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, this 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. Under terms of the Federal Land-Grant Act, Tennessee's Federal Land-Grant Institution. 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. Then the University was designed 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 professional interactions between various units of the Institute. For example, most of the faculty in the College of Agricultural Sciences and Natural Resources hold joint appointments in the Agricultural Experiment Station and they are actively involved in significant basic and applied research in agriculture and the associated natural resources. On campus and field research laboratories are utilized in the instructional programs of the College, while extension and research activities provide many students excellent part-time job opportunities.

The unique association the College has with the UT Knoxville campus and the other units of this Institute of Agriculture make it possible for the College to offer comprehensive high quality undergraduate and graduate programs.

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 Agricultural Sciences and Natural Resources.

The College provides curricula leading to the degrees of Bachelor of Science in Agriculture, Bachelor of Science in Biotechnology 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 Biotechnology Engineering requires strong support from the College of Engineering and is fully accredited by the Accreditation Board of Engineering and Technology. The forest resources management and wildlife management concentrations are fully accredited by the Society of American Foresters.

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

Students pursuing programs leading to the degree of Bachelor of Science in Agriculture major in one of several specialized areas of agriculture offered in the College. These areas are: agricultural economics and business, agricultural education, animal science, food technology and sciences, and plant and soil science. Specific courses required for each of these areas are given under the departmental headings in this section of the catalog. A student must complete the curriculum outlined by the department in which he/she is majoring in order to receive a degree. In all areas of specialization, particular emphasis is placed upon the sciences as a background for agricultural instruction; other courses are included to provide a liberal education. In all subject matter 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 Biotechnology Engineering may select one concentration offered in agricultural engineering, biological engineering or food engineering. Students seeking the Bachelor of Science in Forestry may choose concentrations in forest resources management or wildlife resources.

All academic and general requirements of the University as stated in the front section of this catalog must be met by agricultural students, and they must complete the requirements in one of the organized curricula. Students transferring into the College of Agricultural Sciences and Natural Resources from other than the UT Knoxville campus must have a grade point average of 2.0. The use of transfer credit in technical subject matter areas appropriate to each organized curriculum will be considered and approved by the advisor of that curriculum and the Dean of the College of Agricultural Sciences and Natural Resources. When 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 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

Students may include a maximum of 21 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

Prospective graduate study leading to the Master of Science degree is offered in all departments in the College of Agricultural Sciences.

DOCTORAL PROGRAMS

Graduate study programs lead to the Doctor of Philosophy degree in animal sciences, agricultural economics, biotechnology engineering, food technology and sciences, 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, financial aid, and examination and admission to candidacy shall apply to those programs and are described in the Graduate Catalog.

FACILITIES
The College of Agricultural Sciences and Natural Resources uses the facilities on the agricultural campus, on University farms located near Knoxville, and on the main University campus. On the agricultural campus, the facilities are the found the main agricultural building, Morgan Hall; the Agricultural Engineering Building; McCoit Hall; the Dairy Products Building; McCord Food Technology Building; C.E. Brehm Animal Sciences Building, which includes a teaching laboratory; Plant Sciences Building which houses the plant science departments; and greenhouses for teaching and experimental work. The buildings which have been erected recently provide facilities compatible 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 (60 acres). Cherkiss Farm (500 acres). Plant Sciences Farm (512 acres). and a livestock farm (510 acres) provide excellent field laboratory facilities for instructional programs offered in the College. Cherkiss Westend (150 acres), the Oak Ridge Forest (2,260 acres), and Ameiz Plantation (12,500 acres) of forested land provide excellent facilities for field work in forestry, wildlife, and fisheries.

Transportation by bus is provided for classes of agricultural students from the agricultural campus to the University farms and to other points of interest in the state. Transportation by bus is provided 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 serve the needs of all departments. Courses in the basic sciences, business, communications, engineering, and fine arts are open to agricultural students and are taught on the main University campus.

SELECTION OF CURRICULUM
Agricultural students and those in other fields of study who have a very strong interest in agricultural matters should consider enrollment in the College of Agricultural Sciences and Natural Resources. For this purpose, the advisors of each department should maintain a complete record of the student's progress. The multiplemajor will normally require more than 132 hours credit for graduation.

MINIMUM REQUIREMENTS FOR BACCALAUREATE DEGREE PROGRAMS
All B.S. degree programs offered in the College have the following minimum requirements: Liberal Arts and Sciences (40 hours) and/or electives (12) (38)

Electives (8)

Writing or Speaking elective (3)

Economics (4) and electives (8) (12)

English Composition (6), Speech (3), and Writing or Speaking elective (3) (12)

English Composition (6)

Speech (3)

Writing or Speaking elective (3)

Mathematics (6)

Physical Sciences (Chemistry, Physics, Geology) (8)

Social Sciences and Humanities including English Composition (6) and electives (12) (18)

Economics (4)

Electives (6)

Major Courses (24)

College of Agricultural Sciences and Natural Resources courses must be taken under the major department) designated by the department and/or electives (12)

Other courses designated by the department and/or electives (36) (48)

(Should be taken in any of the following departments) (18)

Bachelor of Science in Agriculture, Bachelor of Science in Agricultural Engineering, Bachelor of Science in Forestry, Bachelor of Science in Wildlife, Bachelor of Science in Horticulture.

INDEPENDENT STUDY
Independent study and special topics courses are available in each department. To become familiar with the programs offered, interested students are encouraged to contact the department.

TRANSFER STUDENTS
Transfer students who transfer to the College of Agricultural Sciences and Natural Resources from another institution, or from another college at UT Knoxville, should consult the dean of the College. Students intending to transfer should have an above average academic record and a genuine interest in agricultural education.

INDEPENDENT STUDEY
Independent study and special topics courses are available in each department. To become familiar with the programs offered, interested students are encouraged to contact the department.

TRANSFER STUDENTS
Transfer students who transfer to the College of Agricultural Sciences and Natural Resources from another institution, or from another college at UT Knoxville, should consult the dean of the College. Students intending to transfer should have an above average academic record and a genuine interest in agricultural education.

AGRICULTURAL ECONOMICS AND RURAL SOCIETY

Professors:

D.L. McLeom (Head), Ph.D. Clemson; M.E. Brueggemeier, Ph.D. (Emeritus), Ph.D. Oklahoma State; J.P. Brooker, Ph.D. Florida; C.L. Chilens (Emeritus), Ph.D. Wisconsin; W.D. Eastwood, Ph.D. Tufts; B.C. English, Ph.D. Iowa State; L.H. Keller (Emeritus), Ph.D. Iowa State; J.B. Martin, Ph.D. University of Wisconsin.

