The Institute of Agriculture 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. Today, the Institute has four main divisions: College of Agriculture, College of Veterinary Medicine, Agricultural Experiment Station, and Agricultural Extension Service. In addition to agriculture and veterinary medicine, the institute conducts research and extension programs in home economics.

Agricultural Experiment Station

The Agricultural Experiment Station was established in 1887 by an act of Congress known as the Hatch Act. The purpose of the Experiment Station is to promote fundamental and applied research on all problems primarily affecting the people of Tennessee, but also having national and international implications. The research program embraces studies of the productivity of soils, plants, animals, other capital and people and the combination of these resources necessary to maintain a viable agriculture. Specific research projects relate to development of new and improved crop varieties, insect, disease, and weed control methods, cultural and harvesting techniques, and improved genetics, nutrition, physiology, and management of livestock. Other studies deal with various aspects of processing and distributing food and fiber, consumer preferences, food safety and nutritional needs and maintenance of institutions to serve people.

The results of investigations are carried to the clientele in the form of bulletins, circulars, and reports through the Agricultural Extension Service, and the state educational system through the Colleges of Agriculture and Education. Headquarters as well as the Main Station of the Agricultural Experiment Station are located at Knoxville. Eleven branch stations are located across the state. These stations are essential as research laboratories to test the performance of crop and livestock enterprises grown under different soil, climatic, and environmental conditions. The locations of the Branch Stations are as follows:

- **Ames Plantation** near Grand Junction includes 18,500 acres (about 10,000 acres in forest). The resources are held in trust by the Hobart Ames Foundation for use by the Institute of Agriculture. Large scale experiments involve forestry, farm management, crop production, and genetics and management of beef cattle and swine.
- **Dairy Experiment Station** near Lewisburg is operated in cooperation with USDA/SEA-AR. Major emphases are genetics, physiology, nutrition, and management of Jersey cattle. Production, handling and preservation of feed for dairy cattle are also being evaluated along with waste management systems.
- **Forestry Experiment Stations and Arboretum at Oak Ridge, Tullahoma, and Warburtg**. The 250-acre arboretum at Oak Ridge places emphasis on woody plants. Research in forestry studying genetics, species adaptation, fertilization, and other management practices is underway along with the adjoining land. The Cumberland forest consists of two tracts of land in Morgan and Scott counties. Research at this location deals with many of the forest problems in the Cumberlands including strip-mine reclamation. The Highland Rim Forestry Station is located near Tullahoma. Research at this location deals primarily with tree improvement through genetics and also management problems associated with the forest of the Highland Rim.
- **Middle Tennessee Experiment Station** near Spring Hill is representative of high phosphate Central Basin soils. Research studies are underway with agronomic crops, vegetables, fruits, ornamental horticulture, beef cattle, and dairy cattle of the Holstein breed.
- **Plateau Experiment Station** near Crossville consists of three farms. Studies with beef cattle, and agronomic and vegetable crops provide information about results to be expected under the cooler, more humid climate and special soil conditions of the Cumberland Plateau.
- **Tobacco Experiment Station** is located near Greeneville. Extensive research on all phases of burley tobacco is in cooperation with USDA/SEA-AR. In addition, research is underway with tobacco and other field crops.
- **UT Martin**—The research farm, adjacent to the UT Martin campus, is used for both research and teaching. The research staff at Martin, jointly employed by the Experiment Station and the School of Agriculture, cooperate with other station personnel in planning and conducting research on field crops, beef cattle, dairy cattle, and swine. Emphasis is on problems of importance to the northwestern part of the state.
- **West Tennessee Experiment Station** is located near Jackson. Major emphases are all phases of production on agronomic crops produced in the western part of the state. In addition, research deals with problems associated with fruit and vegetable production and dairy production. The USDA/SEA-AR cooperates with research on the soybean cyst nematode.
Agricultural Extension Service

M. L. Downen, Dean
Troy W. Hinton, Associate Dean
Mildred F. Clarke, Associate Dean
B. G. Hicks, Assistant Dean

The Agricultural Extension Service serves the entire state of Tennessee. This educational service of the Institute of Agriculture is active in every county extending information on agriculture, home economics, and related subjects to farm families and other citizens.

This educational organization was established July 1, 1914, by an act of Congress commonly known as the Smith-Lever Act. Staff members of the Agricultural Extension Service use a wide range of methods—farm and home visits, educational meetings, field demonstrations, publications, and mass media—in providing educational programs for people who do not have the opportunity to enroll in resident courses of instruction at colleges.

Extension service staff members develop and carry out programs to meet the specific needs of the residents of their counties. They work with both adults and youth. Educational activities for boys and girls are carried out through 4-H Clubs which are organized in schools and in communities.

County, state, and federal governments cooperate in carrying out the Agricultural Extension Service program. The United States Department of Agriculture, the State of Tennessee, and each county government provide the financial support. Any county which appropriates funds for the program may have an office located there to serve its residents. Most offices are located in county seat towns. Headquarters for the Agricultural Extension Service is at Knoxville and district administrative offices are located in Cookeville, Knoxville, Chattanooga, Nashville, and Jackson.

As a distinct administrative unit of the Institute of Agriculture, the Agricultural Extension Service works closely with the other units of the institute—the Agricultural Experiment Station, the College of Agriculture, the College of Veterinary Medicine—in providing a total program of research, instruction, and extension for developing the agriculture of the state.

College of Agriculture

O. Glen Hall, Dean

Curricula in Agriculture

Broad opportunities for individuals to prepare for a future in agriculture, forestry, and wildlife and fisheries science are offered in the College of Agriculture. The college provides curricula leading to the degrees of Bachelor of Science in Agriculture, Bachelor of Science in Agricultural Engineering, Bachelor of Science in Forestry, and Bachelor of Science in Wildlife and Fisheries Science. The professional degree program in agricultural engineering receives strong support from the College of Engineering and is fully accredited by the Accreditation Board for Engineering and Technology. The forestry curriculum is 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 the following specialized areas of agriculture offered in the college. These major areas are agricultural business, agricultural economics and rural sociology, agricultural education, agricultural mechanization, animal science, food technology and science, ornamental horticulture and landscape design, 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 the student 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 there is the opportunity to select elective courses appropriate to the educational objectives of individual students. The choice of electives in each curriculum should be made with the guidance of the faculty advisor.

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 Agriculture from other than the UTK campus must have a grade point average of 2.0. Each curriculum leading to the degree of Bachelor of Science in Agriculture includes the requirements of the basic curriculum for agriculture. For this degree, the minimum requirement is 188 quarter-hour credits. A minimum of 45 hours in agricultural courses is required. For the degrees of Bachelor of Science in Forestry and the Bachelor of Science in Wildlife and Fisheries Science, the minimum is 188 quarter-hour credits. For the degree of Bachelor of Science in Agricultural Engineering, the minimum requirement is 200 quarter-hour credits. The use of technical agriculture appropriate to each organized curriculum will be considered and approved by the advisor of that curriculum and the dean of the College of Agriculture. When desirable, 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 quarter in residence and must be conducted under the supervision of the head of the department in which the course is offered.

A minimum of 27 quarter 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.

Satisfactory/No Credit Courses

Students may include a maximum of 30 hours in non-directed electives taken on a satisfactory/no credit basis in the total hours required for graduation.

Graduate Study in Agriculture

MASTER OF SCIENCE PROGRAMS

Programs of graduate study leading to the Master of Science degree are offered in all departments in the College of Agriculture. See the Graduate Catalog for details.

A Winter Short Term for Agricultural Extension personnel and other professional agricultural workers is held each year during the last half of the winter quarter. Those attending must be accepted by The Graduate School. Students may take three courses and earn nine quarter hours of graduate credit toward the Master of Science degree. A number of courses are offered annually in agricultural extension education and in other departments in the Colleges of Agriculture and Home Economics. Additional information and a five-year schedule of course offerings may be obtained by writing to Professor R. S. Dotson, Head, Department of Agricultural Extension Education, College of Agriculture, Knoxville.

DOCTORAL PROGRAMS

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

General requirements and policies of The Graduate School of The University of Tennessee 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 Agriculture uses the facilities on the agricultural campus, on University farms located near Knoxville, and on the main University campus. On the agricultural campus are found the main agricultural building, Morgan Hall; the Agricultural Engineering Building; McCord Products Building; McLeod Food Technology Building; C. E. Brehm Animal Sciences Building, which includes a large pavilion; Ellington Plant Sciences Building which houses the plant science departments; 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.

Four farms adjacent to or within eight miles of the agricultural campus are used both for instructional and experimental purposes. Morgan Farm (80 acres), Cherokee Farm (550 acres), Plant Science Farm (212 acres), and a livestock farm (510 acres) provide excellent field laboratory facilities for instructional programs offered in the College. Cherokee Woodlot (120 acres), the Oak Ridge Forest (2,260 acres), and Ames Plantation (6,000 acres of forested land) provide excellent facilities for field work in forestry.

Transportation by bus is provided for classes of agricultural students from the agricultural campus to the University farms and to other points of interest where instruction may be given. Transportation by bus is provided for students between the agricultural campus and the main University campus so that students may make the change between classes without serious inconvenience.
The facilities of the University on the main campus are available to agricultural students. Courses in the basic sciences, business, communications, engineering, etc., are open to agricultural students and are taught on the main University campus.

Selection of Curriculum

Agricultural students who have determined their area of special interest may choose the curriculum most adaptable to their needs. When any recommendation is made an advisor from the department will be assigned for their counseling. It is not necessary, however, that freshman students select 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 of study 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 consult the advisor about selecting 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 Agricultural 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 major by taking all the requirements for one curriculum. For this purpose, the advisors of each curriculum should be consulted, the dean of the College of Agriculture should be informed, and each advisor should maintain a complete record of the student's progress.

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 the College of Agriculture requires a minimum of 24 credit hours in courses numbered 2000 and above with the majority of credit hours at the 3000 and 4000 level. At least 12 of the credit hours required for the minor must be completed at UTK. Specific requirements are listed by each department offering a minor. Minors offered in the College of Agriculture are open to students of other colleges who have the approval of their advisor and department.

Students who transfer to the College of Agriculture from another institution, or from another college in UTK, 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 examinations should be submitted for consideration during the first quarter of study in the selected curriculum.

BASIC CURRICULUM FOR AGRICULTURE

All students except those majoring in Food Technology and Agriculture or Ornamental Horticulture and Landscape Design working for a degree of Bachelor of Science in Agriculture will include in their course of study the following minimum requirements. The sequence and the selection of courses not specified will be guided by the advisor.

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th>Agriculture 1110</th>
<th>Introduction to Social Science for Agriculture</th>
<th>4</th>
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<tbody>
<tr>
<td>Agriculture 1120</td>
<td>Introduction to Agricultural Engineering</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Agriculture 1130</td>
<td>Animal Science for Agriculture</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Agriculture 1140</td>
<td>Plant Science for Agriculture</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Agriculture 1150</td>
<td>Food Technology and Science for Agriculture</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Agricultural Science</td>
<td>(courses listed in department subject-matter areas)</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td>English and Communications</td>
<td>(English 1010 or 1011; 1020; 1031 or 1033; Speech 2311, and three 4 hour literature or communications)</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Mathematics 1540-50-60</td>
<td>(general and biological science)</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Mathematics 1545-50-60</td>
<td>(Economics 2510-20 and electives, 10 hours—not more than 3 areas)</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Other Courses or Electives Hours Specified</td>
<td>By Departments</td>
<td>76</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>198</td>
<td></td>
</tr>
</tbody>
</table>

Or equivalent honors courses.

The Mathematics 1840-50-50 sequence may be necessary in some courses of study.

Exception—See Agricultural Business and Agricultural Economics.

The basic five courses in agriculture are not departmental, but the course outlines and content were prepared by a group of experienced teachers representing the appropriate subject-matter areas. They are presented by a team of teachers who work together in developing material in each course. The five courses are required of all agricultural students, except those majoring in Food Technology and Science and Ornamental Horticulture and Landscape Design, who seek the degree of Bachelor of Science in Agriculture, and the five teaching teams coordinate their work carefully to insure a unified program. A major purpose of this basic program is to present freshman agricultural students an appropriate concept of modern agriculture, its role in our economic and social structure, the unity among its several segments, and its relation to other areas of study. Basic subject-matter concepts are presented to provide suitable foundations for further study. These courses serve as strong motivation for study in the physical, biological, and social sciences, and are prerequisite to advanced courses in technical agriculture.

