

# Department of Agriculture and Natural Resources

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## Faculty

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## Mission

The primary mission of the Department of Agriculture and Natural Resources is to provide a high quality undergraduate education leading to bachelor of science degrees in either agriculture or natural resources management. Both programs are distinctive, in that students are exposed to all principal disciplines within each program and have the flexibility to choose a concentration of courses in a discipline that interests them. Students in each program have opportunities to obtain field experience, prepare for postgraduate studies and engage in scholarly and professional activities. The department offers – completely by distance delivery – a master of science degree in agriculture and natural resources systems management, designed to prepare working agriculture and natural resources professionals and agricultural educators for career advancement (see Graduate Study section). Both faculty and students engage in public service and limited applied research related to the needs of the region.

## Majors

The bachelor of science degree programs in agriculture and in natural resources management include the following majors, areas of concentration and options. The professional education option within agricultural science is accredited by the National Council for the Accreditation of Teacher Education.

### **Bachelor of Science in Agriculture** (with a major in General Agriculture)

#### *Concentrations*

Agricultural Business (Agribusiness, and Farm and Ranch Management Options) (1111, 1126)

Agricultural Engineering Technology (1124)

Agricultural Science (Production, Professional Education and Agriculture Communications Options)  
(1112, 1113, 1120)

Animal Science (Production and Management, Business, Science and Companion Animal Options)  
(1119, 1117, 1115, 1125)

Plant and Soil Science (Crop and Soil Management and Golf Course and Landscape Management Options)  
(1121, 1123)

## **Bachelor of Science in Natural Resources Management (with a major in NRM)**

### *Concentrations*

Environmental Management (1154)

Park and Recreation Administration (1151)

Soil and Water Conservation (1152)

Wildlife and Fisheries Biology (Wildlife Science & Fisheries Sciences Options) (1156, 1155)

The bachelor of science in agriculture degree includes a set of general education requirements, common agricultural core requirements and concentration requirements for a major field. Students will meet general education requirements for biological and physical systems, communications, fine arts (aesthetics), humanities, mathematics and social and behavioral sciences. It requires completion of 120 semester hours of course work. Course requirements during the first two years are similar to those of other universities, a feature that facilitates transferring to or from other universities and community colleges. After completing basic courses in agriculture and supporting subjects, students may elect an area of concentration according to their interests. Each concentration provides a broad general education and excellent preparation for advanced study.

The bachelor of science in natural resources management also includes general education requirements, common natural resource management core requirements and concentration requirements for a major field. Each of the major field concentrations is designed to provide a broad general education in management of natural resources as well as specialization in the major field. Completion of any of these curricula with selection of proper electives provides an excellent foundation for graduate study.

All of the curricula available in agriculture or natural resources management include elective courses to allow flexibility in selection of courses according to interests of the individual student. Electives must be selected by the student with consultation and approval of his/her academic adviser. Many courses include field trips to, and work experiences with, leading agricultural businesses, farms and resource management agencies such as state and national parks and wildlife refuges. Thus, students have an opportunity to observe proper application of new concepts and information, technology and principles of management to real-life situations. The master of science in agriculture and natural resources systems management degree is described in the graduate section of the catalog.

## **Pre-Professional Programs**

In addition to the degree programs mentioned above, UT Martin offers these pre-professional programs:

Agricultural Engineering (1131)

Forestry (1133)

Veterinary Medicine (1135)

After completing two or three years of basic studies at UT Martin, students interested in one of these curricula may transfer to other universities offering advanced study leading to a degree in their chosen area of interest.

## **Minors**

Minors are available in agriculture and in park and recreation administration for students who are completing the university's bachelor of arts or bachelor of science degrees (see preceding section). The minor in agriculture consists of Agricultural Economics 110, Agricultural Engineering Technology 110, Animal Science 110, Plant Science 110 and 12 semester hours of study in agriculture-related courses numbered 300 or above (excluding courses designated as Natural Resources Management, Wildlife Biology, or Park and Recreation Administration). Agriculture faculty will provide advice and counsel as requested by students or their academic advisers to assist in selecting courses that are appropriate to each student's goals and objectives.

The minor in park and recreation administration consists of Park and Recreation Administration 100, 110, 200 and 12 hours of upper-division park and recreation administration courses selected from Park and Recreation Administration 300, 310, 321, 400, 430 and 440. Two hours from courses designated as Natural Resources Management 200 or 301 and 302 may be applied toward the upper-division park and recreation administration requirements.

Agriculture and natural resources management students wishing to complete an optional minor in a second degree area are invited to do so. All requirements for the minor as set forth by the granting department must be met. Minors are available through a number of different departments on campus.

## **Facilities**

The UT Martin Agricultural and Natural Resources Field Teaching/Demonstration Complex, located adjacent to the campus, are utilized as the lab farm in the department's teaching programs. Together, both units comprise 680 acres and include herds of beef cattle, sheep, goats, horses and swine, as well as greenhouses and landscape, wildlife, field and forage crop demonstration areas. These facilities are used by faculty and students to conduct research that complements the teaching program as well as contributes to the broad objectives of the Center of Excellence.

The organization outlined above enables students to become familiar with research conducted at the teaching farm, other experiment stations of the UT Institute of Agriculture and other laboratories of the university. UT Martin, in this way, occupies a unique position that differentiates it from other institutions.

UT Martin also has the Ned McWherter Agricultural Complex (pavilion and stalling facility), an Equine Center and the Smith Livestock Center, with all of these hosting a variety of events throughout the year.

## **Student Organizations**

Agriculture and natural resources management students are active in several organizations which include the Agronomy Club, Alpha Gamma Rho, Block and Bridle Club, Collegiate FFA, Collegiate 4-H, National Agribusiness Marketing Association, Park and Recreation Adventure Club, Equestrian Team (Athletics), Rodeo Team (Athletics), UT Martin chapter of the Wildlife Society, Student Cattlemen's Association, UT Martin Turf Club, Sigma Alpha and UT Martin Pre-Veterinary Club. These student organizations provide opportunities for meeting established professionals in the field, enhancing leadership skills and participation in social activities.

## **Cooperative Education Program**

The department participates in the UT Martin Cooperative Education Program that provides students an opportunity to gain valuable professional experience while preparing for career employment or graduate study. This program is designed so that students spend alternate semesters in study on campus and employment with an approved business or agency. Students majoring in any of the curricula offered in agriculture or natural resources management, as well as agricultural engineering, are eligible to participate in the program, provided they demonstrate satisfactory academic and on-the-job performance. Participants in the program should allow five years to earn the baccalaureate degree; however, they will obtain two years of valuable field experience and salary while employed. For further information, see Cooperative Education section of catalog, or write: Coordinator, Career Services, or Dean, College of Agriculture and Applied Sciences, The University of Tennessee at Martin, Martin, TN 38238.

## Internship Programs

Supervised field experience, or an internship, is available for academic credit. It is required of all students in park and recreation administration, agricultural business, agricultural science production and plant science programs, and strongly encouraged for students in all other agricultural and natural resources management degree programs. Internships are designed to enable a student to obtain credit for completion of a prescribed program of work with an approved business or agency. Students have served as interns in a variety of agricultural management and marketing positions and as interns with a variety of city, state and federal agencies.

Supervision and evaluation are provided by faculty and on-the-job supervisors. An essential element of this program is that the work experience be designed so it contributes to a student's learning and level of competence in his/her chosen career area; routine summer jobs or seasonal employment that do not meet these criteria cannot be considered for internship credit. Students interested in the program should apply for participation one semester in advance and they should have achieved senior standing at the time the work experience begins in the case of park and recreation administration – and junior standing in the case of other concentration areas.