Associate Professors:

W.J. McLeom, Ph.D. Oklahoma State University; M.D. Mundy, Ph.D. Purdue; F.O. Ray, Ph.D. Cornell; C.B. Sappington (Emeritus), Ph.D. Missouri; S.D. Mundy, Ph.D. Purdue; R.K. Roberts, Ph.D. Iowa State; T.J. Whatley (Emeritus), Ph.D. North Carolina State.

Assistant Professors:

E.C. Jarecki, Ph.D. Purdue.

Agricultural Economics and Business Curriculum

Advisors:

Professors Brooker, McLeom, Mundy, and Park.

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. Through course selection, students may prepare for employ- ment in the rapidly expanding field of agricultural business or in the field of farm production and related areas. The business oriented student will be prepared for the management phases of agricultural business. Employment opportunities include work in marketing of agricultural products, agribusiness firm management, agricultural credit agencies and banks, farm real estate and appraisal services, public and private market analyses, and farm information services utilizing mass communications. Farm management oriented students will be prepared for positions such as farm managers, county agricultural agents, managers of farm supply and purchasing firms, agricultural jour- nalists, and farm loan agents. The curriculum also provides the necessary background for graduate work in agricultural economics.

Minor consists of 10 credit hours including Economics 201, Agricultural Economics 342, 350, 410, and a 3-hour elective in Agricultural Economics.

AGRICULTURAL EXTENSION

The department of agricultural and extension education has two educational areas of emphasis: namely, Agricultural Extension Education and Agricultural Education.

AGRICULTURAL EXTENSION EDUCATION

The non formal and undergraduate curriculum is offered in Agricultural Extension Education. Undergraduate curricula are available as electives in each formal curriculum. The courses are designed to develop an understand- ing of the fundamental concepts and techniques of the Agricultural Extension Service; and to provide prospective Extension employees with work experience in selected field activities.

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 cur- riculum is designed to prepare persons to ac- quaint educational and leadership roles in many phases of the agricultural industry, including agriculture and ranching, schools, agencies, and farming and ranching. Emphasis is placed on preparing stu- dents to teach agricultural education or serve as an educators 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 agricultural education.

Teacher Certification is given through the Col- lege of Education. Students must file for admis- sion to Teacher Education in the College of Education. (See Admission to Teacher Educa- tion and Student Teaching sections.) 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 curriculum. With advisor approval additional hours, required for the professional option. Students, may also be substi- tuted with courses in the humanities, social sciences or technical agriculture. A 3-hour elective option provides a broad-based curriculum designed for those students who wish to pre- pare for careers in the Agricultural Extension Service, agribusiness, government agencies, and farming and ranching. This option does not prepare a student to meet teacher certification requirements.

AGRICULTURAL AND BIOSYSTEMS ENGINEERING

http://bioengr.ag.utk.edu

Professors: K.L. Cate, Ph.D. Oklahoma State; J.E. Bledsoe, Ph.D., Oklahoma State; R.L. Womac, Ph.D., Oklahoma State; and J.R. Yoder, Ph.D., Purdue University. Associate Professors: A.J. Evans, Ph.D., Oklahoma State; R.E. Yoder, Ph.D., Purdue University; and B.R. Fowke, Ph.D., California State University, Northridge. Assistant Professors: J.R. Evans, Ph.D., Utah State University; R.J. Morgan, Ph.D., Texas A&M University; and J.A. Carter, Ph.D., Colorado State University. Adjunct Professors: J.J. Cowan, Ph.D., Oregon State University; R.L. Womac, Ph.D., Oklahoma State University; and J.R. Yoder, Ph.D., Purdue University. Visiting Professors: J.D. Rice, Ph.D., University of Georgia; and W.L. Jones, Ph.D., University of Georgia.

Agricultural Engineering is offered in three concentrations: Agricultural Bioengineering, Agricultural Electrical and Electronics, and Agricultural Mechanics.

Agricultural Bioengineering: The Agricultural Bioengineering option provides a comprehensive background in the areas of agricultural and biological engineering. The curriculum is designed to prepare students for careers in agricultural and biological engineering, as well as for graduate study in the field.

Agricultural Electrical and Electronics: The Agricultural Electrical and Electronics option provides a comprehensive background in the areas of electrical and electronic engineering. The curriculum is designed to prepare students for careers in the field of agricultural electrical and electronic engineering, as well as for graduate study in the field.

Agricultural Mechanics: The Agricultural Mechanics option provides a comprehensive background in the areas of agricultural machinery and equipment. The curriculum is designed to prepare students for careers in the field of agricultural mechanics, as well as for graduate study in the field.

Agricultural and BioSystems Engineering offers a Bachelor of Science Degree in Agricultural and BioSystems Engineering with a Major in Agricultural and BioSystems Engineering.

Agricultural and BioSystems Engineering: The Agricultural and BioSystems Engineering program is designed to provide students with a comprehensive education in the areas of agricultural and biological engineering. The curriculum is designed to prepare students for careers in the field of agricultural and biological engineering, as well as for graduate study in the field.
OBJECTIVES

The Biosystems Engineering Program at the University of Tennessee, Knoxville, is committed to linking engineering sciences and mathematics to real-world problems involving natural and man-made biologically-based systems. We strive to educate students to become engineers with the ability to serve humankind by applying engineering knowledge to solve problems facing society. This education is accomplished by providing a strong grounding in engineering fundamentals and incorporating hands-on, real-world design scenarios throughout the curriculum.

Our graduates are technically competent in engineering design. They:

- understand the steps in the engineering process;
- can define a problem;
- can gather the information required to solve a problem;
- can critically evaluate information from various sources;
- are creative and can synthesize solutions to a problem;
- can perform engineering analyses;
- can design components, machines, or systems to solve a problem;
- understand the importance of social, environmental, economic, and safety issues;
- and appreciate the role of uncertainty and risk in engineering analyses.

Our graduates have the skills needed by professional engineers. Our program strives to:

- an understanding of the engineering profession;
- the thrill of rewarding engineering accomplishments;
- a knowledge of the responsibilities of a professional engineer;
- an ability to work effectively in teams of diverse talents;
- an understanding of the importance of critical and ethical decision making;
- effective oral, written, and graphical communications skills;
- the importance of taking initiative on projects;
- continuance in technical capabilities;
- strong personal time management skills;
- and the ability to perform professional skills.

The curriculum provides instruction in the analytical and design skills needed to solve engineering problems related to biological and agricultural systems. Comprehensive design of systems and their components is emphasized in the senior year. Three concentrations are available: Agricultural Engineering, Biosystems Engineering, and Food Science. A concentration should be selected early in the academic program since there are differences as easily as the sophomore year. Each concentration in the curriculum has provisions for elective courses to be taken in specific subject areas. Students must consult with their advisors each semester regarding the selection of courses and should follow a plan for all such electives not later than their second year of study.

