



College of Agricultural Sciences and Natural Resources

Jack Britt, Vice President for the Institute of Agriculture and Acting Dean
Mary Lewnes Albrecht, Associate Dean for Academic Programs
Clark J. Brekke, Assistant Dean for Academic Programs
Thomas H. Klindt, Associate Dean, Tennessee Agricultural Experiment Station
C. Roland Mote, Assistant Dean, Tennessee Agricultural Experiment Station
Robert H. Orr, Coordinator, International Programs in Agriculture and Natural Resources
Emily Gray, Director of CASNR Student Services
Theresa Cooper, Coordinator, Student Recruitment and Retention

<http://casnr.tennessee.edu/>

The College of Agricultural Sciences and Natural Resources (CASNR) dates back 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. Later, federal legislation provided resources for agricultural research and extension programming for dissemination of research findings to the people of Tennessee. Over time, the college expanded its academic majors from traditional agricultural fields to include natural resources and agribusiness. Today, academic majors represent the breadth of modern natural resources and agricultural sciences. The college, the Agricultural Experiment Station, the Agricultural Extension Service, and the College of Veterinary Medicine constitute the University of Tennessee Institute of Agriculture (<http://www.agriculture.utk.edu>).

The College of Agricultural Sciences and Natural Resources faculty conduct research using the resources available to them from the Agricultural Experiment Station. They are engaged in significant basic and applied research ranging from biotechnology to wildlife management to agricultural economics to public horticulture. On-campus and field research laboratories are used in the instructional programs of the college, while extension and research activities provide many students excellent opportunities for individualized study with faculty mentors, as well as part-time job opportunities.

Majors and Minors

The college offers a broad range of majors that prepare students for natural and social sciences based careers in a wide array of opportunities in agricultural sciences and natural resources.

Majors, Concentrations and Departments

- Agricultural economics and business with a concentration in agricultural equipment systems management (Department of Agricultural Economics)
- Agricultural science with concentrations in agricultural education and agricultural extension education (Interdepartmental unit)
- Animal science with concentrations in production/business, science/technology, science/technology—pre-veterinary medicine, and pre-veterinary medicine 3+1 (Department of Animal Science)
- Biosystems engineering with a pre-professional concentration (Department of Biosystems Engineering and Environmental Science)
- Environmental and soil sciences with concentrations in agricultural systems technology, environmental science, and soil science (Department of Biosystems Engineering and Environmental Science)
- Food science and technology with concentrations in technology/business, pre-professional, and science (Department of Food Science and Technology)
- Forestry with concentrations in forest resources management and wildland recreation (Department of Forestry, Wildlife and Fisheries)
- Plant sciences with concentrations in business management, horticulture and agronomy, landscape design, public horticulture, and turfgrass management (Department of Plant Sciences)
- Wildlife and fisheries science with a concentration in wildlife health (Department of Forestry, Wildlife and Fisheries)

The Department of Entomology and Plant Pathology offers undergraduate courses in support of the above majors. However, it does not have an undergraduate major.

The professional degree program in biosystems engineering receives strong support from the College of Engineering and is fully accredited by the Accreditation Board of Engineering and Technology. The forest resources management and wildland recreation concentrations are fully accredited by the Society of American Foresters. The food science and technology program maintains the standards as established by the Institute of Food Technologists. The agricultural education concentration meets state of Tennessee teacher education standards.

A pre-veterinary medicine curriculum 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. The pre-professional program in food science and technology allows students to be awarded a Bachelor of Science in agriculture with a major in food science after three years and upon successful completion of the first year at UT-Memphis dental, medical or pharmacy programs, or at the University of Tennessee, Knoxville, College of Veterinary Medicine.

Specific degree requirements are given under each of the departmental headings in this section of the catalog. A student must meet all degree requirements as outlined by the department in which he/she is majoring in order to receive a degree. In all majors, particular emphasis is placed upon the sciences that are fundamental to agricultural sciences and natural resources; other courses are included to provide a university general education. In all curricula, there is the opportunity to select elective courses appropriate to the educational objectives of the individual students. The choice of electives in each major should be made with the guidance of the faculty academic advisor. However, it is ultimately the responsibility of the student to understand what is required to earn a degree.

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

The use of transfer credit in subject areas appropriate to each organized curriculum will be considered by the student's academic advisor. If deemed appropriate, the petition to apply transfer courses will be processed through departments and submitted to the Dean of the College of Agricultural Sciences and Natural Resources for final approval. All university guidelines and policies must be followed. 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 agriculture and natural resources coursework appropriate to a specified major requirement, and approved by the major advisor, must be completed in residence to fulfill the requirements of baccalaureate degrees offered in the college.

A minimum grade point average of 2.0 for all courses taken in the department offering the major/concentration is required. All courses must be passed. A student cannot graduate with a

grade of F in any course in the major/concentration. Students must repeat courses in the major/concentration and earn a passing grade prior to the awarding of the degree.

Selection of Major

When registering as freshmen, students who have decided upon their area of study select the major that meets their interests or career goals. A faculty member, from the department that manages the major, will serve as the academic advisor. It is not necessary, however, that freshman students select their major until the end of the first year. Undecided students will be assigned an academic advisor to assist them in exploring College of Agricultural Sciences and Natural Resources programs and to guide them in the planning of appropriate courses of study for the freshman year. Undecided students are encouraged to enroll in Agriculture and Natural Resources 100, Orientation to Studies in Agriculture and Natural Resources, during the fall semester of their first year of enrollment at the University of Tennessee, Knoxville. When they choose a major, an academic advisor will be assigned from the appropriate department.

Students interested in a career with a state's agricultural extension service should select the agricultural science major and follow the agricultural extension education concentration.

A foundation for advanced study beyond the baccalaureate degree may be established in any major if appropriate electives are included. Most departments offer a science concentration intended for those students who have a strong interest in pursuing graduate studies. A very careful choice of electives enables a student with an excellent academic record to complete a double or triple major by satisfying all the requirements in each major. For this purpose, the academic advisors of each major should be consulted. The academic advisors will work with the student to ensure that degree requirements are met. However, it is ultimately the responsibility of the student to understand what is required to complete multiple majors. Completing multiple majors will normally require more than 124 credit hours for graduation. It is the student's responsibility to keep academic advisors informed about each major and/or minor he/she is pursuing.

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 Studies

The College of Agricultural Sciences and Natural Resources faculty participates in both master of science and doctoral graduate student education and training. Master of Science study is available from all academic departments. Graduate programs leading to the Doctor of Philosophy degree in animal sciences, biosystems engineering, food technology and science, and plants, soils and insects are available.

Minimum Requirements for Baccalaureate Degree Programs

All Bachelor of Science degree programs offered in the college have the following minimum requirements:

- Communicating through Writing—3 courses to include English Composition (101-102) and 1 writing-intensive (WC) course from the University approved list.
- Communicating Orally—1 course— Communication Studies 210 or 240 or a course with an (OC) designation from the University approved list.
- Quantitative Reasoning — 2 courses — 2-course mathematics sequence or 1 mathematics course and 1 course with a (QR) designation from the university approved list.
- Arts and Humanities—2 courses from the university approved list.
- Social Sciences—2 courses from the university approved list.
- Biological Sciences—2 courses, minimum 6 hours, 1 course may be a College of Agricultural Sciences and Natural Resources course.
- Physical Sciences—2 courses, minimum 6 hours from Chemistry, Physics, Geology.

NOTE: At least one of the four Biological and Physical Sciences courses must be a lab course.

- Cultures and Civilizations—2 courses from the university approved list or 2 foreign languages at the intermediate level (200-level).
- Computer Technology/Applications—1 course—ANR 290 or a course in which computer technology is an integral and necessary component and is approved by the College of Agricultural Sciences and Natural Resources Undergraduate Council as such.
- Major Courses—minimum of 22 hours in the major to include an orientation course (Agriculture and Natural Resources 100 or an equivalent orientation course in the department or university).

For a total of 124 hours minimum.

Selection of Minor

Students may have a single or multiple minors in any of the University of Tennessee, Knoxville, colleges recorded on their transcripts without regard to course overlap among majors and minors. Minors offered by departments require a minimum of 16 credit hours in courses offered in the program. The majority of credit hours must be at the 300 and 400 level. No departmental or college orientation 100-level course may be used to satisfy the requirements of the minor. At least 9 of the credit hours required for the minor must be completed at the Knoxville campus. Each department offering a minor lists specific requirements. Minors offered in the College of Agricultural Sciences and Natural Resources are open to any students of any other colleges, who have the approval of their academic advisor and department. Students working on a minor in the College of Agricultural Sciences and Natural Resources should contact the specific department to have an academic advisor assigned.

Minors and Departments

- Agricultural economics and business (Department of Agricultural Economics)
- Animal science (Department of Animal Science)
- Biosystems engineering technology (Department of Biosystems Engineering and Environmental Science)
- Environmental and soil sciences (Department of Biosystems Engineering and Environmental Science)
- Food science and technology (Department of Food Science and Technology)
- Forestry (Department of Forestry, Wildlife and Fisheries)
- Plant sciences (Department of Plant Sciences)
- Wildlife and fisheries science (Department of Forestry, Wildlife and Fisheries)

Independent Study

Independent study, 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 and natural resources. Students gain experience and are encouraged to assume responsibilities not available in formally organized courses. Working with students and faculty from all phases of agriculture and natural resources in the study of a common problem provides an exciting experience.

Students may also earn academic credit for faculty-guided international study. Students should consult with their academic advisors, department heads, or the Coordinator of International Programs in Agriculture and Natural Resources about international experiences in agriculture and natural resources.

CASNR Honors Research and Creative Achievements Program

The CASNR Honors Research and Creative Achievements Program is designed to allow students to expand and improve their critical thinking and analytical skills while pursuing the baccalaureate degree in the college. Students in this program will complete an Honors project, related to research, teaching or extension, under the guidance of a faculty member, and report that work in both written and oral format in a one-hour course, Agriculture and Natural Resources 498. The program objectives are:

- to increase the scope of educational attainment by providing a program with greater breadth and depth,
- to provide special recognition for outstanding scholastic achievement, and
- to foster a sustained interest in advanced education, research and creative achievement.

To be eligible, a student must be a junior, senior or second semester junior transfer student with a minimum grade point average of 3.25. Additionally, once a student is admitted to the program, he/she must maintain a GPA of 3.25 or above. Students will be invited by the college to participate in the program the first semester they are eligible and once per academic year thereafter. Students must apply for the program and be approved by a College Honors Committee. This application includes details

of the proposed research, teaching or extension project. Upon admission, the student can enroll in Agriculture and Natural Resources 497, Honors Project (repeatable for a maximum of 6 hours), or departmental independent study credit. The student should enroll during the semester(s) that he/she is actively working on the project. Some departments may elect to allow some or all of this credit to count toward graduation requirements. Upon completion of their work, students must enroll in Agriculture and Natural Resources 498, Honors Presentations (1). Students prepare a written report and give an oral presentation to the Committee and interested individuals.

More detailed information is available from the College of Agricultural Sciences and Natural Resources Dean's office.

Course Load

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

Transfer Students

Students who transfer to the College of Agricultural Sciences and Natural Resources from another institution or from another college at the University of Tennessee, Knoxville, should contact the specific department of the major they wish to follow for assignment to an appropriate advisor. If the student is unsure of the specific major, he/she should contact the Dean's office. Requests for substitutions (application of transfer credit to meet degree requirements if not already assigned through the Degree Audit Report System) or special examinations should be submitted for consideration during the first semester of study in the selected major.

**Department of
AGRICULTURAL ECONOMICS**

<http://economics.ag.utk.edu/>

D.L. McLemore, *Head*

Professors

Brooker, J.R., PhD	Florida
Cross, T.L. (Assistant Dean), PhD	Oregon State
Eastwood, D.B., PhD	Tufts
English, B.C., PhD	Iowa State
Garland, C.D., PhD	Tennessee
Gerloff, D.G., PhD	Texas A&M
Hall, C.R., PhD	Mississippi State
Jensen, K.L., PhD	Oklahoma State
Klindt, T.H. (Associate Dean), PhD	Kentucky
McLemore, D.L., PhD	Clemson
Orr, R.H., PhD	Illinois
Park, W.M., PhD	Virginia Tech
Rawls, E.L., PhD	Virginia Tech
Ray, D.E., PhD	Iowa State
Riley, J.B., PhD	Oklahoma State
Roberts, R.K., PhD	Iowa State
Smith, G.F., PhD	Tennessee

Associate Professors

De La Torre Ugarte, D.G., Ph D	Oklahoma State
Larson, J.A., PhD	Oklahoma State
Yen, S.T., PhD	Minnesota

Assistant Professors

Bazen, E.F., PhD	Kentucky
Clark, C.D., PhD	Vanderbilt
Tiller, K.H., PhD	Tennessee

Emeriti Faculty

Leuthold, F.O., PhD	Wisconsin
Mundy, S.D., PhD	Tennessee

**AGRICULTURAL ECONOMICS AND BUSINESS
MAJOR**

Advisors

Brooker, McLemore, Park, and Riley

Students majoring in agricultural economics and business study the functioning of the agricultural sector of the global economic system and economic principles for decision making by business managers, consumers, policymakers and others within that system. Students complete a curriculum designed to provide them with a broad-based education and the specialized skills necessary for a successful career in the agribusiness industry or with a related organization or public agency. The curriculum builds upon the university-wide general education requirements by adding a set of directed electives from within the College of Agricultural Sciences and Natural Resources, a set of core courses from within the College of Business Administration, and a set of required courses within the Department of Agricultural Economics. Students then are able to customize their program by selecting among upper-division electives within the department. General elective hours in the curriculum also allow flexibility for students to pursue a minor within some area of technical agriculture or another field such as communications. Students have ample opportunity to develop strong microcomputer skills and gain practical real-world experiences through case study analyses, the NAMA marketing team, internships, and extracurricular activities.

