statistics. Specific requirements are:	
M 221 Calculus I .....	3 <sup>1</sup>
or	
M 241 Analytic Geometry and Calculus A .....	4
M 222 Calculus II .....	3 <sup>2</sup>
or	
M 242 Analytic Geometry and Calculus B .....	4
Six credits chosen from: .....	6 <sup>3,4</sup>
Anthropology, Art, Art History, Black American Studies, Criminal Justice, Economics, Education, Foreign Language, Geography, History, Music, Philosophy, Political Science, Psychology, Sociology, Theatre, or Women's Studies.	

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

#This requirement may be fulfilled through a course taken to complete major, group, breadth, or elective requirements. See page 24.

†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.



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

E 301	Problems in Composition.....	3 <sup>3</sup>
E 302	Advanced Composition.....	3
E 307	News Writing and Editing.....	3
E 312	Written Communications in Business.....	3
E 410	Technical Writing.....	3

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

COM 200	Introduction to Human Communication Systems.....	3 <sup>3</sup>
COM 255	Fundamentals of Communication.....	3
COM 350	Public Speaking.....	3
COM 356	Small Group Communication.....	3

#### Within the College

PLS 204	Introduction to Soil Science.....	4 <sup>3</sup>
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#### Within the Department

AGE 111	Computer Applications in Engineering Technology.....	3 <sup>1</sup>
AGE 113	Land Surveying.....	1 <sup>1</sup>
AGE 218	Fundamentals of Hydraulic Systems.....	4 <sup>1</sup>
AGE 244	Electricity for Engineering Technology.....	4 <sup>2</sup>
AGE 311	Fundamentals of Thermodynamics.....	3 <sup>2</sup>
AGE 335	Power and Machinery Management I.....	4 <sup>2</sup>
AGE 336	Power and Machinery Management II.....	4 <sup>3</sup>
AGE 323	Soil and Water Conservation.....	4 <sup>3</sup>
AGE 365	Junior Seminar.....	1 <sup>3</sup>
AGE 441	Engineering Aspects of Agricultural Process.....	4 <sup>4</sup>
AGE 454	Rural/Light Industrial Buildings.....	4 <sup>4</sup>

A minimum of 30 credits in an area of specialization that 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<sup>1-4</sup>

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**

## ANIMAL SCIENCE AND AGRICULTURAL BIOCHEMISTRY

The objective of the Department of Animal Science and Agricultural Biochemistry is to prepare students for advanced study or careers in the areas of breeding, nutrition and management of all classes of livestock and poultry, and the marketing of their products. Instruction is offered in animal and poultry nutrition, physiology, reproduction, breeding, animal health, molecular biology, and dairy, poultry and livestock management. Students interested in veterinary medicine have the opportunity to obtain preveterinary training leading to

candidacy for a professional veterinary school. Suitable courses are also available to students interested in advanced studies in the animal sciences. A versatile staff, qualified in major fields of animal and veterinary science, provides curricula to fit scholastic backgrounds and professional objectives of students. A wide range of ongoing research facilitates the design of independent study courses to fit the needs of the progressive student. The teaching philosophy of the department 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 fields in which the animal science student may wish to specialize.

A suggested curriculum for each concentration follows. The preveterinary concentration is designed to meet not only the department, college, and University requirements, but also the admission requirements of the professional schools to which students must apply.

Physical facilities for instruction and research include registered and pedigreed Holstein and Guernsey dairy herds accommodated in loose housing with a modern milking parlor and an automatic feeding system. A herd of registered Angus cattle, a flock of registered Dorset sheep and a small equine herd are also available for teaching purposes. Experimental laboratory animals for undergraduate independent study and for basic research studies in reproductive physiology are housed on the premises. Both cage and small floor pen facilities for broilers as well as layers are available on the poultry farm in Newark. Various breeds and strains representing economic and geographical classes of poultry are maintained for teaching purposes. A modern, fully equipped, small scale broiler house, disease isolation units, and feedmixing equipment are available for poultry and independent study courses as well as for research. Commercial broiler and swine growing facilities are located at the Research and Education Center, Georgetown, Delaware. An environmentally controlled large animal research laboratory provides a suitable environment for research and study with larger species of animals. A nutrition laboratory contains equipment for calorimetry, chromatography, electrophoresis, and analysis of feed. A well equipped laboratory for disease research has a complete microbiology and immunology research unit and equipment available for preparing tissue sections for histological and histopathological study. There is access to radioisotope research laboratories and to a gas chromatograph, amino acid analyzer, and atomic absorption spectrophotometer. The facilities of the University's Office of Academic Computing and Instructional Technology are used in the nutrition, breeding, teaching, and research programs.

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

**CURRICULUM** **CREDITS\***

**UNIVERSITY REQUIREMENTS**

E 110 Critical Reading and Writing	3 <sup>1</sup>
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content #	3 <sup>1-4</sup>

**COLLEGE REQUIREMENTS**

<i>Mathematics and Computer Science</i>	
Mathematics course (M 115 or higher level)	3 <sup>1</sup>
Computer Science course selected from CIS 105, AGE 111, AEC 235, or equivalent	3 <sup>2</sup>
<i>Agricultural and Biological Sciences</i>	9-12 <sup>2,3</sup>
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.	
<i>Literature and Arts</i>	6 <sup>2,3</sup>
Six credits selected from the general areas of English, Art, Art History, Communication, Music, Theatre, or Foreign Language.	
<i>Social Sciences and Humanities</i>	9 <sup>2,3</sup>
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	
<i>Physical Sciences</i>	8 <sup>1</sup>
Minimum of eight credits selected from one of the following areas: Chemistry, Physics, Geology, or Physical Science.	

**MAJOR REQUIREMENTS**

**External to the College**

C 101 General Chemistry	4 <sup>1</sup>
or	
C 103 General Chemistry	4 <sup>1</sup>
C 102 General Chemistry	4 <sup>1</sup>
or	
C 104 General Chemistry	4 <sup>1</sup>

**Within the Department**

APS 101 Introduction to Animal Science	3 <sup>1</sup>
APS 111 Animal Science Laboratory	1 <sup>1</sup>
APS 140 Functional Anatomy	4 <sup>1</sup>
APS 251 Livestock Nutrition and Feeding	3 <sup>2</sup>
APS 300 Principles of Animal and Plant Genetics	3 <sup>3</sup>
APS 332 Introduction to Animal Diseases	3 <sup>3</sup>
APS 345 Comparative Physiology of Domestic Animals	4 <sup>3</sup>
APS 465 Seminar	1 <sup>4</sup>

One course must be selected from the following:

APS 404 Dairy Production	3 <sup>3-4</sup>
APS 417 Beef Cattle and Sheep Production	3 <sup>3-4</sup>
APS 418 Swine Production	3 <sup>3-4</sup>
APS 421 Poultry Production	3 <sup>3-4</sup>

Animal Science courses 5<sup>3</sup>

No more than five credits of APS 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: APS 221, 322, 342, or 420.