An Honors Seminar is offered as a challenge to exceptional students who desire to explore in greater depth some special topic of unusual significance to the student. A team of faculty members shares in this seminar as participants and resource people. The students gain experience and are encouraged to assume responsibilities not available in formally organized courses. Association with students and faculty from all phases of agriculture in the study of a common problem provides an unusual challenge.

COURSE LOAD

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

Institute of Agriculture

Agricultural Economics and Rural Sociology

AGRICULTURAL BUSINESS CURRICULUM

Advisors: Professors Martin, Brooker, McLemore, Mundy, Assistant Professors: Park and Whipple.

This curriculum is designed to prepare students for employment in the rapidly expanding field of agricultural business. Recognition is given to the desire of many college graduates to continue to work with agriculture through many public and private services where major emphasis is in areas other than farm production. This program emphasizes particularly those capacities needed for the management phases of agricultural business. Course offerings in the College of Business Administration have been used freely in this curriculum.

Preparation is given for such work in crops, livestock and poultry marketing, fertilizer and feed business, cooperative business management, agricultural credit agencies, farm real estate and appraisal services, agricultural representatives with banks, public and private market analysis, agricultural journalism, and farm information services utilizing mass communications.

Minor in Agricultural Business consists of 30 credit hours including Economics 2510-20, Agricultural Economics 3120 or 3220, Agricultural Economics 4140 or Accounting 2110, Agricultural Economics 4120 or 4610, 13 hours of Agricultural Economics and Rural Sociology electives.

Freshman

HOURS CREDIT

| Agriculture 1110-20-30-40-50 | 20 |
| Agriculture 1210-20 | 8 |
| English 1010 or 1011; 1020; 1031 or 1033 | 9 |
| Mathematics 1540-50-60 or 1840-50-60 | 12 |

Sophomore

HOURS CREDIT

Agricultural economics elective | 3 |
Biological science elective | 4 |
Chemistry 1110-20 or 1510-20 and Physics 1210-20 or Geography 1410-20 or Chemistry 1110-20-30 or 1510-20-30 and Physics 1210 or Geography 1410 | 16 |

Economics 2510-20 | 8 |
Non-departmental social science and humanities electives | 4 |
Speech 2311 | 4 |
Statistics 2100 | 3 |
Electives | 4 or 5 |

Junior

Accounting 2110-20-30 | 9 |
Agricultural Economics 3220 | 3 |
Agricultural economics and rural sociology electives | 3 |
Economics 3110 | 3 |
Journalism 2010 | 3 |
Non-departmental agricultural electives | 6 |
Non-departmental social science and humanities electives | 8 |
Rural Sociology 3420 | 3 |
Statistics 3220 | 3 |
Electives | 9 |

Senior

Agricultural Economics 4140, 4320; 4120 or 4610 | 9 |
Agricultural economics and rural sociology electives | 12 |
Agricultural Economics 4710 or Business Law 4110 | 4 or 3 |
Economics 3120 | 3 |
Office Administration 4520 | 3 |
Non-departmental agricultural electives | 3 |
Business administration electives | 9 or 10 |

TOTAL: 198 hours

*Selected from the following with no more than two courses from any one department: History 1540-20 or 2510-20; Philosophy 2510-20 or 3710; Political Science 2510-20; Psychology 2500 and 2530 or 2540; Sociology 1030; 3130; 3512 to be taken during first quarter of junior year.

To be selected from: Finance 3120, 3130, 3150; Management 3110; Marketing 3110, 3120; Transportation 3110, 3115.
AGRICULTURAL ECONOMICS AND RURAL SOCIOLOGY CURRICULUM
Advisors: Professors Martin, Boeker, McLemore, Mundy. Assistant Professors Park and Whipple.

This curriculum is designed to provide students with training in the social sciences as well as in the physical and biological sciences and technical agriculture. Recognition is given to the desire of many college graduates to enter farming, industry, and governmental agencies, research and testing organizations, and foreign service opportunities to agricultural engineers. The minimum requirements for admission include two units of algebra, one unit in geometry, and one-half unit in trigonometry. Students may remove deficiencies by registering for special classes during the freshman year.

The curriculum gives training in the fundamentals of engineering applied to problems of agriculture. In the senior year, the comprehensive design of systems and their components is emphasized.

Graduates may pursue careers in design, analysis, or development in these following specialties areas: agricultural power and machinery, agricultural structures and environment, electric power and processing, soil and water conservation engineering, and food engineering.

The curriculum provides for elective courses which can be taken in the student's area of interest. Students should check with their advisors each quarter regarding the selection of courses.

Students majoring in agricultural engineering are eligible to participate in the Engineering Cooperative Scholarship program, Engineers’ Day program, and other student activities in the College of Engineering. They are also eligible for selection into Tau Beta Pi and Alpha Zeta. Agricultural engineering majors interested in the Cooperative Engineering Scholarship program should consult with the head of the Department of Agricultural Engineering.

The curriculum is fully accredited by the Accreditation Board for Engineering and Technology. Industry, government agencies, research and testing organizations, and foreign service offer employment opportunities to agricultural engineers.

by the Accreditation Board For Engineering and Technology. Industry, government agencies, research and testing organizations, and foreign service offer employment opportunities to agricultural engineers.

Agricultural Education
Advisors: Professors Wiegert and Craig, Associate Professor Todd

The curriculum in agricultural education is planned in cooperation with the College of Education. All agricultural education courses are offered in the College of Education.

This curriculum is designed to provide students with training and professional agricultural educational service. Graduates are qualified to teach vocational agriculture. The curriculum also provides training for those who wish to enter farming, industry, and governmental services associated with agriculture, and other occupations.

The senior courses in agricultural education (except Ag. Ed. 4110) are taught at selected off-campus centers. These courses are scheduled concurrently each quarter during the regular school year.

Students should file applications for student teaching in the College of Education. (See admission to Teacher Education and Student Teaching section.)

Students seeking the requirements for general vocational agriculture certification may secure endorsements in ornamental horticulture and agricultural mechanics by meeting the following requirements:

Ornamental Horticulture—18 quarter hours of courses in ornamental horticulture and landscape design and/or plant and soil science. Subject matter areas must include plant propagation, greenhouse management, growing media, landscape design, and nursery management.

Agricultural Mechanics—18 quarter hours of courses in agricultural mechanization. Subject matter areas must include agricultural power and machinery, soil and water conservation, and agricultural structures.

Senior
Agricultural Economics 4140, 4320 and 4330.
Agricultural economics and rural sociology electives
Economics 3111-12 or Economics 3110-20 and 3 hours economics electives.
Non-departmental agricultural electives.
Non-departmental social science and humanities electives
Rural Sociology 3420
Statistics 3110
Electives

Junior
Agricultural Economics 4140, 4320 and 4330.
Agricultural economics and rural sociology electives
Economics 3111-12 or Economics 3110-20 and 3 hours economics electives.
Non-departmental agricultural electives.
Non-departmental social science and humanities electives
Rural Sociology 3420
Statistics 3110
Electives

Sophomore
Agricultural Education 3450-60-70.
Educational Psychology 3810.
Educational C & I 1020.
Animal Science 3310.
Animal Science 4820.
Horticulture electives.
Geology or physics elective.
English, Journalism, speech electives.
Agricultural Mechanization 3110.
Agricultural Mechanization 3233.
Agricultural electives.
Non-departmental agricultural electives.
Non-departmental social science and humanities electives
Rural Sociology 3420
Statistics 3220
Electives

Freshman
Agricultural Education 3450-60-70.
Educational Psychology 3810.
Educational C & I 1020.
Animal Science 3310.
Animal Science 4820.
Horticulture electives.
Geology or physics elective.
English, Journalism, speech electives.
Agricultural Mechanization 3110.
Agricultural Mechanization 3233.
Agricultural electives.
Non-departmental agricultural electives.
Non-departmental social science and humanities electives
Rural Sociology 3420
Statistics 3220
Electives

Agricultural Engineering
Advisors: Professors Luttrell, Blodse, Henry, and McDow.
Associate Professors: Mote, Tormpkins, VonBemuth, and Wilhelm.

The College of Agriculture, with the cooperation of the College of Engineering, offers a four-year curriculum leading to the degree of Bachelor of Science in Agricultural Engineering. The curriculum is fully accredited.

AGRICULTURAL ENGINEERING CURRICULUM
Advisors: Professors Luttrell, Blodse, Henry, and McDow.
Associate Professors: Mote, Tormpkins, VonBemuth, and Wilhelm.

The College of Agriculture, with the cooperation of the College of Engineering, offers a four-year curriculum leading to the degree of Bachelor of Science in Agricultural Engineering. The curriculum is fully accredited.
### Agricultural Mechanization CURRICULUM

<table>
<thead>
<tr>
<th>Courses</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>Agriculture 4210</td>
<td>3</td>
</tr>
<tr>
<td>Agriculture Mechanization 3560</td>
<td>3</td>
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<tr>
<td>Agriculture Mechanization 4170</td>
<td>3</td>
</tr>
<tr>
<td>Agricultural Mechanization 4180</td>
<td>3</td>
</tr>
<tr>
<td>Animal Science 2610</td>
<td>4</td>
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<tr>
<td>Animal Science 3310</td>
<td>3</td>
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<td>Animal Science 3310</td>
<td>3</td>
</tr>
<tr>
<td>Food Technology and Science 3020</td>
<td>4</td>
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<td>Food Technology and Science 3400</td>
<td>4</td>
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<tr>
<td>Forestry 1620</td>
<td>3</td>
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<tr>
<td>Forestry 3110</td>
<td>3</td>
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<tr>
<td>Plant and Soil Science 3110</td>
<td>4</td>
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<tr>
<td>Plant and Soil Science 3120</td>
<td>3</td>
</tr>
<tr>
<td>Plant and Soil Science 3510</td>
<td>3</td>
</tr>
<tr>
<td>Plant and Soil Science 3610</td>
<td>3</td>
</tr>
<tr>
<td>Ornamental Horticulture 3510</td>
<td>4</td>
</tr>
</tbody>
</table>

### Agricultural Extension Education

**Advisors:** Professors Dotson, Dickson and Carter.

No formal undergraduate curriculum is offered in agricultural extension education, but undergraduate courses are available as electives in the usual curriculum. Courses are designed to: (1) develop in prospective extension workers and other interested students an understanding of the functions, responsibilities, and techniques of the Cooperative Agricultural Extension Service, and (2) provide prospective extension workers with practical extension work experience in selected training counties. Graduate majors and minors are offered in agricultural extension education. Graduate courses are designed to develop in present extension workers and other interested students those competencies needed for improving the effectiveness of their work. Professor Dotson will give guidance for desired emphasis in agricultural extension education.

### Animal Science

**Advisors:** Professors Barth, Erickson, Lidall, Mclaren, Montgomery, Richardson, Shirley, Shrode; Associate Professors Backus, Hitchcock, Massicup, Robbins; Assistant Professors Bel, Godkin, Helme, Kattesh, and Smalling.

This curriculum is designed to prepare students for specialization in livestock and in related industries. Swine, poultry, sheep, dairy, and beef cattle production and management may be involved, providing the opportunity for special or additional training in the dynamic livestock and husbandry technology (production). Through course selection, the student, therefore, may prepare for general or livestock farming, management, business, or science, or elect the pre-veterinary courses preparatory for specialization. Elective selection permits special training for work with feed companies, meat animal, milk, egg, or poultry production, managerial or marketing groups, other educational agencies, supply and equipment business, agricultural extension services, agricultural communication, public relations, and various organizations associated with agriculture.

Students have the opportunity, through appropriate course selection, to obtain double majors by combining the animal science curriculum with another curriculum. Students majoring in the animal science curriculum may if they desire arrange to minor in various other curricula. The requirements for these minors shall be stipulated by the department supervising that particular curriculum. Students majoring in other curricula may opt to minor in animal science.

A minor in animal science consists of 28 credit hours including 2610, 2810, 3210, 3310, 3410, 3510 and one 3600 course and one 4800 course. Students outside of the College of Agriculture should add Agriculture 1130-39. Requests for substitution of similar courses in biology or zoology will be considered on an individual basis. It is suggested that the 3600 and 4800 series deal with the same class of livestock.

