The College of Agricultural Sciences and Natural Resources traces its history to 1869 when the University was designated as Tennessee's Federal Land-Grant Institution. Under terms of the Federal Land-Grant Act, the University was enabled for the first time to offer instruction in agriculture. This later was expanded to include research for the development of new knowledge and extension for dissemination of such knowledge to rural people.

Two separate administration units—the Agricultural Experiment Station and the Agricultural Extension Service—were organized and assigned responsibility for research and extension functions, respectively. More recently a College of Veterinary Medicine was established. These three units and the College now constitute the University of Tennessee’s Institute of Agriculture. Thus, the College of Agricultural Sciences and Natural Resources is not only an academic unit of The University of Tennessee, Knoxville, campus, it is also an important administrative unit of the Institute of Agriculture.

There are many shared resources and positive interactions between various units of the Institute. For example, most of the faculty in the College of Agricultural Sciences and Natural Resources hold joint appointments in the Agricultural Experiment Station and they are actively involved in significant basic and applied research in agriculture and the associated natural resources. On campus and field research laboratories are utilized in the instructional programs of the College, while extension and research activities provide many students excellent part-time job opportunities.

There are many shared resources and positive interactions between various units of the Institute. For example, most of the faculty in the College of Agricultural Sciences and Natural Resources hold joint appointments in the Agricultural Experiment Station and they are actively involved in significant basic and applied research in agriculture and the associated natural resources. On campus and field research laboratories are utilized in the instructional programs of the College, while extension and research activities provide many students excellent part-time job opportunities.

CURRICULA IN AGRICULTURE

Broad opportunities for individuals to prepare for a future in agriculture, forestry, and wildlife and fisheries sciences are offered in the College of Agricultural Sciences and Natural Resources.

The College provides curricula leading to the degrees of Bachelor of Science in Agriculture, Bachelor of Science in Biosystems Engineering, Bachelor of Science in Forestry, Bachelor of Science in Ornamental Horticulture and Landscape Design and Bachelor of Science in Wildlife and Fisheries Sciences. The professional degree program in Biosystems Engineering receives strong support from the College of Engineering and is fully accredited by the Accreditation Board for Engineering and Technology. The forest resources management and wildlife recreation concentrations are fully accredited by the Society of American Foresters.

A pre-professional curriculum in veterinary medicine is offered in the College. This program is designed to prepare students for admission to the College of Veterinary Medicine located on the Knoxville campus.

Students pursuing programs leading to the degree of Bachelor of Science in Agriculture major in one of several specialized areas of agriculture offered in the College. These major areas are agricultural economics and business, agricultural education, animal science, food technology and science, and plant and soil science. Specific courses required for each of these areas are given under the departmental headings in this section of the catalog. A student must complete the curriculum outlined by the department in which he/she is majoring in order to receive a degree. In all areas of specialization, particular emphasis is placed upon the sciences as a background for agricultural instruction; other courses are included to provide a liberal education. In all subject matter areas appropriate to the educational objectives of individual students. The choice of electives in each curriculum should be made in consultation with the guidance of the faculty advisor.

Students pursuing programs leading to the degree of Bachelor of Science in Biosystems Engineering may select the concentration offered in agricultural engineering, biological engineering or food engineering. Students seeking the Bachelor of Science in Forestry may choose concentrations in forest resources management or wildlife recreation.

All academic and general requirements of the University as stated in the front section of this catalog must be met by agricultural students, and they must complete the requirements in one of the organized curricula. Students transferring into the College of Agricultural Sciences and Natural Resources from other than the UT Knoxville campus must have a grade point average of 2.0.

The use of transfer credit in technical subject matter areas appropriate to each organized curriculum will be considered and approved by the advisor of that curriculum and the Dean of the College of Agricultural Sciences and Natural Resources. When transferable, validating or proficiency examinations may be requested to determine competence in an area and to avoid unnecessary repetition. Such examinations should be taken during the first semester in residence and must be conducted under the supervision of the head of the department in which the course is offered.

A minimum of 18 semester hours of upper division technical agriculture appropriate to a specified major requirement, and approved by the major advisor, must be completed in residence to fulfill the requirements of baccalaureate degrees offered in the college.

A minimum grade point average of 2.0 for all courses taken in the department offering the major concentration is required.

Satisfactory/No Credit Courses

Students may include a maximum of 21 hours in non-directed electives taken on a satisfactory/no credit basis. Such courses must be approved by the advisor of the curriculum and the Dean of the College of Agricultural Sciences and Natural Resources.

Graduate Study in Agriculture

MASTER OF SCIENCE PROGRAMS

Programs of graduate study leading to the Master of Science degree are offered by all departments in the College of Agriculture.

DOCTORAL PROGRAMS

Graduate study programs lead to the Doctor of Philosophy degree in animal sciences, and to receive a degree in agriculture, forestry, and wildlife and fisheries sciences are offered in the College of Agricultural Sciences and Natural Resources. The College provides curricula leading to the degrees of Bachelor of Science in Agriculture, Bachelor of Science in Biosystems Engineering, Bachelor of Science in Forestry, Bachelor of Science in Ornamental Horticulture and Landscape Design and Bachelor of Science in Wildlife and Fisheries Sciences. The professional degree program in Biosystems Engineering receives strong support from the College of Engineering and is fully accredited by the Accreditation Board for Engineering and Technology. The forest resources management and wildlife recreation concentrations are fully accredited by the Society of American Foresters. A pre-professional curriculum in veterinary medicine is offered in the College. This program is designed to prepare students for admission to the College of Veterinary Medicine located on the Knoxville campus.

Students pursuing programs leading to the degree of Bachelor of Science in Agriculture major in one of several specialized areas of agriculture offered in the College. These major areas are agricultural economics and business, agricultural education, animal science, food technology and science, and plant and soil science. Specific courses required for each of these areas are given under the departmental headings in this section of the catalog. A student must complete the curriculum outlined by the department in which he/she is majoring in order to receive a degree. In all areas of specialization, particular emphasis is placed upon the sciences as a background for agricultural instruction; other courses are included to provide a liberal education. In all subject matter areas appropriate to the educational objectives of individual students. The choice of electives in each curriculum should be made in consultation with the guidance of the faculty advisor.

Students pursuing programs leading to the degree of Bachelor of Science in Biosystems Engineering may select the concentration offered in agricultural engineering, biological engineering or food engineering. Students seeking the Bachelor of Science in Forestry may choose concentrations in forest resources management or wildlife recreation.