## Judging Teams

Teams composed of students enrolled in agriculture or natural resources management annually participate in intercollegiate contests in livestock judging, crops judging, horse judging, NAMA Quiz Bowl, SAEA Quiz Bowl and soil judging. Instruction and coaching are provided by faculty members and membership on the team is based upon participation and competitive performance in practice exercises. The teams have received awards in regional and national competition. They provide excellent opportunities for interested students to sharpen their evaluation skills. Equestrian competition is also available to interested students through the UT Martin athletics program.

## Bachelor of Science in Agriculture

### I. General Education Requirements (38-39 hours)

Biological and Physical Systems .....	8
Two courses from: Astronomy 201, 202; Biology 110, 120, 130, 140; Chemistry 111, 112, 121, 122; Geology 110, 120; Physics 101, 102, 211, 212, 220, 221; Zoology 200, 201, 251	
Communication .....	9-10
Communications 230; English 110 (4) or 111 (3), 112	
Fine Arts (Aesthetics) .....	3
One course from: Art 110; Art History 210, 211; Dance 110; Music 111, 112; Theatre 110, 111	
Humanities .....	9
Three courses from: English 250, 251, 260, 261, 270, or 271; French 250; German 250; History 121, 122, 201, 202; Honors 111; Philosophy 110, 120, 130, 160; Spanish 250	
Mathematics .....	3
One course from Mathematics 140, 160, 185, 251	
Social and Behavioral Sciences .....	6
Two courses from approved General Education listing	

### II. Agriculture Common Core Requirements (18 hours)

Agriculture.....	18
Agriculture 390, Agricultural Economics 110, Agricultural Engineering Technology 110, Animal Science 110, Plant Science 110, Soil Science 210	

**III. Concentration Requirements (64 hours)**  
 (See respective concentrations on the following pages.)

**Total hours required for B. S. Ag. degree**  
**(must include 30 hours of upper-division courses) ..... 120**

**Agricultural Business Concentration**

**Agribusiness Option (1111)**

This curriculum is designed to prepare students for careers in the rapidly expanding agricultural business sector. Students receive instruction in the agricultural sciences, agricultural economics, accounting, finance, policy, marketing and management. Students learn how the economic system operates as well as the role agriculture plays in the U.S. and global economy. The program emphasizes training related to the management phases of agricultural industry and business. Excellent career opportunities are available in industries allied with agriculture, including those engaged in transportation, distribution, marketing and processing of farm products; agricultural banking and farm credit agencies; farm real estate and land appraisal services; insurance; agricultural supply businesses and cooperative management; agricultural policy at state and federal levels; market analysis and international agricultural trade.

**CONCENTRATION REQUIREMENTS\* (64 Hours)**

Accounting 201-202 .....	6
Agriculture 295; 230 or 420; 441 .....	9
Agricultural Economics 271 or 471; 325; 335; 345 or 364; 375; 385 or 465; 445; 485 .....	24
Agriculture/Natural Resources Management Electives .....	6
Business Electives chosen from Business Law 201, Finance 301, Management 301 and Marketing 301 .....	9
Economics 201, 202 (if not taken to meet Social & Behavioral Sciences reqt) .....	6
Mathematics 160, 210 (if not taken to meet Mathematics requirement) .....	6
General Electives.....	4

\*At least 30 hours of concentration requirements must be taken in upper-division courses. If not taken to meet Biological and Physical systems requirements, Chemistry 111 or 121 is a prerequisite for the required agricultural core course, Soil Science 210.

**Farm and Ranch Management Option (1126)**

This curriculum is designed to prepare students for careers in the rapidly expanding agricultural business sector, but in particular, for careers in farming and farm management. Students receive instruction in the agricultural sciences, agricultural economics, accounting, finance, policy, marketing and management. Students can add to their background in agribusiness courses their choice of courses in animal science, plant and soil science and agricultural engineering technology to prepare for managing a farm. The program emphasizes training related to the management phases of agricultural industry and business. Career opportunities in farm management are primarily available for those who are going to inherit or partner in an existing farm operation but farm management careers are also available in the banking, insurance and credit industries.

**CONCENTRATION REQUIREMENTS\* (64 Hours)**

Agricultural Economics 271, 325, 335, 345 or 364, 375, 385 or 465, 445.....	21
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Agriculture/Natural Resources Management Electives**	25
Economics 201, 202 (if not taken to meet Social & Behavioral Sciences requirement)	6
General Electives	12

\*At least 30 hours of concentration requirements must be taken in upper-division courses. If not taken to meet Biological and Physical systems requirements, Chemistry 111 or 121 is a prerequisite for the required agricultural core course, Soil Science 210.

\*\*A maximum of nine hours can be selected from among Special Problems, Practicum, Research Participation, Supervised Field Experience, or International Travel Study.

## Agricultural Engineering Technology Concentration (1124)

The Agricultural Engineering Technology program was developed for students seeking careers associated with the application of technologies in the field of food and fiber production. Careers in Agricultural Engineering Technology include: agricultural equipment manufacturers, agricultural/industrial equipment sales and service, fiber processing, food production/processing industries, geospatial technologies and technological fields in government-related careers. The Agricultural Engineering Technology program leads to a Bachelor of Science degree in Agriculture. The program prepares students to be successful in careers associated with industry or government. The curriculum is also structured to prepare students for admission to graduate school in Agricultural Engineering Technology, Agricultural Operations Management, Agricultural Systems Management, or Agricultural Mechanics.

### CONCENTRATION REQUIREMENTS (65 Hours)

Accounting 201-202	6
Agricultural Economics 375 or Business Law 201	3
Agricultural Engineering Technology Electives	18
Choose 18 hours from 210, 220, 310, 350, 370, 450, 460 and 482	
Biological and Physical Systems	12
Physics 101-102 or 211-212 or 220-221 (if not taken to meet Biological and Physical Systems requirements); Chemistry 111	
Communications 326	3
Engineering 100 (if not used to fulfill Social & Behavioral Sciences requirement)	3
Engineering 101	3
English 325	3
Mathematics 160 or 251	3
Soil Science 315	3
Agriculture and Natural Resource Management Electives	12
Adviser approved courses from Agriculture and Natural Resources	
General Electives	6
Adviser approved courses from Biology, Business, Chemistry, Engineering, Food Science, Geology, Mathematics, or Physics	

## Agricultural Science Concentration

The program provides technical expertise that prepares students to assume a variety of agriculture-related positions in rural or urban communities. The curriculum is designed for those who desire to own or manage farms; become agricultural representatives for banking and financial institutions, cooperatives, chemical companies, the Agricultural Extension Service and other federal agencies and state agencies; or to engage in public relations, research and other aspects of industry related to agriculture and agribusiness.

**Agricultural Communications Option (1120)**

This agricultural science option is offered in cooperation with the College of Humanities and Fine Arts. Graduates are eligible for employment in communications, journalism and public relations related to the food and fiber industry.

**Agricultural Production Option (1112)**

This agricultural production option is offered through the Department of Agriculture and Natural Resources. This program of study provides a broad general education that includes courses from several subject matter disciplines in agriculture. More than 25 percent of the courses may be selected by students to give in-depth preparation in areas especially intriguing to them. This combination provides a good general education and broad overview of the agricultural industry, while allowing specialization according to individual interests.

**Professional Education Option (1113)**

This agricultural science option is offered in cooperation with the College of Education and Behavioral Sciences and graduates meet certification requirements to teach high school agricultural education and agriscience. The option is designed especially to prepare students as professional agricultural educators. Graduates are prepared to assume leadership roles in other segments of the agricultural industry related to public relations, sales, communication, manufacturing and government service. It is possible to obtain add-on endorsements in the secondary education (7-12) areas such as biology and chemistry.