Graduates may pursue careers in design and development of: management practices in agricultural processing systems. Students majoring in biosystems engineering are eligible to participate in the Engineering Cooperative Scholarship program and other student activities in the College of Engineering. Biosystems Engineering majors interested in the Cooperative Engineering Scholarship program should consult with their faculty advisor or the head of this Agricultural and Biosystems Engineering Department (phone: 403-794-2092; e-mail: agrin@utk.edu).

BIOSYSTEMS ENGINEERING WITH CONCENTRATION IN AGRICULTURAL ENGINEERING

Hours Credit

**Freshman**

- Engineering Fundamentals 101, 102 .......................... 12
- Biosystems Engineering 101, 102 .......................... 6
- Chemistry 105 .................................................. 4
- English 101, 102 .............................................. 8
- Mathematics 141, 142 ...................................... 8
- Sophomore

- Agriculture 101 .............................................. 3
- Biosystems Elective ........................................... 3
- Engineering Science 231, 321 .............................. 6
- Historical Studies Elective ................................. 3
- Humanities Elective ....................................... 3
- Mathematics 200, 231, 241 ............................ 4
- Physics 231 .................................................. 3
- Junior

- Biosystems Engineering 302, 451 .............................. 3
- Biosystems Engineering Core Elective ....................... 3
- Electrical Engineering 361 ................................. 3
- Food Science Elective ...................................... 3
- Historical Studies Elective ................................ 3
- Industrial Engineering 405 ................................. 3
- Thermodynamics Elective ................................. 3
- Technical Electives ........................................ 3
- Senior

- Biosystems Engineering 401, 422 ............................ 3
- Biosystems Engineering 405, 425, 435 or 450, 453 .... 3
- Biochemistry Elective ........................................ 3
- Speech 210 or 240 ...................................... 3
- English 230 .................................................. 3
- Economics 301 .............................................. 3
- Social Science Elective ........................................ 3
- Technical Electives ........................................ 3

Total: 134 hours

*Or equivalent honors courses.

If Mathematics placement test is unsatisfactory, take Mathematics 120 prior to 141 (See advisor for additional hours toward graduation). The sequence of Mathematics 130 will be completed at least 2 Seminars in Biosystems Engineering to 2100. Biology 550 Biology 110, 111, 551, and 552. Students majoring in biosystems engineering are interested in the Q Engineering Cooperative Scholarship program and other student activities in the College of Engineering. Biosystems Engineering majors interested in the Cooperative Engineering Scholarship program should consult with their faculty advisor or the head of this Agricultural and Biosystems Engineering Department (phone: 403-794-2092; e-mail: agrin@utk.edu).

**BIOSYSTEMS ENGINEERING WITH CONCENTRATION IN FOOD ENGINEERING**

Hours Credit

**Freshman**

- Engineering Fundamentals 101, 102 .......................... 12
- Biosystems Engineering 101, 102 .......................... 6
- Chemistry 120 .................................................. 4
- English 101, 102 .............................................. 6
- Mathematics 141, 142 ...................................... 8
- Sophomore

- Agriculture 101 .............................................. 3
- Biosystems Engineering 101, 203 ............................. 4
- Chemical Engineering 231, 321 ............................ 3
- Economics 201 .............................................. 3
- Mathematics 200, 231, 241 ............................ 4
- Physics 231 .................................................. 3
- Junior

- Biosystems Engineering 300, 451 .............................. 3
- Biosystems Engineering Core Elective ....................... 3
- Chemical Engineering 361 ................................. 3
- Food Science Elective ...................................... 3
- Historical Studies Elective ................................ 3
- Industrial Engineering 405 ................................. 3
- Thermodynamics Elective ................................. 3
- Technical Electives ........................................ 3

Total: 134 hours

*Or equivalent honors courses.

If Mathematics placement test is unsatisfactory, take Mathematics 120 prior to 141 (See advisor for additional hours toward graduation). The sequence of Mathematics 130 will be completed at least 2 Seminars in Biosystems Engineering to 2100. Biology 550 Biology 110, 111, 551, and 552. Students majoring in biosystems engineering are interested in the Q Engineering Cooperative Scholarship program and other student activities in the College of Engineering. Biosystems Engineering majors interested in the Cooperative Engineering Scholarship program should consult with their faculty advisor or the head of this Agricultural and Biosystems Engineering Department (phone: 403-794-2092; e-mail: agrin@utk.edu).

**BIOSYSTEMS ENGINEERING WITH CONCENTRATION IN BIOLOGICAL ENGINEERING**

Hours Credit

**Freshman**

- Engineering Fundamentals 101, 102 .......................... 12
- Biosystems Engineering 101, 102 .......................... 6
- English 101, 102 .............................................. 6
- Mathematics 141, 142 ...................................... 8
- Sophomore

- Biosystems Engineering 201, 242 ............................. 4
- Food Science Elective ...................................... 3
- Food Science & Technology 310, 320, 329, 340 ............ 12
- Economics 201 .............................................. 3
- Industrial Studies Electives ................................ 3
- Thermodynamics Elective .................................. 3
- Senior

- Biosystems Engineering 311, 421, 422, 433 ................ 13
- Chemical Engineering 321, 322 ............................ 6
- Engineering Science 231, 321 ............................ 6
- Mathematics 200, 231, 241 ............................ 4
- Physics 231 .................................................. 3
- Junior

- Biosystems Engineering 300, 451 .............................. 3
- Electrical Engineering 301 .................................. 3
- Thermodynamics Elective .................................. 3
- Chemical Engineering 320 .................................. 3
- Economics 201 .............................................. 3
- Industrial Studies Electives ................................ 3
- Industrial Engineering 405 .................................. 3

Total: 134 hours

*Or equivalent honors courses.

If Mathematics placement test is unsatisfactory, take Mathematics 120 prior to 141 (See advisor for additional hours toward graduation). The sequence of Mathematics 130 will be completed at least 2 Seminars in Biosystems Engineering to 2100. Biology 550 Biology 110, 111, 551, and 552. Students majoring in biosystems engineering are interested in the Q Engineering Cooperative Scholarship program and other student activities in the College of Engineering. Biosystems Engineering majors interested in the Cooperative Engineering Scholarship program should consult with their faculty advisor or the head of this Agricultural and Biosystems Engineering Department (phone: 403-794-2092; e-mail: agrin@utk.edu).
In the Graduate Technology 202, 212, 432, 442 and two of the technology requires a minimum of 18 semester hours as follows: Biosystems Engineering Technology 320, 321, 432, 442 and two of the three courses 422, 432, 482.

A program leading to the Master of Science degree with a major in biosystems engineering technology is available (see the Graduate Catalog). The graduate program is open to qualified BS graduates from other disciplines who earned a minor in biosystems engineering technology or who completed courses equivalent to those required for the minor in biosystems engineering technology.