Students graduating with a major in agricultural economics and business are prepared for a wide variety of careers. Many graduates take positions as managers of businesses involved in provision of farm input supplies, production of agricultural commodities, or processing of food products. Other graduates become marketing representatives or serve in a customer or public relations role. Quite a number of graduates establish careers in financial institutions, insurance agencies, or real estate companies. Many industry organizations and government agencies also have employment opportunities for our graduates. It is not uncommon for our graduates to take positions with businesses that are outside the food and agricultural industry. Graduates also find themselves well prepared for graduate study in agricultural economics or agribusiness management, as well as for professional programs such as law.

**Requirements for the Bachelor of Science in Agriculture •
Agricultural Economics and Business Major**

Freshman	Hours	Credit
Agricultural Economics 110	1	1
Agriculture and Natural Resources 290	3	3
¹ Biological Sciences Electives*	8	8
² Cultures and Civilizations Electives*	6	6
English 101*, 102*	6	6
Mathematics 123*, 125*	6	6
Sophomore		
Accounting 201, 202	5	5
Agricultural Economics 212	3	3
Animal Science 280 or 381	3	3
Economics 201*	4	4
² Arts and Humanities Elective*	3	3

³ Physical Sciences Electives*	8
Environmental and Soil Science 210 or Plant Sciences 235	3-4
Statistics 201*	3

Junior

Agricultural Economics 310, 320, 342, 350, 412	13
English 295* or 360* or Journalism and Electronic Media 201*	3
⁴ Non-departmental Agricultural Electives	6
Psychology 110* or Political Science 102* or Sociology 120*	3
Communication Studies 210* or 240*	3
Statistics 320 or 365	3
Electives	3

Senior

Agricultural Economics 410	1
⁵ Agricultural Economics or Rural Sociology Electives	15
Economics 313	3
² Arts and Humanities Elective*	3
Electives	8-9

Total 127

*Meets General Education Requirement.

¹Selected from Biology 101, 102, 130, 140.

²Choose any course from University General Education list.

³Selected from Chemistry 100, 110, 120, 130, Geography 131, 132, Geology 101, 102, 103.

⁴See list of acceptable courses after information on minor and concentration.

⁵A minimum of 9 credit hours must be taken from the following courses: Agricultural Economics 355, 360, 420, 430, 442, 450, 470. A maximum of 3 credit hours can be used from each of the following courses: Agricultural Economics 356 and 493.

Minor in Agricultural Economics and Business

Economics 201	4
Agricultural Economics 212, 342, 350, 412	12
Agricultural Economics Elective	3

Total 19

Agricultural Equipment Systems Management Concentration

The agricultural equipment systems management concentration is a unique interdisciplinary program that combines courses from the agricultural economics and business program and the biosystems engineering technology program. Students develop a high degree of technical expertise with respect to agricultural equipment, as well as the ability to apply sound business and economic principles to management of a business. Graduates are particularly well prepared for career opportunities in the agricultural machinery industry as dealership managers, as well as with agribusiness firms in operations management.

Students enrolling in the agricultural equipment systems management concentration may apply for participation in the John Deere Dealership Management Program. This unique program is a partnership between John Deere and the University of Tennessee, Knoxville, for the southern region of the United States. Students participating in the John Deere Dealership Management Program will have a dealership manager as a mentor, spend two summer internships in a dealership, and be considered for additional scholarship assistance.

Requirements for the Bachelor of Science in Agriculture • Agricultural Economics and Business Major • Agricultural Equipment Systems Management Concentration

Freshman	Hours	Credit
Agricultural Economics 110	1	1
Agriculture and Natural Resources 290	3	3
Botany 110*-120*	8	8
¹ Cultures and Civilizations*	6	6
English 101*, 102*	6	6
Mathematics 123*, 125*	6	6

Sophomore

Accounting 201, 202	5
Agricultural Economics 212	3
Biosystems Engineering Technology 202	3
Chemistry 120*	4
Economics 201*	4
¹ Arts and Humanities Elective*	3
Physics 161*	3
Environmental and Soil Science 210	4
Statistics 201*	3

Junior

Agricultural Economics 310, 320, 342, 350, 412	13
Biosystems Engineering 315	3
Biosystems Engineering Technology 452	3
English 295* or 360* or Journalism and Electronic Media 201*	3
¹ Arts and Humanities Elective*	3
Psychology 110* or Political Science 102* or Sociology 120*	3
Communication Studies 210* or 240*	3
Statistics 320 or 365	3

Senior

Agricultural Economics 410, 442	4
² Agricultural Economics or Rural Sociology Electives	9
Biosystems Engineering Technology 432, 462	6
Biosystems Engineering Technology Electives	6
Economics 313	3
³ Non-departmental Agricultural Elective	3

Total 127

*Meets University General Education Requirement.

¹Choose any course from University General Education list.

²A minimum of 6 credit hours must be taken from the following list of courses: Agricultural Economics 355, 360, 420, 430, 450, 470. A maximum of 3 credit hours can be used from each of the following courses: Agricultural Economics 356 and 493.

³See list of acceptable courses after information on minor and concentration.

DIRECTED ELECTIVES LISTS • AGRICULTURAL ECONOMICS AND BUSINESS MAJOR**Non-departmental Agricultural Electives**

Animal Science 280, 381; Biosystems Engineering Technology 202; Entomology and Plant Pathology 201, 313, 321; Food Science and Technology 140; Forestry, Wildlife and Fisheries 211, 250; Plant Sciences 110, 235; Environmental and Soil Sciences 210.

AGRICULTURE AND NATURAL RESOURCES**(Interdepartmental Unit)**

Agriculture and Natural Resources is an interdepartmental unit that offers a general agricultural science major with concentrations in agricultural education and agricultural extension education. The major is designed for students who want a broad, general background in agriculture and natural resources and wish to pursue careers in non-formal agricultural education, agricultural communications or agriculture public relations. The agricultural education concentration leads to teacher licensure in agricultural sciences in the State of Tennessee. The agricultural extension concentration is designed for those interested in agricultural extension careers. This major is also designed for

students who want an individualized plan of study. Plans need to be submitted before the junior year and approved by the advisor, department head, and the dean’s office.

Students who are undecided as to their studies in agriculture and natural resources are advised to follow the agricultural science program and explore the different majors available in the college. They should work with their assigned advisor to eventually choose one of the agricultural sciences minors. Students in the agricultural education and agricultural extension education concentrations or the communications minor should follow the appropriate concentration and work with faculty in agricultural and extension education housed in Morgan Hall.

AGRICULTURAL SCIENCE MAJOR
Requirements for the Bachelor of Science in Agriculture
• Agricultural Science Major

Freshman	Hours	Credit
Agriculture and Natural Resources 100.....	1	
Agriculture and Natural Resources 290.....	3	
Animal Science 160.....	3	
Biology 130*, 140*.....	8	
English 101*, 102*.....	6	
Mathematics 110* and Quantitative Reasoning Course*.....	6	
Plant Sciences 110.....	3	
Sophomore		
Agricultural and Extension Education 211.....	3	
Agricultural Economics 212.....	3	
Food Sciences and Technology 140.....	3	
Biosystems Engineering Technology 202.....	3	
Chemistry 100*, 110* or 120*-130*.....	8	
Environmental and Soil Sciences 210.....	4	
Plant Sciences 235.....	3	
Economics 201*.....	4	
Communication Studies 210* or 240*.....	3	
Junior		
Agricultural Economics 342.....	3	
Animal Science 220.....	3	
Entomology and Plant Pathology 313 or 321.....	3	
¹ Cultures and Civilizations Elective*.....	3	
¹ Arts and Humanities Elective*.....	3	
Plant Sciences 430.....	3	
² Agricultural Sciences and Natural Resources or Communication Minor.....	12	
Senior		
² Agricultural Sciences and Natural Resources or Communication Minor.....	9	
Agriculture and Natural Resources Electives.....	6	
Animal Science 381.....	3	
¹ Arts and Humanities Elective*.....	3	
¹ Cultures and Civilizations Elective*.....	3	
¹ Social Sciences Elective*.....	3	
Free Electives.....	3	
		Total 124

*Meets University General Education Requirement.
¹ Choose from the University General Education lists. One of the Arts and Humanities (AH) or Cultures and Civilizations (CC) Electives must be a writing-intensive (WC) course.
²Students should select one of the minors offered by the College of Agricultural Sciences and Natural Resources: Agricultural Economics, Animal Science, Biosystems Engineering Technology, Environmental and Soil Sciences, Food Science and Technology, Forestry, Wildlife and Fisheries Science, Plant Sciences; or one of the minors in the College of Communication and Information (see listing in this catalog), or submit an individualized plan of study before the Junior year, for approval by the advisor, department head, and the Dean’s Office. If the minor is less than 21 hours, the excess hours will become free electives.

Agricultural Education Concentration

<http://aee.tennessee.edu/>

Professors	
Waters, R.G., PhD.....	Pennsylvania State
Assistant Professors	
Fritz, C.A., PhD.....	Iowa State
Emeriti Faculty	
Lessly, R.R., EdD.....	Oklahoma State
Todd, J.D., EdD.....	Illinois

The agricultural education concentration is designed to prepare students to meet teacher certification requirements for agricultural education in the public schools. Teacher certification is given in collaboration with the College of Education, Health, and Human Sciences. Progression toward completion of a degree and licensure in agricultural education requires acceptance to the teacher education program by a board of admissions. The admissions process begins at the time of matriculation at the University of Tennessee, Knoxville, whether the student enters as a freshman or transfer student.

Students must maintain a 2.7 undergraduate cumulative GPA to be admitted to the teacher education program. It is important to note that all professional education courses must be passed with a minimum letter grade of C or better or they must be repeated.

Requirements for the Bachelor of Science in Agriculture
• Agricultural Science Major • Agricultural Education Concentration

Freshman	Hours	Credit
Agriculture and Natural Resources 100.....	1	
Agriculture and Natural Resources 290.....	3	
Animal Science 160 or 280.....	3	
Biology 101*-102* or 130*-140*.....	8	
English 101*, 102*.....	6	
Mathematics 110* and Quantitative Reasoning course*.....	6	
Economics 201*.....	4	
Sophomore		
Agricultural Economics 212.....	3	
Agricultural and Extension Education 211.....	3	
Agricultural and Extension Education 201.....	1	
Biosystems Engineering Technology 202.....	3	
Chemistry 100*, 110* or 120*-130*.....	8	
Environmental and Soil Sciences 210.....	4	
Food Science and Technology 269.....	2	
¹ Arts and Humanities Elective*.....	3	
Plant Sciences 110 and 235.....	6	
Communication Studies 210*.....	3	
¹ Social Sciences Elective*.....	3	
Junior		
Agricultural Economics 342.....	3	
Agricultural and Extension Education 345 and 346.....	6	
Educational Psychology 210.....	3	
Cultural Studies in Education 400.....	2	
Educational Psychology 401.....	2	
Special Education 402.....	2	
Entomology and Plant Pathology 313 or 321.....	3	
¹ Cultures and Civilizations Elective*.....	3	
² Health Elective.....	3	
Plant Sciences 430.....	3	

Senior

Agricultural and Extension Education 435 and 436	12
Agricultural and Extension Education 420	2
¹ Agricultural Sciences and Natural Resources Elective	3
Animal Science 381	3
Biosystems Engineering Technology 452	3
¹ Cultures and Civilizations Elective*	3
¹ Arts and Humanities Elective*	3
Total	129

*Meets University General Education Requirement.

¹ Choose from the University General Education lists. One of the Arts and Humanities (AH) or Cultures and Civilizations (CC) Electives must be a writing-intensive (WC) course.

² Health elective list is available and should be selected in conference with academic advisor.

Agricultural Extension Education Concentration

<http://aee.tennessee.edu/>

Professors

Waters, R.G., PhD Pennsylvania State

Assistant Professors

Fritz, C.A., PhD Iowa State

Emeriti Faculty

Lessly, R.R., EdD Oklahoma State

Todd, J.D., EdD Illinois

The agricultural extension education concentration is designed to prepare students to gain the agricultural and educational skills necessary to work in the national Cooperative Extension System or the Agricultural Extension Service in Tennessee. The agricultural extension agent is a generalist in agriculture who plans and delivers non-formal educational programs for local citizens and community groups. The extension agent has an understanding of community needs, educational program planning and the non-formal learner as well as a broad background in the disciplines of agriculture and natural resources.