**Biofuels Option (1127)**

This agricultural science option provides broad-based training in a variety of agriculture fields that relate to the production and utilization of transportation fuels derived from agricultural products and biomass. The curriculum is designed to prepare students for employment in the biofuels industry, including ethanol and biodiesel production facilities, agricultural production operations focused on producing biomass crops, or agricultural businesses related to biofuel production and marketing. Students will receive a background in plant science topics dealing with biomass production, agricultural engineering related to biofuels production and issues in agricultural economics that relate to the biofuels industry.

**CONCENTRATION REQUIREMENTS (64 hours)****Agricultural Science Core Courses (4 hours)**

Science Elective .....	4
(Biology 110 and 120, and Chemistry 111 or 121 are prerequisites for required courses in this concentration and can be taken to fulfill Biological and Physical Systems General Electives requirements and these science electives.)	

**PLUS****Agriculture Communications Option (60 hours)**

Agriculture 275, 450 .....	6
Agricultural Engineering Technology 482 .....	3
Animal Science 119 .....	1
Animal Science 240, Upper-division Elective.....	6
Animal Science 380 .....	3
Communications 200 or 210, 250, 320, 322 and six hours from two 3-hour upper-division Communications courses for which student has met the prerequisites.....	18
Plant Science 119 .....	1
Plant Science 242 .....	3
English 325 .....	3

Agriculture/Natural Resources Management Electives .....	3
General Electives .....	13

**OR****Production Option (60 hours)**

Agriculture 420, 441 .....	6
Agricultural Engineering Technology 220, 482 .....	6
Agriculture/Natural Resources Management Electives .....	9
Animal Science 119, 350 .....	4
Animal Science 380 .....	3
Agricultural Economics, Animal Science, Plant Science, or Soil Science upper-division Electives ....	12
Chemistry 111 or 121 (if not taken to meet science electives), 112 .....	8
General Elective .....	3
Mathematics 210 .....	3
Plant Science 119, 322, 333 .....	7
Zoology 325 .....	3

**OR****Professional Education Option (60 hours)**

Agriculture 450 .....	3
Agricultural Education 310*, 404*, 405* .....	15
Agricultural Education 470 .....	3
Agricultural Engineering Technology 210, 220, 370 .....	9
Animal Science 119, 240 .....	4
English Literature elective (if not taken to meet Humanities requirement) .....	3
English 250, 251, 260, 261, 270, 271	
Human Learning 311, 325 .....	5
Plant Science 119, 242 .....	4
Psychology 120 (if not taken to meet Social & Behavioral Sciences requirement) .....	3
Reading 433 .....	3
Special Education 300 .....	3
Teacher Education 211*, 302*, 303* .....	7
Science elective in Agriculture or Natural Resources Management .....	3
Animal Science 350, Plant Science 341, Soil Science 315, 430, or Wildlife Biology 250	

General Elective .....	1
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\*Admission to Teacher Education required. See section on “Requirements for Recommendation for Licensure.”

**OR****Biofuels Option (60 hours)**

Agriculture 420 .....	3
Agricultural Economics 325, 364, 475 .....	9
Agricultural Engineering Technology 210, 350, 460, 470 .....	12
Animal Science 350 .....	3
Economics 202 .....	3
Mathematics 210 .....	3
Microbiology 251 or 310 .....	4
Natural Resources Management 101 or 210 .....	3
Physics 101, 150 or 211 .....	4
Plant Science 341, 410, 433, 442 .....	12
Science Upper-division Elective .....	4

## **Animal Science Concentration**

This curriculum introduces students to the many facets of the animal industry. Students then orient themselves toward a career in livestock, horse and companion animal management; animal science and industry; or veterinary medicine by selecting one of the four options available.

The production and management option (1119) is designed for students most interested in a terminal bachelor of science degree. The science option (1115) better prepares students for post-baccalaureate training in graduate or professional schools (including veterinary medicine). The business option (1117) prepares the student for entrance into the master of business administration degree. The companion animal science option (1125) prepares students for careers in small animal industries along with preparing students to enter the veterinary technology program at Columbia State Community College. The option requirements are generally started in the junior year to allow individual flexibility in selecting the degree track best suited for each individual student.

Students may also complete requirements for a minor in business administration, biology or chemistry by completing course requirements as outlined by each of these respective departments.

The animal science concentration is comprehensive and includes training in animal nutrition, physiology, breeding and reproduction, selection and evaluation, management, marketing, animal health and welfare and biotechnology. Training is provided through classroom instruction, hands-on experience in lab and field production facilities through the UT Martin Agriculture and Natural Resources Field Teaching/Demonstration Complex, tours to commercial farms, ranches, businesses and marketing and processing facilities. Optional industry-oriented internships and cooperative education experiences allow students to strengthen their training and education in a specific area of animal science and develop contacts with potential employers. New equine facilities, recently renovated beef, swine and sheep units give students interested in production and management the opportunity to acquire skills associated with modern production practices. The West Tennessee Animal Disease Diagnostic Laboratory is scheduled to open in 2008.

Excellent employment opportunities exist in career fields that include: private farming or ranching and commercial farm or ranch management and teaching; research and extension opportunities in both federal and state agencies; and government including the United States Department of Agriculture and University of Tennessee Agricultural Extension Service. Opportunities also exist in private industry in areas of production, technical services, management and marketing for commodity groups and feed, equipment manufacturing, pharmaceutical and food processing corporations; industry and private consulting; environmental and regulatory monitoring; and agricultural finance and communication. Many animal science graduates may continue their education with graduate and professional training in areas such as law, medicine, veterinary medicine, pharmacy, dentistry, business administration and advanced degrees leading to careers in teaching, research and extension.

### **CONCENTRATION REQUIREMENTS (64 Hours)**

#### **Animal Science Concentration Core Courses (35 hours)**

Animal Science 119, 240, 330, 350, 351, 360, 371, 372 .....	21
Biological and Physical Sciences .....	16
Biology 110 and 120 and Chemistry 111, 112 are required for Animal Science options although eight hours may have already been applied to the Biological and Physical Sciences General Education requirement. The Animal Science Science Option will require students to take Biology 140 and 130 in place of Biology 110 and 120, and Chemistry 121 and 122 instead of Chemistry 111 and 112.	
English or Communications Speaking or Writing Elective.....	3
Communications 200, 210; English 305, 310, 315, 325	
Mathematics 210 .....	3

#### **PLUS**

**Production and Management Option (29 hours)**

Agriculture/Natural Resources Management Electives.....	6
Any course offering in Agriculture and Natural Resources Management excluding Animal Science courses and Special Problems or Research Participation courses.	
Animal Science Production Electives.....	9
Animal Science 380, 410, 420, 430, or 440	
Science Requirements .....	4
Microbiology 251	
Plant Science and Soil Science upper-division Electives.....	3
General Electives .....	7

**OR****Science Option (29 hours)**

Animal Science Requirements.....	6
Animal Science 320	
Choose from Animal Science 410, 420, 430, or 440	
Science Requirements .....	11
Chemistry 341; Microbiology 251; Agriculture 441	
Science upper-division Electives.....	8
Courses chosen from Biochemistry, Biology, Chemistry, Mathematics, Physics, Microbiology, or Zoology	
Agriculture and Natural Resources Management Electives .....	4
Must include one 3-hour course selected from Agricultural Engineering Technology, Agricultural Economics, or upper-division Plant Science	

**OR****Business Option (29 hours)**

Animal Science Requirements.....	6
Animal Science 380, and 410, 420, 430, or 440	
Microbiology 251, 310, or 311.....	4
Business Electives .....	18
Accounting 201* and 202* or Accounting 300;	
Business Law 201* or Agricultural Economics 375;	
Economics 201* and 202* (if not taken to meet Social & Behavioral Sciences requirement);	
Finance 301* or Agricultural Economics 465;	
Management 301* or Agricultural Economics 471;	
Marketing 301* or Agricultural Economics 364	
General Electives .....	1

**OR****Companion Animal Science Option\*\* (29 hours)**

Animal Science Production Requirements .....	3
Choose from Animal Science 410, 420, 430, or 440	
Companion Animal Science Requirements.....	9
Animal Science 230 and 260	
Animal Science 320	
Microbiology 251 or 310.....	4
Business Electives .....	9
Accounting 201* and 202* or Accounting 300;	
Business Law 201* or Agricultural Economics 375;	
Economics 201* and 202* (if not taken to meet Social & Behavioral Sciences requirement);	

- Finance 301\* or Agricultural Economics 465;
- Management 301\* or Agricultural Economics 471;
- Marketing 301\* or Agricultural Economics 364

General Electives ..... 4

\*Students completing these courses will complete requirements equivalent to a minor in Business Administration, as well as most undergraduate prerequisites for the UT Martin Master of Business Administration program.