ENTDOMIOLOGY AND PLANT PATHOLOGY

Professors: C.D. Ploss (Interim Head), Ph.D. Clemson; E.C. Bentili, Ph.D. Georgia; R.R. Girard, Ph.D. North Carolina State; J.D. Herren, Ph.D. Clemson; J.W. Hily (Emeritus), Ph.D. Ohio State; P.L. Lambkin, Ph.D. VPI and SU; and C.L. Sulivan (Emeritus), Ph.D. North Carolina State.


Assistant Professor: Roberto Pereira, Ph.D. Florida.

Advisors: Garlton Lambkin, Ph.D. and Ph.D.

No undergraduate curriculum exists in the Department 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). Course work in economic entomology, diseases and production of ornamental plants, forest protection, plant pathology, and veterinary entomology are available to undergraduate students.

Instruction and training is provided in those disciplines which deal with the natural hazards that are major causes of losses in agricultural production, namely, insects and plant diseases. Courses of study in entomology, plant pathology should give the student an appreciation of the potential damage to plants and their products, and various control alternatives in crop production.

ANIMAL SCIENCE

Professors: R.K. Robbins (Head), Ph.D. Illinois; K.M. Barth (Emeritus), Ph.D. Illinois; R.D. Spilman, M.C. Ball (Emeritus), Ph.D. Oklahoma State; J.K. Belmer (Emeritus), Ph.D. Ohio State; C.C. Chamberlin (Emeritus), Ph.D. Iowa State; I. Eiler, D.V.M., Ph.D. Illinois; B.H. Erickson (Emeritus), Ph.D. Kansas State; J.G. Goodin, Ph.D. Massachusetts; O.H. Hall, D.V.M., Ph.D. Iowa State; J.L. Herrick (Emeritus), Ph.D. Florida State; R.W. Harry, D.V.M., Ph.D. Ohio State; E.R. Ullrey (Emeritus), M.S. Missouri; P.B. Maschoff, Ph.D. Kansas State; T.P. McDonald (Emeritus), Ph.D. Pennsylvania State; J.B. McLain (Emeritus), Ph.D. Auburn; S.P. Ososki, Ph.D. Ohio State; J.K. Miller, Ph.D. Georgia; D.O. Richardson, (Emeritus), Agricultural Experiment Station; J.D. Ohio State; A. Stewart, Ph.D. North Carolina State; T.W. Schult (Emeritus), Ph.D. Tennessee; H.V. Shirley (Emeritus), Ph.D. Illinois; M.H. Sim, Ph.D. Auburn; A.L. Togilid (Emeritus), Ph.D. Kansas State.


Advisors: Professors Godden, Maschoff, and Oliver. Assistant Professors Backus, Bell, Grizzolo, Hallman, Katkas, Mathew, Smith and Walker. Assistant Professor Schrck.

The curriculum is designed to prepare students for leadership careers in livestock production and related industries. Courses in animal science, nutrition, health, and marketing, animal husbandry practices, animal nutrition, and feeding practices are offered. Students may specialize in the development of livestock and feedlot systems. Through course selection, students may prepare for general or livestock farming, management, business, or science, or elect the pre-veterinary courses preparatory for specializations in the veterinary field. The pre-veterinary courses prepare for specialization in veterinary medicine.

A minor in animal science consists of 3 credits from 250 Animal Industry & Market Evaluation or 255 (Farm Animal Management Principles), 3 credits from Animal Science 212, 213, 215 and three of 420, 430, 440, 480 courses and no more than 3 credits from 493.

ANIMAL SCIENCE WITH CONCENTRATION IN PRODUCTION/MANAGEMENT

Freshman

Agriculture 101 .................................................. 3
Economics 102 .................................................. 3
Agriculture 105 .................................................. 3
Animal Science 101 ............................................ 3

Sophomore

Agriculture 106 .................................................. 3
Economics 105 .................................................. 3
Economics 106 .................................................. 3

Total: 132 hours

May be chosen from approved list of courses meeting University requirements as Social Sciences. May be chosen from approved list of courses meeting University requirements as Humanities and social sciences.

May be chosen from approved list of courses meeting University requirements as Humanities and social sciences.

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May be approved listed of courses meeting University requirements as Humanities and social sciences.

May be approved listed of courses meeting University requirements as Humanities and social sciences.
3. At least 12 hours of upper division (300 and 400 level courses) technical agriculture courses must be taken at UT Knoxville. In addition to all the required pre-veterinary medical courses, the following (or approved equivalents) must be completed before entering the College of Veterinary Medicine:
   a. Mathematics 123-125 or 141-142 or 151-152
   b. Animal Science 101—1 hour
   c. Animal Science 103—1 hour
   d. Animal Science 260—3 hours
   e. Animal Science 303—3 hours
   f. Animal Science 340—3 hours
   g. Animal Science 360—3 hours
   h. Computer Science Elective—3 hours
   i. Economics 100—3 hours
   j. Speech 210—2-4 hours
   k. Non-Animal Science Agriculture Electives—6 hours

4. The last 30 hours of the three-year pre-veterinary curriculum must have been taken at UT Knoxville.

5. Satisfaction completion of the first two semesters in the CVM professional program.

6. No later than December 31 of student's first year in the CVM (the student should contact the College of Veterinary Medicine in order to check on graduation procedures for this program.

7. A total of 132 hours must be completed by the end of the first year in the CVM.

8. \textit{Career opportunities include positions in the food industry in quality assurance, production management, marketing, governmental inspection, etc. Students entering the program should have an interest in the sciences, such as chemistry, microbiology, and sanitation.}

9. \textit{Advisors:}
   - D.A. Golden, Ph.D. Georgia; G. Hubert, Ph.D. Illinois; K.L. van Laack, Ph.D. Wisconsin; W.C. Morris, Ph.D. Iowa State; J.L. Mount, Ph.D. Ohio State.

10. \textit{Food Industry and Technology include a science concentration, a business/technology concentration, and a pre-professional concentration. They prepare students to apply basic scientific and quantitative knowledge to managing, processing, distribution, and utilization of food products that meet the needs and desires of consumers.}

11. \textit{Recommended courses are offered to students who have completed the requirements for a major in Animal Science during the Senior year.}

\textbf{FOOD SCIENCE AND TECHNOLOGY}

\textbf{Food Science and Technology include a science concentration, a business/technology concentration, and a pre-professional concentration. They prepare students to apply basic scientific and quantitative knowledge to managing, processing, distribution, and utilization of food products that meet the needs and desires of consumers.}

\textbf{Advisors:}
   - D.A. Golden, Ph.D. Georgia; G. Hubert, Ph.D. Illinois; K.L. van Laack, Ph.D. Wisconsin; W.C. Morris, Ph.D. Iowa State; J.L. Mount, Ph.D. Ohio State.