**Within the Concentration**

APS 310 Animal Genetics Laboratory	1 <sup>3</sup>
B 207 Introductory Biology I	4 <sup>2</sup>
B 208 Introductory Biology II	4 <sup>2</sup>
B 371 Introduction to Microbiology	4 <sup>3</sup>
C 321 Organic Chemistry	3 <sup>2</sup>
C 325 Organic Chemistry Laboratory	1 <sup>2</sup>
C 322 Organic Chemistry	3 <sup>2</sup>
C 326 Organic Chemistry Laboratory	1 <sup>2</sup>
C 527 Introductory Biochemistry or equivalent	3 <sup>4</sup>
M 221 Calculus	3 <sup>1</sup>
PS 201 General Physics	4 <sup>3</sup>
PS 202 General Physics	4 <sup>3</sup>

**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*

AEC 201 Records and Accounts	3 <sup>2-4</sup>
APS 270 Biotechnology: Science and Socioeconomic Issues	3 <sup>2</sup>
APS 431 Infection and Immunity in Animal Diseases	4 <sup>4</sup>
APS 446 Environmental Physiology of Domestic Animals	4 <sup>3-4</sup>
APS 452 Advanced Comparative Animal Nutrition	4 <sup>3-4</sup>
APS 635 Introduction to Virology	3 <sup>4</sup>
COM 312 Oral Communications in Business	3 <sup>2</sup>
E 312 Written Communications in Business	3 <sup>2-4</sup>

**CREDITS TO TOTAL A MINIMUM OF 130**

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

**CURRICULUM** **CREDITS\***

**UNIVERSITY REQUIREMENTS**

E 110 Critical Reading and Writing	3 <sup>1</sup>
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content #	3 <sup>1-4</sup>

**COLLEGE REQUIREMENTS**

<i>Mathematics and Computer Science</i>	
Mathematics course (M 115 or higher level)	3 <sup>1</sup>
Computer Science course selected from CIS 105, AGE 111, AEC 235, or equivalent	3 <sup>2</sup>
<i>Agricultural and Biological Sciences</i>	9-12 <sup>2,3</sup>
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.	
<i>Literature and Arts</i>	6 <sup>2,3</sup>
Six credits selected from the general areas of English, Art, Art History, Communication, Music, Theatre, or Foreign Language.	
<i>Social Sciences and Humanities</i>	9 <sup>2,3</sup>
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., <sup>1</sup>freshman year, <sup>2</sup>sophomore year, etc.

#This requirement may be fulfilled through a course taken to complete major, group, breadth, or elective requirements. See page 24.

*Physical Sciences* ..... 8<sup>1</sup>  
Minimum of eight credits selected from one of the following areas: Chemistry, Physics, Geology, or Physical Science.

### MAJOR REQUIREMENTS

#### External to the College

C 101	General Chemistry	4 <sup>1</sup>
or		
C 103	General Chemistry	4 <sup>1</sup>
C 102	General Chemistry	4 <sup>1</sup>
or		
C 104	General Chemistry	4 <sup>1</sup>

#### Within the Department

APS 101	Introduction to Animal Science	3 <sup>1</sup>
APS 111	Animal Science Laboratory	1 <sup>1</sup>
APS 140	Functional Anatomy	4 <sup>1</sup>
APS 251	Livestock Nutrition and Feeding	3 <sup>2</sup>
APS 300	Principles of Animal and Plant Genetics	3 <sup>3</sup>
APS 332	Introduction to Animal Diseases	3 <sup>3</sup>
APS 345	Comparative Physiology of Domestic Animals	4 <sup>3</sup>
APS 465	Seminar	1 <sup>4</sup>

One course must be selected from the following:

APS 404	Dairy Production	3 <sup>3,4</sup>
APS 417	Beef Cattle and Sheep Production	3 <sup>3,4</sup>
APS 418	Swine Production	3 <sup>3,4</sup>
APS 421	Poultry Production	3 <sup>3,4</sup>
	Animal Science courses	5 <sup>3</sup>

No more than five credits of APS 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: APS 221, 322, 342, or 420.

#### Within the Concentration

APS 270	Biotechnology: Science and Socioeconomic Issues	3 <sup>2</sup>
APS 310	Animal Genetics Laboratory	1 <sup>3</sup>
APS 431	Infection and Immunity in Animal Diseases	4 <sup>4</sup>
APS 466	Independent Study (Approved research project)	3 <sup>4</sup>
APS 670	Molecular Genetics	3 <sup>4</sup>
B 207	Introductory Biology I	4 <sup>1</sup>
B 208	Introductory Biology II	4 <sup>1</sup>
B 301	Molecular Biology of the Cell	4 <sup>2,3</sup>
B 371	Introduction to Microbiology	4 <sup>2,3</sup>
C 321	Organic Chemistry	3 <sup>2</sup>
C 325	Organic Chemistry Laboratory	1 <sup>2</sup>
C 322	Organic Chemistry	3 <sup>2</sup>
C 326	Organic Chemistry Laboratory	1 <sup>2</sup>
C 527	Introductory Biochemistry	3 <sup>4</sup>
or		
C 641 and C 642	Biochemistry	6 <sup>4</sup>
M 221	Calculus	3 <sup>1</sup>
PS 201	General Physics	4 <sup>3</sup>
PS 202	General Physics	4 <sup>3</sup>

Select a minimum of one course from the following:

APS 624	Monogastric Nutrition	3 <sup>4</sup>
APS 633	Poultry Pathology	3 <sup>4</sup>
APS 635	Introduction to Virology	3 <sup>4</sup>
APS 643	Molecular Endocrinology	3 <sup>4</sup>
APS 645	Avian Physiology	4 <sup>4</sup>
APS 654	Ruminant Nutrition	3 <sup>4</sup>

One additional course must be selected from the following:

B 601	Immunochemistry	4 <sup>4</sup>
B 602	Molecular Biology of Animal Cells	3 <sup>4</sup>
B 650	Bacterial Physiology	3 <sup>4</sup>
B 653	Recent Advances in Molecular Biology	3 <sup>4</sup>
B 654	Biochemical Genetics	3 <sup>4</sup>
B 658	Developmental Genetics	3 <sup>4</sup>
B 671	Immunobiology	3 <sup>4</sup>
B 679	Virology	3 <sup>4</sup>
B 693	Human Genetics	3 <sup>4</sup>

### 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

C 220	Quantitative Analysis	3 <sup>2,4</sup>
C 418	Introductory Physical Chemistry	3 <sup>4</sup>
COM 350	Public Speaking	3 <sup>2</sup>
E 312	Written Communications in Business	3 <sup>2,4</sup>
FS 439/639	Food Microbiology	4 <sup>4</sup>
FS 449/649	Fermentation Technology	4 <sup>4</sup>

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

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

#### CURRICULUM

CREDITS\*

#### UNIVERSITY REQUIREMENTS

E 110	Critical Reading and Writing	3 <sup>1</sup>
	Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content #	3 <sup>1,4</sup>

#### COLLEGE REQUIREMENTS

##### Mathematics and Computer Science

	Mathematics course (M 115 or higher level)	3 <sup>1</sup>
	Computer Science course selected from CIS 105, AGE 111, AEC 235, or equivalent	3 <sup>2</sup>

##### Agricultural and Biological Sciences

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

##### Literature and Arts

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

##### Social Sciences and Humanities

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

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

#This requirement may be fulfilled through a course taken to complete major, group, breadth, or elective requirements. See page 24.

*Physical Sciences* ..... 8<sup>1</sup>  
Minimum of eight credits selected from one of the following areas: Chemistry, Physics, Geology, or Physical Science.

**MAJOR REQUIREMENTS****External to the College**

C 101	General Chemistry	4 <sup>1</sup>
or		
C 103	General Chemistry	4 <sup>1</sup>
C 102	General Chemistry	4 <sup>1</sup>
or		
C 104	General Chemistry	4 <sup>1</sup>

**Within the Department**

APS 101	Introduction to Animal Science	3 <sup>1</sup>
APS 111	Animal Science Laboratory	1 <sup>1</sup>
APS 140	Functional Anatomy	4 <sup>1</sup>
APS 251	Livestock Nutrition and Feeding	3 <sup>2</sup>
APS 300	Principles of Animal and Plant Genetics	3 <sup>3</sup>
APS 332	Introduction to Animal Diseases	3 <sup>3</sup>
APS 345	Comparative Physiology of Domestic Animals	4 <sup>3</sup>
APS 465	Seminar	1 <sup>4</sup>

One course must be selected from the following:

APS 404	Dairy Production	3 <sup>3-4</sup>
APS 417	Beef Cattle and Sheep Production	3 <sup>3-4</sup>
APS 418	Swine Production	3 <sup>3-4</sup>
APS 421	Poultry Production	3 <sup>3-4</sup>

Animal Science courses ..... 5<sup>3</sup>

No more than five credits of APS 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: APS 221, 322, 342, or 420.