\*\*Students will receive a Bachelors of Science after course of study completion. Students will also be eligible to be certified as a Veterinary Technician AFTER completing 33 hours of study in the Veterinary Technology program at Columbia State University.

**Plant and Soil Science Concentration**

Students may choose from two options in this curriculum: Crop and Soil Management and Golf Course and Landscape Management.

**Crop and Soil Management Option (1121)**

Special studies in many facets of crop production and soil science are emphasized in this curriculum. Studies include soil origin and management, soil resource utilization, plant reproduction including genetics and breeding, fertilizer formulation and use, pesticides, crop management and ornamental horticulture. Practical applications of basic principles are illustrated with field trips and visits to farms and industries. A student may emphasize technology (production), science, or business phases of the plant and soil sciences according to individual interests, but will meet requirements for certification as a Certified Crop Advisor (CCA) and with the addition of a course in Physics can meet certification requirements for Certified Professional Agronomist (CPAg).

Many career opportunities are available with various federal and state agencies, including the Agricultural Extension Service and Natural Resources Conservation Service. Other opportunities are available in various industries associated with agriculture, including feed, seed, fertilizer and chemical companies; agricultural supply and equipment companies; agricultural communications and public relations; conservation and recreation; and banking, credit appraisal, sales and production agriculture.

**Golf Course and Landscape Management Option (1123)**

American culture is experiencing rapid change and most Americans have more leisure time and discretionary income than ever before. Consequently a growing number of people are interested in playing golf. This has resulted in a sharp demand for more golf courses, in both urban and rural settings. New golf courses are rapidly being built and this has resulted in a corresponding increase in golf course management positions. The turf industry is also rapidly expanding as new golf courses are being built and established ones are entertaining more golfers and need to be maintained. In addition, a tremendous demand for turfgrass has resulted from new road construction. New building construction, along with an increased emphasis on using turfgrass as a fast efficient way to stabilize soil and beautify landscapes, has increased turfgrass demand. Playing fields for football, soccer, baseball and softball also use turfgrass, as well as playgrounds and parks.

**CONCENTRATION REQUIREMENTS (61 Hours)**

**General Plant and Soil Science Requirements (45 hours)**

Agriculture 295 (if not taken to meet Social & Behavioral Sciences requirement) .....	3
Agriculture 420 .....	3
Agricultural Engineering Technology 220 .....	3
Biological and Physical Sciences.....	16

Biology 110 and 120, and Chemistry 111, 112 are required for all Plant and Soil Science options although 8 hours may have already been applied to the Biological and Physical Sciences General Education requirement.)

English 325 or Communications 210, 323, 324, or 430 .....	3
Mathematics 210 .....	3
Natural Resources Management 101 (if not taken to meet Social & Behavioral Sciences reqt) .....	3
Plant Physiology or Ecology Requirement .....	3
Botany 421, 431, or Plant Science 442	
Plant Science 119, 322, 333, 431 .....	10
Soil Science 315, 430, or 440.....	3
Soil Science 412 .....	3
Zoology 325 .....	3

**PLUS****Crop and Soil Management Option\* (22 hours)**

Agriculture 441 .....	3
Agricultural Engineering Technology 482 .....	3
Physics 150 or 211 .....	4
Plant Science 433 .....	3
Plant Science 422 or 442 (if not taken to meet plant physiology or ecology requirements) .....	3
Upper-division Science Elective.....	6
UD courses in the Departments of Agriculture and Natural Resources; Biological Science; Chemistry; Engineering; or Geology, Geography, and Physics	

**OR****Golf Course and Landscape Management Option (22 hours)**

Agriculture 441 .....	3
Plant Science 234, 242, 321, 363, 471 .....	15
Upper-division Science Elective.....	4
UD courses in the Departments of Agriculture and Natural Resources; Biological Science; Chemistry; Engineering; or Geology, Geography, and Physics	

## Bachelor of Science in Natural Resources Management

**I. General Education Requirements (38-39 hours)**

Biological and Physical Systems .....	8
Biology 110, 120	
Communication .....	9-10
Communications 230; English 110 or 111, and 112	
Fine Arts (Aesthetics) .....	3
Choose from approved General Education listing	
Humanities .....	9
Choose from approved General Education listing	
Mathematics 140 or 185 .....	3
Social and Behavioral Sciences .....	6
Choose from approved General Education listing. (Students with concentrations in Environmental Management or Soil and Water Conservation must take one course in Economics 100, 201 or 202.)	

**II. Natural Resources Management Common Course Requirements (19 hours)**

Agricultural Engineering Technology 220.....	3
Chemistry 111 .....	4

Natural Resources Management 100, 210, 390 .....	8
Soil Science 210 .....	4

### III. **Concentration Requirements** (63 hours)

(See respective concentrations.)

**Total Hours required for B.S.N.R.M. degree: .....120**

### **Environmental Management Concentration (1154)**

Of all living beings, humans are unique in their ability to manage the environment in which they live. However, modification of the environment to suit human needs often results in the degradation of environmental ecosystems. This curriculum is a science-oriented curriculum designed to provide a broad understanding of environmental quality. Students will develop a solid foundation in basic sciences, mathematics and communications skills. This foundation will then be applied in courses dealing with ecology and natural resources. Students will be strongly encouraged to pursue relevant work experience through supervised field study with an approved agency or firm.

Graduates of this program will find employment opportunities as technical, scientific, or support personnel with local, state, or federal agencies, or with private industry. Examples include positions with municipal waste treatment facilities; state and federal regulatory agencies; consulting firms involved in environmental remediation and development of impact statements; various manufacturers; environmental and conservation support organizations; and other public and private employers in the environmental field. The curriculum will also prepare the student for graduate study in areas related to the environment and natural resources, including environmental law.

#### **CONCENTRATION REQUIREMENTS (63 Hours)**

Agricultural Economics 445 .....	3
Agricultural Engineering Technology 220, 460 .....	6
Biology 418 .....	3
Chemistry 112 .....	4
English 325 .....	3
Geographic Information Systems Elective (select from Geography 310 or 410, Park and Recreation Administration 300, or Agricultural Engineering Technology 482) .....	3
Geography 472 .....	3
Geology 110 .....	4
Geology 365 or 445 or Soil Science 440 .....	3
Mathematics 160, 210 .....	6
Microbiology 251 .....	4
Natural Resources Management 350.....	3
Soil Science 315 or 430.....	3
Plant Science elective: Plant Science 110, 205, 234, 333, 341, or 422.....	3
Science Electives.....	12
Chosen from upper-division courses in Departments of Agriculture and Natural Resources; Biological Sciences; Chemistry; Engineering; or Geology, Geography & Physics (Natural Resources Management 420 recommended)	

### **Park and Recreation Administration Concentration (1151)**

This curriculum is designed to prepare students for the proper management of natural, cultural and recreational resources. Leadership positions in parks and other recreation settings require fundamental knowledge of basic

principles from many disciplines which collectively emphasize the natural and cultural sciences as well as personnel and fiscal management, thus preparing students with leadership abilities and an applied understanding of the tools for recreation administration.