All academic and general requirements of the University as stated in the front section of this catalog must be met by agricultural students, and they must complete the requirements in one of the organized curricula. Students transferring into the College of Agricultural Sciences and Natural Resources from other than the UT Knoxville campus must have a grade point average of 2.0.

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A minimum grade point average of 2.0 for all courses taken in the department offering the major concentration is required.

Satisfactory/No Credit Courses

Students may include a maximum of 21 hours in non-directed electives taken on a satisfactory/no credit basis. Such courses must be approved by the advisor of the curriculum and the Dean of the College of Agricultural Sciences and Natural Resources.

Graduate Study in Agriculture

MASTER OF SCIENCE PROGRAMS

Programs of graduate study leading to the Master of Science degree are offered by all departments in the College of Agriculture.

DOCTORAL PROGRAMS

Graduate study programs lead to the Doctor of Philosophy degree in animal sciences,
agricultural economics, agricultural engineering, food technology and sciences, and plant and soil science.

General requirements and policies of the Graduate School of The University of Tennes-

see relating to admission to the Graduate School, residence, language, research, examination, and admission to candidacy shall apply to these programs and are described in the Graduate Catalog.

**FACILITIES**

The College of Agricultural Sciences and Natural Resources uses the facilities on the agricultural campus, on University farms located near Knoxville, and on the main university campus. On the agricultural campus, students have access to buildings such as the Biological Sciences Building, McClure Hall, the Agricultural Engineering Building, McClure Hall, the DIX Products Building, McClure Food Technology Building, C.E. Brehm Animal Sci-

ences Building, which includes a large pension; Eltington Plant Science Building, a building housing which has the plant science departments; and greenhouses for teaching and experimental work. The buildings which have been erected recently provide facilities comparable to the best in the country for the departments which they serve. The facilities of the University on the main campus are available for the University students. Courses in the basic sciences, business, communication, humanities, and social sciences are available to agricultural students and are taught on the main university campus.

**SELECTION OF CURRICULUM**

Students who have determined their areas of special interest may choose the curriculum most adaptable to their needs when they arrive on campus. The advisor from the department will be assigned for their coun-

selling. It is not necessary, however, that the student schedule their curriculum until the end of the first year. Those who are in doubt will be assigned a special advisor to assist them in exploring agriculture and to guide them in the planning of appropriate courses for the freshman year. When they choose a curriculum, an advisor will be assigned from that department. Students with special interest in science, business, or production technology should con-

sider the advisor about selection of appropriate electives. A foundation for advanced study beyond the baccalaureate degree may be established in any curriculum if appropriate electives are included; also, courses may be elected in any of the curricula leading to the degree of Bachelor of Science in Agriculture, in preparation for employment with the Agriculture Extension Service. For this purpose, both the major-curriculum advisor and the agricultural extension advisor should be consulted.

A very careful choice of electives enables a student with an above average academic record to complete a double or major by satisfying all the requirements in each curricu-

lum. For this purpose, the advisor of each curriculum should be consulted, the dean of the College of Agricultural Sciences and Natural Resources should be informed, and each advisor should maintain a complete record of the student's progress. The major curriculum will normally require more than 120 hours credit for graduation.

**OPTIONAL MINORS**

Agricultural students may have single or multiple minors in agriculture or in other colleges recorded on their transcripts without regard to course overlap among majors and minors. A minor in a department of this College of Agricul-

tural Sciences and Natural Resources requires a minimum of 18 credit hours in courses num-

bered 200 and above with the majority of credit hours at the 300 and 400 level. All 18 of the credit hours required for the minor must be completed at UT Knoxville. Specific requirements are listed by each department offering a minor. Minors offered in the College of Agricultural Sciences and Natural Resources are open to students of other colleges who have the approval of their advisor and department.

**MINIMUM REQUIREMENTS FOR BACCALAUREATE DEGREE PROGRAMS**

All B.S. degree programs offered in the Col-

lege have the following minimum requirements: Agriculture and Renewable Natural Resources Perspectives (12 credit hours), Biological Sciences (College of Agricultural Sciences and Natural Resources courses included) (9), Computer Science (3) or equivalent experience, specific departmental requirements.

English and Communications (including English Composition (6), Speech (3), and Writing of Speaking elective (3) (12) English Composition (6) Speech (3), Writing or Speaking elective (3) Mathematical (6) Physical Sciences (Chemistry, Physics, Geology) (8) Social Sciences and Humanities (including Economics (4) and electives (6)) (12) Economics (4) Electives (6) Directed Electives (6) Major Courses (24) College of Agricultural Sciences and Natural Resources courses (outside of the major department) (at least 30 credit hours selected by the department and/or electives (12)) Other courses designated by the department and/or electives (38)

For a total of 132 hours.

**AGRICULTURAL ECONOMICS AND RURAL SOCIOLOGY**

Professors: H. Williamson (Head), Ph.D. Missouri; M.B. Bedenhoop (Emeritus), Ph.D. Purdue; R.J. Brooker, Ph.D. Florida; C.L. Claisen (Emeritus), Ph.D. Wisconsin; E.L. Elphick, Ph.D. Duke; B.C. English, Ph.D. Iowa State; L.H. Jackson, Ph.D. Purdue; J.H. Klimt (Assoc. Dean), Ph.D. Kentucky; F.O. Leutkai, Ph.D. Wisconsin; J.A. Martin (Emeritus), Ph.D. Minnesota; D.L. McLemore, Ph.D. Cornell; R.H. Mears, Ph.D. Iowa State; D.A.McKeehan, Ph.D. (Emeritus); Ph.D. Purdue; S.D. Murray, Ph.D. Tennessee; R.H. Orner, Ph.D. Illinois; W.K. Penn, Ph.D. Virginia Polytechnic Institute; D.E. Hay, Ph.D. Iowa State; J.B. Riley (Dean, College of Agricultural Sciences and Natural Resources), Ph.D. Oklahoma State University, R.K. Roberts, Ph.D. Iowa State, C.B. Sappington (Emeritus), Ph.D. Texas A&M; J.T. Wheelley (Emeritus), Ph.D. Purdue.

Associate Professors: K.L. Jensen, Ph.D. Oklahoma State; G.K. Pumelli, Ph.D. California (Davis).

Assistant Professors: E.C. Janisse, Ph.D. Maryland; P.M. Jakus, Ph.D. North Carolina State; J.A. Larson, Ph.D. Oklahoma State; J.R. Stiles, Ph.D. Texas A&M.

