

ARTHUR TEMPLE COLLEGE OF FORESTRY AND AGRICULTURE

HANS M. WILLIAMS

Interim Dean

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MISSION

The mission of the Arthur Temple College of Forestry and Agriculture is to: maintain excellence in teaching, research and outreach; enhance the health and vitality of the environment through sustainable management, conservation and protection of our forests and natural resources; and enhance the production and economic viability of agricultural commodities. The principles supporting this mission include:

- Students receive classroom and field-based experiences to prepare them for their professional careers. Academic courses provide learning opportunities that encourage and inspire students to approach forest resource, environmental, agricultural and social issues in a critical yet creative manner, to identify and analyze key elements, and to articulate ethical solutions.
- The college has a strong commitment to a research program that encourages basic and applied studies in natural resource management, environmental topics, agricultural production and social values. Although research projects are centered predominantly in East Texas, the issues addressed and results obtained often have national and international implications.
- A service program provides professional expertise, information and training. Practicing professionals, industrial landowners, timber investment management organizations, family forest owners, public agencies, non-government organizations, farmers, ranchers, poultry producers and society in general are beneficiaries of these services.

The forestry, environmental science and agriculture complex contains classrooms, laboratories, student computer rooms, greenhouses, a center for livestock production and geographic information systems laboratories. Excellence within the ATCOFA is reflected in a variety of other research centers and institutes, including the Center for Applied Studies in Forestry, the Columbia Geospatial Service Center, the Center for Pharmaceutical Crops, the

Poultry Science Center, the Forest Resources Institute, the East Texas Native Plants Center, the Institute for White-tailed Deer Management and Research, and the Waters of East Texas Center.

The campus is situated near the Stephen F. Austin Experimental Forest, the East Texas Plant Materials Center, five wilderness areas that are part of four national forests and several million acres of private commercial forests. The university also is situated in the heart of the nursery/landscape, beef cattle and poultry industries of East Texas. Forestry, environmental science, spatial science and agriculture classes take advantage of these resources for hands-on education and research opportunities. Forestry, environmental science, spatial science and agriculture programs benefit from cooperative efforts with industry and producers.

FORESTRY AND SPATIAL SCIENCE

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FACULTY

Regents Professors

Kenneth W. Farrish (2016-2017)
Brian P. Oswald (2012-2013)
Hans M. Williams (2010-2011)
David L. Kulhavy (1996-1997)

Professors

Henry M. Rockwell Chair in Forestry - Steven H. Bullard
Hiram and Gloria Arnold Distinguished Professor - Kenneth W. Farrish,
Bone Hill Foundation Distinguished Professor - Gary D. Kronrad,
Lacy Hunt Distinguished Professor - David L. Kulhavy,
Joe C. Denman Distinguished Professor - Brian P. Oswald,
Kenneth Nelson Distinguished Professor - Hans M. Williams
Christopher E. Comer
I-Kuai Hung
Matthew W. McBroom
Daniel R. Unger

Associate Professors

Daniel G. Scognamillo, Jeremy P. Stovall, Pat Stephens Williams, Yanli Zhang

Assistant Professors

Rebecca Kidd, Shelby G. Laird, Yuhui Weng

Research Professor

Shiyu Li

College Advisers

Brandy Bishop
Kara Goodson

ACCREDITATION

The forestry undergraduate degree programs offered by the Arthur Temple College of Forestry and Agriculture are accredited by the Society of American Foresters.

ADVISING AND STUDENT SERVICES

All students in the forestry and spatial science degree programs with 60 hours or less must consult an academic adviser prior to each registration period. Students in this category will automatically have an advising hold that can only be cleared by the adviser following an advising session. Students with 61 hours or more must meet with an academic adviser at least once per academic year; however, it is recommended that every student, regardless of completed semester hours,

consult with an adviser prior to each registration period to ensure satisfactory progress on his or her degree program.

SCHOLARSHIPS

The ATCOFA annually awards numerous scholarships to forestry, spatial science and environmental science students totaling more than \$100,000. These are available to undergraduate (including incoming freshmen) and graduate students and are awarded based on academic excellence and/or financial need. Scholarship applications are due by Feb. 1 and are available online on the Financial Aid Office website. Information about other sources of financial aid, including work-study and loans, is available from the Financial Aid Office.