**Hours Credit**

<table>
<thead>
<tr>
<th>Course</th>
<th>Agriculture 1110, 1130, 1140</th>
<th>5</th>
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<tbody>
<tr>
<td>Biology 1200</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Mathematics 154-50-60 or 1840-50-60</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Animal Science 2610, 2810 (core requirement)</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Chemistry 1130 or 1530, and 2211-19 or 2230, or Biochemistry 3110, or Nutrition 3130</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Economics 2516-20</td>
<td>8</td>
<td></td>
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<tr>
<td>Microbiology 2910-11</td>
<td>8</td>
<td></td>
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<tr>
<td>Plant and Soil Science 2130</td>
<td>4</td>
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<tr>
<td>Physics elective</td>
<td>4</td>
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<tr>
<td>Speech 2311 and communications elective</td>
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<tr>
<td>Electives</td>
<td>2</td>
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</tr>
</tbody>
</table>

### Senior

Non-animal science agricultural electives | 6 |

### Animal Science (core requirement)

Animal Science 3210, 3220, 3320, 3430, 3430, 3430, 3510 | 24 |

Directed electives—evaluation | 3 |

Communications elective | 2 |

Electives | 9 |

Humanities-social science electives | 4 |

### Senior

Non-animal science agricultural electives | 6 |

### Animal Science 4910 (core requirement)

Directed electives | 27 |

Humanities-social science electives | 6 |

**TOTAL:** 198 hours

### Student Majoring in Agriculture

Students majoring in agriculture have the opportunity to minor in another curriculum. The requirements for these minors shall be stipulated by the department supervising the particular curriculum. Students majoring in other curricula may opt to minor in agriculture.

A minor in animal science consists of 28 credit hours including 2610, 2810, 3210, 3310, 3410, 3510 and one 3600 course and one 4800 course. Students outside of the College of Agriculture should add Agriculture 1130-39. Requests for substitution of similar courses in biology or zoology will be considered on an individual basis. It is suggested that the 3600 and 4800 series deal with the same class of livestock.

**Hours Credit**

<table>
<thead>
<tr>
<th>Course</th>
<th>Agriculture 1110, 1130, 1140</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology 1200</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Mathematics 154-50-60 or 1840-50-60</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Animal Science 2610, 2810 (core requirement)</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Chemistry 1130 or 1530, and 2211-19 or 2230, or Biochemistry 3110, or Nutrition 3130</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Economics 2516-20</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Microbiology 2910-11</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Plant and Soil Science 2130</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Physics elective</td>
<td>4</td>
<td></td>
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<tr>
<td>Speech 2311 and communications elective</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Electives</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

### Junior

Non-animal science agricultural electives | 6 |

### Animal Science (core requirement)

Animal Science 3210, 3220, 3320, 3430, 3430, 3430, 3510 | 24 |

Directed electives—evaluation | 3 |

Communications elective | 2 |

Electives | 9 |

Humanities-social science electives | 4 |

### Senior

Non-animal science agricultural electives | 6 |

### Animal Science 4910 (core requirement)

Directed electives | 27 |

Humanities-social science electives | 6 |

**TOTAL:** 198 hours

### Or equivalent honors courses.

Electives allow students to select an area for specialization. Those interested in production would select additional courses in agriculture; in business administration, economics, agricultural economics, finance, and accounting; in research in chemistry, zoology, physics, and statistics, etc. Electives...
should be chosen with career objectives in mind and in consultation with the advisor.

**PRE-VETERINARY MEDICINE OPTION**

Advisors: Professors Barth, Erickson, Lidvall, McLaren, Montgomery, Richardson, Shoote, Associate Professors Backus, Hitchcock, Masincupp, Robbins; Assistant Professors Bell, Godkin, Helmann, Kishel, Smalling.

This program is designed to guide the student in meeting the admissions requirements of The University of Tennessee College of Veterinary Medicine. The completion of specific subject matter requirements is needed. Students intending to apply to The University of Tennessee College of Veterinary Medicine must complete a minimum of 120 hours. They must complete their pre-veterinary requirements by the end of the third year and in consultation with their advisors.

It is strongly recommended that each interested student plan to pursue at least a three-year pre-veterinary program. Inquiries concerning possible course substitutions and the combining of the pre-veterinary program with a degree program should be directed to the department's pre-veterinary advisors.

**ANIMAL SCIENCE CURRICULUM WITH A PRE-VETERINARY OPTION**

This program is designed for students accepted by the UT College of Veterinary Medicine after their third undergraduate year who wish to complete their pre-veterinary requirements with a major in animal science upon completion of the first year in the College of Veterinary Medicine.

The student will need to complete the requirements as established by the College of Veterinary Medicine. In addition, the student needs to complete the courses listed above, including Economics 2610-20 and, under electives, complete Agriculture 1150 or equivalent food technology and science course; Plant and Soil Science 2130; agriculture other than animal science, six hours, (suggested Agriculture Mechanization 1410, Food Technology and Science 3840, Entomology and Plant Pathology 3210, Plant and Soil Science 3140). Students wanting to complete pre-vet requirements, but not wishing to major in animal science, should consult with the appropriate departmental advisor for a proper selection of electives.

| Hours Credit |  |
|--------------|  |
| **First year** |  |
| English 1010 or 1011 | 10 |
| 1020, 1031 or 1033 | 10 |
| Mathematics 1540, 1550, 1560 | 12 |
| Biology 1210-20-30 | 12 |
| Chemistry 1110-20-30 | 12 |
| Agriculture 1130 | 6 |
| Humanities electives | 3 |
| **Second year** |  |
| Chemistry 3211-21-31 | 9 |
| Chemistry 2319-29-39 | 9 |
| Physics 2510-20-30 | 12 |
| Agriculture 1110 | 4 |
| Economics 2510 | 4 |
| Speech 2311 | 4 |
| Animal Science 2610 4, 2610A, 3320 and 3330B and 3410B | 17 |
| **Third year** |  |
| Biochemistry 4110-20 | 8 |
| Microbiology 2810-20-30 | 5 |
| Economics 2520 | 5 |
| Social science electives | 2 |
| Humanities electives | 6 |
| *Animal science 3420, 3800 level evaluation (3 hrs), 4800 level evaluation (4 hrs)* | 10 |
| *Electives* | 14 |
| **TOTAL:** 153 hours |  |

*Students with a strong math background may omit Math 1540 and start with 1150 or elect to take the 1940-50 series or 1941-51.

*Courses required to meet the minimum of 13 hours of animal science established by the College of Veterinary Medicine. A recommended sequence for students with limited or no practical animal experience and required for those attempting to obtain B.S. in Agriculture with a major in animal science in the regular program and is required for those accepted to UT College of Veterinary Medicine after three years and who wish to obtain the B.S. in Agriculture with a major in animal science after completion of the first year in the College of Veterinary Medicine (See below).

*Animal science courses required for the 3 and 1 program to permit the student to receive a B.S. in Agriculture with a major in animal science at the end of the first year in the College of Veterinary Medicine.

*For the student accepted at the end of the third year of pre-veterinary medicine and desiring to receive a B.S. in Agriculture with a major in animal science upon successful completion of the first year in The University of Tennessee College of Veterinary Medicine, the following are required, in addition to all of the courses above: Agriculture 1150 or equivalent food technology and science course, Plant and Soil Science 2130, other agriculture outside of animal science 6 hrs. (suggested Agricultural Mechanization 1410, Food Technology and Science 3840, Entomology and Plant Pathology 3210, Plant and Soil Science 3140).

*Students wanting to complete pre-vet requirements, but not wishing to major in animal science, other than animal science, should consult with the appropriate departmental advisor for a proper selection of electives.*

| Hours Credit |  |
|--------------|  |
| **Freshman** |  |
| Agriculture 1110-30-40 (choose two) | 8 |
| Agriculture 1120 | 4 |
| Biology 1220 | 4 |
| English 1030-20-33 | 9 |
| Mathematics 1150-50-60 | 12 |
| Physics 1210-20 | 8 |
| Humanities-social sciences elective | 4 |
| **Sophomore** |  |
| Chemistry 1510-20-30 | 12 |
| Economics 2510-20 | 8 |
| Food Technology and Science 2300 | 3 |

and with the substitution of appropriate courses from the first year and the completion of a minimum of 198 hours will be granted a B.S. in Agriculture with a major in animal science. It is the student's responsibility to complete the above requirements and to initiate the request for the degree.

**Entomology and Plant Pathology**

Advisors: Professors Southard, Hily, Fless.

No undergraduate curriculum exists in the Dept. of Entomology and Plant Pathology, but a program leading to the Master of Science degree with a major in entomology and plant pathology is available (see Graduate Catalog). Courses in economic entomology, plant pathology, soil microbiology, and plant parasitic nematodes are available to agricultural students. The department is currently composed of two major disciplines: economic entomology and plant pathology. The primary objective of offering a major at the graduate level is to provide training in those disciplines which deal with the natural hazards that are the major causes of losses in agricultural production. The training gives such a graduate the foundation necessary for coping with the myriad insect and plant disease problems that constantly threaten Tennessee's dynamic agriculture.

**Food Technology and Science**

Advisors: Professors Miles, Collins, Jaynes and S. Melton; Assistant Professor: Mount.

Food technology and science is the application of the sciences and engineering to the manufacture, preservation, storage, transportation and consumer use of food products. Processing of raw food materials into consumer products by canning, freezing, dehydrating, fermenting, preserving, etc., is taught with emphasis on basic principles rather than on specific commodity procedures. Therefore, men and women who plan to enter food technology must have an interest in the sciences, particularly chemistry, biology, microbiology, and mathematics.

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, research and development manager, packing specialist, ingredients specialist, etc. The Model Curriculum of the Institute of Food Technologists was used as a guide in developing this curriculum. A special problem course provides opportunity for practical training in food processing plants and laboratories of federal and state laboratories.

Minor in Food Technology and Science consists of 25-27 hours as follows: 3810 or 4810, 4130 or 4140, 4200, 4400 and three (3) elective Food Technology and Science courses numbered 2520 or above.

| Hours Credit |  |
|--------------|  |
| **Freshman** |  |
| Agriculture 1110-30-40 (choose two) | 8 |
| Agriculture 1120 | 4 |
| Biology 1220 | 4 |
| English 1030-20-33 | 9 |
| Mathematics 1150-50-60 | 12 |
| Physics 1210-20 | 8 |
| Humanities-social sciences elective | 4 |
| **Sophomore** |  |
| Chemistry 1510-20-30 | 12 |
| Economics 2510-20 | 8 |
| Food Technology and Science 2300 | 3 |
Forest Economics—economics, business administration, social science.
Forest Engineering—engineering, computer science, photogrammetry.
Forest Inventory—mathematics, statistics, computer science, photogrammetry.
Forest Recreation—natural and social sciences.
Wildlife Management—ecology, zoology, botany.

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 teaching program. Within these areas is a wide variety of tree species and forest types ranging from elements of the boreal forest to southern pines and hardwoods.

Lumber, pulp and paper, and other wood-using industries cooperate in conducting tours and demonstrating industrial processes.

Upon completion of the four-year forestry curriculum the degree of Bachelor of Science in Forestry (B.S.F.) is awarded.

A minor in Forestry consists of 24 credit hours from any courses having a Forestry designation. Prerequisites will not be waived.

Forestry, Wildlife and Fisheries
Advisor: G. Schneider

The department offers two majors. The major in forestry leads to the degree Bachelor of Science in Forestry and the major in wildlife and fisheries science leads to the degree Bachelor of Science in Wildlife and Fisheries Science. The forestry major has three options, Forest Resource Management Option, Forest Recreation Option, and Wood Utilization Option.

FORESTRY
The profession of forestry is the science, the art, and the practice of managing and using the natural resources which occur on and in association with forest lands. Benefits are derived from the multiple resources of the forest: wood, water, wildlife, recreation, forage, and environmental amenities. Foresters are managers of these resources. Thus, our principal instructional objective is to provide the broad education needed to deal effectively with the complex of forest resources.