INDIPENDENT STUDY

Independent study and special topics courses and seminars offered in each department provide exceptional students the opportunity to explore in greater depth subject matter of unusual significance to agriculture. Students gain experience and are encouraged to assume responsi-

bilities not available in formally organized courses. In association with students and faculty from all phases of agriculture and the renewable natural resources in the study of a common problem provides an unusual challenge.

**COURSE LOAD**

Students desiring to take more than 19 hours per semester must have the approval of the dean of the college.

**TRANSFER STUDENTS**

Students who transfer to the College of Agricultural Sciences and Natural Resources from another institution, or from another college at UT Knoxville, should consult the dean if in doubt about the curriculum they wish to follow and for assignment to an appropriate advisor. Requests for substitutions or special examina-

tions should be submitted for consideration during the first semester of study in the selected curriculum.
AGRICULTURAL ECONOMICS AND BUSINESS CURRICULUM

Advisors:
Professors: Brooker, McAllister, Mundy, and Park.

This curriculum is designed to provide students with knowledge in the social sciences as well as in the physical and biological sciences and technical agriculture. Through course selection, students may prepare for employment in the rapidly expanding field of agricultural business or in the field of farm production and related areas. The business-oriented student will be prepared for the management phases of agricultural business. Employment opportunities include work in marketing of agricultural products, agricultural finance, agriculture credit agencies and banks, farm real estate and appraisal services, public and private marketing analysis, and farm information services utilizing mass communications.

Farm management oriented students will be prepared for positions such as farm managers, county agricultural agents, managers of farm supply and purchasing firms, agricultural journalists, and farm loan agents. The curriculum also provides the necessary background for graduate work in agricultural economics. Minor consists of 19 credit hours including Economics 201, Agricultural Economics 210, 342, 343, and 6 hours of Agriculture Economics and Rural Sociology electives.

Hours Credit
Freshman
Agricultural Economics 110 3
Agriculture 101 3
*Biology Science electives 9
Mathematics 103, 105 6
Economics 101 3
Economics 201 4
Agricultural Economics 240 2

Sophomore
English 299 3
Agricultural Economics 310 3
Physical Science electives 8
Biology 101, 102 6
Accounting 201, 202 6
Agricultural Economics 231 3
Plant and Soil Science 210 or 230 3

Junior
Rural Sociology 300 3
Economics 313 3
Statistics 211, 302 4
Nondepartmental agricultural electives 6
Agricultural Economics 320, 342, 343 3
Nondepartmental social science and humanities 6
Senior
Agricultural Economics 410 1
Agricultural Economics or Rural Sociology electives 15
*Agriculture electives 6

Electives 14

Total: 123 hours

AGRICULTURAL AND EXTENSION EDUCATION

Professors:

Associate Professor:
R.G. Watren, Ph.D. Penn State.

The Department of Agricultural and Extension Education has two undergraduate programs: one in Agricultural Education and one in Agricultural Extension Education and Agricultural Education.

AGRICULTURAL EXTENSION EDUCATION

The nondepartmental undergraduate curriculum is offered in Agricultural Extension Education, undergraduate courses are assembled as electives in each format curriculum. These courses are designed to develop a knowledge of the functions, responsibilities, and operations of the Agricultural Extension Service; and to provide prospective Extension employees with work experience in selected training counties.

Agricultural Education
Students who complete the requirements for graduation in Agricultural Extension receive a Bachelor of Science Degree in Agriculture with a Major in Agricultural Education. The curriculum is designed to prepare persons to assume educational and leadership roles in many phases of the agricultural industry, including agronomy, business schools, agencies, and farming and ranching. Emphasis is on preparing stu-

BIOSYSTEMS ENGINEERING

Professors:

Associate Professors:

Assistant Professors:
G.J. Hubbert, Ph.D. Illinois; D.R. Raman, Ph.D. Cornell; A.R. Womac, Ph.D. Tennessee; D.C. Yoder, Ph.D. Purdue; R.E. Yoder, Ph.D. Colorado State, P.E.

Advisors:
Professors Blelauke, Fieldland, Henry, Hartz, Womac, Raman, Wilkinson, Williams, Yoder, and Yoder.

The College of Agricultural Sciences and Natural Resources, with the cooperation of the College of Engineering, offers a four-year curriculum leading to the degree of Bachelor of Science in Biosystems Engineering. The curriculum is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology, Inc., regional and professional organizations, and foreign service to other opportunities available to biosystems engineers.

The student must fulfill the requirements for admission to the University, the minimum requirements for association include two units of algebra, one unit in trigonometry, one-half unit in geometry, and one unit in physics or chemistry. Students may remove deficiencies by registering for special classes during the freshman year.
The curriculum provides instruction in the analytical and design skills needed to solve engineering problems related to agricultural and biological systems. Three concentrations: Traditional Agricultural Engineering, Biological Engineering, and Food Engineering are available. A concentration should be selected early in the academic program since there are differences as early as the sophomore year. Graduates may pursue careers in design, analysis, or development in power and machinery, electronic and electrical systems, processing and materials handling systems, soil and water engineering, waste management, biological and environmental systems, and food engineering.

Each concentration in the curriculum has provisions for elective courses to be taken in the student's area of interest. Students must consult with their advisors each semester regarding the selection of courses and should make plans for all such elective courses before starting the junior year. In the senior year, completion of design systems and their components is emphasized. Students majoring in biosystems engineering are eligible to participate in the Engineering Cooperative Scholarship program and other student activities in the College of Engineering. Biosystems engineering majors interested in the Cooperative Engineering Scholarship program should consult with the head of the Department of Agricultural and Biosystems Engineering or their faculty advisor.