STUDENT ORGANIZATIONS

Professional and special interest student organizations sponsored by the ATCOFA provide opportunities for students to participate in college programs, develop leadership skills, compete in national contests and network with practicing professionals. Official student organizations include the Society of American Foresters, The Wildlife Society, Xi Sigma Pi National Forestry Honor Society, Student Society of Arboriculture, Sylvans Professional Forestry Students Club, Park and Recreation Club, National Association of Interpretation, National Association of Environmental Professionals, Graduate Student Association, Ducks Unlimited, Texas Trophy Hunters Association and the Student Chapter of the Association of Fire Ecology.

AREAS OF STUDY AND UNDERGRADUATE DEGREE PROGRAMS

Core Curriculum Requirements: A grade of at least C in each freshman English course; a grade of C in each forestry core course; a C average at SFA; a C average in major courses taken at SFA; a C average in minor courses taken at SFA. These required averages are based on those courses in each category that are included in the student's official degree plan.

Bachelor of Science in Forestry with Majors in:

Forest management, forest wildlife management and general forestry. (Individually tailored programs under this broad category include: human dimensions in natural resources, urban forestry, fire management and agroforestry.

Bachelor of Science in forestry degree requires 130 semester credit hours of coursework, depending upon the major. Specifically, it requires completion of:

- 1. A General Education core designed to provide broad education in the arts, mathematics and social and natural sciences: (42 hours)**
 - A. Communication Component Area (6 semester hours):**

Three hours from: ENG 131, ENG 133H
Three hours from: COM 111, COM 170, COM 215
 - B. Mathematics Component Area (3 semester hours):**

Three hours from: MTH 220
 - C. Life and Physical Sciences (6 semester hours):**

Three hours from: BIO 131 (co-requisite 1 hour BIO 131L required)
Three hours from: CHE 111 (co-requisite 1 hour CHE 111L required)
 - D. Language, Philosophy and Culture (3 semester hours):**

Three hours from: ENG 200, ENG 209, ENG 211, ENG 212, ENG 221, ENG 222, ENG 229, ENG 230, ENG 230H, HIS 151, HIS 152, PHI 153, PHI 223

E. Creative Arts (3 semester hours):

Three hours from: ART 280, ART 281, ART 282; MUS 140; MHL 245; THR 161, THR 163; DAN 140

F. American History (6 semester hours):

Six hours from: HIS 133, HIS 134

G. Government/Political Science (6 semester hours):

Six hours from: PSC 141, PSC 142

H. Social and Behavioral Sciences (3 semester hours):

Three hours from: ANT 231, ECO 231, ECO 232, GEO 131, PSY 133, SOC 137

I. Component Area Option-Communication (6 semester hours):

Three hours from: ENG 132

Three hours from: BCM 247, ENG 273, FRE 131, FRE 132, GER 131, GER 132, POR 131, POR 132, SPA 131, SPA 132, SPH 172, SPH 272

2. A forestry **core designed to provide broad exposure to all fields of forest resource management: (47 hours)

- Fifteen hours from: FOR 111, 152, 205, 209, 219 (Labs required)
- Two hours from: FOR 240 (Lab required)
- Three hours from: FOR 251
- Three hours from FOR 313 (Lab required)
- Two hours from: FOR 337
- Three hours from: FOR 347 (Lab required)
- Three hours from: FOR 348
- Six hours from: FOR 349 and 409 (Labs required)
- Three hours from: FOR 435
- Four hours from: FOR 458 (Lab required)
- Three hours from: GIS 224 (Lab required)

** A minimum grade of C is required for each course in the forestry core, including forestry field station.

3. Forestry Field Station (6 hours)

All students pursuing the B.S.F. degree are required to attend forestry field station. Students participate with faculty in an integrated sequence of six courses for a total of six semester credit hours. Students attend field station for six weeks during the summer between their sophomore and junior years. The following courses are prerequisites for field station: FOR 111, 152, 205, 209, 219, 240, 251; and GIS 224. Students must have an overall GPA of 2.0 at the end of the fall semester prior to attending field station. Six hours from: FOR 310, 323, 325, 329, 335, 336.

