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

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

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

The unique association the College has with the UT, Knoxville campus and the other units of the Institute of Agriculture make it possible for the College to offer comprehensive high quality undergraduate and graduate programs. The choice of electives in each curriculum should be made with the guidance of the faculty advisor. Students pursuing a program leading to the degree of Bachelor of Science in Agriculture major in one of several specialized areas in agriculture offered in the college. These major areas are agricultural economics and business, agricultural education, animal science, food technology and science, and plant and soil science. Specific courses required for each of these areas are given under the departmental headings in the section of the catalog. A student must complete the curriculum outline by the department in which he/she is majoring in order to receive a degree. In all areas of specialization, particular emphasis is placed upon the sciences as a background for agricultural instruction; other courses are included to provide a liberal education. In all subject matter departments there is the opportunity to select elective courses appropriate to the educational objectives of individual students.

CURRICULA IN AGRICULTURE

GRADUATE STUDY IN AGRICULTURE

The College of Agricultural Sciences and Natural Resources. The College provides curricula leading to the degrees of Bachelor of Science in Agriculture, Bachelor of Science in Agricultural Engineering, Bachelor of Science in Forestry, Bachelor of Science in Ornamental Horticulture and Landscape Design 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 forest resource management and forest innovation concentrations are fully accredited by the Society of American Foresters.

A pre-professional curriculum in veterinary medicine is offered in the College. This program is designed to prepare students for admission to the College of Veterinary Medicine located on the Knoxville campus. Students pursuing programs leading to the degree of Bachelor of Science in Agriculture major in one of several specialized areas in agriculture offered in the college. These major areas are agricultural economics and business, agricultural education, animal science, food technology and science, and plant and soil science. Specific courses required for each of these areas are given under the departmental headings in the section of the catalog. A student must complete the curriculum outline by the department in which he/she is majoring in order to receive a degree. In all areas of specialization, particular emphasis is placed upon the sciences as a background for agricultural instruction; other courses are included to provide a liberal education. In all subject matter departments 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.

Students pursuing a program leading to the degree of Bachelor of Science in Agricultural Engineering may select the concentration of interest to them. Students seeking the Bachelor of Science in Forestry may choose concentrations in forest resource management, forest recreation or wood utilization.

An academic and general requirements of the University as stated in the front section of this catalog must be met by agricultural students, and they must complete the requirements in one of the organized curricula. Students transferring into the College of Agricultural Sciences and Natural Resources from other than the UT, Knoxville campus must have a grade point average of 2.0. The use of transfer credit in technical subject matter areas appropriate to each organized curriculum will be considered and approved by the advisor of that curriculum and the Dean of the College of Agricultural Sciences and Natural Resources. When desirable, validating or proficiency examinations may be required to determine competence in an area and to avoid unnecessary repetitions. Such examinations should be taken during the first semester in residence and must be conducted under the supervision of the head of the department in which the course is offered. A minimum of 18 semester hours of upper division technical agriculture appropriate to a specified major requirement, and approved by the major advisor, must be completed in residence to fulfill the requirements for baccalaureate degrees offered in the college.

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

Satisfactory/No Credit Courses

An academic maximum of 21 hours in non-directed electives taken on a satisfactory/unsatisfactory basis may apply. The SAT/ACT scores and general prerequisites are 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.
Students with special interest in science, business, or production technology should consult the advisor about selection of appropriate electives. A foundation for advanced study beyond the baccalaureate degree may be established in any curriculum. If a major or minor specific area is selected; at least, courses may be elected within the terms of that major or minor.

DEGREE PROGRAMS

For the College of Agricultural Sciences and Natural Resources, the facility of the University throughout the general education program at the University campus so that students and faculty from all phases of agriculture and the renewable natural resources in the study of a common problem provides an unusual challenge.

INDEPENDENT STUDY

Independent study and special topics courses and seminars offered in each department provide exceptional students the opportunity to explore in greater depth subject-matter of unusual significance to agriculture. Students gain experience and are encouraged to assume responsibilities not available in formally organized courses. Association with students and faculty from other phases of agriculture and the renewable natural resources in the study of a common problem provides an unusual challenge.