BIOSYSTEMS ENGINEERING WITH CONCENTRATION IN AGRICULTURAL ENGINEERING

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Biosystems Engineering 105</td>
</tr>
<tr>
<td>3</td>
<td>Basic Engineering 100, 111, 112</td>
</tr>
<tr>
<td>3</td>
<td>Chemistry 101, 130</td>
</tr>
<tr>
<td>3</td>
<td>English 101, 102</td>
</tr>
<tr>
<td>1</td>
<td>Mathematics 141, 142</td>
</tr>
<tr>
<td>1</td>
<td>Agriculture 101</td>
</tr>
<tr>
<td>1</td>
<td>Biosystems Engineering 201</td>
</tr>
<tr>
<td>1</td>
<td>Basic Engineering 101, 131</td>
</tr>
<tr>
<td>1</td>
<td><em>Bioengineering Elective</em></td>
</tr>
<tr>
<td>1</td>
<td>Engineering Science and Mechanics 231, 321</td>
</tr>
<tr>
<td>1</td>
<td><em>Humanities/Historical Social Sciences Elective</em></td>
</tr>
<tr>
<td>1</td>
<td>Mathematics 208, 231, 241</td>
</tr>
<tr>
<td>1</td>
<td>Physics 231, 321</td>
</tr>
<tr>
<td>1</td>
<td>Pre-Engineering 201</td>
</tr>
<tr>
<td>1</td>
<td><em>Technical Elective</em></td>
</tr>
<tr>
<td>1</td>
<td>Junior Biosystems Engineering 203, 451</td>
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<tr>
<td>1</td>
<td>Agriculture 101</td>
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<tr>
<td>1</td>
<td>Chemistry 471</td>
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<td>1</td>
<td>Economics 201</td>
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<tr>
<td>1</td>
<td>Electrical and Computer Engineering 301</td>
</tr>
<tr>
<td>1</td>
<td><em>History/Social Sciences Elective</em></td>
</tr>
<tr>
<td>1</td>
<td>Microbiology 210</td>
</tr>
<tr>
<td>1</td>
<td><em>Microbiology and/or Biostatistics</em></td>
</tr>
<tr>
<td>1</td>
<td>Biosystems Engineering 311, 400, 420, 412, 423</td>
</tr>
<tr>
<td>1</td>
<td><em>Technical Elective</em></td>
</tr>
<tr>
<td>1</td>
<td>Industrial Sciences Elective</td>
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<tr>
<td>1</td>
<td>Industrial Engineering 405</td>
</tr>
<tr>
<td>1</td>
<td>English 461 or 462</td>
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<tr>
<td>1</td>
<td><em>Elective</em></td>
</tr>
<tr>
<td>1</td>
<td><em>Total 134 hours</em></td>
</tr>
</tbody>
</table>

*For equivalent honors course.*

*At least 28 hours or placement test.*

*Score is unsatisfactory, take Mathematics 130 prior to 141. (see advisor for alternate course schedule).*

*Select from ESE 390, 492 (general biology sequence) or Botany 110 & 120 (general biology sequence).*

*May include Biosystems Engineering design courses or courses from other engineering disciplines as approved by advisor.*

### BIOSYSTEMS ENGINEERING WITH CONCENTRATION IN BIOLOGICAL ENGINEERING

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>3</td>
<td>Biosystems Engineering 105</td>
</tr>
<tr>
<td>3</td>
<td>Basic Engineering 100, 111, 112</td>
</tr>
<tr>
<td>3</td>
<td>Chemistry 101, 130</td>
</tr>
<tr>
<td>3</td>
<td>English 101, 102</td>
</tr>
<tr>
<td>1</td>
<td>Mathematics 141, 142</td>
</tr>
<tr>
<td>1</td>
<td>Agricultural Engineering 101</td>
</tr>
<tr>
<td>1</td>
<td><em>Bioengineering Elective</em></td>
</tr>
<tr>
<td>1</td>
<td><em>Engineering Science and Mechanics 231, 321</em></td>
</tr>
<tr>
<td>1</td>
<td><em>Humanities/Historical Social Sciences Elective</em></td>
</tr>
<tr>
<td>1</td>
<td>Mathematics 208, 231, 241</td>
</tr>
<tr>
<td>1</td>
<td>Physics 231, 321</td>
</tr>
<tr>
<td>1</td>
<td><em>Technical Elective</em></td>
</tr>
<tr>
<td>1</td>
<td>Senior Biosystems Engineering 402, 403, 413</td>
</tr>
<tr>
<td>1</td>
<td><em>Biosystems Engineering Design Elective</em></td>
</tr>
<tr>
<td>1</td>
<td><em>Bioengineering Elective</em></td>
</tr>
<tr>
<td>1</td>
<td>Speech 210 or 240</td>
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<tr>
<td>1</td>
<td><em>Elective</em></td>
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<tr>
<td>1</td>
<td><em>Total 134 hours</em></td>
</tr>
</tbody>
</table>

*For equivalent honors course.*

*Mathematics ACT is less than 28 or placement test.*

Biological Engineering majors interested in the Cooperative Engineering Scholarship program should consult with the head of the Department of Agricultural and Biosystems Engineering or their faculty advisor.

### BIOSYSTEMS ENGINEERING WITH CONCENTRATION IN FOOD ENGINEERING

<table>
<thead>
<tr>
<th>Hours Credit</th>
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<tbody>
<tr>
<td>3</td>
<td>Biosystems Engineering 105</td>
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<tr>
<td>3</td>
<td>Basic Engineering 100, 111, 112</td>
</tr>
<tr>
<td>3</td>
<td>Chemistry 101, 130</td>
</tr>
<tr>
<td>3</td>
<td>English 101, 102</td>
</tr>
<tr>
<td>1</td>
<td>Mathematics 141, 142</td>
</tr>
<tr>
<td>1</td>
<td>Agricultural Engineering 101</td>
</tr>
<tr>
<td>1</td>
<td><em>Bioengineering Elective</em></td>
</tr>
<tr>
<td>1</td>
<td><em>Engineering Science and Mechanics 231, 321</em></td>
</tr>
<tr>
<td>1</td>
<td><em>Humanities/Historical Social Sciences Elective</em></td>
</tr>
<tr>
<td>1</td>
<td>Mathematics 208, 231, 241</td>
</tr>
<tr>
<td>1</td>
<td>Physics 231, 321</td>
</tr>
<tr>
<td>1</td>
<td><em>Technical Elective</em></td>
</tr>
<tr>
<td>1</td>
<td>Senior Biosystems Engineering 402, 403, 413</td>
</tr>
<tr>
<td>1</td>
<td><em>Biosystems Engineering Design Elective</em></td>
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<td>1</td>
<td><em>Bioengineering Elective</em></td>
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<tr>
<td>1</td>
<td>Speech 210 or 240</td>
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<tr>
<td>1</td>
<td><em>Elective</em></td>
</tr>
<tr>
<td>1</td>
<td><em>Total 134 hours</em></td>
</tr>
</tbody>
</table>

*For equivalent honors course.*

*Mathematics ACT is less than 28 or placement test.*

Biological Engineering majors interested in the Cooperative Engineering Scholarship program should consult with the head of the Department of Agricultural and Biosystems Engineering or their faculty advisor.