4. A major designed to provide added expertise in a specialized field of forestry.

A. Forest management major (FRMG): (35 hours)

- The emphasis is on production of wood fiber and other forest resources.
- Three hours from: FOR 223 (Lab required)
- Nine hours from: FOR 317, 411, 427
- Three hours from: FOR 428 (Lab required)
- Six hours from: FOR 460 or 463 and FOR 470
- Three hours from: GIS 390 (Lab required)
- Six hours from: Business courses
- One to three hours of elective courses approved by an adviser.

B. Forest wildlife management major (FRWM): (35 hours)

For students especially interested in management of wildlife resources as part of the forest:

- Eight hours from: BIO 133 and 433 (Labs required)
- Sixteen hours from: FOR 255, 305, 450, 475 and FOR 486 (Labs required)
- Three hours from: FOR 406
- Three hours from: FOR 441, 447, 449, 454, 455, 464 (Wildlife Conservation, Wildlife Diseases, 466 (Labs required for some courses)
- Three hours from: ANS 333, 428; BIO 341, 342, 343, 370, 407, 437, 438; FOR 447, 454, 464 (Wildlife Diseases) (Labs required for some courses)

C. General Forestry Tailored Program: (35 hours)

Students in the tailored program complete the general education core and the forestry core (including field station) plus sufficient additional courses to total 130 credit hours of acceptable credit. These tailored programs are available for qualified students with specific career objectives. Students in the General Forestry program must be advised by the student services coordinator and a faculty member with expertise in their area of study.

Individually tailored programs include:

- Human Dimensions in Natural Resources
- Urban Forestry
- Fire Management
- Agroforestry

Second Major/Minor in Forestry

1. A non-forestry student wishing to earn a second major in forestry must complete the forestry core and field station requirements.
2. A non-forestry student may earn a minor in any of the specialized fields of forestry by completing a minimum of 20 semester hours. At least nine semester hours must be at the advanced (300 - 400) level. Advising for second majors or minors will be in the office of the associate dean or college adviser.

Bachelor of Science in Spatial Science with Emphasis Fields in Natural Resources and Surveying: (120 hours)

The B.S.S.C. degree program is designed to educate students in spatial science theory and application in order to meet increasing job market demands. It includes the major fields of geographic information systems, remote sensing, and surveying and global positioning systems. Students will start with the fundamentals of geospatial sciences both in theory and application and complete the degree with an emphasis in natural resources or land surveying. Students who complete the surveying emphasis track will satisfy the academic background requirement to become a registered surveyor in Texas; actual licensing requires work experience in addition to the educational background.

In order to receive the B.S.S.C., a student must complete the listed general education core, the common core of the spatial science major and one of the two emphasis tracks for a total of 120 semester credit hours of coursework. Specifically, it requires completion of:

1. Core Curriculum (42 Hours)

- A. Communication Component Area (6 semester hours):
 - Three hours from: ENG 131, ENG 133H
 - Three hours from: COM 111, COM 170, COM 215
- B. Mathematics Component Area (3 semester hours):
 - Three hours from: MTH 220
- C. Life and Physical Sciences (6 semester hours):
 - Three hours from: ENV 110 (co-requisite ENV 110L required)
 - Three hours from: AST 105, PHY 101, GOL 131 (if necessary, co-requisite 1 hour lab)
- D. Language, Philosophy and Culture (3 semester hours):
 - Three hours from: PHI 223
- E. Creative Arts (3 semester hours):
 - Three hours from: ART 280, ART 281, ART 282; MUS 140; MHL 245; THR 161, THR 163; DAN 140
- F. American History (6 semester hours):
 - Six hours from: HIS 133, HIS 134
- G. Government/Political Science (6 semester hours):
 - Six hours from: PSC 141, PSC 142
- H. Social and Behavioral Sciences (3 semester hours):
 - Three hours from: ANT 231, ECO 231, ECO 232, GEO 131, PSY 133, SOC 137
- I. Component Area Option-Communication (6 semester hours):
 - Three hours from: ENG 132
 - Three hours from: BCM 247, ENG 273, FRE 131, FRE 132, GER 131, GER 132, POR 131, POR 132, SPA 131, SPA 132, SPH 172, SPH 272