**Within the Concentration**

AEC 120	Elementary Agricultural Economics	3 <sup>1</sup>
AEC 201	Records and Accounts	3 <sup>2-3</sup>
APS 201	Behavior of Domestic Animals	3
APS 441	Reproductive Physiology	3 <sup>4</sup>
APS 446	Environmental Physiology of Domestic Animals	4 <sup>4</sup>
APS 452	Advanced Comparative Animal Nutrition	4 <sup>4</sup>
C 213	Elementary Organic Chemistry	4 <sup>2</sup>
C 214	Elementary Biochemistry	3 <sup>2</sup>
C 216	Elementary Biochemistry Laboratory	1 <sup>2</sup>
ENT 205	Elements of Entomology	3 <sup>2-3</sup>
PLS 151	Introduction to Crop Science	3 <sup>2-3</sup>
PLS 204	Introduction to Soil Science	3 <sup>2-3</sup>

Select a minimum of three courses from the following:

APS 404	Dairy Production	3 <sup>3-4</sup>
APS 417	Beef Cattle and Sheep Production	3 <sup>3-4</sup>
APS 418	Swine Production	3 <sup>3-4</sup>
APS 420	Equine Management	3 <sup>3-4</sup>
APS 421	Poultry Production	3 <sup>3-4</sup>

**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**

AEC 153	Agricultural Salesmanship	3 <sup>1-2</sup>
AEC 350	Farm Management	3 <sup>3-4</sup>
AGE 328	Agricultural Waste Management Systems	3 <sup>3-4</sup>

APS 270	Biotechnology: Science and Socioeconomic Issues	3 <sup>2</sup>
APS 431	Infection and Immunity in Animal Diseases	4 <sup>4</sup>
B 207	Introductory Biology I	4 <sup>2</sup>
B 208	Introductory Biology II	4 <sup>2</sup>
B 371	Introduction to Microbiology	4 <sup>3</sup>
COM 312	Oral Communications in Business	3 <sup>3</sup>
E 312	Written Communications in Business	3 <sup>2-4</sup>
PLS 401	Agonomic Crop Science	3 <sup>4</sup>

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

**DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE****MAJOR: ANIMAL SCIENCE****CONCENTRATION: GENERAL ANIMAL SCIENCE****CURRICULUM**

**CREDITS\***

**UNIVERSITY REQUIREMENTS**

E 110	Critical Reading and Writing	3 <sup>1</sup>
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content.#		3 <sup>1-4</sup>

**COLLEGE REQUIREMENTS***Mathematics and Computer Science*

Mathematics course (M 115 or higher level)	3 <sup>1</sup>
Computer Science course selected from CIS 105, AGE 111, AEC 235, or equivalent	3 <sup>2</sup>

*Agricultural and Biological Sciences* ..... 9-12<sup>2,3</sup>

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<sup>2,3</sup>

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

*Social Sciences and Humanities* ..... 9<sup>2,3</sup>

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<sup>1</sup>

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

**MAJOR REQUIREMENTS****External to the College**

C 101	General Chemistry	4 <sup>1</sup>
or		
C 103	General Chemistry	4 <sup>1</sup>
C 102	General Chemistry	4 <sup>1</sup>
or		
C 104	General Chemistry	4 <sup>1</sup>

**Within the Department**

APS 101	Introduction to Animal Science	3 <sup>1</sup>
APS 111	Animal Science Laboratory	1 <sup>1</sup>
APS 140	Functional Anatomy	4 <sup>1</sup>
APS 251	Livestock Nutrition and Feeding	3 <sup>2</sup>
APS 300	Principles of Animal and Plant Genetics	3 <sup>3</sup>
APS 332	Introduction to Animal Diseases	3 <sup>3</sup>

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

#This requirement may be fulfilled through a course taken to complete major, group, breadth, or elective requirements. See page 24.



APS 345 Comparative Physiology of Domestic Animals .....	4 <sup>3</sup>
APS 465 Seminar .....	1 <sup>4</sup>
One course must be selected from the following:	
APS 404 Dairy Production .....	3 <sup>3,4</sup>
APS 417 Beef Cattle and Sheep Production .....	3 <sup>3,4</sup>
APS 418 Swine Production .....	3 <sup>3,4</sup>
APS 421 Poultry Production .....	3 <sup>3,4</sup>
Animal Science courses .....	5 <sup>3</sup>
No more than five credits of APS 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: APS 221, 322, 342, or 420.	

**ELECTIVES**

<i>Electives</i> .....	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*

AEC 201 Records and Accounts .....	3 <sup>2,3</sup>
APS 270 Biotechnology: Science and Socioeconomic Issues .....	3 <sup>2</sup>
B 207 Introductory Biology I .....	4 <sup>2</sup>
B 208 Introductory Biology II .....	4 <sup>2</sup>
B 371 Introduction to Microbiology .....	4 <sup>3</sup>
COM 350 Public Speaking .....	3 <sup>2</sup>
E 312 Written Communications in Business .....	3 <sup>2,4</sup>

**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: APS 101; 111; 251; 332; one course from APS 301, 431, 441, or 446; and one course from APS 404, 417, 418, 420, and 421.

**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 under-

stand systems components, and to operate systems to achieve conceptual goals without jeopardizing their effectiveness, safety or cost.

Career opportunities for engineering technologists lie in designing and developing hardware from proven concepts, analyzing and developing products, managing the construction and operation of production processes, servicing machines and systems, and providing sales support for technical products and systems. A major goal of any engineering technology program is to fully prepare graduates for employment opportunities. To accomplish this, close liaison is maintained between the educational programs and industry to give graduates the greatest opportunity for career development and to accommodate industry's needs for competent manpower.

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

Because of mutual interests and problems in production, the ET major is jointly offered by the Department of Agricultural 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 SCIENCES**  
**MAJOR: ENGINEERING TECHNOLOGY**

**CURRICULUM****CREDITS\*****UNIVERSITY REQUIREMENTS**

E 110 Critical Reading and Writing .....	3 <sup>1</sup>
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content #	3 <sup>1-4</sup>

**COLLEGE REQUIREMENTS**

<i>Communications</i> .....	6 <sup>1-3</sup>
Six credits selected to provide training in oral and written communications to include: A second writing course An oral communications course	
<i>Social Sciences and Humanities</i> .....	15 <sup>1-4</sup>
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:	
EC 151 Introduction to Microeconomics .....	3
EC 152 Introduction to Macroeconomics .....	3
Nine credits to be selected from a minimum of three of the following areas: Anthropology, Black American Studies, Criminal Justice, Economics, Education, Foreign Language, Geography, History, Philosophy, Political Science, Psychology, Sociology or Women's Studies.	9

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

#This requirement may be fulfilled through a course taken to complete major, group, breadth, or elective requirements. See page 24.



<i>Basic Sciences and Mathematics</i> .....	28 <sup>1-3</sup>
Twenty-eight credits selected to provide fundamental knowledge about nature and its phenomena and mathematics including calculus as follows:	
C 103 General Chemistry .....	4
C 104 General Chemistry .....	4
PS 201 General Physics .....	4
PS 202 General Physics .....	4
M 115 Pre-Calculus .....	3
M 221 Calculus I .....	3
M 222 Calculus II .....	3
Statistics course .....	3

**MAJOR REQUIREMENTS†**

<i>Technical Sciences</i> .....	15 <sup>1-3</sup>
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Fifteen 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.

<i>Technical Skills‡</i> .....	30 <sup>1-3</sup>
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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
AEC 235 Introduction to Data Analysis .....	3
AGE 111 Computer Applications in Engineering Technology .....	3

<i>Technical Specialization</i> .....	9 <sup>2-4</sup>
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A minimum of nine 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. A course dealing with the broad discipline of earth and life sciences is strongly recommended.

<i>Technical Management</i> .....	15 <sup>2-4</sup>
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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:

AEC 201 Records and Accounts .....	3
or	
ACC 207 Accounting I .....	3
ACC 208 Accounting II .....	3
Accounting credits cannot exceed six of the fifteen credit hours. AEC 201 will not substitute for ACC 207. ACC 207 will substitute for AEC 201.	