### BIOSYSTEMS ENGINEERING TECHNOLOGY


No baccalaureate degree program is offered in biosystems engineering technology; however, several undergraduate courses are offered to prepare students in other disciplines to apply elementary principles, techniques and systems of engineering to the broad industry of agriculture. A minor in biosystems engineering technology requires a minimum of 18 semester hours as follows: Biosystems Engineering Technology 203, 212, 432, 433 and two of the three courses: 402, 403, 413. A program leading to the Master of Science degree with a major in biosystems engineering technology is available (see the Graduate Catalog). The graduate program is open to qualifying BS graduates from other disciplines who earned a minor in biosystems engineering technology who completed courses equivalent to those required for the minor in biosystems engineering technology.
### ANIMAL SCIENCE WITH CONCENTRATION IN PRODUCTION/MANAGEMENT

**Freshman**  
<table>
<thead>
<tr>
<th>Course</th>
<th>Hours Credit</th>
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<tbody>
<tr>
<td>Animal Science 320</td>
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<tr>
<td>Animal Science 330, 340</td>
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<tr>
<td>Animal Science 380</td>
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</table>

**Sophomore**  
<table>
<thead>
<tr>
<th>Course</th>
<th>Hours Credit</th>
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<tbody>
<tr>
<td>Animal Science 220, 260</td>
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<tr>
<td>Animal Science 290</td>
<td>3</td>
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</table>

**Junior**  
<table>
<thead>
<tr>
<th>Course</th>
<th>Hours Credit</th>
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</thead>
<tbody>
<tr>
<td>Animal Science 220, 260, 380</td>
<td>3</td>
</tr>
<tr>
<td>Agriculture 320</td>
<td>4</td>
</tr>
<tr>
<td>Plant and Soil Science 210, 211</td>
<td>4</td>
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</tbody>
</table>

**Senior**  
<table>
<thead>
<tr>
<th>Course</th>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture 400</td>
<td>3</td>
</tr>
<tr>
<td>Animal Science Electives</td>
<td>6</td>
</tr>
<tr>
<td>Other Electives</td>
<td>9</td>
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</tbody>
</table>

Total: 132 hours

**Advisors:**  
J.M. Grizzle, Ph.D. Florida; K. Holmgren-Jenkins, Ph.D., Retracts; A.F. Mathew, Ph.D. Purdue; C. Mandell-Fahedawy, D.V.M., Ph.D. Monash; University, Ph.D. M.D., Ph.D. Texas A&M; J.D. Smaling, Ph.D. Texas A&M; F.N. Schraut, Ph.D., Clemson.

**Advisers:**  

The curriculum is designed to prepare students for leadership careers in livestock production and related industries. Courses in horticulture, animal husbandry, poultry, and beef cattle production and management may be utilized, providing the opportunity for special or additional training in the dynamic livestock and poultry technology (production) areas.

Through course selection, students may prepare for general or livestock management, farming, business, or science, or elect the pre-vestibular courses preparatory for specialization. Elective selection permits special training for work with feed companies, meat animal, milk, egg, or poultry production, marketing or managerial affairs, other educational agencies, supply and equipment business, agricultural extension services, agricultural communication, public relations, and various organizations associated with agriculture.

A minor in animal science consists of 3 credits from 280 (Animal Industry & Market Evaluation) or 281 (Animal Production Systems) or 360 (Animal Evaluation) plus 8 credits from the following list:

- Economics 201
- Speech 210 or 240
- Agriculture 290
- Animal Science 220, 260

**Advisors:**  
K.R. Robbins (Head), Ph.D., Illinois; K.M. Barth (Emeritus), Ph.D., Illinois; M.G. Bel (Emeritus), Ph.D., Illinois; L.S. Hambard (Emeritus), Ph.D., Florida; T.A. Miller (Emeritus), M.D., Kansas City; J.P. McDonald (Emeritus), Ph.D., Tennessee; B.J. McInnes (Emeritus), Ph.D., Auburn; S.P. Oliver, Ph.D., Ohio State; J.M. Jenkins (Emeritus), Ph.D., Georgia; D.O. Richardson, Dean, Agric. Exp. Sta., Ph.D., Ohio State; A. Vetter, Ph.D., North Carolina State; T.W. Schultz, Ph.D., Kansas State; H.S. Winkler (Emeritus), Ph.D., Illinois; M.H. Sims, Ph.D., Auburn; L.R. Tegmueller (Emeritus), Ph.D., Kansas State.

**Associate Professors:**  
W.R. Belk, Ph.D., Tennessee; B.R. Bell, Ph.D., Pennsylvania State; H.C. Blatt, Ph.D., Illinois; R.H. Heilman, Ph.D., Marine; H.G. Ketten, Ph.D., Virginia Polytechnic Institute, F.D. Kaul, Ph.D., Kansas State; J.D. Quigley, Ph.D., Virginia Polytechnic Institute; M.O. Smith, Ph.D., Oklahoma State; J.C. Walker, Ph.D., Nebraska.
Electives allow students to select an area for specialization. Those interested in production management would select additional courses in agriculture; in business administration, economics, agricultural economics, finance, and accounting; in science/technology in chemistry, zoology, physics, and statistics, etc. Electives should be chosen with career objectives in mind and in consultation with the advisor. The area for science coursework are 250, 250, 320, 330, 340, and 360.

**PRE-VETERINARY MEDICINE PROGRAM**

This program allows students to be awarded a B.S. degree in Agriculture with a major in Animal Science, after the successful completion of the first two semesters in the College of Veterinary Medicine (CVM). Students must begin this program in the pre-veterinary curriculum. The specific requirements are:

1. Completion of all pre-veterinary requirements:
   - a. English Comp. 101-102 (3.3) - 6 hours
   - b. Humanities and Social Sciences - 18 hours
   - c. Elements of Physics 211-222 (4.4) - 8 hours
   - d. General Chemistry 120-130 (4.4) - 8 hours
   - e. Organic Chemistry 250-350 and Laboratory 369 (3.3) - 8 hours
   - f. Cellular and Comparative Biochemistry 410 (4) - 4 hours
   - g. General Biology 110-130 (4.4) - 8 hours
   - h. Genetics 200 - 4 hours
   - i. Cell Biology 210 - 4 hours
   - j. The last 30 hours of the three-year pre-veterinary curriculum must be taken at UT Knoxville.
   - k. At least 12 hours of upper division (300 and 400 level courses) must be taken at UT Knoxville.
   - l. In addition to all the required pre-veterinary medical courses, the following (or approved equivalents) must be completed before entering the College of Veterinary Medicine:
     - a. Mathematics 123-125 or 141-142 or 151-152 - 16 hours
     - b. Animal Science 101 - 1 hour
     - c. Agriculture 101 - 3 hours
     - d. Animal Science 260 - 3 hours
     - e. Animal Science 320 - 3 hours
     - f. Animal Science 380 - 3 hours
     - g. Animal Science 360 - 3 hours
     - h. One course from Animal Science 481, 482, 483, 484, 485, 486, or 489 - 3 hours
     - i. Computer Science Elective - 3 hours
     - j. Economics 201 - 3 hours
     - k. Biology 210 or 240 - 3 hours
     - l. English Comp. 101, 102 or 240
2. The last 30 hours of the three-year pre-veterinary curriculum must be taken at UT Knoxville.
3. At least 12 hours of upper division (300 and 400 level courses) must be taken at UT Knoxville.
4. In addition to all the required pre-veterinary medical courses, the following (or approved equivalents) must be completed before entering the College of Veterinary Medicine:
   - a. Mathematics 123-125 or 141-142 or 151-152 - 16 hours
   - b. Animal Science 101 - 1 hour
   - c. Agriculture 101 - 3 hours
   - d. Animal Science 260 - 3 hours
   - e. Animal Science 320 - 3 hours
   - f. Animal Science 380 - 3 hours
   - g. Animal Science 360 - 3 hours
   - h. One course from Animal Science 481, 482, 483, 484, 485, 486, or 489 - 3 hours
   - i. Computer Science Elective - 3 hours
   - j. Economics 201 - 3 hours
   - k. Biology 210 or 240 - 3 hours
   - l. English Comp. 101, 102 or 240
5. This curriculum meets the requirements for entrance to the CVM and after the first successful year in the CVM, the student will be awarded a B.S. in Agriculture with a major in Animal Science. Should the student not gain admission to the CVM after the Junior year, the student could complete the requirements for a major in Animal Science during the Senior year.

### FOOD SCIENCE AND TECHNOLOGY

C.J. Brekke (Head), Ph.D. Wisconsin; J.L. Carlisle (Assistant Professor), Ph.D. Florida; D. Janardan (Assistant Professor), Ph.D. Georgia; G.H. Jones (Emeritus), Ph.D. Illinois; S.L. Milton, Ph.D. Tennessee; J.T. Miles (Emeritus), Ph.D. Wisconsin; W.W. Overstreet (Emeritus), Ph.D. Iowa State; M.P. Penfield, Ph.D. Tennessee.

**Associate Professors:** G.L. Christen, Ph.D. Missouri; H.D. Loveland, Ph.D. Kansas State; J.R. Mount, Ph.D. Ohio State.

**Assistant Professors:** D.A. Daubert, Ph.D. Georgia; G. Hubbert, Ph.D. Illinois; R.L. van Laack, Ph.D. Iowa State.

**Adjuncts:** L.M. Draughon, Golden, Loveland, Milton, Mount and Penfield.

The major in food science and technology prepares students to apply the sciences and engineering technology to manufacture, preserve, store, and distribute foods that meet the needs and desires of consumers. Coursework emphasizes the basic principles of converting raw food materials into acceptable consumer products. Selected commodity courses detail processing of specific types of food materials. Students entering the program must have an interest in the sciences; particularly chemistry, microbiology, and biology.

This curriculum is designed to prepare students for a professional career in positions in the food industry such as food microbiologist, food chemist, quality evaluation and control supervisor; plant manager, ingredient specialists, etc. The program of coursework conforms to the guidelines in the model curriculum of the Institute of Food Technologists. A special problem course provides opportunity for practical training in food processing plants and laboratories of industry and state laboratories.

The minor in Food Science and Technology totals a minimum of 17 hours as follows:

- 140, 310, 322-323, 340 and one elective course in Food Science and Technology.

### Hours Credit

**Freshman**
- Animal Science 102 2
- Animal Science 103 2
- Biology 120 4
- English 101, 102 6
- Mathematics 123-125 or 141-142 or 151-152 6
- General Chemistry 120-130 8
- General Biology 110-130 8
- Genetics 200 4
- Cell Biology 210 4
- English Comp. 101-102 6
- Microbiology 210 4
- Statistics 201 3
- Computer Science 201 4
- Computer Science 202 4
- Foreign Language 201 4
- Agriculture 101 3
- Speech 210 3
- Communication Elective 3
- Total: 18-19 hours

**Sophomore**
- English Comp. 201-202 6
- Economics 201 3
- Economics 210-211 3
- Animal Science 481-482, 483, 484, 485, 486, or 489 13
- General Biology 220 or Animal Science 340 4
- Agriculture 290 3
- Animal Science 260 3
- Agriculture 201 3
- Animal Science 281 3
- Animal Science 282 3
- Total: 30 hours

**Junior**
- Economics 201 3
- Agriculture 201 3
- Agriculture 202 3
- Animal Science 260 3
- Agricultural Engineering Tech 422 3
- Food Science and Technology 452 3
- Food Science and Technology 460 3
- Food Science and Technology 401 2
- Economics 201 3
- Speech 210 3
- Speech 220 3
- Communication Elective 3
- Total: 13 hours

**Senior**
- Food Science and Technology 401 2
- Food Science and Technology 402 2
- Agricultural Engineering Tech 402 2
- Nutrition 365 3
- Environmental Science 360 3
- History Electives 3
- Total: 15 hours

**Graduate**
- Food Science and Technology 452 3
- Food Science and Technology 460 3
- Nutrition 365 3
- Ethics 3
- Communications Elective 3
- Communication Elective 3
- Total: 12 hours

**Electives**
- 15 hours
- May be chosen from approved list of courses meeting University requirements as Humanities or Social Sciences.
- 12 hours
- May be chosen from approved list of courses meeting University requirements as Humanities or Social Sciences.
- 12 hours
- May be chosen from approved list of courses meeting University requirements as Humanities or Social Sciences.
- 15 hours
- May be chosen from approved list of courses meeting University requirements as Humanities or Social Sciences.
- 12 hours
- May be chosen from approved list of courses meeting University requirements as Humanities or Social Sciences.
- 12 hours
- May be chosen from approved list of courses meeting University requirements as Humanities or Social Sciences.
- 12 hours
- May be chosen from approved list of courses meeting University requirements as Humanities or Social Sciences.
- 12 hours
- May be chosen from approved list of courses meeting University requirements as Humanities or Social Sciences.
- 12 hours
- May be chosen from approved list of courses meeting University requirements as Humanities or Social Sciences.