Flexibility is provided through restricted elective hours, allowing credit hours to be taken in a more specialized area of the park and recreation field. The curriculum includes supervised field experience with an approved park or recreational agency and applications are further illustrated by frequent trips to nearby national, state and municipal park settings and private and commercial recreation attractions.

Employment opportunities include positions with federal, state and municipal park agencies as well as a multitude of private, commercial and volunteer organizations.

#### **CONCENTRATION REQUIREMENTS (63 Hours)**

Accounting 201 or 300 .....	3
Agricultural Engineering Technology 110, 210, or 370 .....	3
Biology Electives .....	6
Chosen from Biology 418; Botany 303; Zoology 319, 320, 321, or 322	
Criminal Justice 200 or Wildlife Biology 340 .....	3
Geology 110 .....	4
History Electives: History 310, 331, 334, 335, or 495 .....	6
Natural Resource Management 200, 430, 440 .....	8
Park & Recreation Administration 100, 110, 200, 300, 400, 410, 430 .....	21
Plant Science 321, 341 .....	6
Restricted Electives .....	3
Selected with the assistance of the student's adviser based on the student's career goals.	

#### **Soil and Water Conservation Concentration (1152)**

Urbanization, industrialization and population growth demand effective management of land and water resources for multiple uses. This curriculum prepares students for conservation and management of soil and water resources for the long-range benefit of society. Requirements include a strong background in physical and biological sciences, ecology and management to provide understanding of the physical, chemical and biological interrelationships of soil, water and plants. Elective courses provide an opportunity for emphasis in areas of particular interest such as ecology, communications, agriculture, economics, political science, and others.

Employment opportunities are available with federal agencies such as Natural Resources Conservation Service and Bureau of Land Management; governmental units including state, county and municipal agencies; planning and economic development districts; businesses in the agricultural industry, such as fertilizer and chemical companies; public utility companies; and private industry, including banks, financial institutions and real estate agencies.

#### **CONCENTRATION REQUIREMENTS (63 Hours)**

Agriculture 441 .....	3
Agricultural Economics 110 .....	3
Agricultural Engineering Technology 220, 460 .....	6
Chemistry 112 .....	4
English 325 .....	3
Geographic Information Systems Elective (select from Geography 310 or 410, Park and Recreation Administration 300, or Agricultural Engineering Technology 482) .....	3
Geology 110 .....	4
Geology 365 or 445 .....	3

Mathematics 210 .....	3
Microbiology 251 .....	4
Physics 101, 150 or 211 .....	4
Plant Science 110, 333, or 422.....	6
Soil Science 315, 321, 412, or 440.....	9
Soil Science Elective (Soil Science 250 recommended) .....	2
Science Electives.....	6
Upper-division courses in Departments of Agriculture and Natural Resources; Biological Sciences; Chemistry; Engineering; or Geology, Geography, and Physics (Natural Resources Management 420 recommended)	

## **Wildlife and Fisheries Biology Concentration (1155)**

This curriculum emphasizes basic sciences, plant and animal biology and communications skills for effective performance as a wildlife or fisheries biologist. Students learn to view wildlife and fisheries and problems associated with their management from a broad perspective, while also being exposed to social, cultural and ethical issues.

Seminar courses and supervised experience in the field with an approved agency provide opportunities for learning management of wildlife populations. Nearby wildlife management areas maintained by state and federal agencies are utilized to illustrate principles

Graduates with the wildlife science option are eligible for certification by The Wildlife Society as Associate Wildlife Biologists and graduates with the fisheries science option are eligible for certification by the American Fisheries Society as Associate Fisheries Professionals. Both options qualify graduates for employment by state wildlife resources agencies, the U.S. Fish and Wildlife Service and other governmental agencies, as well as private and commercial entities. However, students interested in the more technical phases of this field and in meeting standards for higher managerial positions should plan for graduate study.

### **CONCENTRATION REQUIREMENTS (63 Hours)**

#### **Wildlife and Fisheries Biology Concentration Core Courses (43 Hours)**

Biology 336 .....	3
Botany 303 .....	3
Chemistry 112 .....	4
Mathematics 160, 210 .....	6
Natural Resources Management 430.....	3
Soil Science 315 or 430.....	3
Technology Elective .....	3
To be chosen from Agricultural Engineering Technology 482; Geography 310, 410, or Park and Recreation Administration 300	
Wildlife Biology 240, 250, 330, 450 .....	14
Zoology 441, 442 .....	4

#### **PLUS**

#### **Wildlife Science Option (20 Hours)**

Biology 412 .....	1
Botany 431; Plant Science 341.....	6
Zoology 319, 320, 321, or 322 .....	9
Policy Elective.....	3
To be chosen from: Agricultural Economics 325, 445; Natural Resources Management 375; or Wildlife Biology 340	
General Elective.....	1

**OR**

**Fisheries Science Option (20 Hours)**

Biology 413, 418 .....	4
Wildlife Biology 300 .....	3
Zoology 319, 321, or 322 .....	6
Zoology 320 .....	3
General Elective* .....	4

\*Participation in at least one course at the Gulf Coast Marine Laboratory, through the Department of Biological Sciences is recommended.

## Pre-Professional Curricula in Agriculture

### Agricultural Engineering (1131)

The Department of Agriculture and Natural Resources, in cooperation with the College of Engineering and Natural Sciences, offers a two-year program that is basic to a degree in Agricultural Engineering. After completion of freshman and sophomore years at UT Martin, students may transfer to The University of Tennessee, or another university to complete their junior and senior years.

Agricultural Engineering is the profession that provides engineering know-how for the development of agriculture. Graduates are employed by agricultural colleges in research, teaching and extension and by federal agencies such as USDA, the Natural Resources Conservation Service and the Department of the Interior. Job opportunities are also available in farm equipment design, manufacturing and sales; building design and construction; electric power systems in agriculture; soil and water conservation engineering; and other industries.

<b>Freshman Year</b>	<b>Hours</b>
Chemistry 121-122 .....	8
Engineering 101 .....	4
Engineering 121 .....	3
English 111-112 .....	6
Mathematics 251-252 .....	8
Social Science/Humanities elective .....	3
<b>Total Hours</b> .....	<b>32</b>

<b>Sophomore Year</b>	<b>Hours</b>
Engineering 241 .....	3
Microbiology 251 .....	4
Mathematics 310, 320, 330 .....	10
Physics 220-221 .....	8
Soil Science 210 .....	4
Social Science/Humanities elective .....	3
<b>Total Hours</b> .....	<b>32</b>

## Forestry (1133)

Forestry is the science, art and practice of managing natural resources of wood, water, forage and environmental amenities that occur in association with forest lands. Students interested in preparing for careers in forestry may complete two years of the curriculum at UT Martin. Upon completion of the program outlined below, students may transfer with junior standing to departments of forestry at other universities.