Students must maintain a 2.7 undergraduate cumulative GPA to be considered for employment in the Tennessee Agricultural Extension Service. Other states may or may not have established GPA requirements for employment.

Requirements for the Bachelor of Science in Agriculture • Agricultural Science Major • Agricultural Extension Education Concentration

Freshman	Hours	Credit
Agricultural and Extension Education 211	3	3
Agriculture and Natural Resources 100	1	1
Agriculture and Natural Resources 290	3	3
Animal Science 280	3	3
Biology 101*-102* or 130*, 140*	8	8
English 101*, 102*	6	6
Mathematics 110* and Quantitative Reasoning course*	6	6
Sophomore		
Agricultural and Extension Education 201	1	1
Agricultural Economics 212	3	3
Animal Science 220	3	3
Chemistry 100*, 110* or 120*-130*	8	8
Economics 201*	4	4
Psychology 110*	3	3
Environmental and Soil Sciences 210	4	4
Plant Sciences 110	3	3
Communication Studies 210*	3	3

Junior

Agricultural and Extension Education 345 and 346	6
Agricultural Economics 342	3
Animal Science 330	3
Entomology and Plant Pathology 313 (recommended course) or 321	3
Environmental and Soil Sciences 344	3
Food Science and Technology 269	2
Forestry, Wildlife and Fisheries 250	3
¹ Cultures and Civilizations Elective*	3
¹ Arts and Humanities Elective*	3
Plant Sciences 235	3

Senior

Agricultural Sciences and Natural Resources Electives	6
Animal Science 381	3
Biosystems Engineering Technology 432	3
Biosystems Engineering Technology 442	3
Biosystems Engineering Technology 462	3
Free Electives	3
¹ Cultures and Civilizations Elective*	3
¹ Arts and Humanities Elective*	3
Plant Sciences 430	3
Total	124

*Meets University General Education Requirement.

¹ Choose from the University General Education lists. One of the Arts and Humanities (AH) or Cultures and Civilizations (CC) Electives must be a writing-intensive (WC) course.

Department of ANIMAL SCIENCE

<http://animalscience.ag.utk.edu/>

Alan Mathew, *Head*

Professors

Conatser, G.E., MS	Kentucky
Gill, W.W., PhD	Kentucky
Godkin, J.D., PhD	Massachusetts
Hopkins, F., DVM	Tennessee
Kattesh, H.G., PhD	Virginia Tech
Kirkpatrick, F.D., PhD	Tennessee
Lane, C.D., PhD	Tennessee
Mathew, A.G., PhD	Purdue
Meadows, D.G., PhD	Texas A&M
Neel, J.B., PhD	Tennessee
Oliver, S.P., PhD	Ohio State
Robbins, K.R., PhD	Illinois
Rogers, G.W., PhD	North Carolina State
Saxton, A., PhD	North Carolina State
Smith, M.O., PhD	Oklahoma State

Associate Professors

Grizzle, J.M., PhD	Florida
Harper, F., PhD	Rutgers
Heitmann, R.N., PhD	Maine
Schrick, F.N., PhD	Clemson
Waller, J.C., PhD	Nebraska

Assistant Professors

Edwards, J.L., PhD	Florida
Pighetti, G.P., PhD	Penn State
Richards, C.J., PhD	Kentucky

Instructor

Fisher, A.E., MS	Tennessee
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Advisors

Fisher, Godkin, Grizzle, Heitmann, Kattesh, Pighetti, Richards, Robbins, Schrick, Smith, Waller

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

For a complete list of accepted directed electives appearing in the showcases below see the departmental Undergraduate Advising Guide at http://www.animalscience.utk.edu/undr_guide.htm.

ANIMAL SCIENCE MAJOR

Production/Business Concentration

Requirements for the Bachelor of Science in Animal Science • Animal Science Major • Production/Business Concentration

Freshman	Hours	Credit
Animal Science 160	3	
Biology 130*, 140* or 101*-102*	8	
English 101*, 102*	6	
Mathematics 123*, 125*, 141*-142* or 151*-152*	6-8	
Chemistry 100*, 110* or 120*-130*	8	
Sophomore		
Animal Science 220, 280	6	
Agriculture and Natural Resources 290	3	
Environmental and Soil Sciences 210	4	
Communication Studies 210* or 240*	3	
Economics 201*	4	
¹ Arts and Humanities Electives*	6	
² Business Minor or ³ Agricultural Economics and Business Minor	3	
¹ Social Science Elective*	3	
Junior		
Animal Science 320, 330, 340, 380, 395	13	
Biological Science Restricted Elective	3	
¹ Cultures and Civilizations Electives*	6	
Animal Science 360	3	
² Business Minor or ³ Agricultural Economics and Business Minor	6	
Senior		
Animal Science 430, 495	4	
Select two courses from: Animal Science 481 or 482;		
Animal Science 483 or 484; Animal Science 485 or 489	6	
² Business Minor or ³ Agricultural Economics and Business Minor		
(plus 6 hours of any Agricultural Economics or Business courses)	12	
Free Electives	6-8	
Total		124

*Meets University General Education Requirement.

¹ Courses selected from the University General Education lists; one must be writing-intensive (WC).

² Requirements for a Business minor: Accounting 201, 202 (5); Economics 201 (4); Statistics 201 (3); Business Administration 201 (4); Finance 301 (3); Marketing 300 (3); Management 300 (3).

³ Requirements for an Agricultural Economics and Business minor: Economics 201; Agricultural Economics 212, 342, 360, 412; Agricultural Economics Elective (3). Total 19 credits.

Science/Technology Concentration

Requirements for the Bachelor of Science in Animal Science • Animal Science Major • Science/Technology Concentration

Freshman	Hours	Credit
Animal Science 160	3	
Biology 130*, 140*	8	
English 101*, 102*	6	
Mathematics 123*, 125*, 141* -142* or 151*-152*	6-8	
Chemistry 120*-130*	8	
Sophomore		
Animal Science 220, 280	6	
Agriculture and Natural Resources 290	3	
Communication Studies 210* or 240*	3	
¹ Arts and Humanities Elective*	3	
Economics 201*	4	
Physical Science and Mathematics Restricted Elective	8	
Biological Science Restricted Elective	3	
Junior		
Animal Science 320, 330, 340, 380, 395	13	
Biological Science Restricted Elective	8	
Physical Science and Mathematics Restricted Elective	6	
¹ Cultures and Civilizations Elective*	3	
Senior		
Animal Science 495	1	
Select two courses from: Animal Science 481 or 482;		
Animal Science 483 or 484;		
Animal Science 485 or 489	6	
¹ Arts and Humanities Elective*	3	
Biological Science Restricted Elective	3	
¹ Cultures and Civilizations Elective*	3	
¹ Social Science Elective*	3	
Business Elective	5	
Free Electives	7-9	
Total		124

*Meets University General Education Requirement.

¹ Courses selected from the University General Education lists; one must be writing-intensive (WC).

Science/Technology—Pre-Veterinary Medicine Concentration

Requirements for the Bachelor of Science in Animal Science • Animal Science Major • Science/Technology-Pre-Veterinary Medicine Concentration

Freshman	Hours	Credit
Animal Science 160	3	
Biology 130*, 140*	8	
English 101*, 102*	6	
Mathematics 123*, 125*, 141*-142* or 151*-152*	6-8	
Chemistry 120*-130*	8	
Sophomore		
Animal Science 220, 280	6	
Agriculture and Natural Resources 290	3	
Communication Studies 210* or 240*	3	
¹ Arts and Humanities Elective*	3	
Economics 201*	4	
Chemistry 350, 360 and 369	8	
Biology 240	4	

Junior

Animal Science 320, 330, 340, 380, 395	13
Biological Science Restricted Elective	3
Physics 221*-222*	8
¹ Arts and Humanities Elective*	3
¹ Cultures and Civilizations Elective*	3

Senior

Animal Science 495	1
Select two courses from: Animal Science 481 or 482; Animal Science 483 or 484; Animal Science 485 or 489	6
Biological Science Restricted Elective	3
Biochemistry and Cellular and Molecular Biology 401	4
¹ Cultures And Civilizations Elective*	3
¹ Social Science Elective*	3
Business Elective	5
Free Electives	5-7
Total	124

*Meets University General Education Requirement.

¹Courses selected from the University General Education lists; one must be writing-intensive (WC).

Pre-Veterinary Medicine Program (3+1)

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

- Completion of all pre-veterinary requirements.

English Composition 101-102 (3,3) – 6 hours; Humanities and Social Sciences – 18 hours; Elements of Physics 221-222 (4,4) – 8 hours; General Chemistry 120-130 (4,4) – 8 hours; Organic Chemistry 350-360 and Laboratory 369 (3,3,2) – 8 hours; Cellular and Comparative Biochemistry 401 (4) – 4 hours; General Biology 130-140 (4,4) – 8 hours; Biology 240-4 hours or Animal Science 340-3 hours; Biology Elective-4 hours.

- The last 30 hours of the three-year pre-veterinary curriculum must have been taken at the University of Tennessee, Knoxville.
- At least 12 hours of upper division (300- and 400-level courses) technical agriculture courses must be taken at the University of Tennessee, 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:

Mathematics 123-125 or 141-142 or 151-152; Animal Science 160-3 hours; Animal Science 220-3 hours; Animal Science 280-3 hours; Animal Science 320-3 hours; Animal Science 330-3 hours; Animal Science 340-3 hours; Animal Science 380-3 hours; Agriculture and Natural Resources 290-3 hours; Economics 201-4 hours; Communication Studies 210 or 240-3 hours.

NOTE: Economics 201 and Communication Studies 210 or 240 will be accepted by the College of Veterinary Medicine as meeting requirements in the Arts and Humanities/Social Sciences category. The remainder must be a Social Science elective, Arts and Humanities electives (6 hours), and Cultures and Civilization electives (6 hours); one of which must be writing-intensive.

- Satisfactory completion of the first two semesters in the College of Veterinary Medicine professional program.
- No later than the first day of the first semester of the student's first year in the College of Veterinary Medicine

(s)he should contact the Animal Science Department in order to check on graduation procedures for this program.

- A total of 124 hours must be completed by the end of the first year in the College of Veterinary Medicine.

Requirements for the Bachelor of Science in Animal Science • Animal Science Major • Pre-Veterinary Medicine Program (3+1)

Freshman	Hours Credit
Animal Science 160	3
Biology 130*, 140*	8
English 101*, 102*	6
Mathematics 123*, 125*, 141*-142* or 151*-152*	6-8
Chemistry 120*-130*	8
Sophomore	
Animal Science 220, 280	6
Biology 240	4
Agriculture and Natural Resources 290	3
Communication Studies 210* or 240*	3
Chemistry 350, 360, 369	8
Physics 221*-222*	8
Junior	
Animal Science 320, 330, 340, 380, 395	13
Biochemistry and Cellular and Molecular Biology 401	4
¹ Arts and Humanities Elective*	6
Economics 201*	4
¹ Cultures and Civilizations Elective*	6
¹ Social Science Elective*	3
Total	99-101

*Meets University General Education Requirement.

¹ Courses selected from the University General Education lists; one must be writing-intensive (WC).

This curriculum meets the requirements for entrance to the College of Veterinary Medicine and after the first successful year in the College of Veterinary Medicine, the student will be awarded a Bachelor of Science in Animal Science. Should the student not gain admittance to the College of Veterinary Medicine after the junior year, the student could complete the requirements for a major in animal science during the senior year.

Minor in Animal Science

Animal Science 220	3
Animal Science 280	3
Animal Science 381	3
Animal Science 480 Series	3
Nine credits from Animal Science 320, 330, 340, 360, 380, 420, 430, and the 480 Series	9
Total	21

NOTE: The core courses give the minor student a broad background in physiology, nutrition, and management. Careful selection of the directed electives allows the minor student to emphasize physiological reproduction, nutrition, or management.

Department of BIOSYSTEMS ENGINEERING AND ENVIRONMENTAL SCIENCE

<http://bioengr.ag.utk.edu>

Ronald E. Yoder, *Head*

Professors

Ammons, J.T., PhD	West Virginia
Ayers, P.D., PhD, PE	North Carolina State
Buschermohle, M.J., PhD	Clemson
Essington, M.E., PhD	California (Riverside)
Freeland, R.S., PhD, PE	Tennessee
Mote, C.R. (Assistant Dean, Tennessee Agricultural Experiment Station), PhD, PE	Ohio State
Tompkins, F.D. (Vice President for Research, UT Knoxville), PhD, PE	Tennessee
Tyler, D.D., PhD	Kentucky
Wilhelm, L.R. (Associate Dean, College of Engineering), PhD, PE	Tennessee
Wills, J.B., MS	Tennessee
Yoder, D.C., PhD	Purdue
Yoder, R.E., PhD, PE	Colorado State

Associate Professors

Burns, R.T., PhD, PE	Tennessee
Grandle, G.F., Ph.D	Tennessee
Hart, W.E., PhD	Purdue
Hayes, D.G., PhD.....	Michigan
Logan, J., PhD	Nebraska
Radosevich, M., PhD	Ohio State
Raman, D.R., PhD, PE	Cornell
Savoy, H.J., PhD	Louisiana State
Walker, F.R., PhD	North Carolina State
Wilkerson, J.B., PhD	Purdue
Womac, A.R., PhD, PE	Tennessee

Assistant Professors

Buchanan, J.R., PhD, PE	Tennessee
Eash, N.S., PhD	Iowa State
Lee, J., PhD	Iowa State
Leib, B.G., PhD.....	Penn State
Tyner, J.S., PhD	Oklahoma State

Programs Available

The Department of Biosystems Engineering and Environmental Science offers two undergraduate degree programs: Bachelor of Science in Biosystems Engineering and Bachelor of Science in Environmental and Soil Sciences. The biosystems engineering program is a four-year, ABET-accredited engineering program emphasizing engineering applications to biological systems. The environmental and soil sciences program is a strong science-based program for students interested in environmental science, soil science, and agricultural systems technology. Minors in either environmental and soil sciences or in biosystems engineering technology are also available. More detailed descriptions of each program are included with the curriculum material that follows.