**Total: 132 hours**
For progression, will be ranked based on the relevant career goals and letter of reference requirements for progression, including having completed Junior classes. Activities, and a transcript, before registering for Spring Semester.

Core Courses

The Forestry Major: two courses in English composition (English 101 and 102 or equivalent); college algebra and calculus (Math 119 and 125 or equivalent); general chemistry (Chemistry 100 or equivalent); two courses in general biology (Biology 110 and 120 or equivalent); general economics (Economics 201 or equivalent); and statistics (Statistics 201 or equivalent). Natural Sciences (Physics 210 or equivalent); and general education (Biology 230 or equivalent).

Wildlife and Fisheries Science Majors: two courses in English composition (English 101 and 102 or equivalent); college algebra and calculus (Math 119 and 125 or equivalent); general chemistry (Chemistry 100 or equivalent); two courses in general biology (Biology 110 and 120 or equivalent); general economics (Economics 201 or equivalent); public speaking (Speech 210 or 240 or equivalent); and statistics (Statistics 201 or equivalent). Natural Sciences (Physics 210 or equivalent); and general education (Biology 230 or equivalent).

Applicants who are not accepted into the program and who believe that extenuating circumstances prevented them from meeting the criteria for progression may appeal the decision to a faculty appeals committee. Applicants receiving a positive response from the appeals committee will be admitted to the program on a provisional basis through the end of the Fall Semester; at that time they will either be fully admitted or released from the program.

FOREST RESOURCES MANAGEMENT CONCENTRATION

The Forest Resources Management Concentration provides an opportunity to obtain an education related to the management of the broad spectrum of wildlife resources. In addition to the core of required courses, there are about 18 elective credit hours for broad studies or specialized training in one or more selected areas of focus. These areas and examples of related fields of study are Forest Biology, including plant physiology and morphology, ecology, genetics, natural nutrition, forest soils; Forest Business Management including economics, accounting, finance, marketing, management, and law; Forest Economics including dendrology, business administration, social science; Forest Inventory including mathematics, statistics, computer science, photogrammetry; Forest Recreation including natural and social sciences; and Wildlife Management including ecology and behavior.

The University has over 21,000 acres of forest land available for teaching, research, and demonstration. The Tennessee Valley Authority, Great Smoky Mountains National Park, and Cherokee National Forest provide additional land and facilities available to the incoming program. Contained within these areas is a wide variety of tree species and forest types ranging from the boreal forest to southern pines and hardwoods.

WILDERNESS RECREATION CONCENTRATION

The Wilderness Recreation Concentration is an interdisciplinary degree that prepares students to work in natural resource based recreation settings on private and public lands, including

College of Agricultural Sciences and Natural Resources
WILDLIFE AND FISHERIES SCIENCE

Wildlife and fisheries management is the science and art of maintaining populations of wildlife at levels consistent with the best interests of wildlife species and of the public. Management goals may be aesthetic, economic, or ecological. Success depends upon wildlife and fisheries biologists providing assistance; scholarly application of scientific information and methods to these goals; ecological perspective; and evaluation of programs to ensure past successes, to prevent repetition of past failures, and to prepare for future needs.

A minor in Wildlife and Fisheries Science consists of 16 hours from FWF 102, 211 or 213, 317, 415, 416, WFS 541, 440, 442, 443, and 444 and 445.

Freshman

English 101, 102 ............................. 6
Mathematics 115, 115 6
Biology 110, 120 8
Lower Division Psychology or lower division Sociology or Urban Studies 200 or 210 3
Agriculture 101 3
EEB 245 or 246 3
Elective 3

Sophomore

Statistics 201 or Psychology 285 8
Agriculture 100 4
Speech 213 or 240 3
Upper Division Psychology or upper division Sociology or Geography 320 or 323 3
Journalism 201 or 412 or 450 or 451 3
Plant and Soil Science 210 3
Biological Sciences 210 3
Speech 220 or 230 or 370 or 312 or 335 or 435 3
Electives 3

Junior

Physics 311, 313, 317 11
Forest Resources 349 3
WFS 341 4
4 hours from Recreation 310, 415, 416, 430, or OHLD 380, 370 6
Electives 3

Senior

EEB 374 3
EEB 470 or Anthropology 340 4
Histories 412 or FWF 351 3
History Electives 3
Electives 3

Total: 132 hours

Notes:

1. Electives are chosen in conference with advisor.
2. Students will choose one course from Philosophy 110, 120, 240, 280, 342, 346 or Zoology 310.
3. Lists of appropriate courses in Humanities and Photography are available at the Department of Forestry, Wildlife and Fisheries Office.
Course sequences are subject to change without notice. Please consult the current university catalog for the most current information.

Turfgrass management students receive academic and hands-on instruction in the science of growth and management of turfgrasses used for recreation, landscaping, sports fields, and industrial and commercial landscapes. Students study turfgrass management, insects and diseases, soil and water management, sports field management, landscape architecture, and interior plants. Graduates in design have access to a large segment of the OHLD commodity areas of employment. Opportunities include landscape designer or sales manager for landscape design/build firms, retail nurseries and garden centers; landscape maintenance and interscapesaping firms; landscape designer, architect, or planner for city, county, and government agencies; park and recreation facilities; college or university teacher, etc.

FLORICULTURE

The floriculture field of marketing and designing flowers and plants. Students interested in crops and plants that are grown for year-round use will find courses in the floriculture field of interest. Students study floriculture, flower technology, plant pathology, and greenhouse engineering, management of plants, production, marketing, pest management, and interior plant maintenance and design. A scientific approach to selecting plants and flowers, as well as practical plant maintenance and design, is a characteristic of floriculture students. The floriculture market includes nurseries, florists, greenhouses, public gardens, interior plant services, and exterior landscaping firms. The employment opportunities for graduates of the floriculture field are many, including florist, flower shop supervisor, plant nursery manager, field nursery manager, garden center manager, landscape architect, and landscape designer.

WHOLESALE NURSERY PRODUCTION

The wholesale nursery industry is the production of trees, shrubs, and other ornamental plants in rooted or containerized form for sale to landscape contractors, garden centers, wholesale nurseries, retail nurseries, and garden centers. Students study basic woody plant ID, plant anatomy, plant morphology, plant physiology, plant pathology, and interior plant maintenance and design. A scientific approach to selecting plants and flowers, as well as practical plant maintenance and design, is a characteristic of the wholesale nursery production student. The wholesale nursery market includes nurseries, garden centers, wholesale nurseries, and retail nurseries. Opportunities for graduates of the wholesale nursery production field are many, including plant nursery manager, field nursery manager, nursery salesperson, garden center manager, landscape architect, and landscape designer.