<b>Freshman Year</b>	<b>Hours</b>
Biology 110, 120 .....	8
Chemistry 111 .....	4
English 111, 112 .....	6
Fine Arts Elective .....	3
Humanities Elective .....	3
Mathematics 140, 160 .....	6
Natural Resources Management100.....	3
<b>Total Hours.....</b>	<b>33</b>

<b>Sophomore Year</b>	<b>Hours</b>
Communications 230.....	3
Economics 202.....	3
Humanities Elective .....	6
Mathematics 210 .....	3
Natural Resource Management 210 .....	3
Wildlife Biology 250 .....	3
Soil Science 210 .....	4
Social and Behavioral Sciences Elective .....	6
<b>Total Hours .....</b>	<b>31</b>

## Veterinary Medicine (1135)

Students interested in pursuing studies leading to the Doctor of Veterinary Medicine (DVM) degree should complete the following program if not planning to pursue the four-year degree plan in Agriculture (Animal Science Concentration, Science option) from UT Martin. This is a three-year curriculum designed to qualify students for admission to the College of Veterinary Medicine at The University of Tennessee. Students considering application to other colleges of veterinary medicine should consult those colleges for their residency and admission requirements.

### Veterinary Medicine Pre-Professional Program Option (105 hours)

38 hours of General Education Requirements, 29 hours of Veterinary Medicine Requirements, 38 hours of Agriculture/Animal Science or Natural Resources Management/Wildlife and Fisheries Biology Requirements – 105 hours.

#### General Education Requirements (38 hours)

For Animal Science Concentration, Science Option, follow general education requirements for Bachelor of Science in Agriculture.

For Wildlife and Fisheries Biology Concentration, Wildlife Science Option, follow general education requirements for Bachelor of Science in Natural Resources Management.

**AND**

**Veterinary Medicine Requirements (29 hours)**

Biology 337 or 436.....	3
Biochemistry 411, 412 .....	6
Chemistry 122, 341, 342 .....	12
Physics 211, 212 .....	8

**AND****Agriculture/Animal Sci/Sci Option (1115) Requirements (38 hours)**

Agriculture 390, 441 .....	5
Agricultural Economics 110 .....	3
Agricultural Engineering Technology 110 .....	3
Animal Science 110, 119, 350 .....	7
Animal Science 360 or Biology 336.....	3
Chemistry 121 .....	4
Communication 200, 210; English 305, 310, 315, 325.....	3
Mathematics 160 or 210.....	3
Plant Science 110 .....	3
Soil Science 210 .....	4

**OR****Natural Resources Management/Wildlife Science Option (1156) Requirements (38 Hours)**

Agricultural Engineering Technology 220 .....	3
Biology 331, 336 .....	6
Botany 303 .....	3
Chemistry 121 .....	4
Natural Resources Management 210, 390.....	5
Plant Science 341 or Natural Resources Management 410.....	3
Soil Science 210 .....	4
Wildlife Biology 250 .....	3
Zoology 319, 320, 321 .....	3
Zoology 441, 442 .....	4

Students who complete this curricula may obtain the Bachelor of Science in Agriculture (Animal Science Concentration-Science Option) or the Bachelor of Science in Natural Resources Management (Wildlife Biology Concentration-Wildlife Science Option) after satisfactory completion of the first year of study in The University of Tennessee College of Veterinary Medicine providing the following provisions are met:

1. the last 30 semester hours of the pre-veterinary medicine curriculum must be completed at UT Martin.
2. the first year of academic study must be completed in the College of Veterinary Medicine with a cumulative grade point average of at least 2.00.
3. appropriate courses from this year of study will be accepted toward fulfillment of the minimum 120 semester hour graduation requirement.
4. students must have met all other graduation requirements of the UT Martin College of Agriculture and Applied Sciences.
5. students who wish to pursue this option must assume responsibility for completing all graduation requirements and initiating a formal request for granting of the degree.
6. students should check with the Admissions Office of The University of Tennessee College of Veterinary Medicine to insure that courses completed under this option will meet the current admission requirements for the class of which they are submitting their application.

## **Geographic Information Systems (GIS) Certificate Curriculum**

Geographic Information Systems (GIS) technology and applications are integral to many areas in the geosciences and other disciplines. Students who systematically develop skill sets and experience in GIS may possess key advantages in professional advancement and graduate studies. A special certificate which recognizes basic proficiency in Geographic Information Systems (GIS) technology and applications is now available.

A GIS Certificate is issued to students who complete the following requirements:

1. successful completion of all requirements for the bachelor's degree in his or her respective major degree program.
2. successful completion of the following:
  - a. Agricultural Engineering Technology 482 Precision Technologies for Agriculture and Natural Resource Management (3)
  - b. Geography 310 Principles of Geographic Information Systems (3)
  - c. Any two of the following three courses:
    - Geography 364 Introduction to Remote Sensing (3)
    - Geography 410 Geographic Information Systems: Modeling and Applications (3)
    - Geography 471 Cartography (3)
  - d. One of the following two courses:
    - Agricultural Engineering Technology 401 Research Participation (3)
    - Geography 481 Research Practicum (3)

**Note:** Research projects undertaken through these courses must involve significant application of GIS-related technology.
3. a minimum final grade point average of 3.00 in all of the Agricultural Engineering Technology and Geography courses specified above that are used to earn a certificate.
4. a minimum final letter grade of C in all of the Agricultural Engineering Technology and Geography courses specified above that are used to earn a certificate.

## **Land Surveying and Geomatics Certification (LSGC) Program**

The Land Surveying and Geomatics Certification (LSGC) program defines a group of courses offered by the Department of Agriculture and Natural Resources, the Department of Engineering and the Department of Geology, Geography, and Physics that are formulated to meet the Tennessee Board of Examiners for Land Surveyors (TBELS) requirements to apply for licensure as a Professional Land Surveyor (PLS).

Students completing B.S. degree requirements in a science-based undergraduate curriculum and taking 24 semester hours of surveying-specific course work are qualified to apply for licensure as a PLS by the TBELS under Category B (TCA 62-18-109). Completion of the licensure process requires passing all exams as specified by the TBELS along with having two years of work experience under a licensed surveyor.

The TBELS further defines course work meeting Category B criteria as 24 semester hours of acceptable courses relating directly to surveying. Courses are selected from a grouping of courses by the TBELS designated as List I, II, or III. A minimum of 18 hours must be equivalent to courses from List I and the remainder from List II or III. The TBELS maintains a list of pre-approved courses (List I, II and III) on its Website (<http://www.state.tn.us/commerce/boards/surveyors/>).

The following courses, offered at The University of Tennessee at Martin, are formulated to meet the TBELS criteria for a Category B application process.

**List I Courses**

(Minimum of 18 hours required)

**Required**

Engineering 350	Principles of Land Surveying and Geomatics (3)
Agricultural Engineering Technology 354	Advanced Land Surveying and Geomatics (3)
Agricultural Engineering Technology 454	Land Surveying with GPS (3)
Agricultural Engineering Technology 456	Boundary Control and Legal Principles (3)
Agricultural Engineering Technology 458	Subdivision Site Planning and Development (3)

**Electives**

(Choose minimum of one)

Engineering 352	Transportation Engineering (3)
Engineering 490	Special Topics - Surveying Projects (3)
Geography 471	Cartography (3)

**List II Courses**

(Minimum of six hours required)

**Required**

Agricultural Engineering Technology 220	Surveying and Soil and Water Engineering (3)
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**Electives**

(Choose minimum of one)

Agricultural Engineering Technology 482	Precision Technologies for Agriculture and Natural Resources (3)
Engineering 353	Hydraulics and Hydrology (3)
Geography 310	Principles of Geographic Information Systems (3)
Geography 364	Introduction to Remote Sensing (3)
Geography 410	Geographic Information Systems: Modeling and Applications (3)
Plant Science 341	Dendrology and Forest Ecology (3)

**Qualification:** It is the applicant's responsibility to meet all TBELS requirements for licensure. License requirements are specified on the TBELS website ([www.state.tn.us/commerce/boards/surveyors/IsLicense.html](http://www.state.tn.us/commerce/boards/surveyors/IsLicense.html)) and applicants are strongly encouraged to contact the TBELS Director at (615) 741-3611 to coordinate all aspects of the application process. The University of Tennessee at Martin does not warrant or guarantee that students completing the LSGC program will be granted permission to sit for the Fundamentals of Land Surveying examination. The TBELS has the sole authority to approve or disapprove an application for PLS licensure.