\textbf{FOOD SCIENCE AND TECHNOLOGY WITH CONCENTRATION IN SCIENCE}

\textbf{Freshman}

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
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<tbody>
<tr>
<td>English 101-102</td>
<td>3</td>
</tr>
<tr>
<td>Biology 101</td>
<td>3</td>
</tr>
<tr>
<td>Biology 210-212</td>
<td>4</td>
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<tr>
<td>Chemistry 120-130</td>
<td>4</td>
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<tr>
<td>Animal Science 101</td>
<td>1</td>
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<tr>
<td>Animal Science 102</td>
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<td>Animal Science 260</td>
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<td>Animal Science 303</td>
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<td>Animal Science 340</td>
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<td>Animal Science 360</td>
<td>3</td>
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<tr>
<td>Animal Science 380</td>
<td>3</td>
</tr>
<tr>
<td>Computer Science Elective</td>
<td>3</td>
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<tr>
<td>English 101-102</td>
<td>3</td>
</tr>
<tr>
<td>History 101-102</td>
<td>3</td>
</tr>
<tr>
<td>Physical Science Elective</td>
<td>3</td>
</tr>
<tr>
<td>Chemistry 120-130</td>
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</tr>
<tr>
<td>Animal Science 101</td>
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<tr>
<td>Animal Science 260</td>
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<tr>
<td>Animal Science 303</td>
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<tr>
<td>Animal Science 340</td>
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<td>Animal Science 360</td>
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<td>Animal Science 380</td>
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<tr>
<td>Computer Science Elective</td>
<td>3</td>
</tr>
<tr>
<td>Economics 100-102</td>
<td>3</td>
</tr>
<tr>
<td>Speech 210-212</td>
<td>2</td>
</tr>
<tr>
<td>Non-Animal Science Agriculture Electives</td>
<td>6</td>
</tr>
</tbody>
</table>

Total: 59-101 hours

\textit{Courses chosen from approved list of courses meeting University requirements as Humanities and Social Sciences.}

\textbf{TECHNOLOGY}

\textbf{Food Science and Technology include a science concentration, a business/technology concentration, and a pre-professional concentration. They prepare students to apply basic scientific and quantitative knowledge to managing, processing, distribution, and utilization of food products that meet the needs and desires of consumers.}

\textbf{Advisors:}
   - D.A. Golden, Ph.D. Georgia; G. Hubert, Ph.D. Illinois; K.L. van Laack, Ph.D. Wisconsin; W.C. Morris, Ph.D. Iowa State; J.L. Mount, Ph.D. Ohio State.

\textbf{FOOD SCIENCE AND TECHNOLOGY}

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\textbf{FOOD SCIENCE AND TECHNOLOGY WITH CONCENTRATION IN SCIENCE}

\textbf{Freshman}

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
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<tbody>
<tr>
<td>English 101-102</td>
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<tr>
<td>Biology 101</td>
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<td>Chemistry 120-130</td>
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<tr>
<td>Computer Science Elective</td>
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<td>English 101-102</td>
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<td>History 101-102</td>
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<td>Physical Science Elective</td>
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\textit{Courses chosen from approved list of courses meeting University requirements as Humanities and Social Sciences.}

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### Forestry, Wildlife, and Fisheries

<table>
<thead>
<tr>
<th>Course Title</th>
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<tr>
<td><strong>Food Science and Technology</strong></td>
<td></td>
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</tr>
<tr>
<td>Food Science and Technology 430</td>
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<td></td>
</tr>
<tr>
<td>Food Science and Technology 439</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Food Technology/Business Electives</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

**Total:** 132 hours

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**May be chosen from Biology 101, 130 or Botany 110.**

**May be chosen from approved list of courses meeting University requirements as Social Sciences.**

**May be chosen from Philosophy 110, 240, 342, 344,**

**May be chosen from approved list of courses meeting University requirements as Humanities.**

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**FOOD SCIENCE AND TECHNOLOGY WITH PREPROFESSIONAL CONCENTRATIONS**

These programs in Pre-Dental, Pre-Medical, Pre-Pharmacy and Pre-Veterinary Medicine allow students to be awarded a B.S. degree in Agriculture with a major in Food Science and Technology, after three years and the successful completion of the first year (two semesters) in UT Knoxville College of Veterninary Medicine. The last 30 hours of the three-year curriculum must have been taken at UT Knoxville. A total of 132 hours must be completed by the end of the first year in professional school. No later than December 31 of the student's first year in professional school, the student must contact the Dept Food Science and Technology in order to obtain graduation procedures for this program.

Although a B.S. degree is not required for admission to the Colleges of Dentistry or Medicine, most of the students accepted into these programs have the baccalaureate degree before admission. Therefore students are encouraged to plan to complete all requirements for a B.S. degree before entering in one of these professional schools.

---

**FORESTRY, WILDLIFE, AND FISHERIES**

**Professors:**

G.M. Hopper (Head), Ph.D., Virginia Polytechnic Institute and State University; J.M. Syndrome, E.R. Buehler (Emeritus), Ph.D., North Carolina State University; A.A. Core (Emeritus), Ph.D., North Carolina State University; B.L. Darrell, Ph.D., Colorado State University; D.M. Ostender, Ph.D., Syrman; M.R. Paton, Ph.D., George, J.C. surgeons, Ph.D., North Carolina State University; J.L. Wilson, Ph.D., Tennessee, Ph.D., Colorado State University; B.L. Dearden, Ph.D., Colorado State University; H.A. Core (Emeritus), Ph.D., North Carolina State University; D.M. Ostender, Ph.D., J.R. Strain, Ph.D., North Carolina State University; B.L. Dearden, Ph.D., Colorado State University; J.L. Wilson, Ph.D., Tennessee,

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**Associate Professors:**

---

**Forestry Advisors:**

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**Assistant Professors:**

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**Forest and Wildlife Advisors:**

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The mission of the Department of Forestry, Wildlife, and Fisheries is to advance the management, utilization, and appreciation of natural resources in Tennessee, the region, and beyond through programs in teaching, research, and extension.
ENROLLMENT MANAGEMENT PLAN

All majors in the Department of Forestry, Wildlife and Fishery Sciences must submit an application for progression with relevant core grade, names of three references, work experience (both volunteer and paid positions) related to natural resources, and service and professional activities, and a transscript, before regis- tering for the Forestry class.

To be considered for progression into the upper division of the program, applicants must have submitted all required documentation (application form, resume, and transcript) by a December deadline late in the Fall Semester.