2. A spatial science **core designed to provide broad exposure to all fields of spatial science: (41 hours)

- Six hours from MTH 133, 138
- Twenty-one hours from: GIS 201, 224, 301, 390, 395, 400, 405 (Labs required)
- Three hours from: GIS 410
- Six hours from: GIS 415 and 420 (Labs required)
- Three hours from: FOR 223 (Lab required)
- Three hours from: FOR 443

** A minimum grade of C is required for each course in the Spatial Science Core.

3. Complete one of the following two tracks:

A. Natural Resources Track: (36 hours)

- Twenty-four semester hours of FOR, ENV, GOL, HRT, AGR, AGN or BIO, including at least nine semester hours of 300-400 advanced-level courses. Nine to 10 semester hours of approved electives. A minor is required.

B. Surveying Track: (36 hours)

- Six hours from: FOR 219 and 423 (Labs required)
- Three hours from: FIN 265
- Six hours from: BLW 366 and 468
- Six hours from: HRT 325 and 326
- Three hours from: GEO 315
- Nine to 10 hours of approved electives

Second Major/Minor in Spatial Science

1. A student wishing to earn a second major in spatial science must complete the spatial science core requirements.
2. A student may earn a minor in spatial science by completing a minimum of 18 semester hours. At least nine semester hours must be at the advanced (300 - 400) level. Advising for second majors or minors will be in the office of the college adviser.

CERTIFIED FORESTER

Students who receive a B.S.F. from SFA fulfill the academic requirements for the certified forester credential from the Society of American Foresters. Certification status is not available until the applicant has a minimum of five years of qualifying professional forestry-related experience and has passed the certification examination.

CERTIFIED WILDLIFE BIOLOGIST

Credentialing as a professional certified wildlife biologist by The Wildlife Society is a voluntary program for students in forest wildlife management. It is the responsibility of the student, working closely with his/her advisor, to take the appropriate courses required by The Wildlife Society. Certification status is not available until the applicant has the required coursework and a minimum of five years of work experience in wildlife management.

PROBATION – SUSPENSION POLICY (See Academic Affairs Policy A-3)

A student receiving a probation or suspension notice must see the college adviser.

DEGREE PLAN AND FINAL GRADUATION PLAN

Prior to the end of the sophomore year, all students in the college must select a degree program and prepare a degree plan. To have a degree plan prepared, the student must see the college adviser.

A final graduation plan must be filed prior to pre-registration for the semester in which the student plans to graduate. The student should see the college adviser for review and for filing of the final graduation plan.

GRADUATE DEGREE PROGRAMS

The college offers Master of Science degree programs in forestry, environmental science and agriculture. M.S. degrees with a major in resource interpretation are available as fully online degree programs. The college also offers the Doctor of Philosophy degree. Students interested in pursuing graduate studies should refer to the SFA Graduate Bulletin for details on all graduate programs.

COURSES IN FORESTRY (FOR)

All courses are offered both fall and spring semesters unless a specific semester is indicated. A course not regularly scheduled may be offered on demand. Except for courses numbered 460 and 463, all undergraduate courses must have a minimum of 10 students to be offered. Courses with required field trips or extensive use of GIS will have an additional fee. Unless otherwise indicated, each course carries three semester hours credit and three hours lecture per week.

111. **Careers and Competencies in Forestry (FORE 1301)** - Three semester hours, two hours lecture and three hours lab per week. Introduction to the multiple use concepts of forestry and basic techniques of forest