LANDSCAPE CONSTRUCTION AND CONTRACTING

The landscape construction and contracting industry includes residential and commercial landscaping and garden center retail sales. Marketing is usually on a regional or national scale. Students study nursery management, field nursery production, crop production, marketing, and management of plants, plant pathology, and field nursery management. Opportunities for graduates of the landscape construction and contracting field are many, including store manager, landscape manager, production manager, retail marketing manager, salesperson, landscape architect, plant diagnostician, etc.

GARDEN CENTER AND RETAIL NURSERY MANAGEMENT

Garden centers and retail nurseries are the primary sources of nursery products sold to the general public. They sell a wide variety of garden supplies, including trees, shrubs, perennial plants, annuals, and bulbs. Students study retail management, marketing, crop production, and greenhouse construction. Graduates of the garden center and retail nursery management field are employed in retail nurseries, garden centers, and wholesale nurseries. Opportunities for graduates of the garden center and retail nursery management field are many, including store manager, landscape manager, field nursery manager, and plant diagnostician.
PLANT AND SOIL SCIENCE

Professors:
- Students with a Mathematics ACT of 26 or more or a
  - Mathematics 151-152 or 141-142.

Minor in Plant and Soil Science consists
- Group A: Plant and Soil Science 311, 315, 420
- Group B: Plant and Soil Science 411, 413, 424, 453, or 455.

Unrestricted Electives

Total: 132 hours

Specific requirements for these electives are available at the CUS office.

Courses should be selected in consultation with an academic advisor.

SCIENCE CONCENTRATION

Hours Credit

Freshman
- Agriculture 101 3
- Botany 101-120 or Biology 130-140 3
- Chemistry 101-102 8
- English 101-102 6
- Math 123 or 141-151 or 152 3
- Select 1 from Psychology 110 or Sociology 110 3

Sophomore
- Botany 200-220 or 235 4-6
- Math 221 3
- Agriculture 230 3
- Biology 250 3
- Computer Science 311 3
- Speech 210-240 3

Junior
- Select 3 from OHC 310, 340, 342, 370, or 463 12
- OHC 400 3
- Select 3 from Botany 210, 380, 410, Entomology and Plant Path 313, 321, Plant and Soil Science 391 or 394 9-11
- Select 1 from Chemistry 350 3
- Select 1 from History 110 or Chemistry 350 3
- Select 1 from English 350 3
- Unrestricted Elective 3

Senior
- Select 3 from OHC 410 or 440 9-12

Total: 132 hours

Students with a Mathematics ACT of 26 or more or a satisfactory placement test score should take Mathematics 141-142 or 151-152.

ENVIROSCEENCE AND NATURAL RESOURCES CONCENTRATION

The Environmental Science and Natural Resources concentration will give students a background in natural sciences including ecology, evolutionary biology, soil science, and environmental chemistry. Students will be introduced to environmental science and be trained to apply knowledge of the basic physical, chemical, and biological sciences to the study of environmental problems. Students may be broadly trained or may specialize in a more specific phase of the discipline.

Many employment opportunities are available in the field of environmental science and natural resources including positions with public agencies such as Environmental Protection Agency, Soil Conservation Service, Forest Service, Federal Credit Service, and educational institutions. Many students in the Environmental Science and Natural Resources concentration will go on to work in private industry as technical specialists, consultants, engineers, salespersons, administrators, advisors, farm managers and in international agriculture.

Students selecting this major will complete the basic curriculum for the College of Agriculture and fulfill the major group requirements. A minor may be selected from among many related disciplines.

Recommended courses for a major in Plant and Soil Science are 210, 211, 230, 401 and 471 plus 3 courses from Group A and 3 courses from Group B. Of the 6 courses chosen from Group A and B, one must be a soil science course and one must be a plant science course.

Appropriate selection of the many electives available in the Plant and Soil Science curriculum permits students to select options that meet their interests and career goals. The departmental advisor will assist in designing a program to meet the student's individual objectives. Possible options include field crops, fruits, vegetaables, and soil and water conservation, plant breeding, pest management, agriculture, environmental agriculture, environmental science, etc.

A minor in Plant and Soil Science consists of 16 credit hours including 210, 211, 230, and at least 3 elective hours. Plant and Soil Science 471 will not be accepted as a course to meet minor requirements.
such as soil and water pollution, land use, and waste disposal. Graduates in this concentration would be trained to work in private industry, on their own as concerned citizens, and in governmental agencies such as the Environmental Protection Agency, State Health Departments, Soil Conservation Service, and the Cooperative Extension Service to control, remediate, and regulate environmental problems.

### Hours Credit

#### Freshman

- English 101, 102 .......................................................6
- Agriculture 101 .......................................................3
- Agriculture 102 .......................................................3
- General Biology 100, 101 or Botany 110, 120 ..........8
- General Chemistry 121, 122 .......................................8
- Mathematics 130-150 or 151-152 or 141-142 .......... 6-8

#### Sophomore

- Plant and Soil Science 201, 210, 211, 230 ...............8
- Forestry 250 or PRF 211 ...........................................3
- Ecology 201 ............................................................4
- Geology 101 ............................................................4
- Physics 121 .............................................................3
- Speech 210 or 240 ...................................................3
- History Elective .......................................................3
- Chemistry 110 or 210 ............................................. 3-4
- Humanities Elective ................................................3

#### Junior

- Plant and Soil Science 315 or 317, 318 or 320, 330, 430, 431 .......................................................12
- University Studies 310 or 320 ..................................3
- History Elective .......................................................3
- Humanities Elective ................................................3
- Forestry, Wildlife and Fisheries Science Elective .......3
- Technical Electives ..................................................6-8
- Banker
- Agricultural Economics 470 ....................................3
- English 461 ............................................................3
- Plant and Soil Science 401, 411, 412, 413 .................7
- Agricultural Engineering Technology 442 .................3
- Technical Electives ..................................................9-11
- Social Science Elective .......................................... 3

#### Senior

- Agriculture 470 .......................................................3
- English 461 ............................................................3
- Plant and Soil Science 401, 411, 412, 413, 414 ....... 7
- Agricultural Engineering Technology 442 .................3
- Technical Electives ..................................................9-11
- Social Science Elective .......................................... 3

Total: 132 hours

1. List of approved courses in the humanities and social sciences available from the Department of Plant and Soil Sciences.
2. List of technical electives available from the student's academic advisor.

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College of Agricultural Sciences and Natural Resources