FOREST RESOURCE MANAGEMENT OPTION
The Forest Resource Management Option provides an opportunity to obtain an education related to the management of the broad spectrum of woodland resources. In addition to the core of required courses there are about 30 elective credit hours for broad studies of specialized training in one or more areas of forestry. These areas and examples of related fields of study include:

- Forest Biology—plant physiology and morphology, ecology, genetics, tree nutrition, forest soils.
- Forest Business Management—economics, accounting, finance, marketing, management science.

TOTAL: 198 hours

with leisure time and its use and the relationship of forest resources to the constructive utilization of leisure time.

Forestry Hours Credit

Botany 1110-20 or Biology 1210-20

English 1010 or 1011; 1020; 1031 or 1032 or 1033

Foreign 1860

FOREST RECREATION OPTION
The Forest Recreation Option provides students with opportunities to obtain an education in preparation for professional positions in the planning, development, interpretation, and management of private and public forested lands for recreational purposes. Students are also exposed to the basic philosophy and principles associated

TOTAL: 198 hours

Forest option is accepted in lieu of 1410 for those wishing to elect additional courses in this area.

WOOD UTILIZATION OPTION
The wood utilization option trains students for careers in forest products industries such as lumber, furniture, pulp and paper, or wood composites. Coursework is oriented toward the application of wood technology and engineering principles to wood processing. A sound background in basic sciences is required.

Demand for forest products is forecasted to increase. This increased demand should continue to provide excellent employment opportunities for forest products graduates.

Forestry Hours Credit

English 1010 or 1011; 1020; 1031 or 1032 or 1033

Botany 1110-20

Foreign 1860
### Institute of Agriculture

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economics 2610-20</td>
<td>8</td>
</tr>
<tr>
<td>Forestry 3040-50</td>
<td>7</td>
</tr>
<tr>
<td>Mathematics 2840-50</td>
<td>8</td>
</tr>
<tr>
<td>Basic Engineering 1310, 1410</td>
<td>6</td>
</tr>
<tr>
<td>Statistics 3450-60</td>
<td>6</td>
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<tr>
<td>Industrial Engineering 2320</td>
<td>3</td>
</tr>
<tr>
<td>Computer Science 1510</td>
<td>4</td>
</tr>
<tr>
<td>Forestry 3230, 3320, 3110-20, 3320, 3000</td>
<td>18</td>
</tr>
<tr>
<td>Industrial Engineering 3610-20-30, 3450-40</td>
<td>15</td>
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<tr>
<td>Engineering Graphics 1410-20</td>
<td>6</td>
</tr>
<tr>
<td>Humanities-social science electives</td>
<td>6</td>
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<tr>
<td>Communication electives</td>
<td>3</td>
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<tr>
<td>Senior</td>
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<tr>
<td>Industrial Engineering 4060, 4200, 4520</td>
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<tr>
<td>Entomology and Plant Pathology 3210</td>
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<tr>
<td>Forestry 4150, 4520-50-60</td>
<td>14</td>
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<tr>
<td>Accounting 2110</td>
<td>3</td>
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<tr>
<td>Humanities-social science electives</td>
<td>6</td>
</tr>
<tr>
<td>Text electives</td>
<td>12</td>
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<td>Electives</td>
<td>6</td>
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<tr>
<td><strong>TOTAL:</strong></td>
<td><strong>202</strong></td>
</tr>
</tbody>
</table>

*Or equivalent honors courses.
*For students entering the option with no math credit, (e.g. Freshman) the engineering math series is required: 1840-50-60.
*For students who have some math credit, through 1841, transfer credit for 1840 will be given.

### Wildlife and Fisheries Science

Wildlife and Fisheries Science is the science and art of maintaining populations of wild animals at levels consistent with the best interests of wild species themselves and of the American public. Management goals may be aesthetic, economic, or ecological. Success depends upon wildlife and fisheries biologists giving assistance in attaining the goals for which they strive; scholarly application of scientific information and methods to these goals; ecological perspective, and execution of programs to maintain past successes, to prevent repetition of past failures, and to prepare for future needs.

Upon completion of the four-year wildlife and fisheries science curriculum, the degree of Bachelor of Science in Wildlife and Fisheries Science is awarded.

Minor in Wildlife and Fisheries Science consists of 24 hours as follows: 3230, any three courses from the following: 4450, 4460, 4510, 4520, and 9 additional hours taken from a list of approved courses maintained in the Department of Forestry, Wildlife and Fisheries. Prerequisites will not be waived.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forestry 3110</td>
<td>4</td>
</tr>
<tr>
<td>Forestry 3220 or 4020</td>
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</tr>
<tr>
<td>Forestry 3280</td>
<td>3</td>
</tr>
<tr>
<td>Plant and Soil Science 3202, 3120, or 3140</td>
<td>3</td>
</tr>
<tr>
<td>Botany 3030</td>
<td>3</td>
</tr>
<tr>
<td>Zoology 4300, 4190, 4290, or 4300 (choose two)</td>
<td>8</td>
</tr>
<tr>
<td>Biology 3110</td>
<td>4</td>
</tr>
<tr>
<td>Fisheries and Fisheries Science 3820</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td>6-9</td>
</tr>
<tr>
<td>Senior</td>
<td></td>
</tr>
<tr>
<td>Zoology 4660</td>
<td>4</td>
</tr>
<tr>
<td>Fisheries and Fisheries Science 4450, 4460</td>
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<td>Wildlife and Fisheries Science 4520</td>
<td>8</td>
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<tr>
<td>Forestry 4210</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td>22-27</td>
</tr>
</tbody>
</table>

**TOTAL:** 198 hours

### Ornamental Horticulture and Landscape Design

#### Advisor: Professor Crater

Human needs go beyond food, clothing, and shelter. We require a degree of control over environment, especially immediate surroundings. Ornamental plants and their uses are recognized as part of the environment, hence a curriculum in ornamental horticulture and landscape design. The four areas of study within this curriculum are horticulture, nursery management, turfgrass management, and landscape design.

The area of floriculture includes the science of producing flowering plants in field and greenhouse, and the art and science of using these plants for the enjoyment of humans. Opportunities are available as greenhouse managers, floral designers, retail salespersons, garden writers, research workers, and teachers.

Nursery management deals with the growing of trees, shrubs, and other ornamental plants for sale. Skills necessary to be a nursery manager include horticultural knowledge and a business sense. Students in this area are prepared to work in nurseries, garden centers, botanical gardens, and arboreta. They may find opportunities also in research, teaching, writing, sales, and landscape maintenance.

Turfgrass management includes all aspects of growing and caring for turfgrass, whether it be golf greens or home lawns. The increasing number of golf courses and home lawns and the emphasis on better quality make new opportunities for turfgrass managers. Such opportunities include golf course superintendents, park and recreational turf managers, operation of a lawn maintenance business, producer and seller of sod, research, teaching, and sales.

Landscape design means modifying the outdoor environment for the greatest use, comfort, and enjoyment. It not only means the use of trees, shrubs, and other plant material to accomplish this goal, but it also means having an understanding of the requirements for working, recreation, and housing. Emphasis in the area of landscape design is on plant material and design courses. Opportunities in this area include landscape nursery operation, landscape management, garden center operation, allied, sales highway landscaping, park development, research, teaching, and writing.

#### Minor in Ornamental Horticulture and Landscape Design

Consists of 27 hours as follows: required courses, 3030, 3110, 3210, 3610, and at least 13 hours of upper-division OHL-D electives. Prerequisites will not be waived.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture 1140, 1110 or 1130 or 1150</td>
<td>3</td>
</tr>
<tr>
<td>Entomology and Plant Pathology 3120</td>
<td>4</td>
</tr>
<tr>
<td>Forestry 3230</td>
<td>3</td>
</tr>
<tr>
<td>Plant and Soil Science 3230, 3610</td>
<td>11</td>
</tr>
<tr>
<td>Chemistry 1510-20-30 or 1110-20-30</td>
<td>12</td>
</tr>
<tr>
<td>Economics 2510</td>
<td>4</td>
</tr>
<tr>
<td>Speech 2311</td>
<td>4</td>
</tr>
<tr>
<td>Biology 3120 or 3130</td>
<td>8</td>
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<tr>
<td>Animal Science 3210</td>
<td>4</td>
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<td>Computer Science 1510</td>
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<td>Wildlife and Fisheries Science 3000</td>
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<tr>
<td><strong>TOTAL:</strong></td>
<td><strong>198</strong></td>
</tr>
</tbody>
</table>

*Or equivalent honors courses*
*This can include Botany 1110-20-30 or Biology 1210-20-30 or equivalent from other institutions.
*For students entering the option with no math credit, (e.g. Freshman) the engineering math series is required; 1840-50 recommended.
*Twice and can be taken for a maximum of 4 credits.
*Students should consult with department advisor for suggested electives and suggested course of study.
*To be selected from Agricultural Economics 3430, 4310, Agricultural Mechanics 2110, 2130, 4170, 4170, Plant and Soil Science 3610, 3710, 4120.
*Or equivalent plant physiology course.

### Plant and Soil Science

#### Advisors: Professors Reynolds, Seatz, Coffey; Associate Professors Allen, Lenns, and Reich.

Plant and soil science deals with field and vegetable crops and soils. Plant science includes crop breeding and genetics for crop improvement and the introduction of new varieties, crop management for high quality products, and weed control for efficient crop production.

Soil science studies in soil formation and classification for better understanding of our soil resources; soil management for optimum crop production and conservation; soil fertility for utilizing fertilizers efficiently; and basic studies in chemistry, physics, and biology as they apply to the soil and to a better understanding of its properties and proper use.

The plant and soil scientist must have a knowledge of the basic physical and biological
sciences and, in addition, be trained in communication skills. The scientist may be broadly trained or may specialize in a more specific phase of the subject. Regardless of interest, many good jobs are available for the well-trained plant and soil scientist.

Employment opportunities differ depending upon the individual's type of training and interest. For the person who is scientifically inclined, positions are available with the Agricultural Extension Service as extension agents or as specialists, with the Soil Conservation Service, Forest Service, Farmers Home Administration, Production Credit Association, and other public agencies. Many plant and soil scientists are employed in private industry as technical specialists, supervisors, and salespersons. Banks and other financial institutions employ specialists, supervisors, and salespersons. Others may farm on their own, manage farms for others, or work in foreign agricultural programs. Certainly, plant and soil science is basic to all agriculture, and people trained in this important field will find many opportunities to serve in modern agriculture.

A minor in Plant and Soil Science consists of 24 credit hours including 2130, 4410, and many opportunities to serve in modern agriculture.

A minor in Plant and Soil Science consists of 24 credit hours including 2130, 4410, and at least 16 elective hours to be taken by electing two (2) courses from Group A and two (2) courses from Group B. 3610 will not be accepted as a course to meet minor requirements.

Each student selecting this major must complete the basic curriculum for agriculture and fulfill the major group requirements. The curriculum in plant and soil science showing the manner in which the required courses may be taken by years is as follows:

**Freshman**  
**Hours Credit**  
**Agriculture 1130, 1140...**  
8  
**Agriculture 1110 or 1120 or 1140...**  
4  
**Lower-division biological sciences...**  
12  
**Biology 1010 or 1011; 1020, 1031 or 1032 or 1040...**  
9  
**Mathematics 1540-50-60 or 1840-50-60...**  
12  
**Humanities-social science elective...**  
3  
**Sophomore**  
**Chemistry 1110-20-30 or 1510-20-30...**  
12  
**Economics 2510-20...**  
8  
**Plant and Soil Science 2120-30...**  
7  
**Speech 2111 or 2103...**  
4  
**Physics 1210 or 2210...**  
4  
**English and communications electives...**  
6  
**Computer Science 1510 or 1410 or 1610...**  
3-4  
**Biological or Physical Science electives...**  
4-5  
**Junior**  
**Humanities-social science electives...**  
7  
**Biology 3110...**  
4  
**Entomology and Plant Pathology 3130 or 3210...**  
4  
**Electives...**  
12  
**Chemistry 2230 or 3211-19 or Nut. and Food Science 3130 or Biochemistry 3110...**  
4  
**Botany 3210...**  
4  
**Plant and Soil Science 3120...**  
4  
**Plant and soil science electives...**  
12  
**Senior**  
**Plant and Soil Science 3610, 4910...**  
4  
**Animal Science 3310 or 3320...**  
3  
**Plant and Soil Science electives...**  
12-16  
**Non-departmental electives...**  
12  
**Electives...**  
21-25  
**TOTAL: 198 hours**

*Generally, the requirement will be met by Botany 1110-20 and Microbiology 2910-11, or Biology 1210-20-30.