Course Load

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

TRANSFER STUDENTS

Students who transfer to the College of Agricultural Sciences and Natural Resources from another institution, or from another college of the University, should consult the dean of the college about the curriculum they wish to follow. Requests for substitutions or special examinations must be identified for consideration during the first semester of study in the selected curriculum.

AGRICULTURAL ECONOMICS AND RURAL SOCIOLOGY

Profsessors:
H. Williamson (Head), Ph.D.; M. Bisinotto, Ph.D.

ECONOMICS AND
AGRICULTURAL

SOCIETY

COURSE LOAD

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Agricultural Extension and Education

Professors:
C.E. Biehler, Jr., Ph.D., Ohio State; L.H. Dickson (Emeritus), Ed.D.; T. Todd, Ed.D.; Brian Ginter

Associate Professors:
R.L. Reely (Head), Ed.D., Oklahoma State

Assistant Professor:
R.G. Waters, Ph.D., Penn State

The Department of Agriculture and Extension Education offers two educational areas of emphasis: namely, Agricultural Extension Education and Agricultural Education.

Agricultural Extension Education

Although no formal undergraduate curriculum is offered in Agricultural Extension Education, undergraduate courses are available as electives in each formal curriculum. These courses are designed to develop an understanding of the functions, responsibilities, and techniques of the Agricultural Extension Service; and to provide prospective Extension employees with work experience in selected training centers.

Agricultural Education

Students who complete the requirements for graduation in Agricultural Education receive a Bachelor of Science Degree in Agriculture with a Major in Agricultural Education. The curriculum is designed to prepare persons to assume educational and leadership roles in many phases of the agricultural industry, including agricultural schools, cooperatives, and farming and ranching. Emphasis is on preparing students to teach vocational agricultural and/or serve as an educator with the Agricultural Extension Service. Students may choose to concentrate either in the teacher education (certification) option or the professional services option.

The teacher education option is designed to prepare students to meet teacher certification requirements for vocational agriculture. Teacher Certification is given through the College of Education. Students must file for admittance to Teacher Education in the College of Education. (See Admission to Teacher Education and Student Teaching section.) Students meeting the requirements for general vocational agriculture certification may secure endorsements in ornamental horticulture and/or agriculture mechanics by meeting the following requirements:

1. Ornamental horticulture - 12 semester hours of courses in horticultural structures 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.
2. Agriculture mechanics - 12 semester hours of courses in agricultural mechanization. Subject matter areas must include power and machinery, soil and water conservation, and agricultural structures.

Students who choose the professional services option may substitute additional technical agriculture and/or internship hours equivalent to the number of hours of student teaching required in the teacher education option, with advisor approval additional hours, required specifically for certification, may also be substituted with courses in the humanities, social sciences or technical agriculture areas. This option provides a broad-based curriculum designed for those students who wish to prepare for careers with the Agricultural Extension Service, agribusiness, government agencies, and farming and ranching. This option does not prepare a student to meet teacher certification requirements.
The curriculum is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology. Industry, government agencies, research and testing organizations, and foreign-service offices either employ or in a general requirement allow students to register for alternate course schedules. Credit toward graduation will not be granted for Mathematics 130.

Courses selected from areas of 1) Humanities and the Arts; 2) Historical Perspectives; 3) Social Science; at least one course from Humanities and the Arts and at least two upper division courses from one of the other areas.

Food Technology and Science

Engineering Science and Mathematics

Projects in Agriculture

Agricultural Science and Technology

Agricultural Technology

Agricultural Engineering

Agricultural and Forestry Engineering

Agricultural and Biological Engineering

Agricultural and Food Engineering

Food Science Engineering

Food Engineering

Food engineering technology is available (see the Graduate Catalog). The graduate program is open to qualified BS graduates from other disciplines who earned a minor in agricultural engineering technology or who completed courses equivalent to those required for the minor in agricultural engineering technology.

ENTOMOLOGY AND PLANT PATHOLOGY

Gerrard, Hilly, Ph.D. Ohio State University; P.L. Lambdin, Ph.D. VPI and SU; C.D. Plesch, Ph.D. Clemson.