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

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

**ENTOMOLOGY AND APPLIED ECOLOGY**

Entomology is a biological science that emphasizes insects and their relatives: their structure, physiology, behavior, development, ecology, classification, and control. Applied ecology is the use of practical methods to control 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. The variety of insects challenges the inquisitive student to understand how insects tolerate environmental conditions, reproduce successfully, find specific food species, and develop from egg to adult. Insects are studied in many basic areas of biology such as ecology, physiology, genetics, and behavior.

Some insects attack or damage plants, animals, structures, and stored products that humans value. Others pollinate plants or attack plants and animals that humans consider pests. Still others transmit disease agents. These aspects of insects have prompted a search for ways to manipulate insect populations. Heavy reliance on poisons in the past created new problems. Modern applied entomology seeks practical, ecologically sound methods for managing insect populations.

Faculty who teach the undergraduate courses in entomology are doing research in many of the areas noted above. Students have excellent opportunities to interact closely with them through small classes, independent study, field trips, and employment as research aides.

The Department of Entomology and Applied Ecology strives to cultivate inquiring attitudes and problem-solving skills in its students. The faculty emphasizes basic study in biology and other sciences. It also encourages students to be broadly educated through exposure to the social sciences, humanities, and arts and to develop good writing and speaking skills. In total, the department prepares students for full, knowledgeable participation in everyday living whether or not they choose a career directly related to entomology or wildlife conservation.

The faculty adviser and student jointly plan the course program according to each student's career objective. Successful students enter research, teaching, business and public service positions, or they pursue graduate degrees in entomology, physiology, genetics, ecology, wildlife conservation, etc., that expand their career opportunities. Admission to, and successful completion of, graduate

†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.

study require strong academic performance and a solid background in the sciences as preparation.

Students majoring in entomology choose one of two options: *entomology* or *wildlife conservation*. These options carry no specific requirements but indicate a student's desire to emphasize one or the other aspect in his or her program.

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

#### CURRICULUM CREDITS\*

##### UNIVERSITY REQUIREMENTS

E 110	Critical Reading and Writing	3 <sup>1</sup>
	Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content #	3 <sup>1,4</sup>

##### COLLEGE REQUIREMENTS

<i>Mathematics and Computer Science</i>		
	Mathematics course (M 115 or higher level)	3 <sup>1</sup>
	Computer Science course selected from CIS 105, AGE 111, AEC 235, or equivalent	3 <sup>1,2</sup>

<i>Agricultural and Biological Sciences</i>		9-12 <sup>1,3</sup>
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.		

<i>Literature and Arts</i>		6 <sup>1,3</sup>
Six credits selected from the general areas of English, Art, Art History, Communication, Music, Theatre, or Foreign Language.		

<i>Social Sciences and Humanities</i>		9 <sup>1,3</sup>
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.		

<i>Physical Sciences</i>		8 <sup>1</sup>
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

C 101	General Chemistry	4 <sup>1</sup>
C 102	General Chemistry	4 <sup>1</sup>
B 207	Introductory Biology I	4 <sup>2</sup>
B 208	Introductory Biology II	4 <sup>2</sup>
B 302	General Ecology	3 <sup>3</sup>
AG 211	Literature of the Agricultural and Life Sciences	1 <sup>2</sup>
Nine credits from the following:		9 <sup>3,4</sup>
Biology courses at/or above the 300 level and the following		
PLS courses:		
PLS 151	Introduction to Crop Science	3
PLS 204	Introduction to Soil Science	4
PLS 303	Introductory Plant Pathology	4
PLS 300	Principles of Animal and Plant Genetics	3
PLS 402	Plant Taxonomy	3

##### Within the Department\*\*

FNT 205	Elements of Entomology	3 <sup>1</sup>
ENT 305	Entomology Laboratory	2 <sup>2</sup>
ENT 405	Insect Structure and Function	4 <sup>4</sup>
ENT 406	Insect Identification—Taxonomy	3 <sup>3,4</sup>
ENT 408	Field Taxonomy	2 <sup>3,4</sup>
ENT 465	Seminar	1 <sup>4</sup>
ENT courses		9 <sup>2,4</sup>

##### ELECTIVES

<i>Electives</i>	30 <sup>2,4</sup>
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

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 ENT credits used to satisfy departmental requirements.

##### REQUIREMENTS FOR A MINOR IN ENTOMOLOGY

The minor in entomology requires 15 credits of courses with an ENT prefix, including: ENT 205, 305, and 406. A student may emphasize entomology or wildlife conservation by proper choice of ENT 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.

##### Wildlife Conservation

An undergraduate major in entomology is appropriate for a student wishing to pursue graduate study and a career in wildlife conservation, ecology, or management. Students interested in this field should consult the PreWildlife Adviser in the department for information and guidance in course selection. The student will be an entomology major and must satisfy the same requirements. Careful selection of electives and courses to fulfill group requirements will provide sound preparation for graduate study in a wildlife-related area.

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

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

#This requirement may be fulfilled through a course taken to complete major, group, breadth, or elective requirements. See page 24.

†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.

## ENTOMOLOGY/PLANT PATHOLOGY

Because of mutual interests and problems in the broad field of food, fiber and health protection, the Department of Entomology and Applied Ecology and the Department of Plant and Soil Sciences offer a joint major, entomology/plant pathology (EPP), for a baccalaureate degree. 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 the student to study both insects and plant diseases and to emphasize one or the other depending on his or her interest.

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

E 110	Critical Reading and Writing	3 <sup>1</sup>
	Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content #	3 <sup>1-4</sup>

##### COLLEGE REQUIREMENTS

<i>Mathematics and Computer Science</i>		
	Mathematics course (M 115 or higher level)	3 <sup>1</sup>
	Computer Science course selected from CIS 105, ACE 111, AEC 235, or equivalent	3 <sup>2</sup>
<i>Agricultural and Biological Sciences</i>		
	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	9-12 <sup>1-3</sup>
<i>Literature and Arts</i>		
	Six credits selected from the general areas of English, Art, Art History, Communication, Music, Theatre, or Foreign Language.	6 <sup>1-3</sup>
<i>Social Sciences and Humanities</i>		
	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.	9 <sup>1-3</sup>
<i>Physical Sciences</i>		
	Minimum of eight credits selected from one of the following areas: Chemistry, Physics, Geology, or Physical Science.	8 <sup>1</sup>

##### MAJOR REQUIREMENTS

###### External to the College

B 207	Introductory Biology I	4 <sup>3</sup>
B 208	Introductory Biology II	4 <sup>3</sup>

C 101	General Chemistry	4 <sup>2</sup>
or		
C 103	General Chemistry	4
C 102	General Chemistry	4 <sup>2</sup>
or		
C 104	General Chemistry	4

###### Within the College

AG 211	Literature of the Agricultural and Life Sciences	1 <sup>2</sup>
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###### Within the Departments

ENT 205	Elements of Entomology	3 <sup>1</sup>
ENT 305	Entomology Laboratory	2 <sup>2</sup>
ENT 406	Insect Identification—Taxonomy	3 <sup>3,4</sup>
ENT 408	Field Taxonomy	2 <sup>3,4</sup>
ENT 411	Economic Entomology	3 <sup>3,4</sup>
ENT 465	Seminar	1 <sup>4</sup>
PLS 101	Botany I	4 <sup>1</sup>
PLS 201	Botany II	4 <sup>1</sup>
PLS 303	Introductory Plant Pathology	4 <sup>3</sup>
PLS 402	Plant Taxonomy	3 <sup>3,4</sup>
PLS 411	Diagnostic Plant Pathology	2 <sup>4</sup>
	Sixteen credits from Entomology and Applied Ecology and/or Plant Science	16 <sup>3</sup>

Five credits from among the following:

PLS 412	Diagnostic Plant Pathology Laboratory	1-6 <sup>4</sup>
PLS 413	Principles of Plant Disease Control	3 <sup>4</sup>
PLS 429	Introductory Mycology	4 <sup>4</sup>

##### ELECTIVES

<i>Electives</i>	11-14 <sup>3-4</sup>
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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.