## Courses Offered by Department of Agriculture and Natural Resources

Agricultural Economics 110	Introduction to Agricultural Business (F)
Agricultural Economics 271	Farm Management (Sp-odd)
Agricultural Economics 301	Special Problems (F)
Agricultural Economics 302	Special Problems (Sp, Su)
Agricultural Economics 325	Agriculture and Natural Resource Policy (Sp)
Agricultural Economics 335	International Agricultural Trade (F)
Agricultural Economics 345	Agribusiness and Scientific Sales (Sp-even)
Agricultural Economics 364	Agricultural Marketing (F)
Agricultural Economics 375	Environmental and Agricultural Law (F)
Agricultural Economics 385	Agribusiness Market Planning (F)
Agricultural Economics 386	Advanced Agribusiness Market Planning (Sp)
Agricultural Economics 395	Farm Real Estate Appraisal (Sp-odd)
Agricultural Economics 485 (685)	Mathematical Economics for Agriculture (Sp)
Agricultural Economics 401 (601)	Research Participation (F, Su)
Agricultural Economics 402 (602)	Research Participation (Sp, Su)

- Agricultural Economics 445 (645) Natural Resources Economics (Sp)
- Agricultural Economics 465 (665) Agricultural Finance (Sp)
- Agricultural Economics 485 (685) Mathematical Economics for Agriculture (Sp)
- Agricultural Economics 471 (671) Agricultural Management (Sp)
- Agricultural Economics 715 Advanced Farm Real Estate Appraisal (as needed)
- Agricultural Economics 735 Seminar in International Agricultural Trade (Su)
- Agricultural Economics 745 Agricultural Production Economics (as needed)
- Agricultural Economics 750 Agricultural Risk Analysis and Decision Making (F-odd)
- Agricultural Economics 751 Strategic Management Issues in Agriculture (Sp-odd)
- Agricultural Education 310 Integrated Agricultural and Agriscience Education Studies (F, Sp)
- Agricultural Education 404 Student Teaching Grades 7-8 (F, Sp)
- Agricultural Education 405 Student Teaching Grades 9-12 (F, Sp)
- Agricultural Education 430-440 (630-640) Problems in Improvement of Instruction (F, Sp, Su)
- Agricultural Education 450-460 (650-660) Problems in Agribusiness and Natural Resources Education (F, Sp, Su)
- Agricultural Education 470 (670) Problems in Agricultural Education (F, Sp, Su)
- Agricultural Education 740 Seminar in Vocational Agriculture for First Year Teachers (as needed)
- Agricultural Education 741 Supervision of Student Teaching in Agriculture (as needed)
- Agricultural Education 770 Program Development for Agricultural Mechanics Instruction (as needed)
- Agricultural Education 771 Program Development for Future Farmers of America Instruction (as needed)
- Agricultural Engineering Technology 110 Introduction to Agricultural Engineering (Sp)
- Agricultural Engineering Technology 210 Internal Combustion Engines (F)
- Agricultural Engineering Technology 220 Surveying and Soil and Water Engineering (F)
- Agricultural Engineering Technology 301 Special Problems (F, Su)
- Agricultural Engineering Technology 302 Special Problems (Sp, Su)
- Agricultural Engineering Technology 310 Food Engineering Technology (as needed)
- Agricultural Engineering Technology 350 Agricultural Power and Machinery Management (F)
- Agricultural Engineering Technology 354 Advanced Land Surveying and Geomatics (as needed)
- Agricultural Engineering Technology 370 Agricultural Mechanics Shop (F)
- Agricultural Engineering Technology 401 (601) Research Participation (F, Su)
- Agricultural Engineering Technology 402 (602) Research Participation (Sp, Su)
- Agricultural Engineering Technology 450 (650) Agricultural Structures (Sp)
- Agricultural Engineering Technology 454 Land Surveying with GPS (as needed)
- Agricultural Engineering Technology 456 Boundary Control and Legal Principles (as needed)
- Agricultural Engineering Technology 458 Subdivision Site Planning and Development (as needed)
- Agricultural Engineering Technology 460 (660) Waste Management Technology (Sp)
- Agricultural Engineering Technology 482 (682) Precision Technologies for Agriculture and Natural Resources Management (as needed)
- Agricultural Engineering Technology 710 Safety and Ergonomic Sciences in Agriculture (Sp)
- Agricultural Engineering Technology 720 Advanced Soil and Water Conservation Engineering (as needed)
- Agricultural Engineering Technology 760 Comprehensive Nutrient Management Planning and System Design (Sp-odd)
- Agricultural Engineering Technology 782 Advanced Precision Technologies for Agriculture and Natural Resources Management (F)
- Agricultural Engineering Technology 784 Agricultural Systems Science (F)
- Agricultural Engineering Technology 785 Decision and Information Systems in Agriculture (Sp)
- Agriculture 120 Science and Technology of Agriculture and Natural Resources (as needed)

- Agriculture 180 Topics in Agriculture [Topic title] (as needed)  
 Agriculture 230 Travel Studies in Agriculture and Natural Resources (as needed)  
 Agriculture 250 Issues in Alternative Agriculture (Sp-odd)  
 Agriculture 275 Agricultural Communications (Sp)  
 Agriculture 295 International Food and Fiber Systems (F, Sp, Su)  
 Agriculture 390 Career Planning in Agriculture (F, Sp)  
 Agriculture 411 Fundamentals of Cooperative Extension (as needed)  
 Agriculture 420 Supervised Field Experience (F, Sp, Su)  
 Agriculture 441 Interpretation of Agricultural Research (F)  
 Agriculture 450 (650) Dynamics and Development of Leadership in Natural Resources Management (F)  
 Agriculture 701 Master's Thesis (as needed)  
 Agriculture 732 International Travel Study (as needed)  
 Agriculture 741 Statistical Methods in Agriculture and Natural Resources (as needed)  
 Agriculture 77- Topics in Agriculture and Natural Resources Systems Management (F, Sp, Su)  
 Agriculture 791 Research/Internship in Agriculture (F, Sp, Su)  
 Animal Science 110 Introduction to Animal Science (F, Sp)  
 Animal Science 119 Introduction to Animal Science Laboratory (F, Sp, Su)  
 Animal Science 121 Western Horsemanship (F)  
 Animal Science 210 Introduction to Horse Science (F)  
 Animal Science 230 Exotic and Companion Animal Management (F)  
 Animal Science 240 Live Animal and Carcass Selection and Evaluation (F)  
 Animal Science 260 Behavior and Welfare of Farm and Companion Animals (F)  
 Animal Science 301 Special Problems (F, Su)  
 Animal Science 302 Special Problems (Sp, Su)  
 Animal Science 305 Practicum in Animal Science (F, Su)  
 Animal Science 306 Practicum in Animal Science (Sp, Su)  
 Animal Science 320 Farm Animal Health (Sp)  
 Animal Science 330 Basic Meat Science (F)  
 Animal Science 350 Animal Nutrition (Sp)  
 Animal Science 351 Animal Nutrition Laboratory (Sp)  
 Animal Science 360 Breeding and Improvement of Farm Animals and Poultry (Sp)  
 Animal Science 371 Anatomy and Physiology of Domestic Animals (F)  
 Animal Science 372 Applied Animal Reproduction (Sp)  
 Animal Science 380 (580) Livestock Merchandising (F)  
 Animal Science 400 International Studies in Animal Agriculture (as needed)  
 Animal Science 401 (601) Research Participation (F, Su)  
 Animal Science 402 (602) Research Participation (Sp, Su)  
 Animal Science 410 (610) Beef Sciences (F)  
 Animal Science 420 (620) Swine Science (Sp-even)  
 Animal Science 430 Stable Management (Sp-odd)  
 Animal Science 440 (640) Sheep and Goat Production (as needed)  
 Animal Science 441 Advanced Meat Animal Evaluation and Livestock Selection (Sp)  
 Animal Science 442 Advanced Meat Animal Evaluation and Livestock Selection (F)  
 Animal Science 451 Equine Selection and Evaluation (as needed)  
 Animal Science 470 Poultry Science (as needed)  
 Natural Resources Management 100 Introduction to Natural Resource Management (F, Sp)  
 Natural Resources Management 101 Wildlife, Conservation and Environmental Issues (F)  
 Natural Resources Management 180 Topics in Natural Resources Management [Topic title] (as needed)