Associate Professors:

B.L. Reddick, Ph.D., Clemson; M.T. Wiedman, Ph.D. North Carolina State.

Assistant Professors:

J.G. Grant, Ph.D., Clemson; K.D. Gwinn, Ph.D. North Carolina State.

Advisors:

Southard, Gerhard; Hilly, Lambdin, and Plesch.
Electives allow students to select an area for specialization. In particular, those interested in production would select additional courses in agriculture; in business administration, economics, agricultural economics, finance, and accounting, for research in chemistry, zoology, physics, and statistics, etc. Electives should be chosen with career objectives in mind and in consultation with the advisor. The Animal Science core courses are 261, 281, 321, 322, 331, 332 and 341.

PRE-VETERINARY MEDICINE PROGRAM

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

1. Completion of all pre-veterinary requirements.
2. English Comp. 101-102 (3.3) - 6 hours
3. Humanities and Social Sciences - 18 hours
4. Biology 110-112 (4,4) - 8 hours
5. Chemistry 121-122 or 141-142 (3,3) - 6 hours
6. Mathematics 121-122 or 141-142 (3,3) - 6 hours
7. Physics 121-122 or 141-142 (3,3) - 6 hours
8. Additional courses in business administration, economics, agricultural economics, finance, and accounting, for research in chemistry, zoology, physics, and statistics, etc.

Electives should be chosen with career objectives in mind and in consultation with the advisor. The Animal Science core courses are 261, 281, 321, 322, 331, 332 and 341.

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Electives should be chosen with career objectives in mind and in consultation with the advisor. The Animal Science core courses are 261, 281, 321, 322, 331, 332 and 341.
Course requirements beyond PV requirements for PV-BS combined program:

- Mathematics 130 and 141 or 151 accepted for students with advanced mathematics background.
- Economics 201 is a social sciences and humanities elective.
- Three commodity electives are required, one each in dairy products, meats and foods from plant sources.
- Three credits must be earned for the biological science electives.
- A minor in Forestry consists of 16 credit hours as follows: FWF 211 or FWF 250, FWF 311 and 9 hours from FWF 312, 313, 315, 316, and 416 and Forestry designated courses.

FOREST RESOURCE MANAGEMENT CONCENTRATION

The Forest Resources Management Concentration provides an opportunity to obtain an education related to the management of the forest spectrum of wildlands and in industries. In addition to the core of required courses, there are about 18 elective credit hours for forest study or specialization training in one or more areas of forestry. These areas and examples of related fields of study are:

- Forestry: Biology including plant and animal biology, forest and wildlife management, environmental studies, soil and water, forest genetics.
- Forest Resources: Economics, business administration, social sciences, policy studies, forest policy, forest utilization.
- Forest Policy: Law, policy, planning, administration, and policy studies.
- Forest Management: Accounting, finance, and forest management science.
- Forest Economics: Forest economics, forest economics and policy, forest economics and policy studies.
- Forest Utilization: Forest utilization, forest policy, forest planning, and forest policy studies.
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- Forest Management: Accounting, finance, and forest management science.
### SocialScience Elective

- FWF 416
- History Elective
- Humanities and Social Science Elective
- *Total: 135 hours*

### Forest Recreation Concentration

The Forest Recreation Concentration provides 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 also learn the basic philosophy and principles associated with leisure time and its use along with the relationship of forest resources to the constructive use of leisure time.

**Freshman**

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<tr>
<th>Course</th>
<th>Hours</th>
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<tbody>
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<tr>
<td>Mathematics 110, 121</td>
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<tr>
<td>Botany 110, 112</td>
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<td>Chemistry 101</td>
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### WILDLIFE AND FISHERIES SCIENCE

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

- A minor in Wildlife and Fisheries Science consists of 16 hours from FWF 211 or 250, FWF 300, 317, 416, WFS 341, 443, 444, 445, and 446. Prerequisites will not be waived.