BIOSYSTEMS ENGINEERING MAJOR

Advisors

Ayers, Freeland, Hart, Hayes, Raman, Wilkerson, Womac, D. Yoder

The College of Agricultural Sciences and Natural Resources, in cooperation with the College of Engineering, offers a four-year curriculum leading to the degree of Bachelor of Science in biosystems engineering. The curriculum is accredited by

the Engineering Commission of the Accreditation Board for Engineering and Technology (ABET). Overall goals of the program are emphasized in the educational objectives and program outcomes statements listed below. Program details are given in the showcase curricula and the individual course descriptions provided.

Career opportunities for graduates include the design, the development, or the management of: practices that minimize soil erosion and conserve water resources; biological waste treatment systems; safer machinery systems with lower environmental impact; or improved food and bio-processing systems. Employment opportunities are available in a wide variety of industries, government agencies, research and testing organizations, and educational and non-profit institutions.

The mathematics requirement for freshman admission to the biosystems engineering program is 3 1/2 units, including trigonometry and geometry. Otherwise, the general admission requirements of the university apply.

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. In addition to the standard biosystems engineering curriculum, a pre-professional concentration is available. The degree program has provisions for elective courses to be taken in specified subject areas. Students should outline a plan for all such electives not later than their second year of study. Proper scheduling of courses is very important, since prerequisite requirements must be met. Thus, students must consult with their advisors each semester to review their scheduling plan.

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 the Biosystems Engineering and Environmental Science Department, (865) 974-7266; e-mail: bees@utk.edu.

The biosystems engineering program at the University of Tennessee, Knoxville, has specific educational objectives that follow directly from the objectives of the University of Tennessee Institute of Agriculture. In order to meet the Institute's objectives, program graduates will receive the educational tools necessary to perform as entry-level engineering professionals. Recent graduates are to be:

- competitive in seeking employment at the regional and national levels,
- aware of meeting their own and societal needs consistent with the goals of life-long learning, professional ethics, and leadership,
- performing as entry-level engineers in a manner that positively reflects on the overall program's reputation.

Program Outcomes

To achieve the educational objectives listed above, a series of program outcomes have been adopted. These program outcomes provide specific measures to determine the degree of success in meeting each of the educational objectives. These outcomes are as follows:

- an ability to apply knowledge of mathematics, science, and engineering;

- an ability to design and conduct experiments, as well as to analyze and interpret data;
- an ability to design a system, component, or process to meet desired needs;
- an ability to function on multi-disciplinary teams;
- an ability to identify, formulate, and solve engineering problems;
- an understanding of professional and ethical responsibility;
- an ability to communicate effectively;
- the broad education necessary to understand the impact of engineering solutions in a global and societal context;
- a recognition of the need for, and an ability to engage in, life-long learning
- a knowledge of contemporary issues
- an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice
- an understanding of the complexity of biological systems, and the ability to apply engineering principles to those systems.

One of the primary tools engineers bring to the solution of many problems is a mastery of mathematics, so mathematical competence is a critical component of an engineering education. In order to graduate with a major in biosystems engineering, students must display this competence by achieving an average GPA of at least 2.0 in the required mathematics courses. It is the student's responsibility to work with their academic advisor in assuring that they meet this requirement.

Requirements for the Bachelor of Science in Biosystems Engineering • Biosystems Engineering Major

Exempt from the University General Education Requirement until Fall 2005

Freshman	Hours	Credit
Engineering Fundamentals 101,102.....	12	
Biosystems Engineering 104	1	
¹ Chemistry 120	4	
¹ English 101, 102	6	
^{1,2} Mathematics 141, 142	8	
³ General Education Elective (Contemporary Issues Cluster)	3	
Sophomore		
Biosystems Engineering 201, 221, 321	7	
Mechanical Engineering 231,321	6	
Nuclear Engineering 203	3	
Environmental and Soil Sciences 210	4	
¹ Chemistry 130	4	
Mathematics 200, 231, 241	8	
Microbiology 210	3	
Junior		
Biosystems Engineering 411, 416, 431, 441, 451	16	
Electrical and Computer Engineering 301	3	
⁴ Fluid Science Elective	3	
³ General Education Electives (Humanities or Arts Clusters)	6	
Economics 201	4	

Senior

Biosystems Engineering 401, 402, 444	12
³ General Education Elective (Engineering Practice in a Global Societal Context Cluster)	3
Communication Studies 210 or 240	3
English 360	3
Industrial Engineering 405	3
³ General Education Electives (Multicultural Studies Cluster)	3
⁵ Technical Elective	3
Total	
131	

¹Or equivalent honors course.

²If mathematics placement test does not indicate placement into Mathematics 141, please discuss mathematics option with advisor.

³Select from the appropriate cluster in the College of Engineering listing of General Education Electives. In some instances, a single course may meet requirements of more than one cluster. When this occurs, a course from another cluster may be used to meet the total hour requirement. These electives must be approved in advance by advisor to insure that they meet university and ABET criteria.

⁴Select from Civil and Environmental Engineering 390 or Aerospace Engineering 341.

⁵Typically, upper-division courses in engineering or related areas. Must be approved in advance a by advisor.

Pre-Professional Concentration

The pre-professional concentration provides comprehensive training in biosystems engineering while preparing the student for candidacy to medical school. While this program meets general published pre-med requirements, it is the student's responsibility to work with their academic advisor to ensure that their program meets the demands of specific schools.

Requirements for the Bachelor of Science in Biosystems Engineering • Biosystems Engineering Major • Pre-Professional Concentration

Exempt from the University General Education Requirement until Fall 2005

Freshman	Hours	Credit
Engineering Fundamentals 101, 102.....	12	
Biosystems Engineering 104.....	1	
¹ Chemistry 120.....	4	
¹ English 101, 102	6	
^{1,2} Mathematics 141-142.....	8	
³ General Education Elective (College of Engineering list - Contemporary Issues Cluster).....	3	
Sophomore		
Biosystems Engineering 201, 221, 321.....	7	
Mechanical Engineering 231	3	
Nuclear Engineering 203	3	
Economics 201	4	
¹ Chemistry 130.....	4	
Mathematics 200, 231, 241	8	
Biology 130.....	4	
Junior		
Biosystems Engineering 451.....	4	
Mechanical Engineering 321	3	
Electrical Engineering 301.....	3	
⁴ Fluid Science Elective	3	
Communication Studies 210 or 240.....	3	
Biology 140.....	4	
Chemistry 350, 360, 369.....	8	
³ General Education Electives (College of Engineering list - Humanities or Arts Cluster)	6	

Senior

Biosystems Engineering 401, 402, 411, 431	15
English 360	3
Industrial Engineering 405	3
Statistics 251	3
³ General Education Elective (College of Engineering list - Engineering Practice in Global/Soc. Context Cluster)	3
³ General Education Elective (College of Engineering list - Multicultural Studies Cluster)	3
Total	131

¹Or equivalent honors course.

²If mathematics placement test does not indicate placement into Mathematics 141, please discuss mathematics options with advisor.

³Select from appropriate cluster in the College of Engineering listing of General Education Electives. In some cases, a single course may meet requirements in more than one cluster. When this occurs, a course from another cluster may be used to meet the total hour requirement. These electives must be approved in advance by advisor to insure that they meet university and ABET requirements.

⁴Select from Civil Engineering 390 or Aerospace Engineering 341.

Biosystems Engineering Technology Minor

Advisors

Ayers, Freeland, Hart, Wilkerson, Womac, D. Yoder

No baccalaureate degree program is offered in biosystems engineering technology; however, seven undergraduate courses are offered to prepare students in other disciplines to apply elementary principles, techniques, and systems of engineering to the broad industry of agriculture.

Minor in Biosystems Engineering Technology

Biosystems Engineering Technology 202 or 212, 326, and 432	9
3 of the following: 414, 422, 442, 452, 462, 474	9
Total	18

ENVIRONMENTAL AND SOIL SCIENCES MAJOR

Advisors

Eash, Essington, Hart, Lee, Logan, Radosevich

Many human activities adversely impact soil, water, and environmental quality. The Bachelor of Science in Environmental and Soil Sciences provides students with a strong grounding in basic sciences and technology to prepare them for careers in environmental and natural resource management. Students in this program study basic natural sciences as well as applied areas such as ecology, soil sciences, and natural resource policy. Students also build expertise with modern technologies such as geographical information systems, global positioning systems, and computer applications in natural resource management. Graduates are prepared to work in a wide variety of interesting and challenging career paths and to work with a broad variety of other professionals to solve complex problems. Examples of potential careers include: soil and environmental specialists and scientists; state and federal regulatory agency work; private consulting in environmental and agricultural areas; and working with non-governmental organizations with interests in agriculture, environment, and natural resources. Students receiving this Bachelor of Science degree are also very competitive for placement in graduate programs in environmental and agricultural sciences and technology, as well as law school.

The core program provides a strong grounding in the sciences and technology, while concentrations within the Bachelor of Science degree permit a focus on either science or technology. There are three concentrations in this degree program: soil science, environmental science, and agricultural systems technology.

Environmental Science Concentration

The environmental science concentration is a blended program of science and technology that provides a strong, broad background in the natural sciences. The plan of study emphasizes human impacts on the long-term use and productivity of land and water resources. Emphasis is also placed on the tools used in the management of these resources. The curriculum provides a good foundation in the collection and analysis of the information required to characterize resource conservation problems and to make good resource use decisions. Directed technical electives allow the students to concentrate in an area of interest. Students in this program will gain the practical knowledge necessary to compete for career opportunities in government, environmental consulting firms, public health services, environmental research laboratories, and agricultural production, while also gaining the theoretical training necessary for continuing on for advanced degrees in a variety of environmentally related fields.

Requirements for the Bachelor of Science in Environmental and Soil Sciences • Environmental and Soil Sciences Major • Environmental Science Concentration

Freshman	Hours	Credit
Agriculture and Natural Resources 290	3	
Biology 130*, 140*	8	
Chemistry 120*, 130*	8	
English 101*, 102*	6	
Environmental and Soil Sciences 110	1	
Mathematics 151*, 152*	6	
Sophomore		
Biology 250	4	
Biosystems Engineering Technology 212	3	
Economics 201*	4	
Environmental and Soil Sciences 210	4	
Geology 101*	4	
Statistics 201*	3	
Microbiology 210*	3	
Physics 221*	4	
Junior		
¹ Arts and Humanities Elective*	3	
Chemistry 350 or 110*	3-4	
¹ Cultures and Civilizations Electives*	6	
Environmental and Soil Sciences 301*, 324, 355	7	
Biosystems Engineering Technology 326	3	
¹ Social Sciences Elective*	3	
Philosophy 346*	3	
Technical Electives	3	
Free Elective	1-2	
Senior		
Agricultural Economics 470 or Economics 462 or Industrial Engineering 405	3	
Biosystems Engineering Technology 474	3	
Environmental and Soil Sciences 434, 444, 462, 481	12	
Technical Electives	9	
¹ Arts and Humanities Elective*	3	
Total	124	

*Meets University General Education Requirement.
¹ Choose from the University General Education lists.

Soil Science Concentration

This concentration is a rigorous, science-based program for students interested in the field of soil science. The curriculum emphasizes soils and their long-term use and productivity, as well as surface and sub-surface water resources. Students will understand natural resource problems and their management, including soil and water conservation issues, land use problems, waste disposal, and reclamation of disturbed lands. Other areas of interest can be addressed through the appropriate selection of technical electives in the program. Students in this program will gain the practical knowledge necessary to compete for career opportunities in government, environmental consulting firms, public health services, environmental research laboratories, and agricultural production, while also gaining the theoretical training necessary for continuing on for advanced degrees in a number of environmentally related fields.