The curriculum will prepare the student for graduate study in entomology, plant pathology or related areas or direct entry into various agricultural industries, government service, or education. 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.

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.

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

#This requirement may be fulfilled through a course taken to complete major, group, breadth, or elective requirements. See page 24.

## FOOD AND RESOURCE ECONOMICS

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

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 students for graduate work.

The curriculum in agricultural business management is offered cooperatively with the College of Business and Economics. The fundamentals of business are combined with a basic background in agriculture. This curriculum prepares the student for a career in management and research in farm-related businesses such as farm credit and financing, food processing, food wholesaling and retailing, feed and fertilizer companies, agricultural chemical companies, and agricultural cooperatives.

The curriculum in agricultural economics emphasizes farm management, 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. They are Production and Management and Resource Economics and Rural Development.

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

#### CURRICULUM

#### CREDITS\*

#### UNIVERSITY REQUIREMENTS

E 110 Critical Reading and Writing	3 <sup>1</sup>
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content #	3 <sup>1-4</sup>

#### COLLEGE REQUIREMENTS

##### Mathematics and Computer Science

Mathematics course (M 115 or higher level†)	3 <sup>1</sup>
Computer Science course (AEC 235 or equivalent)	3 <sup>1</sup>

##### Agricultural and Biological Sciences 9-12<sup>1,2</sup>

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 <sup>2</sup>
Six credits selected from the general areas of English, Art, Art History, Communication, Music, Theatre, or Foreign Language	

##### Social Sciences and Humanities 9<sup>2</sup>

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<sup>1</sup>

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

### MAJOR REQUIREMENTS

#### External to the College

ACC 207 Accounting I	3 <sup>3</sup>
ACC 208 Accounting II	3 <sup>3</sup>
COM 312 Oral Communication in Business	3 <sup>4</sup>
E 312 Written Communications in Business	3 <sup>3</sup>
EC 151 Introduction to Microeconomics	3 <sup>3</sup>
EC 152 Introduction to Macroeconomics	3 <sup>3</sup>
BU 301 Introduction to Marketing	3 <sup>3,4</sup>
Two additional courses offered by the College of Business and Economics	6 <sup>3,4</sup>

#### Within the Department

AEC 120 Elementary Agricultural Economics	3 <sup>1</sup>
AEC 125 Elementary Agricultural Economics: Applications	1 <sup>1</sup>
AEC 235 Introduction to Data Analysis	3 <sup>1</sup>
AEC 240 Quantitative Methods in Agricultural Economics	3 <sup>2</sup>
AEC 406 Agricultural Policy	3 <sup>3,4</sup>
AEC 465 Seminar	1 <sup>4</sup>

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

1. Marketing/International Trade	
AEC 404 Food Marketing	3 <sup>3,4</sup>
AEC 410 International Agricultural Trade	3 <sup>3,4</sup>
AEC 441 Futures Markets in Agriculture	4 <sup>3,4</sup>
2. Production/Management	
AEC 403 Production Economics	3 <sup>3,4</sup>
AEC 408 Research Methods	3 <sup>3,4</sup>
AEC 615 Advanced Prices and Statistics	3 <sup>3,4</sup>
AEC 427 Agricultural Finance	3 <sup>3,4</sup>
3. Resources/Development	
AEC 420 Agriculture in Economic Development	3 <sup>3,4</sup>
AEC 424 Resource Economics Theory and Policy	3 <sup>3,4</sup>
AEC 429 Rural Development Theory and Policy	3 <sup>3,4</sup>
AEC 444 Economics of Environmental Management	3 <sup>3,4</sup>

AEC 405, AEC 435, AEC 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 <sup>1,4</sup>
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

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

#This requirement may be fulfilled through a course taken to complete major, group, breadth, or elective requirements. See page 24

†M 221, M 230 and ST 201 are strongly suggested.



**DEGREE: BACHELOR OF SCIENCE IN AGRICULTURE  
MAJOR: AGRICULTURAL ECONOMICS****CURRICULUM CREDITS\*****UNIVERSITY REQUIREMENTS**

E 110 Critical Reading and Writing	3 <sup>1</sup>
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content #	3 <sup>1-4</sup>

**COLLEGE REQUIREMENTS**

<i>Mathematics and Computer Science</i>	
Mathematics course (M 115 or higher level†)	3 <sup>1</sup>
Computer Science course (AEC 235 or equivalent)	3 <sup>1</sup>
<i>Agricultural and Biological Sciences</i>	9-12 <sup>1,2</sup>
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	
<i>Literature and Arts</i>	6 <sup>2</sup>
Six credits selected from the general areas of English, Art, Art History, Communication, Music, Theatre, or Foreign Language	
<i>Social Sciences and Humanities</i>	9 <sup>2</sup>
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	
<i>Physical Sciences</i>	8 <sup>1,2</sup>
Minimum of eight credits selected from one of the following areas: Chemistry, Physics, Geology, or Physical Science	

**MAJOR REQUIREMENTS****External to the College**

COM 312 Oral Communication in Business	3 <sup>4</sup>
E 312 Written Communications in Business	3 <sup>3</sup>
EC 151 Introduction to Microeconomics	3 <sup>3</sup>
EC 152 Introduction to Macroeconomics	3 <sup>3</sup>
EC 302 Money, Credit and Banking	3 <sup>3,4</sup>
EC 300 Intermediate Microeconomic Theory	3 <sup>3,4</sup>
EC 303 Intermediate Macroeconomic Theory	3 <sup>3,4</sup>
Two additional courses offered by the College of Business and Economics at the 300 level or higher.‡	6 <sup>3,4</sup>

**Within the Department**

AEC 120 Elementary Agricultural Economics	3 <sup>1</sup>
AEC 125 Elementary Agricultural Economics: Applications	1 <sup>1</sup>
AEC 201 Records and Accounts	3 <sup>2</sup>
AEC 235 Introduction to Data Analysis	3 <sup>1</sup>
AEC 240 Quantitative Methods in Agricultural Economics	3 <sup>2</sup>
AEC 406 Agricultural Policy	3 <sup>3,4</sup>
AEC 465 Seminar	1 <sup>4</sup>

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

1. Marketing/International Trade	
AEC 404 Food Marketing	3 <sup>3,4</sup>
AEC 410 International Agricultural Trade	3 <sup>3,4</sup>
AEC 441 Futures Markets in Agriculture	4 <sup>3,4</sup>
2. Production/Management	
AEC 403 Production Economics	3 <sup>3,4</sup>

AEC 408 Research Methods	3 <sup>3,4</sup>
AEC 615 Advanced Prices and Statistics	3 <sup>3,4</sup>
AEC 427 Agricultural Finance	3 <sup>3,4</sup>
3. Resources/Development	
AEC 420 Agriculture in Economic Development	3 <sup>3,4</sup>
AEC 424 Resource Economics—Theory and Policy	3 <sup>3,4</sup>
AEC 429 Rural Economic Development—Theory and Policy	3 <sup>3,4</sup>
AEC 444 Economics of Environmental Management	3 <sup>3,4</sup>

AEC 405, AEC 435, AEC 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**

<i>Electives</i>	29-33 <sup>1-4</sup>
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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**

E 110 Critical Reading and Writing	3 <sup>1</sup>
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content #	3 <sup>1-4</sup>

**COLLEGE REQUIREMENTS**

<i>Mathematics and Computer Science</i>	
Mathematics course (M 115 or higher level†)	3 <sup>1</sup>
Computer Science course (AEC 235 or equivalent)	3 <sup>1</sup>
<i>Agricultural and Biological Sciences</i>	9-12 <sup>1,2</sup>
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	
<i>Literature and Arts</i>	6 <sup>2</sup>
Six credits selected from the general areas of English, Art, Art History, Communication, Music, Theatre, or Foreign Language	
<i>Social Sciences and Humanities</i>	9 <sup>2</sup>
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	
<i>Physical Sciences</i>	8 <sup>1,2</sup>
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., <sup>1</sup>freshman year, <sup>2</sup>sophomore year, etc.