Those students who have met all preliminary requirements for progression, including having relevant core grade and letters of reference for progression, will be ratified based on the com- bined score of their cumulative grade point aver- age (GPA) and GPA in core courses. The com- bined score will be 50% cumulative GPA (mini- mum 2.2) and 50% cumulative GPA (minimum 2.2) in core courses. Applicants with the highest scores will be accepted into the program. The number of applicants accepted into each pro- gram will be set based on resources available. Applicants will be notified of their acceptance by the start of registration for Spring Semester.

Introduction to microcomputers (Ag 290 or equivalent); general ecology (Biology 130 or equivalent); and statistics (Statistics 201 or equivalent).

CORE COURSES

The Department of Forestry, Wildlife and Fishery Sciences requires completion of the following courses, each with a grade of "C" or better, for admission to the program in this major.

Prerequisites will not be waived.

FORESTRY CONCENTRATIONS

The Forest Resources Management Concentration provides an opportunity to obtain an education related to the management of the broad spectrum of wildland resources. In addi- tion to the course of required courses, there are about 18 elective credit hours for broad studies or specialized training in one or more areas of forestry.

Elective credits may be used to obtain electives, credit hours in the program. The internship is a mandatory component of the program and is required for graduation.

The application process includes a review of the student's academic record, professional experience, and personal references.

The University has over 21,000 acres of wildland resources available for study and research. The Tennessee Valley Authority, Great Smoky Mountains National Park, and Cherokee National Forest provide opportunities for research and professional development.

Ten weeks of professional internship experience (6 credits) is required during the final 45 hours of credit in the program. The internship is a highly structured field experience guided by specific learning objectives pre-approved by the instructor and the field supervisor.

The student receives one credit per two weeks of actual placement. Summer employment or volunteer work in a related field is encouraged. The internship is highly encouraged.

FOREST RESOURCES MANAGEMENT CONCENTRATION

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OREN RMAL HORTICULTURE AND LANDSCAPE DESIGN

Professors:

Associate Professors:

U.T. Agricultural Extension Service Faculty:
G. D. Crider, Ph.D. Ohio State; Professor, T. J. Samples, Ph.D. Oklahoma State; Associate Professor, J. E. Brown-Feust, Ph.D. Michigan State; Assistant Professor, D. F. Ferr, Ph.D. Auburn, Assistant Professor.

Assistant Professors:

The Department of Ornamental Horticulture and Landscape Design (OHLD) of the University of Tennessee provides quality academic instruction to undergraduate and graduate students. The department is staffed by experienced instructors who are committed to the success of their students. OHLD advisors give students sound advice in the selection of career specialties, elective courses, and provide students the best education possible. Professors are important to the success of their students. OHLD advisors give students sound advice in the selection of career specialties, elective courses, and provide students the best education possible. Professors are important to the success of their students. OHLD advisors give students sound advice in the selection of career specialties, elective courses, and provide students the best education possible. Professors are important to the success of their students. OHLD advisors give students sound advice in the selection of career specialties, elective courses, and provide students the best education possible.

A small percentage of under-graduate students go on to graduate study. Students select courses to meet the challenges of the different areas of ornamental horticulture by working closely with their academic advisors. In addition to various horticultural courses, students are encouraged to take courses in business, agriculture, economics, and marketing.

Students can also work with OHLD faculty and other professionals in the field to put theory into practice and screen possible job opportunities. Positions that OHLD graduates hold are numerous and include the following: owner, manager, salesperson or employee of garden centers or retail nurseries; employee of nurseries or other retail outlets; garden center manager, salesperson or employee of horticulture firms; directors, curators, public relations managers of tourist attractions; field engineers, construction firms; landscape contractors, owners, supervisors or growers of turfgrass firms, chemical companies and flower shops; public relations managers with interiorscape firms; directors, curators, public relations managers, education program director, high school or college teachers and employers of landscape gardens and arboretums; federal, state, county, city and municipal horticulturalists; garden center workers in horticulture; sale manager; salesperson or employee of tree care firms; garden writers; and employees of golf course construction firms.

The OHLD curriculum is organized into four different concentrations. Each concentration offers a different academic approach to address the breadth of opportunities available to OHLD undergraduate students. A minimum of 120 credit hours including internship is required for each concentration. Full-time summer internships are available at selected local, national, and regional companies or institutions. Part-time summer or semester internships are available from OHLD other university departments and local and commercial firms. For more information about career opportunities and other departments, please contact the Department of Ornamental Horticulture and Landscape Design at http://ohld.ag.utk.edu.

OHLD CAREER SPECIALTIES

The four concentrations reflect the various career paths open to students. Opportunities exist within horticulture (the field of growing and raising plants), turfgrass management (growing and managing turfgrasses; turf-grass, ornamental plants, parks, athletic fields, and residential and commercial lawns), wholesale nursery production (the production of trees, shrubs and other woody ornamental plants used by the landscape industry or sold through retail outlets), landscape construction and maintenance (installation and maintenance of residential and commercial landscapes), landscape design (creation of aesthetic concepts and practical plans for improved outdoor areas), public horticulture (the promotion of horticulture to enhance people's education and enjoyment of plants), and retail horticulture (the marketing, merchandising and sale of ornamental plants and gardening accessories directed to the consumer).

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ORYN RMAL HORTICULTURE AND LANDSCAPE DESIGN

A minor in OHLD shall consist of 18 hours of courses in Ornamental Horticulture and Landscape Design. For more information about undergraduate programs, please contact the Department of Ornamental Horticulture and Landscape Design at http://ohld.ag.utk.edu. Students are encouraged to take courses in business, agriculture, economics, and marketing. A small percentage of undergraduate students go on to graduate study.

ORSYR MAL HORTICULTURE AND LANDSCAPE DESIGN

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HORTICULTURAL SCIENCE AND MANAGEMENT CONCENTRATION
The Horticultural Science and Management Concentration is designed for the student desiring to pursue areas such as turfgrass management, floriculture, nurseries, production, landscape contracting and construction, or design a general ornamental horticulture curriculum. This concentration should be followed by those students interested in entering a graduate school. Careful selection of OHL electives and other electives in consultation with your academic advisor will prepare graduates for the career of their choice.