**Freshman**

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### WOOD UTILIZATION CONCENTRATION

The Wood Utilization Concentration trains students for careers in forest products processing. A sound background in basic sciences, including earthwork, paving surfaces, fences, pools, decks, pavers, benches, and planting

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<td>6</td>
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<tr>
<td>Botany 110, 112</td>
<td>6</td>
</tr>
<tr>
<td>Chemistry 101</td>
<td>4</td>
</tr>
<tr>
<td>Chemistry 101 or Physics 101 or Geology 101</td>
<td>3-4</td>
</tr>
<tr>
<td>Agriculture 103</td>
<td>4</td>
</tr>
<tr>
<td>FWF 311, 312</td>
<td>18</td>
</tr>
<tr>
<td>FWF 313, 315, 316, 317</td>
<td>13</td>
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<tr>
<td><em>Total: 136 hours</em></td>
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</tbody>
</table>
PLANT AND SOIL SCIENCE

Professors:
J.E. Frye (Professor), Ph.D., Minnesota, F.L. Allen, Ph.D., Minnesota, F.P. Ball (Emeritus), Ph.D., Iowa State; D.L. Coyle, Ph.D., Purdue; B.V. Congal, Ph.D., Washington State; A.A. Fribourg, Ph.D., Iowa State; R.M. Hayes, Ph.D., Nebraska; L.M. Johnson (Emeritus), Ph.D., Wisconsin; W.L. Parks (Emeritus), Ph.D., Purdue; B.S. Pridant (Emeritus), Ph.D., Michigan State; J.H. Reynolds, Ph.D., Wisconsin; L.S. Safrid (Emeritus), Ph.D., North Carolina State; L.N. Seld (Emeritus), M.S.; Karonne (Emeritus), M.S.; S. Spring (Emeritus), Ph.D., California (Berkeley); H.D. Swingle (Emeritus), Ph.D., Louisiana State; E. Winters (Emeritus), Ph.D., Illinois.

Associate Professors:
J.T. Ammons, Ph.D., West Virginia; D.E. Dezain, Ph.D., West Virginia; M. Grice, Ph.D., Purdue; K. Purvail, Ph.D., Purdue; A. Sanstead, Ph.D., Michigan State; R.J. Lewis, Ph.D., North Carolina State; V.H. Neech, Ph.D., Iowa State; C.E. Smol, Ph.D., Michigan State; D.W. Dike, Ph.D., Kentucky; D.R. West, Ph.D., Nebraska.

Assistant Professors:
H.E. Eastman, Ph.D., California (Riverside); J. Logan, Nebraska; T.C. Mueller, Ph.D., Georgia; G.V. Wilson, Ph.D., Arkansas.

Advisors:
Allen, Colfen, Foss, Graavel, Leesch, Reich, and Reynolds.

Plant and soil science deals with field and varied crops and soil resources. Plant science includes crop ecology and physiology, crop breeding and genetics for crop improvement, introduction of new varieties, crop management for high quality products, and weed control for efficient crop production. Soil science includes studies in soil formation and classification for better understanding of soil resources. Soil management for optimum crop production, conservation and improved mental quality, soil fertility for efficient nutrient uptake, soil drainage, pH, and biology as they apply to the soil and to a better understanding of its properties and use.

The plant and soil scientist must have knowledge of the basic, physical, chemical, and biological sciences and be trained in communication and computer skills. The scientific may be broadly trained or may specialize in a more specific phase of the subject. Many employment opportunities are available for the well-trained plant scientist and soil scientist including positions with public agencies such as Agricultural Extension Services, Soil Conservation Services, Forest Service, Federal Credit Service, and educational institutions. Many plant and soil scientists are employed in private industry as technical specialists, consultants, supervisors, salaried employees, appraisals, advisors, farm managers and in international agriculture.