Students who wish to focus studies in the area of business should include: Math 1840-50-60; Chemistry 1110-20-30; 2111-19; Physics 2210. In addition, at least 6 courses beyond those electives in the curriculum in mathematical, physical, or biological sciences; suggested courses are Chemistry 2140-49; 3211-31, 3202-36; Physics 2280-30. Students should consult with departmental advisor for suggested courses.

In-service training is provided special groups, such as the teachers of vocational agriculture, through short-term courses which are offered at convenient locations in the state.

A special occasion known as Varsity Visit is held during the year. Delegates from all Future Farmers of America chapters are invited to spend a day on the agricultural campus with their advisors. Approximately 500 attend and inspect each department of the College.

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### Departments of Instruction

#### Interdepartmental Offerings

**Agriculture (086)**

1110 Introduction to Social Sciences for Agriculture  
Agriculture (4) Social sciences as they relate to agriculture—agriculture in the economic tools of social science—applied to agricultural problems; agriculture, its development, relation to man, industry, and government.

1120 Introduction to Agricultural Engineering  
Agriculture power and machinery fundamentals, agricultural structures, soil and water conservation controls, and agricultural uses of electricity.

1130 Animal Science for Agriculture  
Animals in agriculture: Body systems and development, principles of inheritance, fundamentals of feeding, and function of farm animals, animal sanitation, animal products, and the relationship to public health.

1140 Plant Science for Agriculture  
Plant structure, physiology, heredity, and environment in relation to growth, adaptation, and management of crops. 4 hrs. and 2 labs.

1150 Food Technology and Science in Agriculture  
Utilization, processing, and distribution of food products. 3 hrs. and 1 lab.

4018 Honors: Seminar (3) Selected topics. Offered alternate years. Open to juniors and seniors by invitation.

GRADUATE Consult the Graduate Catalog for listing of graduate level courses.

### Departmental Programs

#### Agricultural Economics and Rural Sociology

Professors:  
J. A. Martin (Head), Ph.D. Minnesota; M. B. Badenhop, Ph.D. Purdue; R. J. Brooker, Ph.D. Florida; C. L. Cleland, Ph.D. Wisconsin; Irving Dubov, Ph.D. California (Berkeley); L. H. Kelter, Ph.D. Kentucky; T. H. Klint, Ph.D. Kentucky; F. O. Leuthold, Ph.D. Wisconsin; D. L. Mclemore, Ph.D. Pennsylvania; S. R. McNamara, Ph.D. Purdue; S. D. Mundy, Ph.D. Tennessee; B. H. Peneost, J. D. Tennessee; W. P. Rammy (Emeritus), Ph.D. Minnesota; C. B. Saupin, Ph.D. Indiana; T. J. Whatley, Ph.D. Purdue.

Associate Professors:  
Agricultural Economics (047)

2410 Economics of Food and Rural Resources (3)
Analysis of economic concepts and problems of public concern relating to food, agriculture, and rural areas using fundamental economic concepts.

3120 Agricultural Prices (3) Factors affecting prices in agricultural production/processing/distribution, prices of inputs and outputs, and oligopoly pricing; space, form and time price differences; tools to measure price; farm price programs.

3320 Marketing Farm Products (3) Survey of the U.S. food and fiber marketing systems; marketing options and oligopoly marketing; marketing problems giving rise to policy; types of agricultural policy and appraisal of results; current policy problems.

Econ. 2510 or consent of instructor. W.

3330 Commodity Futures Markets (3) examines the process whereby new technology spreads from scientists to final adopters. Topics discussed include adoption process, communication behavior, mass media, role of professional change agents, opinion leadership, and two-step flow hypothesis.


4450 Diffusion of Agricultural Technology (3) Analysis of diffusion process whereby new technology spreads from scientists to final adopters. Topics discussed include adoption process, communication behavior, mass media, role of professional change agents, opinion leadership, and two-step flow hypothesis.

Graduate credit for non-majors only. F.

4500 Agricultural Policy (3) Meaning of agricultural policy in democratic society, role of farm groups to public policy; problems giving rise to policy; types of agricultural policy and appraisal of results; current policy problems.

PreReq: Agriculture 1110 and Economics 2520. W.

4330 Land Economics (3) Problems and policies of land use, conservation, development, taxation, and tenure; population growth and demand for land; principles and theories of rent, property, value, and income.

PreReq: Agriculture 1110 and Economics 2520. S.

4610 Management of Farm Supply and Marketing Firms (3) Operations of firms selling farm supplies and merchandising agricultural products. Emphasis on accounting methods and the economic theories of decision making.

PreReq: Agriculture 1110 and Economics 2510. F.

4620 Advanced Agricultural Marketing (3) Economics of market location and pricing; perfect market model; spatial equilibrium analysis, production and market location and transfer costs; processing and storage costs; maximizing returns; institutions and market flows; measuring efficiency.

PreReq: 3120 or 3320 or consent of instructor. W.

Graduate Consult the Graduate Catalog for listing of graduate level courses.

Rural Sociology (680)

3420 Rural Sociology (3) Nature of rural society; social systems concept; rural-urban differences; nature of rural relations; population characteristics and movement; problems of rural people; tenancy, farm labor, health, services, educational facilities, churches, local government, impact of industrialization.

W.

4460 Design of Agricultural Machinery (3) Fundamentals of graphics and mapping, with emphasis on applications in agriculture and forestry. 1 hr. and 2 labs.

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4460 Design of Agricultural Machinery (3) Fundamentals of graphics and mapping, with emphasis on applications in agriculture and forestry. 1 hr. and 2 labs.

A.

4550 Diffusion of Agricultural Technology (3) Analysis of diffusion process whereby new technology spreads from scientists to final adopters. Topics discussed include adoption process, communication behavior, mass media, role of professional change agents, opinion leadership, and two-step flow hypothesis.

Graduate credit for non-majors only. F.

4500 Agricultural Policy (3) Meaning of agricultural policy in democratic society, role of farm groups to public policy; problems giving rise to policy; types of agricultural policy and appraisal of results; current policy problems.

PreReq: Agriculture 1110 and Economics 2520. W.

4330 Land Economics (3) Problems and policies of land use, conservation, development, taxation, and tenure; population growth and demand for land; principles and theories of rent, property, value, and income.

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4620 Advanced Agricultural Marketing (3) Economics of market location and pricing; perfect market model; spatial equilibrium analysis, production and market location and transfer costs; processing and storage costs; maximizing returns; institutions and market flows; measuring efficiency.

PreReq: 3120 or 3320 or consent of instructor. W.

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Agricultural Engineering


Instructors: W. E. Hart, M. S. Tennessee; J. B. Wilkerson, M.S. Tennessee.

Agricultural Engineering (066)

1130 Introductory Agricultural Engineering (3) Basic engineering principles and techniques for agricultural engineers. 2 hrs. and 1 lab. PreReq: Open only to freshman and sophomore students in agriculture engineering.

F.

3100 Seminar (1) Presentations, discussions, reports on research techniques. PreReq: Consent of department head. F.

3610 Soil and Water Conservation Engineering (4) Integration of hydrologic, agronomic, and engineering principles in solving agricultural water management problems involving flood and erosion control, drainage, irrigation, and water quality. Coreq: Plant and Soil Science 2150, Engin. Sci. and Mech. 3110, 3 hrs. and 1 lab. Graduate credit for non-majors only. F.

3620 Structures for Production, Environmental Control, and Waste Management (4) Analysis of loads and stresses; design of wood, steel, and concrete members; structural and environmental requirements for facilities for livestock and crop production and storage; physiological requirements; heat loads; insulation; heating and ventilation; and waste management.

F.


3640 Power Units and Machinery (4) Components and operating characteristics of internal combustion engines and tractor systems; functional analyses and capabilities of agricultural machines; machinery system performance and cost analyses.


4120-30 Seminar (1, 3) Presentations, discussions, reports. 4120—Professional development topics. 4130—Industry trip. PreReq: Consent of department head.

F, W, S.

4220 Special Problems in Agricultural Engineering (3) Selection, analysis, solution, and report of research problem. May be repeated for maximum of nine credit hrs. PreReq: Engagement of advisor with industry approved by department head. W.

4230 Selected Topics in Agricultural Engineering (3) Development of new topics as required by current trends and problems in agricultural engineering.

4510 Design of Water Control and Waste Utilization Systems (3) Design of water control and waste utilization systems including earth dams, irrigation, drainage, land grading, hydraulic transport of waste, and application of wastes on agricultural land. PreReq: 3100 or consent of instructor. 1 hr. and 2 labs.

4620 Design of Structures for Production, Processing, and Environmental Control (3) Functional planning and structural design of agricultural buildings; emphasis placed on complete design of structure or system; design to include functional structural and environmental aspects.

PreReq: 3620. 1 hr. and 2 labs.

4630 Design of Processing and Materials Handling Systems (3) Development of systems and components for integrated agricultural processing considering agricultural raw materials, processing and packaging equipment, characteristics, equipment specifications, storage, handling, and economic merit.

PreReq: 3620. 1 hr. and 2 labs.

4640 Design of Agricultural Machinery (3) Functional design of agricultural machinery. Elements of machine component design, synthesis of mechanisms, mechanical and hydraulic drives. Team effort in compacting machine design project.

PreReq: 3640 or consent of instructor. 1 hr. and 2 labs.

Graduate Consult the Graduate Catalog for listing of graduate level courses.

Agricultural Mechanization (080)

2110 Agricultural Drawing and Mapping (3) Fundamentals of graphics and mapping, with emphasis on applications in agriculture and forestry. 1 hr. and 2 labs.

F, W, S.

2130 Agricultural Surveying (3) Measurement of horizontal distances and angles, differential and profile leveling, topographic surveying and mapping, area computation.

PreReq: Math 1560 or consent of instructor. 1 hr. and 2 labs.

3100 Seminar (1) Presentations, discussions, reports on research techniques. PreReq: Consent of department head.

F.
3110 Agricultural Mechanics (3) Organizing, equip- ping, and managing school and farm shops; tech- niques of shop work, and procedure for design and construction of shop projects; metal work and welding. 1 hr. and 2 labs. W.

3120 Forest Surveying (3) Principles, methods and instruments in measurement of horizontal and vertical distances and angles, with emphasis on forest management applications; computation of traverses, areas and volumes; map types, plotting and drafting. Prereq: Math 1841. 2 hrs. and 1 lab. W.

3140 Forest Surveying and Mapping (3) Use of low- precision methods of instruments including pacing, Abney level, topographic trailer tape, hand compass, and staff compass. Field measurements, computations and layouts involving random and true lines, traverses, topographic mapping, and forest roads. Prereq: 2140. Ten periods of 6 hrs. per period. S.

3210 Soil and Water Conservation Facilities (3) Leveling, topographic surveying, planning, construc- tion, and maintenance of drainage, irrigation, and erosion-control systems. Prereq: Math 1550. 2 hrs. and 1 lab. S.

3220 Agricultural Structures (3) Functional planning of structures; environmental control, construction methods, properties of building materials, and cost estimation. Prereq: Math 1550. 2 hrs. and 1 lab. S.

3510 Food Engineering Technology (4) Application of engineering principles of food processing: Fluid flow, heat transfer, refrigeration, drying evapora- tion, and materials handling. Prereq: Agriculture 1120 or 1130. 4 hrs. and 1 lab. W.

3560 Electrical Systems in Agriculture (3) Electrical terms and fundamentals, distribution, wiring practice, governing codes, controls, and motors used in agricul- tural and residential facilities. Prereq: Physics 1220 or Agriculture 1120. 1 hr. and 1 lab. W.

4100-30 Seminar (1,1) Presentations, discussions, reports. 4120—Professional development topics. 4130—Industry trip. Prereq: Consent of department head. S.

4160 Agricultural Waste Utilization and Disposal (3) Techniques, equipment, and procedures for utilizing, treating, and disposing of agricultural wastes by land spreading, lagging, and processing. Prereq: Senior standing. 2 hrs. and 1 lab. F.

4170 Small Engines (3) Concepts and mechanics of small gasoline engines; selection, operation, adjust- ment, and repair of single cylinder engines. 2 hrs. and 1 lab. W.