Freshman

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>OHL 110</td>
<td>3</td>
</tr>
<tr>
<td>English 101-102</td>
<td>6</td>
</tr>
<tr>
<td>Math 110 or 123</td>
<td>3-6</td>
</tr>
<tr>
<td>Botany 110-120</td>
<td>8</td>
</tr>
<tr>
<td>Accounting 201-202</td>
<td>3</td>
</tr>
<tr>
<td>Plant &amp; Soil Sciences 200 and 210</td>
<td>4</td>
</tr>
<tr>
<td>Statistics 201</td>
<td>3</td>
</tr>
<tr>
<td>General Biology 201</td>
<td>4</td>
</tr>
<tr>
<td>English 350, 360, 370, 390 or 391</td>
<td>10-12</td>
</tr>
<tr>
<td>OHL Elective</td>
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</tr>
<tr>
<td>Select 2 from OHL 320, 330, 340, 350, 360, 370, 380, 390 or 400</td>
<td>6-9</td>
</tr>
<tr>
<td>Select 3 from 4 Agrc. Economics Elective or Fisheries 211, 250</td>
<td>4</td>
</tr>
<tr>
<td>Select 2 from Child 220, 230, or 280</td>
<td>6</td>
</tr>
<tr>
<td>Select 4 from Child 320, 330, 340, 350, 360, 370, 380, 390 or 400</td>
<td>6-12</td>
</tr>
<tr>
<td>Select 4 from Child 419, 420, 430, 440, 450, 460, 480, 485, or 499</td>
<td>6-12</td>
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<tr>
<td>OHL 400</td>
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<tr>
<td>Writing or Speech Elective</td>
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<tr>
<td>Social Science Elective</td>
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<tr>
<td>Unrestricted Electives</td>
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<td>Total: 132 hours</td>
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Sophomore

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>Select 2 from OHL 320, 330, 340, 350, 360, 370, 380, 390 or 400</td>
<td>6-9</td>
</tr>
<tr>
<td>Select 3 from 4 Agrc. Economics Elective or Fisheries 211, 250</td>
<td>4</td>
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<tr>
<td>Select 2 from Child 220, 230, or 280</td>
<td>6</td>
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<tr>
<td>Select 4 from Child 320, 330, 340, 350, 360, 370, 380, 390 or 400</td>
<td>6-12</td>
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<td>Select 4 from Child 419, 420, 430, 440, 450, 460, 480, 485, or 499</td>
<td>6-12</td>
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<tr>
<td>OHL 400</td>
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<tr>
<td>Writing or Speech Elective</td>
<td>3</td>
</tr>
<tr>
<td>Social Science Elective</td>
<td>3</td>
</tr>
<tr>
<td>Unrestricted Electives</td>
<td>1-9</td>
</tr>
<tr>
<td>Total: 132 hours</td>
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</tr>
</tbody>
</table>

A two-semester General Biology series may be substituted for Botany only if taken before entering OHL.

Unrestricted Electives are available and should be selected in consultation with academic advisor.

PUBLIC HORTICULTURE CONCENTRATION
The public horticulture concentration is intended for students interested in professional careers which promote horticulture and emphasize people and their education and development of gardens. Such careers include directors of a botanical garden or park; city or urban horticulturist; conservation agent, teacher, educational director, or program coordinator; professional garden rattist or public relations manager; horticulturist therapist; public garden curator; and plant collections manager. Directed technical electives allow the student to concentrate in an area of their interest while encouraging the development of general people skills. Students are required to intern for at least 20 hours.

Freshman

<table>
<thead>
<tr>
<th>Course</th>
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</thead>
<tbody>
<tr>
<td>OHL 110</td>
<td>3</td>
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<td>English 101-102</td>
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<td>Botany 110-120</td>
<td>8</td>
</tr>
<tr>
<td>Accounting 201-202</td>
<td>3</td>
</tr>
<tr>
<td>Plant &amp; Soil Sciences 200 and 210</td>
<td>4</td>
</tr>
<tr>
<td>Statistics 201</td>
<td>3</td>
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<tr>
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</tr>
<tr>
<td>English 350, 360, 370, 390 or 391</td>
<td>10-12</td>
</tr>
<tr>
<td>OHL Elective</td>
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</tr>
<tr>
<td>Select 2 from Engr. Economics Elective or</td>
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<tr>
<td>Plant &amp; Soil Sciences Engineering Tech. 410 or 420</td>
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</tr>
<tr>
<td>Bookkeeping 201</td>
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<tr>
<td>Humanities Elective</td>
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</tr>
<tr>
<td>Unrestricted Electives</td>
<td>1-9</td>
</tr>
<tr>
<td>Total: 132 hours</td>
<td></td>
</tr>
</tbody>
</table>

A two-semester General Biology series may be substituted for Botany only if taken before entering OHL.

Unrestricted Electives are available and should be selected in consultation with academic advisor.

LANDSCAPE DESIGN CONCENTRATION
Landscape designers create aesthetic concepts and practical plans for improved outdoor living. OHL students study fundamental and advanced landscape design, landscape design graphics, computer aided landscape design, surveying, art, socio-economic impact of plants, field botany, professional practices, bio-otic weed plant identification, landscape construction and maintenance methods. The development of comprehensive design projects helps students prepare for careers in landscape design or advanced studios in landscape architecture. Graduates in design have access to a large segment of the OHL community areas of employment.

Freshman

<table>
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<tr>
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</tr>
<tr>
<td>OHL Elective</td>
<td>5</td>
</tr>
<tr>
<td>Select 4 from OHL 320, 330, 340, 360, 370 or 391</td>
<td>6-12</td>
</tr>
<tr>
<td>Select 1 from Psych. Education 210</td>
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<td>Public Relations 270</td>
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</tr>
<tr>
<td>Child 211, 250</td>
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<tr>
<td>Business 210</td>
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<tr>
<td>Economics 201</td>
<td>3</td>
</tr>
<tr>
<td>Plant &amp; Soil Sciences 210</td>
<td>3</td>
</tr>
<tr>
<td>Speech 210 or 240</td>
<td>3-6</td>
</tr>
<tr>
<td>Humanities Elective</td>
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</tr>
<tr>
<td>Unrestricted Electives</td>
<td>1-9</td>
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<tr>
<td>Total: 132 hours</td>
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A two-semester General Biology series may be substituted for Botany only if taken before entering OHL.

Laws of appropriate electives are available and should be selected in consultation with academic advisor.
TECHNICAL ELECTIVES:
Accounting 411
Agriculture and Extension Education 342, 411
Art 481
Biology 403, 491
Ecology and Evolutionary Biology 411, 412, 484
Entomology and Plant Pathology 410, 530
Forestry 453
Interior Design 200
Management 401
Philosophy 342
Plant and Soil Sciences 413, 414, 415, 433, 471
Psychodiagnostics 210
Psychology 210
Public Health 410
Public Relations 270, 470
Recreation and Leisure Studies 410, 430
Speech 440
Wildlife and Fisheries Sciences 211
ADDITIONAL ELECTIVE LIST: LANDSCAPE DESIGN CONCENTRATION:
Plant and Soil Sciences 311, 334, 414

PLANT AND SOIL SCIENCES:
Professors:
F.L. Allen (Head), Ph.D., Minnesota; J.T. Amernick, M.D., West Virginia; F.D. Belcher (Emeritus), Ph.D., Iowa State; D.L. Coffey, Ph.D., Purdue; B. Corrigan, Ph.D., Washington State; P.D. Deyton, Ph.D., North Carolina State; J.E. Espa (Emeritus), Ph.D., Minnesota; H.A. Freiberg, Ph.D., Iowa State; M.R. Hayes, Ph.D., Boston; R.J. Lewis (Emeritus), Ph.D., North Carolina State; W.L. Parks (Emeritus), Ph.D., Purdue; J.H. Lewis, Ph.D., North Carolina State; R.M. Hayes, Ph.D., Illinois; D.O. Deyton, Ph.D., North Carolina State; V.H. Reich, Ph.D., Michigan State; J.Logan, Ph.D., Louisiana State; D.D. Tyler, Ph.D., Kent State; O.R. West, Ph.D., Nebraska.