†This requirement may be fulfilled through a course taken to complete major, group, breadth, or elective requirements. See page 24.

‡M 221, M 230 and ST 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)



## MAJOR REQUIREMENTS

### External to the College

COM 312 Oral Communication in Business	3 <sup>4</sup>
E 312 Written Communications in Business	3 <sup>3</sup>
EC 151 Introduction to Microeconomics	3 <sup>1,2</sup>
EC 152 Introduction to Macroeconomics	3 <sup>1,2</sup>
EC 302 Money, Credit and Banking	3 <sup>3,4</sup>
EC 300 Intermediate Microeconomic Theory	3 <sup>3,4</sup>
EC 303 Intermediate Macroeconomic Theory	3 <sup>3,4</sup>
Two additional courses offered by the College of Business and Economics at the 300 level or higher.†	6 <sup>3,4</sup>

### Within the Department

AEC 120 Elementary Agricultural Economics	3 <sup>1</sup>
AEC 125 Elementary Agricultural Economics: Applications	1 <sup>1</sup>
AEC 201 Records and Accounts	3 <sup>2</sup>
AEC 235 Introduction to Data Analysis	3 <sup>1</sup>
AEC 240 Quantitative Methods in Agricultural Economics	3 <sup>2</sup>
AEC 406 Agricultural Policy	3 <sup>3,4</sup>
AEC 465 Seminar	1 <sup>4</sup>

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

1. Marketing/International Trade	
AEC 404 Food Marketing	3 <sup>3,4</sup>
AEC 410 International Agricultural Trade	3 <sup>3,4</sup>
AEC 441 Futures Markets in Agriculture	4 <sup>3,4</sup>
2. Production/Management	
AEC 403 Production Economics	3 <sup>3,4</sup>
AEC 408 Research Methods	3 <sup>3,4</sup>
AEC 415 Advanced Prices and Statistics	3 <sup>3,4</sup>
AEC 427 Agricultural Finance	3 <sup>3,4</sup>
3. Resources/Development	
AEC 420 Agriculture in Economic Development	3 <sup>3,4</sup>
AEC 424 Resource Economics—Theory and Policy	3 <sup>3,4</sup>
AEC 429 Rural Economic Development—Theory and Policy	3 <sup>3,4</sup>
AEC 444 Economics of Environmental Management	3 <sup>3,4</sup>

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

AEC 350 Farm Management	3 <sup>3</sup>
AEC 403 Production in Economics	3 <sup>3,4</sup>

Agricultural Economics (AEC) 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:

BU 307 International Business Management	3 <sup>3,4</sup>
BU 309 Management and Organizational Behavior	3 <sup>3,4</sup>
EC 415 Economic Forecasting	3 <sup>3,4</sup>
ST 201 Introduction to Statistics I	3 <sup>1,2</sup>
ST 202 Introduction to Statistics II	3 <sup>1,2</sup>

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

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

## ELECTIVES

*Electives* ..... 11-15<sup>1-4</sup>  
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

E 110 Critical Reading and Writing	3 <sup>1</sup>
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content #	3 <sup>1-4</sup>

### COLLEGE REQUIREMENTS

<i>Mathematics and Computer Science</i>	
Mathematics course (M 115 or higher level†)	3 <sup>1</sup>
Computer Science course (AEC 235 or equivalent)	3 <sup>1</sup>
<i>Agricultural and Biological Sciences</i>	9-12 <sup>1,2</sup>
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.	
<i>Literature and Arts</i>	6 <sup>2</sup>
Six credits selected from the general areas of English, Art, Art History, Communication, Music, Theatre, or Foreign Language.	
<i>Social Sciences and Humanities</i>	9 <sup>2</sup>
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.	
<i>Physical Sciences</i>	8 <sup>1</sup>
Minimum of eight credits selected from one of the following areas: Chemistry, Physics, Geology, or Physical Science.	

### MAJOR REQUIREMENTS

#### External to the College

COM 312 Oral Communication in Business	3 <sup>4</sup>
E 312 Written Communications in Business	3 <sup>3</sup>
EC 151 Introduction to Microeconomics	3 <sup>1,2</sup>
EC 152 Introduction to Macroeconomics	3 <sup>1,2</sup>
EC 302 Money, Credit and Banking	3 <sup>3,4</sup>
EC 300 Intermediate Microeconomic Theory	3 <sup>3,4</sup>
EC 303 Intermediate Macroeconomic Theory	3 <sup>3,4</sup>
Two additional courses offered by the College of Business and Economics at the 300 level or higher.†	6 <sup>3,4</sup>

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

#This requirement may be fulfilled through a course taken to complete major, group, breadth, or elective requirements. See page 24.

†M 221, M 230 and ST 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).

**Within the Department**

AEC 120	Elementary Agricultural Economics .....	3 <sup>1</sup>
AEC 125	Elementary Agricultural Economics: Applications .....	1 <sup>1</sup>
AEC 201	Records and Accounts .....	3 <sup>2</sup>
AEC 235	Introduction to Data Analysis .....	3 <sup>1</sup>
AEC 240	Quantitative Methods in Agricultural Economics .....	3 <sup>2</sup>
AEC 406	Agricultural Policy .....	3 <sup>3,4</sup>
AEC 465	Seminar .....	1 <sup>4</sup>

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

<b>1. Marketing/International Trade</b>		
AEC 404	Food Marketing .....	3 <sup>3,4</sup>
AEC 410	International Agricultural Trade .....	3 <sup>3,4</sup>
AEC 441	Futures Markets in Agriculture .....	4 <sup>3,4</sup>
<b>2. Production/Management</b>		
AEC 403	Production Economics .....	3 <sup>3,4</sup>
AEC 408	Research Methods .....	3 <sup>3,4</sup>
AEC 615	Advanced Prices and Statistics .....	3 <sup>3,4</sup>
AEC 427	Agricultural Finance .....	3 <sup>3,4</sup>
<b>3. Resources/Development</b>		
AEC 420	Agriculture in Economic Development .....	3 <sup>3,4</sup>
AEC 424	Resource Economics—Theory and Policy .....	3 <sup>3,4</sup>
AEC 429	Rural Economic Development—Theory and Policy .....	3 <sup>3,4</sup>
AEC 444	Economics of Environmental Management .....	3 <sup>3,4</sup>

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

AEC 424	Resource Economics—Theory and Policy .....	3 <sup>3,4</sup>
AEC 429	Rural Economics Development—Theory and Policy .....	3 <sup>3,4</sup>
AEC 444	Economics of Environmental Management .....	3 <sup>3,4</sup>

Agricultural Economics (AEC) 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 <sup>1-4</sup>
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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:

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

AEC 405, AEC 435, AEC 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 <sup>1-4</sup>
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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 (3) process engineering technology.

Educational and research opportunities in biotechnology are fostered by the department's Biotechnology Group. The rapidly expanding field of biotechnology and food packaging has created both employment opportunities and the need for new research approaches to meet the potentials of genetic engineering, fermentation technology, medical applications, and improved food supplies. Rapid changes in industry processing techniques meet new consumer demands for products. Industry innovation also creates a demand for quality control specialists, food process engineers, and packaging specialists. The program includes course work in life and chemical sciences, mathematics and engineering, plus independent research work on applied science problems. Students may join as members of the Institute of Food Technologists.

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

CURRICULUM CREDITS\*

**UNIVERSITY REQUIREMENTS**

E 110	Critical Reading and Writing .....	3 <sup>1</sup>
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content #		3 <sup>1-4</sup>

**COLLEGE REQUIREMENTS†**

<i>Mathematics and Computer Science</i>		
Mathematics course .....		3 <sup>1</sup>
Computer Science course selected from CIS 105, AGE 111, .....		3 <sup>2</sup>
AEC 235, or equivalent		

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

#This requirement may be fulfilled through a course taken to complete major, group, breadth, or elective requirements. See page 24.