- resource management and conservation. Required field trips. Course fee required.
152. **Introduction to Wildlife Management** - Three semester hours, two hours lecture and three hours lab per week. Historical perspectives of wildlife management and an introduction to basic wildlife management concepts. Course fee required.
205. **Forest Biometrics I** - Three semester hours, two hours lecture and three hours lab per week. Individual tree measurements, forest sampling methods, applied statistics and computer applications for data analysis. Required field trips. Prerequisite: FOR 111. Course fee required.
209. **Forest Ecology (FORE 2309)** - Three semester hours, two hours lecture and three hours lab per week. Climatic, edaphic and biotic factors and their relation to woody plant growth and development. Required field trips. Course fee required. Prerequisite: FOR 111.
219. **Dendrology (FORE 1314)** - Three semester hours, two hours lecture and three hours lab per week. Identification, distribution and silvical characteristics of angiosperms and gymnosperms. Required field trips. Course fee required.
223. **Surveying and Mapping** - Three semester hours, two hours lecture and three hours lab per week. Introduction to principles and methods of land surveying and associated map production techniques. Course fee required. Spring only.
240. **Wood Science** - Two semester hours, one hour lecture and three hours lab per week. Physical and chemical properties of wood as related to its anatomy and economic use. Prerequisites: BIO 131, CHE 111. Spring only.
241. **Wood Properties** - Three semester hours, two hours lecture and three hours lab per week. Non-mechanical and mechanical properties of wood and their relation to timber grading, processing and manufacture of forest products and their end use. Prerequisite: FOR 240. Course fee required.
251. **Introduction to Recreation and Human Dimensions** - Three semester hours, three hours lecture per week. Survey of the interaction between humans and natural resources with emphasis placed upon management of the human/natural resource interface and outdoor recreation experiences.
252. **Environmental Interpretation Methods** - Three semester hours, three hours lecture per week. Development of effective interpretation, communication and education techniques for interpreting natural and cultural resources to the public. Required field trips. Course fee required. Spring only.
255. **Vertebrate Natural History** - Three semester hours, two hours lecture and three hours lab per week. Principles and techniques of wildlife management. Required field trips. Prerequisite: FOR 152. Course fee required.
304. **Arboriculture** - Three semester hours, two hours lecture and three hours lab per week. Establishment and care of individual trees in a non-forest context. Fall only, odd years.

- 305. Wildlife Techniques** - Three semester hours, two hours lecture and three hours lab per week. Instruction and practice in a variety of field methods used to conduct and evaluate resource management and research. Assumptions, biases and problems associated with various techniques, as well as analysis of data, interpretations and application of results. Prerequisites: FOR 152 and 255. Course fee required. Spring only.
- 310. Field Silviculture** - One semester hour. Study of regeneration techniques, thinning and intermediate cultural operations. Required field trips. Prerequisites: FOR 111, 152, 205, 209, 219, 240, 251 and GIS 224. Students must have an overall GPA of 2.0 at the end of the fall semester prior to attending field station. Course fee required. Summer only at forestry field station.
- 313. Forest Insects and Diseases** - Three semester hours, two hours lecture and three hours lab per week. Examination of the effects of forest pests on forest products, forest-stand structure and function and both economic and non-economic losses. Prerequisite: FOR 209. Course fee required.
- 317. Forest Biometrics II** - Three semester hours, three hours lecture per week. Quantifying forest timber stand structure with respect to basic stand parameters. Prerequisite: FOR 205. Fall only, odd years.
- 323. Land Measurement** - One semester hour. Study of boundary surveying of forestland. Required field trips. Prerequisite: FOR 111, 152, 205, 209, 219, 240, 251 and GIS 224. Students must have an overall GPA of 2.0 at the end of the fall semester prior to attending field station. Course fee required. Summer only at forestry field station.
- 325. Timber Cruising** - One semester hour. Study of timber stand estimation. Required field trips. Prerequisites: FOR 111, 152, 205, 209, 219, 240, 251 and GIS 224. Students must have an overall GPA of 2.0 at the end of the fall semester prior to attending field station. Course fee required. Summer only at forestry field station.
- 329. Harvesting and Processing** - One semester hour. Study of methods of harvesting materials from the forest and procedures used in the manufacture of wood products. Required field trips. Prerequisites: FOR 111, 152, 205, 209, 219, 240, 251 and GIS 224. Students must have an overall GPA of 2.0 at the end of the fall semester prior to attending field station. Course fee required. Summer only at forestry field station.
- 335. Non-timber Resources Management** - One semester hour. Study of inventory and management principles for non-timber uses of forestland. Required field trips. Prerequisites: FOR 111, 152, 205, 209, 219, 240, 251 and GIS 224. Students must have an overall GPA of 2.0 at the end of the fall semester prior to attending field station. Course fee required. Summer only at forestry field station.
- 336. Field Wildlife Techniques** - One semester hour. Field study focusing upon a range of forest wildlife management topics, including detailed investigation of wildlife communities (including birds, mammals and reptiles) present in a variety of forested habitats, trapping and survey techniques, study specimen preparation and other topics. Required field trips. Prerequisites: FOR 111, 152, 205, 209, 219, 240, 251 and

GIS 224. Students must have an overall GPA of 2.0 at the end of the fall semester prior to attending field station. Course fee required. Summer only at forestry field station.