- Natural Resources Management 200 Interpretive Tours-Practicum (Sp)
- Natural Resources Management 210 Mediating Environmental Conflicts (F)
- Natural Resources Management 230 Travel Studies in Agriculture and Natural Resources (as needed)
- Natural Resources Management 301 Special Problems (F, Su)
- Natural Resources Management 302 Special Problems (Sp, Su)
- Natural Resources Management 350 Environmental Regulation (F-odd)
- Natural Resources Management 375 Environmental and Agricultural Law (F)
- Natural Resources Management 390 Career Planning in Natural Resources Management (F, Sp)
- Natural Resources Management 401 (601) Research Participation (F, Su)
- Natural Resources Management 402 (602) Research Participation (Sp, Su)
- Natural Resources Management 410 (610) Nonindustrial Private Forestry (as needed)
- Natural Resources Management 420 Supervised Field Experience (F, Sp, Su)
- Natural Resources Management 430 Natural Resources Research (Sp)
- Natural Resources Management 440 (640) Regional Studies in Natural Resources Management (as needed)
- Natural Resources Management 450 (650) Dynamics and Development of Leadership in Natural Resources Management (F, Sp)
- Natural Resources Management 461 Selected Topics in Natural Resources Management (as needed)
- Natural Resources Management 701-702 Master's Thesis (F, Sp, Su)
- Natural Resources Management 722 Production of Biorenewable Resources (as needed)
- Natural Resources Management 724 Advanced Grazing Management Techniques (as needed)
- Natural Resources Management 730 Advanced Natural Resources Economics (as needed)
- Natural Resources Management 760 Management of Interpretive Resources (as needed)
- Natural Resources Management 765 Conservation and Preservation of Historic Structures (as needed)
- Natural Resources Management 770 Topics in Natural Resources Management (as needed)
- Natural Resources Management 791 Research/Internship in Natural Resources Management (F, Sp, Su)
- Park and Recreation Administration 100 Fundamentals of Park and Recreation Administration (F)
- Park and Recreation Administration 110 Park Management (F)
- Park and Recreation Administration 200 Recreation Leadership and Programming (Sp)
- Park and Recreation Administration 220 Outdoor Recreation (as needed)
- Park and Recreation Administration 300 Technological Applications in PRA (Sp)
- Park and Recreation Administration 310 Recreation Area Design and Comprehensive Planning (as needed)
- Park and Recreation Administration 315 Special Event Management in PRA (as needed)
- Park and Recreation Administration 321 Landscape Management (Sp)
- Park and Recreation Administration 400 (600) Interpretation of Natural and Cultural Resources (F)
- Park and Recreation Administration 410 (610) Financing, Managing and Marketing Recreation Services (as needed)
- Park and Recreation Administration 430 Supervised Field Experience (F, Sp, Su)
- Park and Recreation Administration 760 Management of Interpretive Resources (as needed)
- Park and Recreation Administration 765 Conservation and Preservation of Historic Structures (as needed)
- Park and Recreation Administration 770 Topics in Park and Recreation Administration (as needed)
- Plant Science 110 Introductory Plant and Soil Science (F, Sp)
- Plant Science 119 Introductory Plant and Soil Science Laboratory (F, Sp)
- Plant Science 205 Introduction to Pesticides (F)
- Plant Science 234 Lawn and Turf Management (F)
- Plant Science 242 Fundamentals of Horticulture (Sp)
- Plant Science 250 Crop Evaluation (F, Sp)
- Plant Science 260 Landscape Equipment and Technology (F)
- Plant Science 301 Special Problems (F, Su)

- Plant Science 302 Special Problems (Sp, Su)
- Plant Science 321 Landscape Management (Sp-odd)
- Plant Science 322 Introductory Plant Pathology (F)
- Plant Science 324 Landscape Construction Techniques (F)
- Plant Science 333 (533) Weed Science (F)
- Plant Science 341 Dendrology and Forest Ecology (F)
- Plant Science 342 Fruit and Vegetable Production (as needed)
- Plant Science 345 Fruit and Vegetable Products (as needed)
- Plant Science 363 Plant Identification and Propagation (F-odd)
- Plant Science 365 Greenhouse Crops and Management (Sp)
- Plant Science 401 (601) Research Participation (F, Su)
- Plant Science 402 (602) Research Participation (Sp, Su)
- Plant Science 410 (610) Nonindustrial Private Forestry (as needed)
- Plant Science 422 (622) Forage Crops (Sp-even)
- Plant Science 431 (631) Principles of Plant Breeding (F-odd)
- Plant Science 433 (633) Field Crop Production (F-even)
- Plant Science 442 (642) Crop Adaptation and Ecology (Sp-odd)
- Plant Science 445 Plants, Environment and Design (Sp)
- Plant Science 462 Environmental Landscape Design (Sp-odd)
- Plant Science 471 Golf Course Management (Sp-even)
- Plant Science 475 (675) Grazing Management Techniques (F)
- Plant Science 722 Production of Biorenewable Resources (as needed)
- Plant Science 724 Advanced Grazing Management Techniques (3)
- Soil Science 210 Soil Science (F, Sp, Su)
- Soil Science 250 Soil and Landscape Evaluation (F, Sp)
- Soil Science 301 Special Problems (F, Su)
- Soil Science 302 Special Problems (Sp, Su)
- Soil Science 315 Soil and Water Conservation (F)
- Soil Science 321 Soil Genesis, Morphology and Classification (Sp-odd)
- Soil Science 401 Research Participation (F, Su)
- Soil Science 402 Research Participation (Sp, Su)
- Soil Science 412 (612) Soil Chemistry and Fertility (Sp)
- Soil Science 420 Soil Microbiology and Biochemistry (Sp-even)
- Soil Science 421 Soil Microbiology and Biochemistry Laboratory (Sp-even)
- Soil Science 430 Wetland Science (Sp)
- Soil Science 440 (640) Soil Physics (F-even)
- Wildlife Biology 240 Fish and Wildlife Management Techniques (F)
- Wildlife Biology 250 Principles of Wildlife Management (Sp)
- Wildlife Biology 300 Principles of Fisheries Management (Sp-odd)
- Wildlife Biology 301 Special Problems (as needed)
- Wildlife Biology 311 Game Ecology and Management [Topics Title] (Sp-odd)
- Wildlife Biology 320 White-tailed Deer (as needed)
- Wildlife Biology 330 Wildlife Biopolitics (F-even)
- Wildlife Biology 340 Wildlife Law Enforcement and Public Relations (Sp)
- Wildlife Biology 420 Wildlife Damage Management (Sp-odd)
- Wildlife Biology 441 Forensic Techniques in Wildlife Biology (F-odd)
- Wildlife Biology 450 Wildlife Habitat Management (Sp)
- Wildlife Biology 770 Topics in Wildlife Biology (as needed)

*Complete course descriptions can be found in the Course Description section of the catalog.*