Requirements for the Bachelor of Science in Environmental and Soil Sciences • Environmental and Soil Sciences Major • Soil Science Concentration

Freshman	Hours	Credit
Agriculture and Natural Resources 290.....	3	
Botany 110*, 120* or Biology 130*, 140*.....	8	
Chemistry 120*, 130*.....	8	
English 101*, 102*.....	6	
Environmental and Soil Sciences 110.....	1	
Mathematics 151*, 152*.....	6	
Sophomore		
¹ Arts and Humanities Elective*.....	3	
Chemistry 350 or 110*.....	3-4	
¹ Cultures and Civilizations Elective*.....	3	
Economics 201*.....	4	
Environmental and Soil Sciences 210.....	4	
Geology 101*.....	4	
Microbiology 210*.....	3	
Physics 221*.....	4	
Statistics 201*.....	3	
Junior		
Biosystems Engineering Technology 326.....	3	
Botany 321.....	4	
Chemistry 310 and 319.....	4	
Environmental and Soil Sciences 301*, 324.....	4	
Environmental and Soil Sciences 334 or 355.....	3	
Philosophy 346*.....	3	
Free Elective.....	0-1	
Technical Electives.....	6	
¹ Arts and Humanities Elective*.....	3	
Senior		
Agricultural Economics 470 or Economics 462.....	3	
¹ Cultures and Civilizations Elective*.....	3	
Environmental and Soil Sciences 434, 442, 444, 462, 481.....	15	
¹ Social Sciences Elective*.....	3	
Technical Electives.....	6	
Total		124

*Meets University General Education Requirement.

¹ Choose from the University General Education lists.

Agricultural Systems Technology Concentration

The agricultural systems technology concentration emphasizes the skills needed to manage the sophisticated technological systems that are increasingly essential to modern agricultural production. The program starts with a basic science foundation, adds courses in crop production, pest control, and protection of soil and water resources, then introduces the technologies and control systems available to make production more efficient and environmentally sound. It rounds out the curriculum with analysis and management courses to tie all the information together and to most effectively use it in making and carrying out management decisions. Directed technical electives allow the student to concentrate in a particular area of agricultural production or to develop increased skills with particular technologies or management tools. Students from this program will have the skills and understanding to be successful in agribusiness, agricultural consulting, or employment with agricultural equipment and material suppliers.

Requirements for the Bachelor of Science in Environmental and Soil Sciences • Environmental and Soil Sciences Major • Agricultural Systems Technology Concentration

Freshman	Hours	Credit
Botany 110*, 120*.....	8	
Chemistry 120*, 130*.....	8	
English 101*, 102*.....	6	
Environmental and Soil Sciences 110.....	1	
Mathematics 151*, 152*.....	6	
¹ Social Sciences Elective*.....	3	
Sophomore		
Agricultural Economics 212.....	3	
Agriculture and Natural Resources 290.....	3	
Biosystems Engineering Technology 212.....	3	
¹ Cultures and Civilizations Elective*.....	3	
Economics 201*.....	4	
Environmental and Soil Sciences 210.....	4	
Environmental and Soil Sciences 334.....	3	
Plant Sciences 334.....	3	
Physics 221*.....	4	
Statistics 201*.....	3	
Junior		
Agricultural Economics 350 or 355.....	3	
¹ Arts and Humanities Elective*.....	3	
Biosystems Engineering Technology 326.....	3	
¹ Cultures and Civilizations Elective*.....	3	
English 360*.....	3	
Entomology and Plant Pathology 313.....	3	
Entomology and Plant Pathology 321.....	3	
Environmental and Soil Sciences 324.....	3	
Communication Studies 210* or 240*.....	3	
Technical Electives.....	6	
Senior		
Agricultural Economics 470 or Economics 462.....	3	
¹ Arts and Humanities Elective*.....	3	
Biosystems Engineering Technology 414.....	3	
Biosystems Engineering Technology 432.....	3	
Biosystems Engineering Technology 434.....	3	
Biosystems Engineering Technology 462.....	3	
Biosystems Engineering Technology 474.....	3	
Environmental and Soil Sciences 481.....	3	
Industrial Engineering 405.....	3	
Technical Electives.....	3	
Total		128

*Meets University General Education Requirement.

¹ Choose from the University General Education lists.

Minor in Environmental and Soil Sciences

Environmental and Soil Sciences 210.....	4
Environmental and Soil Sciences 324	3
Biosystems Engineering Technology 326	3
Electives in Environmental and Soil Sciences and/or Biosystems Engineering Technology at the 300 level or higher.....	9
Total	19

TECHNICAL ELECTIVE LIST FOR ALL CONCENTRATIONS • BACHELOR OF SCIENCE DEGREE IN ENVIRONMENTAL AND SOIL SCIENCES

Technical Electives for Soil Science and Environmental Science Concentrations

Note that some electives have required prerequisites. The prerequisites are either required in the major or are listed below. See individual course descriptions in the catalog for specific information.

Animal Science 220, 260, 280, 320, 330, 380, 381; Biochemistry and Cellular and Molecular Biology 310, 401, 402, 410, 471, 481; Biology 240,250; Biosystems Engineering Technology (any course not required for the major); Botany 305, 306, 310, 321, 330, 404, 412, 431, 451, 499; Chemistry 230, 310, 319, 320, 329, 350, 360, 369, 430, 439, 471,481; Ecology and Evolutionary Biology 240, 305, 370, 380, 431, 470, 474, 484; Entomology and Plant Pathology 313, 321; Environmental and Soil Sciences (any course not required for the major); Food Science and Technology 420, 429; Forestry 314, 315, 321; Forestry, Wildlife and Fisheries 250, 311, 312, 313, 317, 410, 412; Geography 101, 102, 131, 132, 310, 334, 410, 411, 412, 413, 415, 434, 436, 439; Geology 102,103, 201, 202, 310, 345, 370, 420, 450, 455, 485, 486; History 346; Planning 401; Plant Sciences 235, 334, 340, 431, 433, 434, 435,440, 453; Management 301, 321, 431; Microbiology 310, 319, 410, 411, 470; Physics 222; Political Science 300, 330, 340, 430, 431, 440, 442,470; Public Health 310; Sociology 360,462,464,465; Statistics (any course above 201); University Studies 322.

Technical Electives for Agricultural Systems Technology Concentration

Accounting 201, 202; Agricultural Economics 342, 350, 355; Biosystems Engineering Technology 202, 442, 452; Business Administration 201, 361; Environmental and Soil Sciences 442, 444, 462; Geography 413; Industrial Engineering 304, 423; Plant Sciences 340, 434, 440, 445; Management 411, 471; Operations and Management Science 410.

Department of ENTOMOLOGY AND PLANT PATHOLOGY

<http://eppserver.ag.utk.edu>

Carl J. Jones, *Head*

Professors

Bernard, E.C., PhD Georgia
 Bost, S.C., PhD North Carolina State
 Burgess, E.E., PhD Tennessee
 Gerhardt, R.R., PhD North Carolina State
 Grant, J.F., PhD Clemson
 Hale, F.A., PhD Ohio State
 Jones, C.J., PhD Wyoming
 Lambdin, P.L., PhD Virginia Tech
 Newman, M.A., PhD Texas A&M
 Patrick, C.R., PhD Mississippi State
 Skinner, J.A., PhD California (Davis)
 Trigiano, R.N., PhD North Carolina State
 Windham, A.S., PhD North Carolina State
 Windham, M.T., PhD North Carolina State

Associate Professors

Canaday, C.H., PhD Ohio State
 Gwinn, K.D., PhD North Carolina State
 Lentz, G., PhD Iowa State
 Ownley, B.H., PhD North Carolina State
 Stewart, S.D., PhD Auburn
 Vail, K.M., PhD Florida

Assistant Professors

Hajimorad, M., PhD..... Adelaide (Australia)
 Lamour, K., PhD Michigan State
 Moulton, J.K., PhD Arizona

Advisor

Gerhardt

Courses in economic entomology, diseases and insect of ornamental plants, forest protection, plant pathology, and veterinary entomology are available to undergraduate students. No undergraduate degree 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 and a PhD with a major in plants, soils and insects and concentrations in entomology, plant pathology, integrated pest management, and bioactive natural products are available (see *Graduate Catalog*). 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 or plant pathology should give the student an appreciation of insects and microorganisms, their ecology, population dynamics, potential damage to plants and their products, and various considerations in control alternatives.

Department of FOOD SCIENCE AND TECHNOLOGY

<http://foodscience.utk.edu>

H.C. Goan, *Head*

Professors

Brekke, C.J. (Assistant Dean), PhD Wisconsin
 Davidson, P.M., PhD Washington State
 Draughon, F.A., PhD Georgia
 Goan, H.C., PhD Michigan State
 Morris, W.C., PhD Iowa State
 Penfield, M.P., PhD Tennessee

Associate Professors

Golden, D.A., PhD Georgia
 Loveday, H.D., PhD Kansas State
 Mount, J.R., PhD Ohio State

Assistant Professors

Weiss, J., PhD Massachusetts
 Zivanovic, S., PhD Arkansas

Advisors

Davidson, Draughon, Golden, Loveday, Mount, Penfield

The curriculum concentrations in food science and technology include a science concentration, a technology/business concentration, and a pre-professional concentration. They prepare students to apply basic scientific and business principles to manufacturing, processing, distribution, and utilization of food products that meet the needs and desires of consumers. Coursework emphasizes the basic principles of converting raw food materials into safe acceptable consumer products. Selected commodity courses detail processing of specific types of food materials. Students entering the program should have an interest in the sciences, such as chemistry, microbiology, and biology.

Career opportunities include positions in the food industry in quality assurance, production management, marketing, governmental inspection, etc. The science concentration of coursework conforms to the guidelines in the model curriculum of the Institute of Food Technologists. The technology/business concentration allows students to obtain an agri-business or business minor or specialization in an area that strengthens the food science and technology major. A special problems course provides opportunity for practical training in

food processing plants and laboratories or federal and state laboratories. The pre-professional concentration provides the science background necessary for medical, pharmacy, dental or veterinary medicine school and also allows the student to develop an understanding of food science principles that will apply to their chosen profession.

FOOD SCIENCE AND TECHNOLOGY MAJOR Science Concentration

Requirements for the Bachelor of Science in Agriculture • Food Science and Technology Major • Science Concentration

Freshman	Hours	Credit
¹ English*	6	6
² Mathematics 125*, 141* or 151*	3-4	3-4
³ Biological Sciences	4	4
Chemistry 120*-130*	8	8
Food Science and Technology 140	3	3
Agriculture and Natural Resources 290	3	3
⁴ Arts and Humanities Elective*	3	3
Sophomore		
Chemistry 350, 360-369	8	8
Microbiology 210* or higher	3	3
⁵ Physics	3-4	3-4
⁴ Social Sciences Electives*	6	6
⁴ Arts and Humanities Elective*	3	3
Food Science and Technology 340	3	3
Nutrition 100* or 300	3	3
Junior		
Food Science and Technology 301 or University Honors 117	1	1
Food Science and Technology 410 and 430	7	7
Biochemistry and Molecular Biology 310 or 410	4	4
Biosystems Engineering Technology 422	3	3
Statistics 201* or Quantitative Reasoning Elective*	3	3
⁴ Cultures and Civilizations Electives*	6	6
Communicating Orally Elective*	1-3	1-3
Electives	5-7	5-7
Senior		
Food Science and Technology 401	1	1
Food Science and Technology 420-429	5	5
Food Science and Technology 445, 460, 490, 495	13	13
Nutrition 420	4	4
Food Science and Technology 493	3	3
Electives	5-7	5-7
Total		124

*Meets University General Education Requirement.

¹ May select either English 101 and 102 or English 118 and 102. (Students who obtain a grade of A or B in 118 may complete their freshman requirement with 102, 355, or with a 200-level course in the English Department. The 200-level course may, if so listed, also be used toward the Arts and Humanities requirement.)

² Mathematics placement depends on high school courses and grades and ACT scores.

³ May be chosen from Biology or Botany course.

⁴ Chosen from the University General Education lists. One of these courses must be a writing-intensive (WC) course.

⁵ May be chosen from a Physics course.

Technology/Business Concentration

Requirements for the Bachelor of Science in Agriculture • Food Science and Technology Major • Technology/ Business Concentration

Freshman	Hours	Credit
¹ English*	6	6
² Mathematics 110* or 123* or 125* or higher	3	3
³ Biological Sciences	4	4
Chemistry 100* or 120*	4	4
⁴ Arts and Humanities Electives*	6	6
Food Science and Technology 140	3	3
Agriculture and Natural Resources 290	3	3
Sophomore		
Chemistry 110*	4	4
Microbiology 210* or higher	3	3
Food Science and Technology 240	2	2
⁴ Social Sciences Electives*	6	6
⁵ Directed Technology/Business electives	9	9
Food Science and Technology 340	3	3
Nutrition 100* or 300 or Animal Science 381	3	3
Junior		
Food Science and Technology 301, 410 and 430	8	8
⁴ Cultures and Civilizations Electives*	6	6
⁵ Directed Technology/Business electives	9	9
Statistics 201* or Mathematics 115*	3	3
Communicating Orally Elective*	1-3	1-3
Electives	3-5	3-5
Senior		
Food Science and Technology 401	1	1
Food Science and Technology 420-429	5	5
Food Science and Technology 445, 460, 490 and 495	13	13
⁵ Directed Technology/Business electives	6	6
Food Science and Technology 493	3	3
Electives	5	5
Total		124

*Meets University General Education Requirement.