Students selecting this major must complete the basic curriculum for the College of Agriculture and fulfill the major group requirements. A minor may be selected from among the major disciplines. Required courses for a major in Plant and Soil Science are 210, 230, and 471 plus 3 courses from Group A and 3 courses from Group B. Of the 6 courses chosen from Groups A and B, one must be a soil science course and one must be a plant science course. Group A: Plant and Soil Science 311, 312, 323, 322, 333, 324. Group B: Plant and Soil Science 411, 412, 413, 414, 431, 433, 453. Appropriate selection of the many electives available in the Plant and Soil Science curriculum permits students to select options that meet their interest and career goals. A departmental advisor will assist in designing a program to meet the students individual objectives. Possible options include field crops, fruits, vegetables, soil and water conservation, plant breeding, pest management, agricultural, international agriculture, environmental sciences, etc. A minor in Plant and Science consists of 16 credit hours including 210, 230, and at least 9 elective hours to be taken by selecting at least one course from each of Group A and B. Plant and Soil Science 211 will not be accepted as a course to meet minor requirements.

Hours Credit
Freshmen
Agriculture 101.................. 3
Business 110, 120.............. 3
Mathematics 110, 120........... 3
Mathematics 101.................. 3
Microbiology 110.............. 3
Physical Science 110, 120..... 3
Physical Science 100........... 3
Psychology 101.................. 3
Sociology 110.................... 3
Sociology 120.................... 3
Economics 101.................. 3
Economics 200.................. 3
Sociology 210.................... 3
Psychology 200.................. 3
Sociology 201.................... 3
Government 101.................. 3
Government 201.................. 3
English 100, 101.................. 3
English 110, 111.................. 3
Sociology 200.................... 3
Sociology 301.................... 3
Economics 101.................. 3
Economics 200.................. 3
Social Science Electives........ 3

Sophomore
Chemistry 120.................. 3
Chemistry 130.................. 3
English 102, 103.................. 3
Psychology 210.................. 3
Mathematics 251-252........... 3
Mathematics 141-142........... 3
Sociology 202.................. 3
Economics 102.................. 3
Economics 103.................. 3
Sociology 201.................. 3
Sociology 301.................. 3
English 102, 103.................. 3
Sociology 200.................. 3
Sociology 301.................. 3

Junior
Agriculture 210.................. 3
Agriculture 220.................. 3
Agriculture 230.................. 3
Agriculture 240.................. 3
Agriculture 250.................. 3
Agriculture 260.................. 3
Agriculture 270.................. 3
Agriculture 280.................. 3
Agriculture 290.................. 3
Agriculture 300.................. 3
Agriculture 310.................. 3
Agriculture 320.................. 3
Agriculture 330.................. 3
Agriculture 340.................. 3
Agriculture 350.................. 3
Agriculture 360.................. 3
Agriculture 370.................. 3
Agriculture 380.................. 3
Agriculture 390.................. 3
Agriculture 400.................. 3
Agriculture 410.................. 3
Agriculture 420.................. 3
Agriculture 430.................. 3
Agriculture 440.................. 3
Agriculture 450.................. 3
Agriculture 460.................. 3
Agriculture 470.................. 3
Agriculture 480.................. 3
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Agriculture 510.................. 3
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Agriculture 630.................. 3
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Agriculture 680.................. 3
Agriculture 690.................. 3
Agriculture 700.................. 3
Agriculture 710.................. 3
Agriculture 720.................. 3
Agriculture 730.................. 3
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Agriculture 750.................. 3
Agriculture 760.................. 3
Agriculture 770.................. 3
Agriculture 780.................. 3
Agriculture 790.................. 3
Agriculture 800.................. 3
Agriculture 810.................. 3
Agriculture 820.................. 3
Agriculture 830.................. 3
Agriculture 840.................. 3
Agriculture 850.................. 3
Agriculture 860.................. 3
Agriculture 870.................. 3
Agriculture 880.................. 3
Agriculture 890.................. 3
Agriculture 900.................. 3
Agriculture 910.................. 3
Agriculture 920.................. 3
Agriculture 930.................. 3
Agriculture 940.................. 3
Agriculture 950.................. 3
Agriculture 960.................. 3
Agriculture 970.................. 3
Agriculture 980.................. 3
Agriculture 990.................. 3

Senior

Preliminary. If any, to these courses will not be included in addition to the total of 18 hours.

Total: 132 hours

Students with a Mathematics ACT of 16 or more and a satisfactory placement test score should take Mathematics 101-102 or 141-142.

College of Agricultural Sciences and Natural Resources/Plant and Soil Science