337. **Introduction to Fire Management** - Two semester hours, two hours lecture per week. Explore fire history in the U.S., fire occurrence, effects and behavior, detection and control. Study the integration of fire in land management planning and policy. Prerequisite: FOR 209 or permission of instructor. Course fee required.
344. **Forest Entomology** - Three semester hours, two hours lecture and three hours lab per week. Study of insects that attack forest trees and products. Required field trips. Prerequisite: FOR 209 or eight hours of BIO. Course fee required.
347. **Silviculture** - Three semester hours, two hours lecture and three hours lab per week. Study of silvicultural systems, regeneration and intermediate management from ecologic and economic viewpoints. Required field trips. Prerequisite: FOR 310. Course fee required.
348. **Natural Resource Policy** - Three semester hours, three hours lecture per week. Forest history and natural resource policy in the United States, including effects of the environmental movement.
349. **Principles of Forest Soils** - Three semester hours, two hours lecture and three hours lab per week. Physical, chemical and biological properties of forest soils. Management and classification of soils. Required field trips. Prerequisite: CHE 111. Course fee required.
351. **Introduction to Wildland Recreation Administration** - Three semester hours, three hours lecture per week. Structure, staffing and financing of parks, wildernesses and other forest recreation areas. Spring only.
402. **Field Ecology** - Three semester hours, two hours lecture and three hours lab per week. Principles of synecology and population ecology as they affect vegetative and animal communities. Ecological impacts of management and quantitative analysis of communities. Prerequisites: FOR 209 or BIO 313. Course fee required. Fall only.
404. **Urban Forestry** - Three semester hours, two hours lecture and three hours lab per week. Planning, establishment, protection and management of individual trees and forest systems within an urban environment. Required field trips. Prerequisites: FOR 209, 304, 349. Course fee required. Spring only, even years.
405. **Environmental Communication and Interpretation** - Three semester hours, three hours lecture per week. Overview of the field of natural resource communication and interpretation. Of particular interest to those whose careers require public interaction. Fall only.
406. **Wildlife Population Ecology** - Three semester hours, three hours lecture per week. Quantitative and conceptual approach to understanding population ecology and dynamics of wildlife species. Population estimation and other analytical/modeling techniques with an emphasis on conservation and management of game and non-game wildlife populations. Prerequisites: FOR 205, 255 or permission of instructor. Course fee required. Spring only.

409. **Forest Hydrology** - Three semester hours, two hours lecture and three hours lab per week. Study of the effects of forests and forest activities on water quantity and quality, soil erosion and stream sedimentation. Required field trips. Prerequisite: FOR 349. Course fee required.
411. **Timber Management** - Three semester hours, three hours lecture per week. Concepts of stand-level and forest-level timber harvesting schedules. Prerequisite: FOR 205. Fall only, even years.
423. **Advanced Surveying** - Three semester hours; two hours lecture and three hours of lab per week. Mathematics, data collection and analysis, boundary law and boundary analysis used in the everyday practice of the land surveyor. Spring only.
427. **Regional Silviculture** - Three semester hours, three hours lecture per week. Multiple use management of the major forest types of the U. S. Prerequisite: FOR 347 or permission of instructor. Fall only.
428. **Intensive Silviculture** - Three semester hours, two hours lecture and three hours lab per week. Study of tree improvement in silviculture context. Fundamental concepts of tree breeding, vegetation management and forest fertilization. Prerequisite: Forestry Field Station. Course fee required. Spring only, odd years.
435. **Forest Economics** - Three semester hours, three hours lecture per week. Economic analysis for decision making in forestry. Prerequisite: Forestry Field Station. Summer II and fall.
438. **Fire Use in Land Management** - Three semester hours, two hours lecture and three hours lab per week. Study of fire in land management. Preparation of burning plans and field applications of prescribed burns. Required field trips. Prerequisite: FOR 337 or permission of instructor. Course fee required. Spring only.
441. **Big Game Management** - Three semester hours, two hours lecture and three hours lab per week. The study of basic biology of white-tailed deer, the proper management procedures for producing whitetails on forested lands and the proper harvest of these game animals. Prerequisites: FOR 255. Course fee required. Spring only every other odd year.
443. **Weather and Climate** - Three semester hours; three hours lecture per week. Introduction to the basic ideas of the atmosphere, weather, climate and weather forecasting, climate and climate change. Develop competencies to access weather information via geospatial software and the Internet. Fall only.
446. **Fire Ecology** - Three semester hours; three hours lecture per week. An investigation of fire ecology in the United States. Emphasis will be on how fire ecology influences natural resource management. Fall only.
447. **Predator Ecology** - Three semester hours, three hours lecture per week. Introduction to predation theory and current research topics and issues related to predator conservation and management. Emphasis will be on predation as a behavior and as an ecological process. Prerequisite: BIO 133 or FOR 255 or instructor permission. Spring only, odd years.
448. **Range Management** - Three semester hours, three hours lecture per week. Principles of range management. Characteristics of