¹ May select either English 101 and 102 or English 118 and 102 (Students who obtain a grade of A or B in 118 may complete their freshman requirement with 102, 355, or with a 200 level course in the English department. The 200-level course may, if so listed, also be used toward the Arts and Humanities (AH) requirement.)

² Mathematics placement depends on high school courses and grades and ACT scores.

Mathematics 125 needed for Statistics 201

³ May be chosen from Biology or Botany course.

⁴ Chose from the University General Education lists. One of these courses must be a writing-intensive (WC) course.

⁵ Lists of appropriate courses are available at <http://foodsscience.utk.edu/academics/undergraduate/curriculum.html> and should be selected in conference with academic advisor match student's interests with concentrations needed in the food industry.

Pre-Professional Concentration

These programs in pre-dental, pre-medicine, pre-pharmacy and pre-veterinary medicine allow students to be awarded a Bachelor of Science 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-Memphis dental, medical, or pharmacy programs or the University of Tennessee College of Veterinary Medicine, Knoxville. The last 30 hours of the three-year curriculum must have been taken at the University of Tennessee, Knoxville. A total of 124 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 (s)he should contact the Department of Food Science and Technology in order to check on graduation procedures for this program.

Although a Bachelor of Science 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 Bachelor of Science degree before enrolling in either of these colleges. A Bachelor of Science degree can be obtained before enrolling in the Doctor of Pharmacy (PharmD) program.

Requirements for the Bachelor of Science in Agriculture
• Food Science and Technology Major • Pre-Professional Concentration

Freshman	Hours	Credit
¹ English*	6	6
² Mathematics 125* or 141* or 151*	3-4	3-4
Biology 130*, 140*	8	8
Chemistry 120*-130*	8	8
Food Science and Technology 140	3	3
Agriculture and Natural Resources 290	3	3
Sophomore		
Chemistry 350, 360-369	8	8
Microbiology 210* or higher	3	3
³ Physics 221*	4	4
⁴ Social Sciences Electives*	6	6
Food Science and Technology 340	3	3
⁵ Directed Science Requirements	12	12
Junior		
Food Science and Technology 301 or University Honors 117	1	1
Food Science and Technology 410, and 420-429	9	9
⁵ Directed Science Requirements	9	9
⁴ Arts and Humanities Electives*	6	6
Statistics 201* or Quantitative Reasoning Elective*	3	3
⁴ Cultures and Civilizations Electives*	6	6
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Total	124	124

*Meets University General Education Requirement.
¹ May select either English 101 and 102 or English 118 and 102 (Students who obtain a grade of A or B in 118 may complete their freshman requirement with 102, 355, or with a 200-level course in the English Department. The 200-level course may, if so listed, also be used toward the Arts and Humanities requirement.)
² Mathematics placement depends on high school courses and grades and ACT scores.
³ Physics 222 is taken as a Directed Science elective for pre-professional programs that require it.
⁴ Chose from the University General Education lists. One of these courses must be a writing-intensive (WC) course.
⁵ May be chosen from Biochemistry and Cellular and Molecular Biology 401, 402, 230, Microbiology 430, Physics 222, Ecology and Evolutionary Biology 240; Biology 240, Food Science and Technology 430, 442, 445, 460, 490, 495 or 493 (maximum of 3 hours); or Nutrition 420.
⁶ May be chosen from Food Science and Technology 430, 445, 460, 490, 495 or 493 (maximum of 3 hours).

Minor in Food Science and Technology

Food Science and Technology 140	3
Food Science and Technology 340	3
Food Science and Technology 410	4
Food Science and Technology 420	2
Food Science and Technology 429	3
Food Science and Technology Elective	2
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Total	17

Department of FORESTRY, WILDLIFE AND FISHERIES

<http://fwf.ag.utk.edu/>

George M. Hopper, *Head*

Professors

Buehler, D.A., PhD	Virginia Tech
Dearden, B.L., PhD	Colorado State
Hill, Sr., T.K., PhD	Auburn
Hopper, G.M., PhD	Virginia Tech
Ostermeier, DM, PhD	Syracuse
Pelton, M.R., PhD	Georgia
Rials, T.G., PhD	Virginia Tech
Schlarbaum, S.E., PhD	Colorado State
Speer, C.A., PhD	Utah State
Strange, R.J., PhD	Oregon State
Wilson, J.L., PhD	Tennessee

Associate Professors

Clatterbuck, W.W., PhD	Mississippi State
Fly, J.M., PhD	Michigan
Hay, R.L., PhD	Duke
Hodges, D.G., PhD	Georgia

Assistant Professors

Buckley, D.S., PhD	Michigan Technological University
Franklin, J.A., PhD	Alberta (Canada)
Gray, M.J., PhD	Texas Tech
Harper, C.A., PhD	Clemson
Muller, L.I., PhD	Georgia
Wang, S., PhD	Nanjing Forestry (China)
Young, T.M., MS	Tennessee

Instructor

Minser, W.G., MS	Tennessee
Moschler, W., MS	Virginia Tech

Adjunct Faculty

Albright, R., PhD	Southern Illinois
Clark, J.D., PhD	Arkansas
Eda, S., PhD	Japan
Franzreb, K., PhD	Arizona State
Van Manen, F., PhD	Tennessee

Emeriti Faculty

Buckner, E.R., PhD	North Carolina State
Dimmick, R.W., PhD	Wyoming
Rennie, J.C., PhD	North Carolina State
Schneider, G., PhD	Michigan State
Stumbo, D.A., PhD	Minnesota

Forestry Advisors

Buckley, Fly, Franklin, Hay, Hodges, Ostermeier, Schlarbaum

Wildlife and Fisheries Advisors

Buehler, Minser, Muller, Strange, Wilson

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.

The department offers two majors. The major in forestry leads to the Bachelor of Science in Forestry and the major in wildlife and fisheries science leads to the Bachelor of Science in Wildlife and Fisheries Science. The forestry major has two concentrations: forest resources management and wildland recreation.

Enrollment Management Plan

All majors in the Department of Forestry, Wildlife and Fisheries must submit an application for progression with relevant career goals, names of three references, work experience (both volunteer and paid positions) related to natural resources and service and professional activities, and a transcript, before registering for junior classes.

To be considered for progression into the upper division of the program, applicants must have submitted all required documents (application form, resume, and transcript) by a March 15 deadline, late in the spring semester.

Those students who have met all preliminary requirements for progression, including having relevant career goals, will be ranked based on the combined score of their cumulative grade point average (GPA) and GPA in core courses. The combined score will be 50% cumulative GPA (minimum 2.2) and 50% cumulative GPA (minimum 2.2) in core courses. Applicants with the highest scores will be accepted into the programs. The number of applicants accepted into each program will be determined based on resources available. Applicants will be notified of their acceptance by the start of registration for summer semester.

Applicants who are not accepted into the program and who believe that extenuating circumstances prevented their acceptance into the program may appeal the decision to a faculty committee (i.e., S.A.C.). A written statement in which the case is made for acceptance is required for all applicants. It must be submitted within one week of the rejection notice.

Appellants receiving a positive response from the appeals committee will be accepted into programs on a provisional basis through the first semester of their junior year. The progress of provisional students will be reviewed at the end of the fall semester. At that time, they will either be fully admitted or released from the program.

Core Courses

Students must have completed or be enrolled in all core courses by the end of the semester in which they apply for acceptance into upper-division courses. They must complete all core courses before entering upper-division courses. They will also need the prerequisites to the individual upper-division courses.

Forestry

Two courses in English composition (English 101 and 102 or equivalent); college algebra and calculus (Mathematics 119 and 125 or equivalent); general chemistry (Chemistry 100 or equivalent); two courses in general botany (Botany 110 and 120 or equivalent); general economics (Economics 201 or equivalent); public speaking (Communication Studies 210 or 240 or equivalent) and statistics (Statistics 201 or equivalent); soil sciences (Environmental and Soil Sciences 210 or equivalent); Introduction to Microcomputers (Agriculture and Natural Resources 290 or equivalent); general ecology (Biology 250 or equivalent).

Wildlife and Fisheries Science

Wildlife and Fisheries Science Majors: two courses in English composition (English 101 and 102 or equivalent); college algebra and calculus (Mathematics 119 and 125 or equivalent); two courses in chemistry (Chemistry 120/130 or 100/110 or equivalent); two courses in general biology (Biology 130/140 or 101/102 or equivalent); general

economics (Economics 201 or equivalent); public speaking (Communication Studies 210 or 240 or equivalent); and statistics (Statistics 201 or equivalent); soils science (Environmental and Soil Sciences 210 or equivalent); Introduction to Microcomputers (Agriculture and Natural Resources 290 or equivalent); general ecology (Biology 250 or equivalent).

FORESTRY MAJOR

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

Forest Resources Management Concentration

The forest resources management concentration provides an opportunity to obtain an education related to the management of the broad spectrum of wildland resources. In addition to the core of required courses, there are about 18 elective credit hours for broad studies or specialized training in one or more areas of forestry. These areas and examples of related fields of study are: forest biology including plant physiology and morphology, ecology, genetics, tree nutrition, forest soils; forest business management including economics, accounting, finance, marketing, management science; forest economics including economics, business administration, social science; forest inventory including mathematics, statistics, computer science; wildland recreation including natural and social sciences; and wildlife management including ecology and botany.

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

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

Requirements for the Bachelor of Science in Forestry • Forestry Major • Forest Resources Management Concentration

Freshman	Hours Credit
English 101*, 102*	6
Mathematics 125*	3
Botany 110*-120*	8
Forestry 100	3
¹ Social Sciences Elective*	3
Electives	3
Sophomore	
Economics 201*	4
Statistics 201*	3
Agriculture and Natural Resources 290	3
Forestry, Wildlife and Fisheries 311	3
Forestry 315	3
Communication Studies 210* or 240*	3
Chemistry 100*	4
Environmental and Soil Sciences 210	4
² Cultures and Civilizations Elective*	3
Electives	3

Junior	
Forestry, Wildlife and Fisheries 312, 313, 317	8
Forestry 305, 306, 314, 321, 322, 323, 326, 329, 330	21
² Arts and Humanities Elective*	3
Electives	3
Senior	
Forestry, Wildlife and Fisheries 410, 412, 416	9
Forestry 331, 332, 420, 422	8
Ethics Elective	3
² Cultures and Civilizations Elective*	3
² Arts and Humanities Elective*	3
Communications Elective	3
Electives	2
Total	125

*Meets University General Education Requirement.
¹ Choose from Anthropology 130; Political Science 102; Psychology 110; Sociology 110, 117, or 120.
² Courses selected from the University General Education list. One of the Cultures and Civilizations (CC) or Arts and Humanities (AH) courses must be writing-intensive (WC).

Wildland Recreation Concentration

The wildland recreation concentration is an interdisciplinary program that prepares students to work in natural resource based recreation settings on private and public lands, including local, state, and national parks, and other state and federal agencies and private or non-profit organizations providing outdoor recreational opportunities.

Students prepare for professional positions in the planning, development, interpretation, and management of private and public lands for recreational purposes. Students also learn the basic philosophy and principles associated with the use of leisure time and the relationship of natural resources to the constructive use of leisure time.

Elective credits may be used to obtain specializations in complementary areas such as education, cultural and natural history interpretation, forestry, wildlife, fisheries, communication and public relations, agricultural extension education, ornamental horticulture and landscape design, business and public administration, and the natural sciences, including ecology, botany, and geology as well as recreation and leisure studies, such as private/commercial and therapeutic recreation.

Ten weeks of professional internship experience (6 credits) are 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 full-time field experience. Preparations for the internship should be made well in advance of actual placement. Summer employment or volunteer work in a related field prior to the internship is highly encouraged.

Requirements for the Bachelor of Science in Forestry • Forestry Major • Wildland Recreation Concentration

Freshman	Hours Credit
English 101*, 102*	6
Mathematics 125*	3
Botany 110*-120*	8
One course from: Psychology 110*, Sociology 110*, Political Science 102*, Sociology 120, Anthropology 130*	3
Forestry 100	3
Forestry, Wildlife and Fisheries 211 or 250*	3
¹ Cultures and Civilizations* or Arts and Humanities* Elective	3
² Elective	3

Sophomore	
Forestry, Wildlife and Fisheries 311	3
Economics 201*	4
Statistics 201*	3
Agriculture and Natural Resources 290	3
Chemistry 100*	4
Communication Studies 210* or 240*	3
Environmental and Soil Sciences 210	4
Forestry 315	3
One course from: Art Media Arts 231, 236; Communication Studies 220, 270, 310, 320, 330, 420; English 295; Journalism and Electronic Media 201*, 290, 412, 450, 451, 488	3
¹ Cultures and Civilizations* or Arts and Humanities* Elective	3

Junior	
Forestry, Wildlife and Fisheries 312, 313, 317	8
Forestry 321, 423	6
One course from: Forestry 314; Management 440; Plant Sciences 427; Political Science 440, 441	2-3
One course from: Recreation 310, 410, 415, 430, 470	3
One course from: Biosystems Engineering Technology 212, 326; Geography 310, 410, 411, 413; Planning 402	3
Plant Sciences 280, 326, 350, 370, 421, 437	3
¹ Cultures and Civilizations* or Arts and Humanities* Elective	3
² Elective	3
Senior	
Forestry, Wildlife and Fisheries 412, 416	5
Forestry 422	3
One course from: Forestry, Wildlife and Fisheries 410; Wildlife and Fisheries Science 443, 444, 445	3
Forestry 495	6
One course from: Philosophy 346; Geography 320, 323, 345; Sociology 345, 360, 370, 380, 464, 465	3
¹ Cultures and Civilizations* or Arts and Humanities* Elective	3
² Electives	5-6
Total	125

*Meets University General Education Requirement.
¹ General Education Electives: Choose two courses from the Cultures and Civilizations list and two from the Arts and Humanities list for a total of 12 credit hours. One of the Cultures and Civilizations (CC) or Arts and Humanities (AH) courses must be writing-intensive (WC).
² Electives are chosen in conference with advisor.