Associate Professors:
M.E. Exline, Ph.D., California (Riverside); W.A. Krueger (Emeritus), Ph.D., Illinois; G.M. Lasean, Ph.D., Michigan State; J. Logan, Nebraska; T.C. Mueller, Ph.D., Georgia; N.D. Mullin, Ph.D., North Carolina State; V.H. Reich, Ph.D., Iowa State.

Assistant Professor:
V.R. Parralona, North Carolina State

Adjunct:
Allen, Coffey, Dayton, Lesaman, Logan, Mullin, Reich, Reynolds and Sami.

Plant and Soil Sciences provides a solid background in science while preparing students to apply this knowledge to many technical aspects of plant, soil, and environmental sciences. Plant science includes crop ecology and physiology, crop breeding and genetics for crop improvement and for the introduction of improved varieties; crop management for the maximization of crop yield and quality, and weed control for efficient crop production. Soil science includes soil formation and classification for a better understanding of our soil resources; soil management for optimum crop production; soil conservation and environmental quality; and soil nutrition, including the use of efficient fertilizer and the efficient utilization of crop residues. The Plant and Soil Sciences major must have knowledge of the basic chemical, physical, and biological sciences and be trained in communication and computer skills. The student may be broadly trained or may specialize in a more specific phase of the subject. The Plant and Soil Sciences major has three concentration: Science/Technology Concentration; Management/Consulting Concentration; and Environment and Natural Resource Concentration. Within each concentration, the basic curricular requirements for the College of Agricultural Sciences and Natural Resources are fulfilled, while the appropriate selection of the many electives available in the curriculum permit students to design a program of study to meet their individual interests and career goals. A departmental advisor will assist in designing a program to meet the student's objectives and prepare students for the numerous job opportunities available in science, business, and education.

A minor in Plant and Soil Sciences consists of 18 credit hours including 210, 330, 353 and at least 6 elective hours. Plant and Soil Sciences 471 will not be accepted as a course to meet minor requirements.

SCIENCE/TECHNOLOGY CONCENTRATION:
The science and technology concentration is especially designed to qualify students for professional certification. It prepares students for graduate study in the plant science and soil science disciplines. Through the appropriate selection of technical electives, students can qualify for certification as a soil scientist, agronomist, and soil conservationist. Students can also prepare themselves for graduate study in crop science, crop breeding and genetics, weed science, soil management, and management of agricultural systems and soil conservation; soil nutrient management; and environmental, ecosystem sciences, soil chemistry and mineralogy, soil hydrology and physics, and soil microbiology and biochemistry.

MANAGEMENT/CONSULTING CONCENTRATION:
This concentration is designed for the student whose goal is to enter a management training program in agribusiness or consulting firms, as well as for those students who may wish to start their own business, whether it be associated with farm operation or some other aspect of management or consulting. Directed technical electives allow the student to concentrate in an area of their interest. Additionally, graduates of this concentration have the option of pursuing the M.S. degree in Plant and Soil Sciences or Agriculture Economics or the M.B.A. degree in Business Administration. Graduates of this curriculum are certified in various specialized fields through the appropriate selection of electives.

Junior Hours Credit
English 101, 102 .......................... 6
Biology 101 ........................................ 6
Chemistry 120, 130 .......................... 8
Math 151, 152 or 141, 143 ................. 6

Sophomore
Plant and Soil Sciences 210 ............... 3
Biology 240 ........................................ 3
Physics 221 ....................................... 3
Chemistry 253 ................................... 3
Economics 201 ................................... 3
Economics 207 ................................... 3

Junior Hours Credit
English 295, 360 or Journalism 414, 450, 451 .... 3
Plant and Soil Sciences 401, 437, 471 ........ 4

Senior
A minor in Plant and Soil Sciences consists of 6-8 electives. The student may substitute for Botany only if taken before entering the Plant Soil Sciences.

List of appropriate electives are available and should be selected in consultation with academic advisors.

Management/Consulting Concentration

Total: 132 hours

A two-year minor General Biology series may be substituted for Botany only if taken before entering the Plant and Soil Sciences.

Total: 132 hours

College of Agricultural Sciences and Natural Resources
ENVIROMENTSICAL SCIENCE AND NATURAL RESOURCES CONCENTRATION

The Environmental Science and Natural Resources concentration is a science-oriented curriculum that provides a strong, broad background in the natural sciences. The plan of study emphasizes land use problems and their impacts on long-term use and productivity as well as on surface and sub-surface water resources. To facilitate this, the student is directed into a core of courses that emphasize the soil and plant sciences, resources (301 or 141) and 0.5 of approved electives.

Electives are available and should be selected in consultation with an academic advisor.

ELECTIVES LIST: SCIENCE/TECHNOLOGY CONCENTRATION

INTEGRATED STUDIES ELECTIVES:
American Studies 310, Anthropology 310, 311, 312, 313, 314, 315, 316, 320, 360, 361
Biology 165
Geography 353, 365, 366
Rural Sociology 380

Microbiology 310, 315, 410, 432, 445, 453

Math 130, 140, 141, 142

American Studies 310

Anthropology 310, 311, 312, 313, 314, 315, 316, 320, 360, 361

Geography 353, 365, 366

Rural Sociology 380

Microbiology 310, 315, 410, 432, 445, 453

Math 130, 140, 141, 142

American Studies 310

Anthropology 310, 311, 312, 313, 314, 315, 316, 320, 360, 361

Geography 353, 365, 366

Rural Sociology 380

Microbiology 310, 315, 410, 432, 445, 453

Math 130, 140, 141, 142

American Studies 310

Anthropology 310, 311, 312, 313, 314, 315, 316, 320, 360, 361

Geography 353, 365, 366

Rural Sociology 380

Microbiology 310, 315, 410, 432, 445, 453

Math 130, 140, 141, 142

American Studies 310

Anthropology 310, 311, 312, 313, 314, 315, 316, 320, 360, 361

Geography 353, 365, 366

Rural Sociology 380

Microbiology 310, 315, 410, 432, 445, 453

Math 130, 140, 141, 142