4180 Equipment and Techniques for Application of Agricultural Chemicals (3) Equipment for application of liquid, solid, and gaseous chemicals; system com- ponents; operational characteristics; safety considera- tions; application of mixtures; liquid, solid, and gaseous chemicals; system compo- nents; handling and disposal methods. 2 hrs. and 1 lab. S.

4210 Agricultural Machinery and Tractors (4) Agri- cultural machinery and power units; adaptation to agricultural practices; field efficiencies, capacities, capabilities, and repairs; design and testing; servicing. Prereq: Math 1550. 3 hrs. and 1 lab. W.

4220 Special Problems in Agricultural Mechaniza- tion (3) Selection, analysis, solution, and report of research problem. May be repeated for maximum of 9 credit hrs. when engaged in approved industry work. Prereq: 2130 or 2140. 3 hrs. and 1 lab. E.

GRADUATE Consult the Graduate Catalog for listing of graduate level courses.

Agricultural Extension Education (075)

Professors: R. P. Ireland (Head), Ph.D. Pennsylvania State; L. H. Dickson (Director), Ed.D. Cornell; C. E. Carter, Jr., Ph.D. Ohio State.

3110 Introduction to Agricultural Extension Education (3) History, philosophy, organization, teaching methods, relationships with other educational agencies, S. F.

4110-20 Field Studies (3,3) Supervised work experi- ence with county extension agents in a designated county. For senior and graduate students. Prereq: Consent of instructor and senior standing. 4110 and consent of instructor. Requires living off-campus for a specified time. SU.

GRADUATE Consult the Graduate Catalog for listing of graduate level courses.

Animal Science (113)

Professors: D. O. Richardson (Head), Ph.D. Ohio State; K. M. Barth, Ph.D. Rutgers; M. C. Bell, Ph.D. Oklahoma State; J. K. Kleiner (Emeritus), Ph.D. Ohio State; C. C. Chambers (Emeritus), Ph.D. Iowa State; B. H. Erickson, Ph.D. Kansas State; G. O. Hall, Dean, College of Agriculture, Ph.D. Iowa State; S. L. Hansard (Emeritus), Ph.D. Florida; E. R. Lowy, M.S. Tennessee; T. P. McDonald, Ph.D. Tennessee; J. B. McLen, Ph.D. Auburn; J. K. Miller, Ph.D. Georgia; M. J. Montgomery, Ph.D. Wisconsin; G. M. Merriman (Emeritus), D.V.M. Michigan State; R. L. Murphee (Emeritus), D.V.M. Wisconsin; H. V. Shively, Ph.D. Illinois; R. J. Shrode, Ph.D. Iowa State; E. W. Swanson, Ph.D. Missouri; R. L. Tugwell (Emeritus), D.V.M. Kansas State; C. E. Wyley (Emeritus), A.M. Missouri.


Assistant Professors: B. R. Bell, Ph.D. N.C. State; W. C. Cullen, Ph.D. Minnesota; J. A. Davis, D.V.M.; C. S. Eubanks, R. N. Heilman, Ph.D. Maine; H. G. Katesh, Ph.D. VPI & SU; T. W. Schultz, Ph.D. Tennessee; J. D. Smalling, Ph.D. Texas A & M.


2610 Fundamentals of Food Animal Evaluation (4) Criteria food animal evaluation; market classes and grades of cattle, poultry and poultry products, lamb and wool, beef and cattle enterprises. Basic ideas in probability as introduction to concept of distributions. Expected values of various variables; statistical distributions. Bio- normal and normal distributions and their prevalence in biological material. Planning effective experiments. Association or relation between variables. Assessment of validity of hypotheses. 2 hrs. and 1 lab.

2610 Animal Farm Management Practices (3) In- tegration of management practices and skills into cattle, beef, dairy, poultry, and swine enterprises. Practices and skills include feeding, castration, docking, showing, and selection of beef cattle, swine, and poultry. 1 hr. and 2 labs.

2710 Introduction to Biometrical Aspects of Ani- mal Science (3) Biometrical concepts for optimum comprehension of material presented in upper-division animal science courses. Basic ideas in probability as introduction to concept of distributions. Expected values of various variables; statistical distributions. Bio-normal and normal distributions and their prevalence in biological material. Planning effective experiments. Association or relation between variables. Assessment of validity of hypotheses. 2 hrs. and 1 lab.

3110 Introduction to Animal Extension Education (3) History, philosophy, organization, teaching methods, relationships with other educational agencies, S. F.
4210 Physiology of Lactation (3) Development, anatomy, and function of mammary glands; endocrine interactions for milk production; development and secretion; factors affecting yield and composition of milk. Prereq: 3210.

4220 Avian Physiology (3) Anatomy and physiology of avian species with emphasis on poultry. Prereq: 3210. 2 hrs. and 1 lab.

4230 Applied Reproduction in Farm Animals (3) Application of methods and techniques in collecting, evaluating, processing, and preserving semen; insemination of females; pregnancy determination; gestation and parturition. Male and female infertility. Prereq: 3220 and permission of instructor.

4330 Feeding Applications for Farm Animals (3) Detailed application of feeding principles designed to allow students to discover and explore feeding options available to producers through problem solving. Prereq: 3330. 1 hr. and 2 labs.

4340 Experimental Animal Nutrition Laboratory (2) Laboratory feeding trials to demonstrate the basic animal nutrition principles. Prereq: 3330. 2 labs.

4610 Advanced Beef Cattle, Dairy Cattle, Horse Poultry, Sheep, and Swine Judging (2) Specialization in preparation for beef judging, dairy judging, and evaluation of oral reasons on classes of beef cattle, dairy cattle, horses, sheep, and swine. May not be repeated for credit. Prereq: Consent of instructor. 2 labs.

4610 Beef Cattle Production and Management (4) Integration of principles of nutrition, physiology, and breeding into complete beef cattle management program. Topics will include structure of industry, enterprise establishment, systems of production, production practices, and herd improvement programs. Alternatives evaluated in terms of production responses and economic returns. Prereq: Completion of animal science sophomore and junior core courses or consent of instructor. 3 hrs. and 1 lab.

4620 Dairy Cattle Production and Management (4) Integration of principles of nutrition, physiology, and breeding into complete dairy cattle management program. Topics will include structure of industry, enterprise establishment, systems of production, production practices, and herd improvement programs. Alternatives evaluated in terms of production responses and economic returns. Prereq: Completion of animal science sophomore and junior core courses or consent of instructor. 3 hrs. and 1 lab.

4830 Pork Production and Management (4) Integration of principles of nutrition, physiology, and marketing into complete pork production and management program. Topics will include structure of industry, enterprise establishment, systems of production, production practices, and herd improvement program. Alternatives evaluated in terms of production responses and economic returns. Prereq: Completion of animal science sophomore and junior core courses or consent of instructor. 3 hrs. and 1 lab.

4850 Light Horse Production and Management (4) Integration of principles of nutrition, physiology, and breeding into light horse management program. Topics include structure of industry, systems and practices of production; individual animal and herd improvement programs; tack, equipment, and facilities for both pleasure owners and commercial producers. Alternatives evaluated in terms of pleasure, recreation, and economic returns. Prereq: Completion of animal science sophomore and junior core courses or consent of instructor. 3 hrs. and 1 lab.

4860 Lamb and Wool Production and Management (4) Integration of principles of selection, nutrition, breeding, physiology, and marketing into complete lamb and wool production and management program. Topics will include structure of industry, enterprise establishment, systems of production responses, and economic returns. Prereq: Completion of animal science sophomore and junior core courses or consent of instructor. 3 hrs. and 1 lab.

4910 Seminar (2) Review of literature and presentations on special topics and current research in animal sciences. Prereq: Senior standing. 1 hr. and 1 lab.

GRADUATE
Consult the Graduate Catalog for listing of graduate level courses.

Entomology and Plant Pathology (341)

Professors:

Associate Professors:
E. C. Bernard, Ph.D. Georgia; P. L. Lambdin, Ph.D. Georgia Tech.

Assistant Professors:
L. E. Klostermeyer, Ph.D. Nebraska; B. R. Pedrick, Ph.D. Clemson.

4300 Introduction to Forest Protection (4) (Same as Forestry 3060). 3130 Plant Pathology (4) Principles of plant patholo-
gy illustrated by diseases of common agricultural crop plants. Prereq: Botany 1120 or Biology 1220. 3 hrs. and 1 lab. (Same as Botany 3130.) F, S.

3210 Economic Entomology (4) Structure, life histo-
ry, habits, and principles of control of important insect pests of farm, garden, orchard, and household. 3 hrs. and 1 lab. F, S.

3220 Apiculture (2) Biology of the honey bee, with emphasis on beekeeping equipment and apiary man-
agement practices relative to pollination of crops and production of honey and beewax. W.

4101 Biology of Soil Microorganisms (4) Morpholo-
y and physiology of soil organisms, decomposition of organic matter, chemical transformations, and interac-
tions between soil organisms and higher plants. Prereq: 3130 or introductory microbiology. 3 hrs. and 1 lab. (Same as Microbiology 4010.) S, A.

4030 Forest and Shade Tree Entomology (3) Identifi-
cation, biology, ecology, and control of forest and shade pests. Prereq: 3210 or equivalent. 3 hrs. and 1 lab. S, A.

4140 Forest Pathology (3) Symptomatology, etiology, epidemiology, and control of forest diseases, including wood decay and other diseases important to urban and production forestry. Prereq: 3130 or Forest-
y 3060. 2 hrs. and 1 lab. May be taken for graduate credit. F.

GRADUATE
Consult the Graduate Catalog for listing of graduate level courses.

Food Technology and Science (390)

Professors:
J. T. Miles (Head), Ph.D. Wisconsin; J. L. Collins, Ph.D. Maryland; H. O. Javins, Ph.D. Illinois; S. L. Melton, Ph.D. Tennessee; W. W. Overcast (Emeritus), Ph.D. Iowa State.

Associate Professors:
P. M. Desch, Ph.D. Washington State; B. J. Demott, Ph.D. Michigan State; F. A. Draughn, Ph.D. Georgia; H. D. Lovejoy, Ph.D. Kansas State; R. J. Riemann, Ph. D. Kansas State.

Assistant Professors:
J. R. Mount, Ph.D. Ohio State.

Instructor:
C. G. Sanders, M.S. Tennessee.

2360 Food Laws and Regulations (3) State and federal laws concerning food industry. Organization and operation of regulatory agencies. Food grades and standards. W.

3020 Dairy Products I (4) Procurement, processing, and distribution of fluid milk, Manufacture of frozen and concentrated dairy products. Prereq: 3810. 3 hrs. and 1 lab. W.

3870 Evaluation and Grading Dairy Products (3) Market standards and grades of dairy products with practice in grading milk, ice cream, butter, cheese, and other specialized dairy products. 1 hr. and 2 labs. S.

3810 Meat Evaluation and Grading (3) Grading stan-
dards for quality and quantity and principles of evalua-
ting beef, pork, and lamb. Practice in grading and judging carcasses and cuts. 1 hr. and 2 labs. F.

3820 Microbiology I (4) General methods for the enumeration of microorganisms in food products. Factors which affect the growth of microorganisms in foods and methods for controlling their growth. Prereq: Microbiology 2100-10 or equivalent. 2 hrs. and 1 lab. W.

3840 Meat Science (3) Processing methods, carcass characteristics of meat animals; slaughtering, cutting selection, curing, freezing, and cookery. 2 hrs. and 1 lab. W.

4000 Problems in Food Technology (1-3) Research problems in student's area of interest. Required written report. Supervised experience in state or federal labo-
raries or approved industries encouraged. May be repeated for a maximum of 3 credit hrs. Prereq: Junior standing and consent of instructor. F, W, S.

4030 Dairy Products II (4) Principles in the manufac-
ture of butter, cheese, and special dairy products. Prereq: 3920. 3 hrs. and 1 lab. A.

4130 Food Chemistry I (3) Minerals, fats, oils, and vitamins in food as affected by processing and storag-
age. Prereq: Nutrition and Food Sciences 3150 or equivalent. 2 hrs. and 1 lab. S.