†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.

*Agricultural and Biological Sciences* ..... 9-12<sup>1,2</sup>  
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<sup>2</sup>  
Six credits selected from the general areas of English, Art, Art History, Communication, Music, Theatre, or Foreign Language.

*Social Sciences and Humanities* ..... 9<sup>2</sup>  
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<sup>1</sup>  
Minimum of eight credits selected from one of the following areas: Chemistry, Physics, Geology, or Physical Science.

#### MAJOR REQUIREMENTS†

##### External to the College

C 103	General Chemistry	4 <sup>1</sup>
C 104	General Chemistry	4 <sup>1</sup>
C 214	Elementary Biochemistry	3 <sup>2</sup>
C 220	Quantitative Analysis I	3 <sup>2</sup>
C 221	Quantitative Analysis Laboratory	1 <sup>2</sup>
PS 201	General Physics	4 <sup>2</sup>
PS 202	General Physics	4 <sup>2</sup>
B 207	Introductory Biology I	4 <sup>1</sup>
B 208	Introductory Biology II	4 <sup>1</sup>
B 371	Introduction to Microbiology	4 <sup>2</sup>
C 321	Organic Chemistry	3 <sup>2</sup>
C 325	Organic Chemistry Laboratory	1 <sup>2</sup>
C 322	Organic Chemistry	3 <sup>2</sup>
C 326	Organic Chemistry Laboratory	1 <sup>2</sup>
C 418	Introductory Physical Chemistry	3 <sup>3</sup>
C 419	Introductory Physical Chemistry	3 <sup>3</sup>
C 445	Physical Chemistry Laboratory	1 <sup>3</sup>
ND 200	Nutrition Concepts	3 <sup>1</sup>
EC 151	Introduction to Microeconomics	3 <sup>1</sup>
PSY 201	General Psychology	3 <sup>1</sup>
PSY 309	Measurement and Statistics	3 <sup>3</sup>
M 221	Calculus I	3 <sup>1</sup>
or		
M 241	Analytic Geometry and Calculus A	4
M 222	Calculus II	3 <sup>1</sup>
or		
M 242	Analytic Geometry and Calculus B	4

##### 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 C 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 (FS x66) may count toward the fulfillment of this requirement.

FS 265	Seminar: Food Science	2 <sup>1</sup>
FS 306	Food Science Laboratory	1 <sup>2</sup>
FS 365	Seminar: Food Science	1 <sup>2</sup>
FS 409	Food Processing I	4 <sup>4</sup>
FS 410	Food Processing II	4 <sup>4</sup>
FS 415	Food Process Engineering Technology I	4 <sup>4</sup>
FS 416	Food Process Engineering Technology II	4 <sup>4</sup>
FS 428	Food Chemistry	4 <sup>3</sup>

FS 429	Food Analysis	4 <sup>3</sup>
FS 439	Food Microbiology	4 <sup>3</sup>
FS 449	Fermentation Technology	4 <sup>4</sup>

#### ELECTIVES

Electives ..... 2-4<sup>3</sup>  
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**

## 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 fertility, 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. The teaching and research programs are supported by modern laboratory, greenhouse, and outdoor study areas.

Students pursuing a program of study leading to the degree Bachelor of Science in Agriculture—majoring in Plant Science—will select one of four areas of concentration: general plant science, ornamental horticulture, agronomy, or pathology.

Each candidate for a degree must earn a minimum of 124 credits; achieve a minimum cumulative grade point average of C (2.0) 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

E 110	Critical Reading and Writing	3 <sup>1</sup>
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content #		3 <sup>1-4</sup>

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

#This requirement may be fulfilled through a course taken to complete major, group, breadth, or elective requirements. See page 24.

†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 <sup>1</sup>
Computer Science course selected from CIS 105, AGE 111, .....	3 <sup>1</sup>
AEC 235, or equivalent.....	

*Agricultural and Biological Sciences*..... 9-12<sup>1,2</sup>

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<sup>2</sup>

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

*Social Sciences and Humanities*..... 9<sup>2</sup>

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<sup>1</sup>

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

**MAJOR REQUIREMENTS†****External to the College**

C 101	General Chemistry.....	4 <sup>1</sup>
or		
C 103	General Chemistry.....	4 <sup>1</sup>
C 102	General Chemistry.....	4 <sup>1</sup>
or		
C 104	General Chemistry.....	4 <sup>1</sup>
C 213	Elementary Organic Chemistry.....	4 <sup>2</sup>

One of the following three courses:

PS 101	Introduction to Physics.....	4 <sup>2</sup>
GEO 105	General Geology.....	4 <sup>2</sup>
C 214	Elementary Biochemistry.....	3 <sup>2</sup>

**Within the Department**

PLS 101	Botany I.....	4 <sup>2</sup>
PLS 201	Botany II.....	4 <sup>2</sup>
PLS 204	Introduction to Soil Science.....	4 <sup>3</sup>
PLS 300	Principles of Animal and Plant Genetics.....	3 <sup>3</sup>
PLS 303	Introductory Plant Pathology.....	4 <sup>3</sup>
PLS 305	Soil Fertility and Plant Nutrition.....	4 <sup>3</sup>
PLS 410	Introduction to Plant Physiology.....	3 <sup>4</sup>

**ELECTIVES***Electives*..... 46-50<sup>1-4</sup>

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**

E 110	Critical Reading and Writing.....	3 <sup>1</sup>
Three credits in an approved course or courses stressing .....	multicultural, ethnic, and/or gender-related content.#	3 <sup>1-4</sup>

**COLLEGE REQUIREMENTS†***Mathematics and Computer Science*

Mathematics course.....	3 <sup>1</sup>
Computer Science course selected from CIS 105, AGE 111, .....	3 <sup>1</sup>
AEC 235, or equivalent.....	

*Agricultural and Biological Sciences*..... 9-12<sup>1,2</sup>

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<sup>2</sup>

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

*Social Sciences and Humanities*..... 9<sup>2</sup>

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<sup>1</sup>

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

**MAJOR REQUIREMENTS†****External to the College**

C 101	General Chemistry.....	4 <sup>1</sup>
or		
C 103	General Chemistry.....	4 <sup>1</sup>
C 102	General Chemistry.....	4 <sup>1</sup>
or		
C 104	General Chemistry.....	4 <sup>1</sup>
C 213	Elementary Organic Chemistry.....	4 <sup>2</sup>

One of the following three courses:

PS 101	Introduction to Physics.....	4 <sup>2</sup>
GEO 105	General Geology.....	4 <sup>2</sup>
C 214	Elementary Biochemistry.....	3 <sup>2</sup>

**Within the Department**

PLS 101	Botany I.....	4 <sup>2</sup>
PLS 201	Botany II.....	4 <sup>2</sup>
PLS 204	Introduction to Soil Science.....	4 <sup>2</sup>
PLS 300	Principles of Animal and Plant Genetics.....	3 <sup>3</sup>
PLS 303	Introductory Plant Pathology.....	4 <sup>3</sup>
PLS 305	Soil Fertility and Plant Nutrition.....	4 <sup>3</sup>
PLS 410	Introduction to Plant Physiology.....	3 <sup>4</sup>

**Within the Concentration***Group One: Required courses*

PLS 133	Ornamental Horticulture.....	3 <sup>1</sup>
PLS 211	Herbaceous Landscape Plants.....	3 <sup>2</sup>
PLS 212	Woody Landscape Plants.....	3 <sup>2</sup>
PLS 422	Plant Propagation.....	3 <sup>4</sup>

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

#This requirement may be fulfilled through a course taken to complete major, group, breadth, or elective requirements. See page 24.

†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.