Minor in Forestry

Forestry Wildlife and Fisheries 211 or 250	3
Forestry Wildlife and Fisheries 311, 312, 313, 412, 416	13
Total	16

NOTE: Prerequisites will not be waived

WILDLIFE AND FISHERIES SCIENCE MAJOR

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 biologists providing assistance; scholarly application of scientific information and methods to these goals; ecological perspective; and execution of programs to maintain past successes, to prevent repetition of past failures, and to prepare for future needs.

Requirements for the Bachelor of Science in Wildlife and Fisheries Science • Wildlife and Fisheries Science Major

Freshman	Hours Credit
Forestry, Wildlife and Fisheries 211	3
English 101*, 102*	6
Biology 130*, 140* or 101*-102*	8
Chemistry 120*-130* or 100*, 110*	8
¹ Cultures and Civilizations* or Arts and Humanities* Elective	6
Sophomore	
Mathematics 125*	3
Statistics 201*	3
Agriculture and Natural Resources 290	3
Communications Studies 210* or 240*	3
Animal Science 220 or Ecology and Evolutionary Biology 350 or Biochemistry and Cellular and Molecular Biology 330	3-4
Environmental and Soil Sciences 210	4
Economics 201*	4
Biology 250	4
¹ Cultures and Civilizations* or Arts and Humanities* Elective	6
Junior	
Forestry, Wildlife and Fisheries 311, 312, 313, 317	11
Wildlife and Fisheries Science 305, 323, 340, 341, 350, 440, 442	16
Ecology and Evolutionary Biology 470 or 446 or Environmental and Soil Sciences 324	3-4
Senior	
Forestry, Wildlife and Fisheries 410, 416	6
Wildlife and Fisheries Science 443, 444, 445	9
Ecology and Evolutionary Biology 474	4
Forestry, Wildlife and Fisheries 422 or Forestry 321	3
² Science Elective	6
¹ Social Sciences Elective*	3
General Elective	1-3
Total	128

*Meets University General Education Requirement.

¹ Courses selected from the University General Education lists. One of the Cultures and Civilizations (CC) or Arts and Humanities (AH) courses must be writing-intensive (WC).

² 300-level and above from Animal Science; Biosystems Engineering Technology; Botany; Ecology and Evolutionary Biology; Entomology and Plant Pathology; Environmental and Soil Sciences; Forestry; Forestry, Wildlife and Fisheries; Plant Sciences; Geography 410, 411, 412, 413, 436.

Requirements for the Bachelor of Science in Wildlife and Fisheries Science • Wildlife and Fisheries Science Major • Wildlife Health Concentration

Freshman	Hours Credit
Forestry, Wildlife and Fisheries 211 or 250*	3
English 101*, 102*	6
Biology 130*, 140* or 101*-102*	8
Chemistry 120*-130*	8
Mathematics 125*	3
Statistics 201*	3
Sophomore	
Biology 240, 250	8
Chemistry 350, 360, 369	8
Physics 221*-222*	8
Economics 201*	4
¹ Cultures and Civilizations* or Arts and Humanities* Elective	3
Junior	
Forestry, Wildlife and Fisheries 317	3
Wildlife and Fisheries Science 305, 323, 340, 341, 350, 440, 442	16
Communication Studies 210*, 220, or 240*	3
Environmental and Soil Sciences 210	4
Agricultural Sciences 220 or Ecology and Evolutionary Biology 350 or Biochemistry and Cellular and Molecular Biology 330	3
¹ Cultures and Civilizations* or Arts and Humanities* Elective	3

Senior

Forestry, Wildlife and Fisheries 410, 416	6
Wildlife and Fisheries Science 443, 444, 445	9
Ecology and Evolutionary Biology 474 or Forestry, Wildlife and Fisheries 311	3-4
Biochemistry and Cellular and Molecular Biology 410	4
¹ Social Sciences Elective*	3
¹ Cultures and Civilizations* or Arts and Humanities* Electives	6
Total	125-126

*Meets University General Education Requirement.

¹ General Education Electives: Choose two courses from the Cultures and Civilizations (CC) list, two courses from the Arts and Humanities (AH) list, one from the Social Sciences (SS) list for a total of 15 credit hours.

Minor in Wildlife and Fisheries Science

Choose from Forestry, Wildlife and Fisheries 211 or 250, 317, 410, 416; Wildlife and Fisheries Science 341, 440, 442, 443, 444, 445	18
Total	18

Department of PLANT SCIENCES

<http://plantsciences.utk.edu/>

G. Neil Rhodes, *Head*

Professors

Albrecht, M.L. (Associate Dean), PhD	Ohio State
Allen, F.L., PhD	Minnesota
Augé, R.M., PhD	Washington State
Denton, H.P., PhD	North Carolina State
Deyton, D.E., PhD	North Carolina State
Hayes, R.M., PhD	Illinois
Lockwood, D.W., PhD	Purdue
McDaniel, G.L., PhD	Iowa State
Mueller, T.C., PhD	Georgia
Rhodes, G.N., PhD	North Carolina State
Samples, T.J., PhD	Oklahoma State
Sams, C.E., PhD	Michigan State
Stewart, C.N. (Racheff Chair), PhD	Virginia Tech
West, D.R., PhD	Nebraska

Associate Professors

Bates, G.E., PhD	Georgia
Cheng, Z.M., PhD	Cornell
Gwathmay, C.O., PhD	California, Davis
Hamilton, S.L., EdD	Tennessee
Menendez, G.L., MS	Tennessee
Pantalone, V.R., PhD	North Carolina State
Rogers, S.M., MLA	Georgia
Stewart, C.E., MLA	Georgia
Wyatt, J.E., PhD	Florida

Assistant Professors

Craig, C.C., PhD	Louisiana State
Garton, S., PhD	Minnesota
Robinson, D.K., PhD	North Carolina State
Klingeman, W.E., PhD	Georgia
McElroy, J.S., PhD	North Carolina State
Sorochan, J.C., PhD	Michigan State
Steckel, L.E., PhD	Illinois
Straw, R.A., PhD	Tennessee
Thompson, M.A., PhD	Tennessee
Zale, J.M., PhD	Saskatchewan

Instructor

Flanagan, P.C., MS	Tennessee
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Adjunct Faculty

Ott, R.J., MBATennessee

Emeriti Faculty

Ashburn, E.L., PhDTennessee

Coffey, D.L., PhDPurdue

Conger, B.V., PhDWashington State

Fribourg, H.A., PhDIowa State

Sams, D.W., PhDMinnesota

Advisors

Coffey, Hamilton, McDaniel, Menendez, Pantalone, Rogers, Sorochan,

C. Stewart

The mission of the Department of Plant Sciences is to serve the teaching, extension and outreach, and research needs of clients, stakeholders and peers in the areas of agronomic and horticultural crops, and landscape design. A robust teaching program is at the center of this mission.

The department provides quality academic instruction to undergraduate and graduate students. Experienced instructors who are committed to the success of their students staff the department. Advisors give students sound advice in the selection of career specialties, elective courses, and provide students the best education possible. Professors want their students to be successful and enjoy positive student-teacher relationships. They keep track of job openings and assist students during the job selection process. Since most plant sciences faculty are also research scientists, undergraduate students interested in advanced studies are directed into appropriate courses necessary for admission to graduate school. Students are also encouraged to work with faculty researchers in a variety of laboratory, greenhouse, or field experiments.

The department offers a major leading to a Bachelor of Science in Plant Sciences with five concentrations: business management, horticulture and agronomy, landscape design, public horticulture, and turfgrass management.

Each concentration offers a different approach to address the breadth of opportunities available to plant sciences undergraduate students. A minimum of 124 credit hours including internship is required for each concentration. Full-time summer internships are available at selected local, regional, and national companies or institutions. Part-time summer or semester internships are available from Plant Sciences, other university departments and laboratories and local commercial firms.

Enrollment Management Plan

All students in the Department of Plant Sciences must meet certain requirements before registering for upper-division plant sciences classes. Admittance to each of the departmental concentrations will be determined by completion of core courses with a C or better for an individual concentration, completion of a minimum of 65 credit hours toward the degree, and a minimum cumulative grade point average (GPA) of 2.25.

To be considered for progression into the upper division of the program, majors must submit an application of intent for progression prior to class registration for the next semester. Faculty members will review students' transcripts for completion of all core courses and meeting the minimum GPA. Students must have completed all but 3 core courses for their concentration by the end of the semester in which they apply for acceptance into upper-division courses. They must complete all core courses before entering upper-division courses. They will also need the prerequisites to these individual upper-division courses.

Once admitted for progression to upper-division programs, students must maintain a cumulative GPA of 2.25. Junior and senior majors in Plant Sciences whose cumulative GPA falls below the minimum of 2.25 will not be allowed to register in departmental upper division classes until they again meet the required GPA for progression.

PLANT SCIENCES MAJOR**Core Courses**

Majors must have completed the core courses for their respective plant sciences concentration. Students must declare a concentration early in their undergraduate program and strictly follow the curriculum described for it. Students who transfer into plant sciences from other colleges or programs must meet the same requirements as those entering the department as freshmen. The core courses for the plant sciences concentrations are:

Business Management Concentration: two courses in English composition (English 101 and 102 or equivalent); Mathematics 123 and 125; general chemistry (Chemistry 100-110 or 120-130 or equivalent); general botany (Botany 110 and 120 or equivalent); general accounting (Accounting 201 and 202 or equivalent); soil science (Environmental and Soil Sciences 210 or equivalent); Computer Applications to Problem Solving (Agriculture and Natural Resources 290 or equivalent); either Introduction to Ornamental Horticulture (Plant Sciences 110 or equivalent) or Introduction to Crop Science (Plant Science 235 or equivalent).

Horticulture and Agronomy Concentration: two courses in English composition (English 101 and 102 or equivalent); Mathematics 123 and 125 or Mathematics 151-152; general chemistry (Chemistry 100-110 or 120-130 or equivalent); general botany (Botany 110 and 120 or equivalent); soil science (Environmental and Soil Sciences 210 or equivalent); either Introduction to Ornamental Horticulture (Plant Sciences 110 or equivalent) or Introduction to Crop Science (Plant Sciences 235 or equivalent); Computer Applications to Problem Solving (Agriculture and Natural Resources 290 or equivalent).

Landscape Design Concentration: two courses in English composition (English 101 and 102 or equivalent); Mathematics 123 and 125; general chemistry (Chemistry 100 or 120 or equivalent) and one natural science elective; general botany (Botany 110 and 120 or equivalent); soil science (Environmental and Soil Sciences 210 or equivalent); Introduction to Ornamental Horticulture (Plant Sciences 110 or equivalent); Basic Landscape Plants (Plant Sciences 220 or equivalent); Fundamentals of Landscape Design (Plant Sciences 280 or equivalent); Computer Applications to Problem Solving (Agriculture and Natural Resources 290 or equivalent).

Public Horticulture Concentration: two courses in English composition (English 101 and 102 or equivalent); Mathematics 123 and 125; general chemistry (Chemistry 100 or 120 or equivalent) and one natural science elective; general botany (Botany 110 and 120 or equivalent); soil science (Environmental and Soil Sciences 210 or equivalent); Computer Applications to Problem Solving (Agriculture and Natural Resources 290 or equivalent); Introduction to Ornamental Horticulture (Plant Sciences 110 or equivalent).

Turfgrass Management Concentration: two courses in English composition (English 101 and 102 or equivalent); Mathematics 123 and 125; general chemistry (Chemistry 100-

110 or 120-130 or equivalent); general botany (Botany 110 and 120 or equivalent); soil science (Environmental and Soil Sciences 210 or equivalent); either Introduction to Ornamental Horticulture (Plant Sciences 110 or equivalent) or Introduction to Crop Science (Plant Sciences 235 or equivalent); Computer Applications to Problem Solving (Agriculture and Natural Resources 290 or equivalent).

Business Management Concentration

The business management concentration is fundamental to those interested in starting their own companies. Students receive a minor in either business administration or agricultural economics and business allowing easier access to management positions as well as graduate programs such as the Master of Business Administration (MBA) should they want to continue their education in the future.