4140 Food Chemistry II (3) Reactions of proteins, carbohydrates, and natural food colorants in food materials. Protein structure, food enzymology, and baking reactions. Effects of storage and processing on proteins and carbohydrates with emphasis on nutri-
tional value and functionality. Prereq: Nutrition and Food Sciences 3150 or equivalent. 2 hrs. and 1 lab. F.

4200 Food Processing I (4) Prevention of spoilage and deterioration of foods. Methods of preservation. Prereq: Agriculture Mechanization 3510. 3 hrs. and 1 lab. F.

4210 Food Additives (3) Substances used in food manu-
facturing with emphasis on properties and func-
tions. Prereq: Nutrition and Food Sciences 3150 or equivalent. F.

4310 Food Packaging (3) Characteristics and appli-
cation of materials and containers to packaging require-
ments and methods of packaging foods. Prereq: 2300. 2 hrs. and 1 lab. S.

4400 Food Processing II (5) Design of food quality assurance programs with emphasis on sanitation. Ap-
plication of general analytical techniques, regulations and unit operations to quality control in the food industry. Prereq: 3810. 3 hrs. and 2 labs. W.

4410 Food Crop Products (3) Food products from crops with emphasis on types, manufacturing systems, quality attributes, and utility. A.

4420 Baking Products (3) Baking ingredients and their interactions during production and storage of bakery products. Prereq: Food Technology and Science 4130 and Chemistry 2230 or equivalents. 2 hrs. and 1 lab. A.

4810 Food Microbiology II (4) Standard methods for the examination, cultivation, and identification of bacte-
ria associated with food processing, food spoilage, and food poisoning. Prereq: 3810. 2 hrs. and 2 labs. F.

4840 Meat Products Manufacturing (3) Prepared meat products with emphasis on sausage making and
Forestry, Wildlife and Fisheries

**Professors:**
- G. Schneider (Head), Ph.D. Michigan State; J. W. Barrett (Emeritus), Ph.D. Syracuse; E. R. Buckner, Ph.D. Michigan; R. J. Rydberg, Ph.D. Auburn; H. A. Core (Emeritus), Ph.D. Syracuse; R. W. Dimmick, Ph.D. Oregon; M. R. Pelton, Ph.D. Georgia; E. Thorn (Emeritus), Ph.D. North Carolina State; J. L. Wilson, Ph.D. Tennessee; F. W. Woods, Ph.D. Tennessee.

**Associate Professors:**

**Assistant Professors:**
- E. F. Dougall, Ph.D. Oregon State; S. E. Schlarbaum, Ph.D. Colorado State.

**Forestry (396)**

**1620 Introduction to Forestry (3)** History of forestry; establishment, care, protection, and use of forest stands; forest products industries; organization and agencies for establishment of forest policies; forest resources.

**2500 Conservation of Renewable Natural Resources (3)** Land, water, plants, and animals and their interrelationships from the biological and ecological basis for decisions about utilization of renewable natural resources; uses and abuses of forest, recreation, and wildlife land; analysis of management alternatives and aspects of pollution. S, F.

**3000 Current Events in Renewable Natural Resources (1)** Current events influencing forestry, wildlife, and fisheries management. Perspectives from other disciplines and professions which are affected by and which influence natural resource management. Extended views of natural resources, their allocation and management. Professional development and education for the disciplines of forestry, wildlife, and fisheries. 1 hr. May be repeated. Maximum credit 4 hrs. S/NC. (Same as Wildlife and Fisheries Science 3000.) W.

**3020 Forest Environments and Ecology (3)** Environments of forests and associated lands and emphasis on the application of ecological principles to contemporary problems. Available for graduate credit for non-forestry majors only. 8 hrs. of biology, botany, or zoology. 3 hrs. F.

**3040 Forests and Trees of Eastern North America (4)** Forest formations and associations of North America east of the Great Plains; dendrology and silvics of the trees and shrubs that comprise them. Emphasis will be on identification, nomenclature and species-site relationships. Weekly field trips during scheduled labs plus required study. Available for undergraduate credit for non-forestry majors only. 8 hrs. basic biology or botany. 3 hrs. and 1 lab. F.

**3050 Forest and Trees of Western North America (3)** Forest formations and associations of North America west of the Great Plains; dendrology and silvics of the trees that comprise them. Largely an audio-visual presentation with emphasis on edaphic, topographic and climatic site variables as they affect species distributions. Available for graduate credit for non-forestry majors only. 8 hrs. basic biology or botany, 2 hrs. and 1 lab. W.

**3060 Introduction to Forest Protection (4)** Biology of forest insects and diseases, including impact on forest ecosystems, control principles and techniques, silviculture for forest fire, including behavior, weather influence, prevention, control, and social impacts. Emphasis on the application of ecological principles to forest fire management. S, F.

**3110 Forest Measurements and Biometry (4)** Measurements of individuals in animal and plant populations; line regression, sampling of forest populations; growth and potential production. Prereq: Plant and Soil Science 3610. 3 hrs. and 1 lab. Available for graduate credit for non-forestry majors only. W.

**3120 Wood Technology (4)** Wood properties; identification of commercial woods by macro and micro characteristics. Prereq: 3040, 3050 (3050 may be taken concurrently). 2 hrs. and 2 labs. W.

**3220 Forest Products and Utilization (3)** Harvesting, processing, and utilization of forest products. Conversion, intermediate and harvest cuts. Prereq: 3120. F.

**3240 Introduction to Forest Recreation (3)** Concepts of leisure time in recreation. Historical development of forest recreation. Forest recreation resources, Development, management, and administration of forest recreation areas and systems. W.

**3250 Ecological Problems of Forest Recreational Land (3)** Examination of major forms of ecological impacts on forest recreation land. Emphasis on impact to vegetation, soil, and water quality; consideration of monitoring methods and management alternatives. Weekend field trip is required. Prereq: 3020 or equivalent, or consent of instructor. Plant and Soil Science 2130 recommended. 2 hrs. and 1 lab. S.

**3260 Forest Land Use and Society (3)** Past and present overviews of forest utilization in the U.S. from socio-economic and institutional perspectives. Major societal factors influencing forest resource use including land ownership. World forest resource uses, and markets. Implications of alternative futures for forest resources. F.

**3270 Principles of Silviculture (3)** Influence of site factors of reproduction, growth, development, and character of forest vegetation; classification of forest structure and its associated disturbances; silviculture and breeding. Prereq: 3210; 3040; Plant and Soil Science 2130. 3 hrs. W.

**4002 Utilization (3)** Wood-using industries; processing forest-products-sawmills, tree-log-lumber grading; pulpwood operations, flooring plants, treating plants; plant layout, equipment layouts. Prereq: 3120 or permission of instructor. S.

**4003 Field Methods of Timber Inventory (4)** Field measurements of forest trees; timber cruising; determining appropriate sample design for specific purposes; tree and stand growth; site evaluation; field problems. Prereq: 3110 and Agricultural Mechanization 5140. S.

**4004 Forest Practice (3)** Management of forest lands by public and private organizations; "multiple-use" concept as it influences management decisions; impact of public pressure for outdoor recreation or management decisions. Prereq: 3260, 4006. S/NC. S.

**4006 Silvicultural Methods (4)** Methods and application of intermediate and regeneration cuttings; site preparation, planting and seeding, modifications of cutting methods to obtain desired goods and benefits. Prereq: 3060, 3320, 4002, 4003. S.

**4007 Applied Forest Surveying, Road Construction, and Timber Harvesting (3)** Application of surveying and construction techniques to forest problems. Interpretation and use of maps and aerial photographs in forest field work. Discussion of harvest equipment and practices. Considerations in logging equipment selection and use. Prereq: Ag. Mech. 5140. S.

**4020 Forest Watershed Management (3)** Water as a forest resource; role of forests in the hydrologic cycle; control of water quality, quantity, and regimen; watershed planning. Prereq: Consent of instructor. 3 hrs. Two overnight field trips. W.

**4110-20 Problems in Forestry (1-4)** Special research or individual problems in forestry. Prereq: Senior standing. Total not more than 9 hrs. E.

**4150 Forest Resource Economics (3)** Application of economic analysis to forest resource problems; impor- tance of micro-economic analysis; timber production economics and valuation; economic analysis of public forest projects. Prereq: Econ 2520 and senior standing, or permission of instructor. F.

**4210 Forestry Organization and Administration (3)** Planning, organizing, and leadership concepts and problems; analysis and decision-making in forest resource management. Prereq: Senior standing in forestry or wildlife and fisheries science or consent of instructor. 2 hrs. and 1 lab. W.

**4220 Forest Resource Management (3)** Decision-making principles, emphasizing forestry as an integrative resource of uses. Models of forestry as a system; concepts of forest finance and valuation; taxation of the forest firm. Prereq: 4160. W.

**4230 Forest Resource Management Plans (4)** Field problems and case studies in forest-resource manage- ment; the forest as a system; management of forest enterprises as a producer of goods and services; diversified enterprises as a producer of timber, recreational services, watersheds, and wildlife; producing multiple services; preparation of a complete plan based on optimizing forest uses. Prereq: 4210. S.

**4240 Interpreting Forest Resources (3)** Principles and techniques of interpreting and analyzing forest resources; importance of environmental interpretation to management of forest resources; development and administration of interpretive services. Possible overnight field trips required. Prereq: 3240 or equivalent. 2 hrs. and 1 lab. S.

**4330 Forest Policy (3)** History of forestry in United States with emphasis on development of forest re- source policies; current policies influencing development and management of forest resources; brief sur- vey of policy implications of forest resource organiza- tions in public and private sectors. Prereq: 4004. W.

**4340 Aerial Photography in Forest-Resource Man- agement (3)** Use of conventional aerial photographs in forest-resource management; interpretation of details, aerial inventories, preparation of cover-type maps, uses of other remotely sensed imagery. Prereq: 3110 or equivalent. 1 hr. and 2 labs. S.

**4420 Forest Tree Improvement (3)** Forest tree im- proveent related to forest products and forest resources; principles of tree improvement and forest genetics; principles of tree cytology and population genetics; importance of seedling, variability, and acclimatization problems; seed types, and development of seed orchards; hybridiza- tion; seed production and seed certification. Prereq: 4006 or consent of instructor. 2 hrs. and 1 lab. S.

**4430 Regional Silviculture of the United States (3)** Factors that influence silvicultural management of important tree species in North America. Importance of forests and forestry to a region; physiography, geology, soils, climate, and the silvicultural history of sites and site types, ecology, problems of protection, and silvicultural characteristics of the more important species. Prereq: 4004 or consent of instructor. F.

**4440 Forest Recreation (3)** Forest lands as a recrea- tion resource; interrelationships of forest recreation and other management activities; development and management of forest recreation areas; socioeco- nomic and political determinants of recreation devel- opment and management. Possible overnight field trips are required. Prereq: 4210. W.

**4450 Recreational Behavior in Forest Environment (3)** Review of sociological and psychological theories relevant to recreation and leisure; methods and evaluation of recreational use. Implication and application of behavior concepts to forest recreation problems, and review of methodologies for assessing recreational behavior. Prereq: 3240 and 6 hrs. in behavioral psy- chology and/or sociology, or consent of instructor. 3 hrs. W.
and cold water fisheries management including tech-
iques of biological assessment, public relations, habi-
tat manipulation, and stocking. Prereq: Biology 3130 or
consent of instructor. 3 hrs. and 1 lab. or field period. S.

GRADUATE
Consult the Graduate Catalog for listing of grade
level courses.

Ornamental Horticulture and Landscape Design (740)

Professors: G. D. Grater (Head), Ph.D. Ohio State; L. M.
Callahan, Ph.D. Rutgers; N. D. Peacock (Emeritus),
Ph.D. Michigan State; D. B. Williams , Ph.D.
Pennsylvania State.

Associate Professors: J. W. Day, Ph.D. Mississippi State; E. T. Graham,
Ph.D. Pennsylvania State; G. L. McDaniel, Ph.D.
Iowa State; H. Van de Werken, GAUST, Horticulture
College (Fredonwick Holland).

Assistant Professor: D. T. Kendall, M.L.A. Louisiana State.

Instructor: E. L. Abbott, M.S. Tennessee.

2230 Environmental Horticulture (3) An introduction to
awareness and techniques of biological assessment for
ornamental plants around and in the home. Design and
management of home landscapes including selection, buying,
effectively using, planting, and transplanting ornamental
turfgrasses, herbaceous landscape plants and house
plants. 3 hrs.