ENT 205 Elements of Entomology.....	3 <sup>2</sup>
ENT 305 Entomology Laboratory.....	2 <sup>3</sup>

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

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

## ELECTIVES

*Electives*..... 17-21<sup>1-4</sup>

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

E 110 Critical Reading and Writing.....	3 <sup>1</sup>
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content #	3 <sup>1-4</sup>

## COLLEGE REQUIREMENTS†

<i>Mathematics and Computer Science</i>	
Mathematics course.....	3 <sup>1</sup>
Computer Science course selected from CIS 105, AGE 111, AEC 235, or equivalent	3 <sup>1</sup>

*Agricultural and Biological Sciences*..... 9-12<sup>1,2</sup>

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<sup>2</sup>

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

*Social Sciences and Humanities*..... 9<sup>2</sup>

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<sup>1</sup>

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

## MAJOR REQUIREMENTS†

### External to the College

C 101 General Chemistry.....	4 <sup>1</sup>
or	
C 103 General Chemistry.....	4 <sup>1</sup>
C 102 General Chemistry.....	4 <sup>1</sup>
or	
C 104 General Chemistry.....	4 <sup>1</sup>
C 213 Elementary Organic Chemistry.....	4 <sup>2</sup>

One of the following three courses:

PS 101 Introduction to Physics.....	4 <sup>2</sup>
GEO 105 General Geology.....	4 <sup>2</sup>
C 214 Elementary Biochemistry.....	3 <sup>2</sup>

### Within the Department

PLS 101 Botany I.....	4 <sup>2</sup>
PLS 201 Botany II.....	4 <sup>2</sup>
PLS 204 Introduction to Soil Science.....	4 <sup>3</sup>
PLS 300 Principles of Animal and Plant Genetics.....	3 <sup>3</sup>
PLS 303 Introductory Plant Pathology.....	4 <sup>3</sup>
PLS 305 Soil Fertility and Plant Nutrition.....	4 <sup>3</sup>
PLS 410 Introduction to Plant Physiology.....	3 <sup>4</sup>

### Within the Concentration

*Group one: Required courses*

PLS 151 Introduction to Crop Science.....	3 <sup>1</sup>
PLS 401 Agronomic Crop Science.....	3 <sup>4</sup>
PLS 411 Diagnostic Plant Pathology†.....	2 <sup>3,4</sup>
PLS 412 Diagnostic Plant Pathology Laboratory†.....	1-6 <sup>3,4</sup>
C 214 Elementary Biochemistry.....	3 <sup>2</sup>
C 216 Elementary Biochemistry Laboratory.....	1 <sup>1,2</sup>
ENT 205 Elements of Entomology†.....	3 <sup>2</sup>
ENT 305 Entomology Laboratory.....	2 <sup>3</sup>

*Group Two: Select a minimum of 12 credits in consultation with  
your faculty adviser.*..... 12<sup>3,4</sup>

## ELECTIVES

*Electives*..... 11-20<sup>1-4</sup>

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

E 110 Critical Reading and Writing.....	3 <sup>1</sup>
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content #	3 <sup>1-4</sup>

## COLLEGE REQUIREMENTS†

<i>Mathematics and Computer Science</i>	
Mathematics course.....	3 <sup>1</sup>
Computer Science course selected from CIS 105, AGE 111, AEC 235, or equivalent	3 <sup>1</sup>

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

#This requirement may be fulfilled through a course taken to complete major, group, breadth, or elective requirements. See page 24.

†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.

‡6-8 credits in Biological Sciences, Chemistry, or Geology may be substituted.



<i>Agricultural and Biological Sciences</i> .....	9-12 <sup>1,2</sup>
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.	
<i>Literature and Arts</i> .....	6 <sup>2</sup>
Six credits selected from the general areas of English, Art, Art History, Communication, Music, Theatre, or Foreign Language.	
<i>Social Sciences and Humanities</i> .....	9 <sup>2</sup>
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.	
<i>Physical Sciences</i> .....	8 <sup>1</sup>
Minimum of eight credits selected from one of the following areas: Chemistry, Physics, Geology, or Physical Science.	

**MAJOR REQUIREMENTS†****External to the College**

C 101 General Chemistry .....	4 <sup>1</sup>
or	
C 103 General Chemistry .....	4 <sup>1</sup>
C 102 General Chemistry .....	4 <sup>1</sup>
or	
C 104 General Chemistry .....	4 <sup>1</sup>
C 213 Elementary Organic Chemistry .....	4 <sup>2</sup>
One of the following three courses:	
PS 101 Introduction to Physics .....	4 <sup>2</sup>
GEO 105 General Geology .....	4 <sup>2</sup>
C 214 Elementary Biochemistry .....	3 <sup>2</sup>

**Within the Department**

PLS 101 Botany I .....	4 <sup>2</sup>
PLS 201 Botany II .....	4 <sup>2</sup>
PLS 204 Introduction to Soil Science .....	4 <sup>3</sup>
PLS 300 Principles of Animal and Plant Genetics .....	3 <sup>3</sup>
PLS 303 Introductory Plant Pathology .....	4 <sup>3</sup>
PLS 305 Soil Fertility and Plant Nutrition .....	4 <sup>3</sup>
PLS 410 Introduction to Plant Physiology .....	3 <sup>4</sup>

**Within the Concentration***Group one: Required courses*

B 207 Introductory Biology I .....	4 <sup>2</sup>
B 208 Introductory Biology II .....	4 <sup>2</sup>
B 371 Introduction to Microbiology .....	4 <sup>3</sup>
ENT 305 Entomology Laboratory .....	2 <sup>3</sup>

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

PLS 401 Agronomic Crop Science .....	3 <sup>4</sup>
PLS 411 Diagnostic Plant Pathology .....	2 <sup>3,4</sup>
PLS 412 Diagnostic Plant Pathology Laboratory .....	1-6 <sup>3,4</sup>
PLS 413 Principles of Plant Disease Control .....	3 <sup>3,4</sup>
PLS 429 Introductory Mycology .....	4 <sup>3,4</sup>
PLS 602 Physiological Plant Productivity .....	3 <sup>3,4</sup>
PLS 605 Plant Breeding .....	3 <sup>3,4</sup>
PLS 607 Plant and Soil Water Relations .....	3 <sup>3,4</sup>
PLS 609 Plant Microtechnique .....	3 <sup>3,4</sup>
PLS 623 Plant Cell and Tissue Culture .....	3 <sup>3,4</sup>
ENT 465 Seminar .....	1 <sup>3,4</sup>

**ELECTIVES**

*Electives* .....

20-24<sup>1,4</sup>  
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

**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**

E 110 Critical Reading and Writing .....	3 <sup>1</sup>
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content #	3 <sup>1,4</sup>

**COLLEGE REQUIREMENTS***Mathematics and Computer Science*

Mathematics course .....	3 <sup>1</sup>
Computer Science course selected from CIS 105, AGE 111, AEC 235, or equivalent	3 <sup>1</sup>

*Agricultural and Biological Sciences* .....

9-12<sup>1,2</sup>  
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<sup>2</sup>  
Six credits selected from the general areas of English, Art, Art History, Communication, Music, Theatre, or Foreign Language.

*Social Sciences and Humanities* .....

9<sup>2</sup>  
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<sup>1</sup>  
Minimum of eight credits selected from one of the following areas: Chemistry, Physics, Geology, or Physical Science.

**External to the college**

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

E 301 Problems in Composition .....	3 <sup>3,4</sup>
E 302 Advanced Composition .....	3
E 312 Written Communication in Business .....	3
E 410 Technical Writing .....	3

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

#This requirement may be fulfilled through a course taken to complete major, group, breadth, or elective requirements. See page 24.

†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.

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

COM 200 Introduction to Human Communication Systems .....	3 <sup>3,4</sup>
COM 255 Fundamentals of Communication .....	3
COM 312 Oral Communication in Business .....	3
COM 350 Public Speaking .....	3
COM 356 Small Group Communication .....	3

#### Within the college

Thirty additional credits from any of the following departments: ... 30<sup>3,4</sup>

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<sup>1-4</sup>

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 five 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;

C = 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. The possibilities are numerous for just about any agricultural career in which the college offers course work and majors. 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 establishment of the Delaware Agricultural Experiment Station in 1888 was made possible by an act of Congress passed in 1887 known as the Hatch Act. 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 con-

tributes 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.