Requirements for the Bachelor of Science in Plant Sciences • Plant Sciences Major • Business Management Concentration

Freshman	Hours	Credit
Botany 110*-120*	8	
Chemistry 100*-110* or 120*-130*	8	
English 101*, 102*	6	
Mathematics 123*, 125*	6	
Plant Sciences 110 or 235	3	
¹ Arts and Humanities Elective*	3	
Sophomore		
Plant Sciences 220, 230, 231, or 280	6	
Agriculture and Natural Resources 290	3	
Accounting 201, 202	5	
Economics 201*	4	
Environmental and Soil Sciences 210	4	
Communication Studies 210* or 240*	3	
Statistics 201* for Business Minor or Agricultural Economics 212 for Agricultural Economics Minor	3	
¹ Cultures and Civilizations Elective*	3	
Junior		
Plant Sciences 326, 330, 334, 340, 350, 360, 370, 380, 390, or 391	9	
Plant Sciences 492	3	
Business Administration 201 and Management 300 for Business Minor or Agricultural Economics 342 and 350 for Agricultural Economics minor	6-7	
Technical Electives	6	
¹ Cultures and Civilizations Elective*	3	
¹ Arts and Humanities Elective*	3	
Senior		
Select 3 Plant Sciences 410, 421, 427, 429, 430, 431, 433, 434, 435, 436, 440, 446, 450, 451, 453, 460, 471, 480, 485, or 493	7-10	
Plant Sciences 490	1	
Finance 301 and Marketing 300 for Business Minor or Agricultural Economics 412 and an Agricultural Economics Elective for Agricultural Economics Minor	6	
¹ Social Sciences Elective*	3	
Unrestricted Electives	8-12	
Total	124	

*Meets University General Education Requirement.

¹ Choose from the University General Education lists. Selection should be made in conference with academic advisor. One of the Arts and Humanities (AH) or Cultures and Civilizations (CC) Electives must be a writing-intensive (WC) course.

Horticulture and Agronomy Concentration

The horticulture and agronomy concentration is designed for the student desiring to pursue professions that include graduate studies, research and commercial production of agronomic and horticultural crops. Careful selection of departmental courses and other electives in consultation with an academic advisor will prepare graduates for the career of their choice. The concentration consists of two tracks of study: (1) emphasis in agronomy and (2) emphasis in horticulture.

Requirements for the Bachelor of Science in Plant Sciences • Plant Sciences Major • Horticulture and Agronomy Concentration

Freshman	Hours	Credit
Botany 110*-120*	8	
Chemistry 100*, 110* or 120*-130*	8	
English 101*, 102*	6	
Mathematics 123*, 125* or 151*-152*	6	
Plant Sciences 235 for Agronomy Track or Plant Sciences 110 for Horticulture Track	3	
Sophomore		
Directed Electives	6	
Agriculture and Natural Resources 290	3	
¹ Arts and Humanities Elective*	3	
¹ Social Sciences Elective*	3	
Environmental and Soil Sciences 210	4	
Communication Studies 210* or 240*	3	
Economics 201*	4	
¹ Cultures and Civilizations Elective*	3	
Junior		
Plant Sciences 330	3	
Plant Sciences 334 for Agronomy Track or Plant Sciences 370 for Horticulture Track	3	
Plant Sciences 340, 370, 380; or 391 for Agronomy Track; or 334, 340, 350, 360, 390, or 391 for Horticulture Track	6	
Plant Sciences 492	3	
Botany 321	4	
Environmental and Soil Sciences 334	3	
Directed Elective	3	
Entomology and Plant Pathology 313, 321, or 410	3	
Technical Elective	3-4	
¹ Cultures and Civilizations Elective*	3	
Senior		
Plant Sciences 471 and 490	4	
Chemistry 350	4	
Technical Elective	3-4	
Directed Electives	12-13	
¹ Arts and Humanities Elective*	3	
Unrestricted Electives	1-4	
Total	124	

*Meets University General Education Requirement.

¹ Choose from the University General Education lists. Selection should be made in conference with academic advisor. One of the Arts and Humanities (AH) or Cultures and Civilizations (CC) Electives must be a writing-intensive (WC) course.

Landscape Design Concentration

Landscape designers create aesthetic concepts and practical plans for improved outdoor living. 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, basic woody plant identification, landscape construction and maintenance methods. The development of comprehensive design projects helps students prepare for careers in landscape design or

advanced studies in landscape architecture. Graduates in design have access to a large segment of the ornamental horticulture commodity areas of employment.

Requirements for the Bachelor of Science in Plant Sciences • Plant Sciences Major • Landscape Design Concentration

Freshman	Hours Credit
Botany 110*-120*.....	8
Chemistry 100* or 120*.....	4
English 101*, 102*.....	6
Mathematics 123* 125*.....	6
Plant Sciences 110.....	3
¹ Social Sciences Elective*.....	3
Sophomore	
Plant Sciences 220, 280.....	6
Agriculture and Natural Resources 290.....	3
¹ Natural Sciences Elective*.....	4
Environmental/Technical Elective.....	3
Environmental and Soil Sciences 210.....	4
Communication Studies 210* or 240*.....	3
¹ Arts and Humanities Elective*.....	3
Unrestricted Elective.....	6
Junior	
Plant Sciences 350, 380.....	6
Plant Sciences 230, 231, 330, 334, 340, or 370.....	6
Plant Sciences 390 or 391.....	3
Environmental/Technical Elective.....	3
¹ Cultures and Civilizations Elective*.....	3
¹ Social Sciences Elective*.....	3
Unrestricted Elective.....	7
Senior	
Plant Sciences 460, 480, 485.....	8
Select 2 from Plant Sciences 410, 427, 430, 434, 440, 450, 446, or 493.....	6
Plant Sciences 490, 492.....	4
Botany 330 or Plant Sciences 421.....	3
Environmental/Technical Elective.....	4
¹ Cultures and Civilizations Elective*.....	3
¹ Arts and Humanities Elective*.....	3
Total	124

*Meets University General Education Requirement.
¹ Choose from the University General Education lists. Selection should be made in conference with academic advisor. One of the Arts and Humanities (AH) or Cultures and Civilizations (CC) Electives must be a writing-intensive (WC) course.

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 enjoyment of plants. Such careers include director of a botanical garden or park; city or urban horticulturist; extension agent, teacher, educational director, or program coordinator; professional garden writer/editor or publication manager; horticulture 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 good people skills. Students are required internship training in the area of their interest.

Requirements for the Bachelor of Science in Plant Sciences • Plant Sciences Major • Public Horticulture Concentration

Freshman	Hours Credit
Botany 110*-120*.....	8
Chemistry 100* or 120*.....	4
English 101*, 102*.....	6
Mathematics 123*, 125*.....	6
Plant Sciences 110.....	3
¹ Natural Science Elective*.....	4
Sophomore	
Plant Sciences 220, 230, 231, or 280.....	6
Agriculture and Natural Resources 290.....	3
Select 1 from: Educational Psychology 210; Public Relations 270; Recreation and Tourism Management 201; Forestry, Wildlife and Fisheries 211, 250.....	3
¹ Social Sciences Elective*.....	3
Environmental and Soil Sciences 210.....	4
Communication Studies 210* or 240*.....	3
¹ Arts and Humanities Elective*.....	6
¹ Cultures and Civilizations Elective*.....	3
Junior	
Select 4 from: Plant Sciences 330, 334, 340, 350, 360, 370, 380, 390, or 391.....	12
Plant Sciences 326.....	3
Philosophy 342, Agriculture and Extension Education 346.....	3
Botany 309, 330; Entomology and Plant Pathology 313, 321, 410.....	6
Technical Electives.....	6
Senior	
Select 4 from: Plant Sciences 410, 421, 427, 429, 430, 431, 433, 434, 436, 437, 440, 446, 450, 451, 460, 480, 485, 493, or 494.....	8-12
Plant Sciences 490 and 492.....	4
¹ Social Sciences Elective.....	3
¹ Cultures and Civilizations Elective.....	3
Technical Electives.....	6
Unrestricted Electives.....	4-8
Total	124

*Meets University General Education Requirement.
¹ Choose from the University General Education lists. Selection should be made in conference with academic advisor. One of the Arts and Humanities (AH) or Cultures and Civilizations (CC) Electives must be a writing-intensive (WC) course.

Turfgrass Management Concentration

The turfgrass management concentration is designed for the student desiring to pursue professions that include growing and managing turfgrasses used for golf courses, parks, athletic fields, sports complexes, and residential and commercial lawns. Careful selection of departmental courses and other electives in consultation with an academic advisor will prepare graduates for the career of their choice.

Requirements for the Bachelor of Science in Plant Sciences • Plant Sciences Major • Turfgrass Management Concentration

Freshman	Hours Credit
Botany 110*-120*.....	8
Chemistry 100*, 110* or 120*-130*.....	8
English 101*, 102*.....	6
Mathematics 123*, 125*.....	6
Plant Sciences 110 or 235.....	3
¹ Social Sciences Elective*.....	3

Sophomore

Plant Sciences 220, 230, 231, or 280	3
Agriculture and Natural Resources 290	3
¹ Arts and Humanities Elective*	3
¹ Social Sciences Elective*	3
Environmental and Soil Sciences 210	4
Communication Studies 210* or 240*	3
¹ Cultures and Civilizations Elective*	3
Unrestricted Electives	6

Junior

Plant Sciences 334, 340 and 370	9
Plant Sciences 330, 350, 360, 390, or 391	6
Plant Sciences 492	3
Technical Electives	6
¹ Cultures and Civilizations Elective*	3
Unrestricted Electives	3

Senior

Select 2 from Plant Sciences 410, 421, 430, 431, 433, 434, 435, 450, 451, 460, 471, or 493	4-6
Plant Sciences 440 and 490	5
Technical Electives	6
Botany 321	4
¹ Arts and Humanities Elective*	3
Unrestricted Electives	8-10

Total 124

*Meets University General Education Requirement.

¹ Choose from the University General Education lists. Selection should be made in conference with academic advisor. One of the Arts and Humanities (AH) or Cultures and Civilizations (CC) Electives must be a writing-intensive (WC) course.

Minor in Plant Sciences

A minimum of 18 semester hours of plant sciences courses. Plant Sciences 110 and 471 will not be accepted as courses to meet minor requirements. The prerequisites, if any, of these courses will not be waived, however will be in addition to the total of 18 hours.

Total 18

ADDITIONAL ELECTIVES LIST FOR PLANT SCIENCES MAJOR**BUSINESS MANAGEMENT CONCENTRATION****Technical Electives**

Biosystems Engineering Technology 202, 212, 452, 462; Environmental and Soil Sciences 324, 334, 462; Entomology and Plant Pathology 313, 321, 410

HORTICULTURE AND AGRONOMY CONCENTRATION**Technical Electives: Agronomy Track**

Agricultural Economics Elective (3); Biosystems Engineering Technology 212, 452, 462; Botany 310, 330; Environmental and Soil Sciences 324, 355, 434, 442, 444; Forestry, Wildlife, and Fisheries 250

Technical Electives: Horticulture Track

Agricultural Economics Elective (3); Biosystems Engineering Technology 212, 452, 462; Botany 310, 412, 431, 451; Forestry, Wildlife, and Fisheries 250

Directed Electives for Sophomore Year:

Agronomy Track: Microbiology 210 and Biology 240

Horticulture Track: Select 1 from Plant Sciences 220, 230, 231, or 280; Microbiology 210 or Biology 240

Directed Electives for Junior Year:

Agronomy Track: Environmental and Soil Sciences 462

Horticulture Track: Botany 330

Directed Electives for Senior Year:

Agronomy Track: Plant Sciences 431, 434, 435, and 453

Horticulture Track: Select 4 from Plant Sciences 410, 430, 431, 433, 434, 440, 451 or 453

LANDSCAPE DESIGN CONCENTRATION**Environmental/Technical Electives**

Architecture 111, 180, 211, 232, 421; Art 101, 103, 191, 295; Art Drawing 211, 212; Biology 250; Biosystems Engineering Technology 202, 212; Botany 305, 306, 330, 431; Entomology and Plant Pathology 306, 313, 321, 410; Environmental and Soil Sciences 324, 334; Forestry, Wildlife, and Fisheries 211, 250; Geology 201, 202; Geography 310, 439; Planning 401, 402

PUBLIC HORTICULTURE CONCENTRATION**Technical Electives**

Accounting 415; Art 481; Botany 431; Educational Psychology 210; Forestry 423; Interior Design 200; Philosophy 342; Environmental and Soil Sciences 355, 434; Public Health 410; Public Relations 470; Recreation and Leisure Studies 410, 430; Communication Studies 440

PUBLIC HORTICULTURE AND LANDSCAPE DESIGN CONCENTRATIONS**Natural Science Electives:**

Chemistry 110, 130; Geography 131; Geology 101, 103

TURFGRASS MANAGEMENT CONCENTRATION**Technical Electives:**

Agricultural Economics Elective (3); Biosystems Engineering Technology 202, 212, 452, 462; Environmental and Soil Sciences 324, 334, 462; Entomology and Plant Pathology 313, 321, 410