3080 Plant Propagation (3) Physiology, methodology,
and environmental requirements for propagation. Prereq:
8 hrs. of biological science. 2 hrs. and 1 lab.

3040 Floral Design (3) Principles and techniques in
flower arrangement with emphasis on arrangements for
home, church, and special occasions. 1 hr. and 2 labs.

3110 Greenhouse Management (3) Factors involved in
management of greenhouses for production and
research. Structures, soils, pest control measures,
heating, ventilating, lighting, water supply, crop suc-
cession. Prereq: Junior standing and consent of in-
structor. 2 hrs. and 1 lab.

3120 Turfgrass Management (4) Practical turf-grass
management; cultivation, identification, and
establishment; basic applied fertility programs, mowing
and irrigation practices; past and present control; pest
identification and control. Prereq: Plant and Soil Science
2130 and 8 hrs. biological sciences: 3 hrs. and 1 lab.

3130 Professional Practices in Ornamental Horti-
culture (3) Application of management and marketing
practices for greenhouses, nurseries, flower shops,
garden centers, plant stores, and landscaping firms.
Investigating of practices and the solution of problems as
they relate to the students' areas of interest in the
establishment and operation of floricultural, nursery,
landscape planning and maintenance enterprises, in-
cluding compliance with governmental regulations and
other operational practices specific to the ornamental
horticulture industry. 3 hrs.

3410 Basic Floriculture (3) Principles and practices
employed in propagation, major cut flowers and potted
plant crops. Application of principles of plant physiolo-
y as they relate to the control of flowering, harvesting
schedule and post-harvest quality. Prereq: 3110, and
Plant and Soil Sciences 3040 or equivalent. 2 hrs. and
1 lab.

3510 Grounds Maintenance and Management (4)
Identification of landscape maintenance basics; growth
control, irrigation, soil amendments, transplanting,
climatic protection, pest control; calibration, maintenance
and use of equipment; schedules and management
practices. Prereq: 3120. 3 hrs. and 1 lab.

3610 Fundamentals of Landscape Design (4) Devel-
opment of basic graphic skills and techniques of plan
preparation. Fundamentals of the process theory of
design, site analysis, program development, design
synthesis, introduction to site layout, topographic inter-
pretation, landscape construction materials and land-
scape structures. Development of awareness and sen-
sitivity to landscape elements. 1 hr. and 2-3-hr. labs.

3620 Intermediate Landscape Design (4) Applica-
tion of principles and techniques of plan preparation to
a variety of landscape projects. Refinedment of graphic
skills. History of landscape design as it relates to con-
temporary applications. Technical aspects of planting
design and implementation. Use of plant
materials in design of small and moderate scale land-
scape situations. Prereq: 3110, 3191 or equivalent. 1
hr. and 2-3 h-lab.

3630 Landscape Construction and Contracting (4) Applica-
tion of construction methods, materials and
principles with landscape installation and contracting.
Site layout procedures, earthwork and drainage, landscape construction materials; applica-
tion through detail design drawings and small scale
projects. Landscape contractors, specifications and con-
ducting procedures. Prereq: 3110, 3161; Ag Mech: 2130
recommended. 1 hr. and 2-3 h-lab.

3810 Basic Landscape Plants (4) Identification, clas-
sification, adaptation, culture, and landscape design
uses for ornamental plants. Prereq: 8 hrs of botany or biological science and
Agriculture 1140. 2 hrs. and 2 labs.

3820 Supplementary Landscape Plants (3) Identifi-
cation, classification, adaptation, culture, and land-
scape design uses for ornamental plants. Prereq:
10 hrs. of biological science. 2 hrs. and 3 labs.

3830 Interior Plants (3) Identification, classification,
adaptation, culture and interior uses for foliage and
planting plans. 1 hr. and 2 labs.

4150 Nursery Production (4) Modern methods of
producing liners, field and container grown woody
ornamental plants. History and evolution of nursery
industry and modern production recommendations for
woody ornamental plants. Prereq: 3030, 3810 and
Plant and Soil Science 2130. 2 hrs. and 2 labs.

4160 Nursery Management (3) Modern management
methods for wholesale and retail nurseries, garden
centers, and landscape contractors. Prereq: 3310, 2 hrs.
and 1 lab.

4180 Park Design (4) Design criteria for parks and
outdoor recreation systems. Park site selection, analy-
sis, planning, and management as related to needs
and natural and economic resources. Evaluation of
esthetic and functional quality of parks and their
impact on environmental quality of rural and suburban
communities. Prereq: 3620. 2 hrs. and 2 labs.

4190 Advanced Landscape Design (4) Comprehen-
sive application of landscape design skills and knowl-
edge through the development of a special project. Analysis, programming, planting design, construction
detailing, estimating, specifications, contracts and bid-
ing. Prereq: 3110, 3191, Plant and Soil Science 3040. 3 hrs.

4220 Advanced Turfgrass Management (4) Princi-
ples and scientific basis of turfgrass culture: adapta-
tion, ecology, physiology, soil fertility, and grass nutri-
tion; climatic influences on grass culture; physiology of
clipping and water management; traffic effects and
compaction; and the physiological influences of pest
infestations and control measures. Prereq: 3120, 3 hrs.
and 1 lab.

4320 Specialty Floriculture (3) Specific practices in
the production of minor cut flowers and potted plant
plants. Production methods for scheduling flowering or
vegetative growth of specialty florist crops in con-
trolled environments. Prereq: 3140. 2 hrs. and 1 lab.

4400 Individual Project Study (1-5) May be re-
peated to maximum of 10 credit hrs.

4610 Seminar (1) Current problems in ornamental
horticulture and landscape design. Prereq: Junior
standing and consent of instructor.

GRADUATE
Consult the Graduate Catalog for listing of grade
level courses.
Plant and Soil Science (782)

Professors:

L. F. Seitz (Head), Ph.D. North Carolina State; F. F. Bell (Emeritus), Ph.D., Iowa State; D. L. Coffey, Ph.D. Purdue; B. V. Conger, Ph.D. Washington State; H. A. Fribourg, Ph.D. Iowa State; L. S. Jeffery, Ph.D. North Dakota State; L. M. Josephson (Emeritus), Ph.D. Wisconsin; W. L. Parks, Ph.D. Purdue; B. S. Pickett (Emeritus), Ph.D. Michigan State; J. H. Reynolds, Ph.D. Wisconsin; L. N. Skold (Emeritus), M.S. Kansas State; M. E. Springer (Emeritus), Ph.D. California (Berkeley); H. D. Swingle (Emeritus), Ph.D. Louisiana State.

Associate Professors:


Assistant Professors:

D. E. Dayton, Ph.D. North Carolina State; C. E. Sams, Ph.D. Michigan State; D. R. West, Ph.D. Nebraska; J. D. Wolf, Ph. D. Auburn.

Clyde B. Austin Distinguished Professor.

2120 World Food Production and Cropping Systems (3) Introduction to world crop plants and cropping systems with emphasis on origin and development, current technology and practices, and future (role, challenges, demands, functions, problems) of agriculture. F.

2130 Soils (4) Nature and properties of soils. Physical, chemical, biological processes in soils and their influence on plant growth. Prereq: Chemistry 1120 or 1520 or 1620. 3 hrs. and 1 lab. F, S.

3110 Soil Fertility and Fertilizers (4) Properties of soils in relation to plant nutrient availability and uptake. Methods of soil fertility evaluation and principles of fertilizer use; manufacture and properties of fertilizers. Prereq: 2130. 3 hrs. and 1 lab. W.

3120 Grain and Oil Crops (3) Distribution, improvement, morphology, culture, harvesting, and utilization of corn, small grains, grain sorghum, soybeans, and related crops. Prereq: 2130; 8 hrs. biological science. 2 hrs. and 1 lab. F.

3140 Forage Crops (3) Characteristics, adaptation, improvement, management, and utilization of pastures, hay, and silage. Prereq: 2130; 8 hrs. biological science. 3 hrs. and 1 lab. F, S.

3160 Cotton and Tobacco (4) Characteristics, adaptation, improvement, culture, harvesting, and marketing of cotton and tobacco. Prereq: 2130; 8 hrs. biological science. 3 hrs. and 1 lab. F.

3170 Vegetable Crops (4) Characteristics, economic importance, adaptability and production of vegetables for fresh and processing markets with emphasis on both warm and cool season crops. May be taken for graduate credit by non—majors only. Prereq: 2130; 8 hrs. of biological science. 3 hrs. and 1 lab. S.

3180 Fruit Crops Management (4) Soils, planting, cultivation, development of fruit crops plantations; pest control, harvesting, packing, storage and pruning. Prereq: 2130; 8 hrs. biological sciences. May be taken for graduate credit by non—majors only. W.

3220 Soil Management (4) Soil management for crop production including cropping systems, fertilizer use, and tillage operations for specified soil and farming conditions. Prereq: 2130. 3 hrs. and 1 lab. S.

3250 Soils in Forestry (3) Soil as a medium for tree growth; relation of physical, chemical, and biological properties of soils to tree growth and management of forest stands. Soil properties of importance in road location, recreational development, and watershed management. Prereq: 2130; Forestry 3320. 2 hrs. and 1 lab. W.

3410 Soil and Plant Analysis (3) Applied methods of soil and plant analysis as they relate to crop nutrition and soil evaluation including sampling procedures, sample preparation, soil physical and chemical analyses, and plan mineral content. Prereq: 3110. 1 hr. and 2 labs. W. Not for graduate credit.

3610 Statistics for Agricultural Research (3) Application of the principles of statistics to agricultural research. Notation, descriptive statistics, probability, distributions, confidence intervals, students' t and chi-square tests, analysis of variance, mean separation procedures, linear regression and correlation. May be taken for graduate credit by non—majors only. Prereq: Math 1560 or 1860 or equivalent. 3 hrs. and 1 rec. F, W.

3810 Practicum in Plant and Soil Science (3-6) Spend one quarter working with agricultural related enterprises with area of work being related to a student's career interest. Requires consent of 3-person faculty administering committee and of academic advisor. May not be used as a 3000-level prerequisite for any course in Plant and Soil Science. May not be taken for graduate credit. PSS majors only. F.

4110 Soil Chemistry (4) Colloidal systems; properties and behavior of colloidal soil materials; relations of chemical properties to plant nutrient availability. Prereq: 2130; Physics 1210. 3 hrs. and 1 lab. F.

4120 Principles of Crop Breeding (4) Genetic principles and techniques used in crop improvement. Prereq: Biology 3110 or equivalent. W.

4250 Agricultural Pesticides (4) Regulation of pesticide development, manufacture, transportation, marketing and use. Structure, use, mode of action, degradation and environmental impact of pesticides used in agriculture, forestry, and related areas. Prereq: 1 year biological sciences and 1 year chemistry. 3 hrs. and 1 lab. F.

4320 Soil Formation, Morphology, and Classification (4) Soil parent materials, basic pedogenic processes, soil forming processes, soil morphology and interpretation of morphology, taxonomic classification of soils. Use of soil surveys. Prereq: 2130. 3 hrs. and 1 lab. S.

4350 Soil Survey (2) Techniques of mapping soils, development of mapping legends and documentation and testing of mapping unit descriptions and interpretations. 1 hr. and 1 lab. Prereq: 4320 or concur. S.

4400 Problems in Plant and Soil Science (1-6) Special research or library problems in some phase of plant and soil science. May be repeated. Maximum credit 9 hrs. E.

4410 Crop Physiology and Ecology (4) Application of the principles of plant physiology and ecology to crop production. Effects of environmental factors (light, heat, water, soil, etc.) on physiological processes (respiration, photosynthesis, germination, flowering, etc.) Prereq: Botany 3210; 2130 and any PSS course at 3000-level except 3610. 3 hrs. and 1 lab. W.

4710 Principles of Weed Science (4) Principles of cultural, biological, and chemical control of weeds, effects on environment, principles of herbicide selectivity and activity, types of herbicides and specific recommendations for various crop and non-crop uses. Prereq: Agric. 1140 or 1120; Organic Chem. 2130 and any PSS course at 3000-level except 3610. 3 hrs. and 1 lab. S.

4910 Seminar (1) Review of literature. Oral and written reports. W.

GRADUATE

Consult the Graduate Catalog for listing of graduate level courses.