rangelands and range plants, and management of grazing animals and vegetation. Emphasis on interactions with recreation, wildlife and forests. Spring only.

449. **Range and Wildlife Ecology and Management** - Familiarize students with the concepts, theories and practices of wildlife management and the management of upland birds, nongame birds and ungulates. Prerequisites: FOR 255 or permission of instructor. Fall only, even years.
450. **Forest Wildlife Habitat Management** - Three semester hours, two hours lecture and three hours lab per week. Theory and practice of evaluating and managing a forest habitat for wildlife. Required field trips. Prerequisites: FOR 219,255, 347. Course fee required. Fall only.
451. **Management of Outdoor Recreation Areas** - Three semester hours, two hours lecture and three hours lab per week. Planning, development and maintenance of parks and forest recreation areas. Required field trips. Prerequisite: FOR 351. Course fee required. Fall only.
454. **Non-game Wildlife Ecology** - Three semester hours, two hours lecture and three hours lab per week. Ecology of non-game animals in forest ecosystems. Topics include population ecology and the relationships of animals to forest ecosystems. Some bird and small mammal sample techniques included, as is management of some endangered species. Required field trips. Prerequisite: FOR 255 or permission of instructor. Course fee required. Fall only, even years.
455. **Wetland Wildlife Management** - Three semester hours, three hours lecture per week. Principles of wetland management to maximize wildlife suitability, use, biological diversity and ecological integrity. Wetland management techniques, practices and concepts with an emphasis on wetland management for migratory birds, including waterfowl, shorebirds and other non-game birds. Prerequisite: FOR 255 or permission of instructor. Fall only, odd years. Course fee required.
457. **Environmental Attitudes and Issues** - Three semester hours, three hours lecture per week. Overview of the global historical origins and current influences on attitudes toward the outdoor environment. Examination and discussion of environmental policy, ethics and issues. Spring only.
458. **Forest Resource Management** - Four semester hours, three hours lecture and three hours lab per week. Formulation, calculation, writing, and implementation of multiple-use resource management plans and environmental impact statements and assessments. Prerequisites: Forestry Field Station. FOR 347, 435 and GIS 390 or FOR 475. Course fee required.
460. **Forestry Internship** - Three semester hours. Studies of resource management in an operational setting under the supervision of an approved organization. Must be arranged in advance and approved by the dean's office. May be repeated for credit for a maximum of six credit hours.
463. **Special Problems** - One, two or three semester hours. Individual study in an area of the student's choice. Must be arranged in advance and approved by the dean's office. May be repeated for credit for a maximum of nine credit hours.

464. **Contemporary Problems in Forestry** - Three semester hours. Classes conducted on current topics in forestry. May be repeated for credit for a maximum of nine credit hours.
465. **Range Development and Evaluation** - Three semester hours, three hours of lecture per week. Principles of the development, improvement and evaluation of rangeland resources. Required field trips. Course fee required. Spring only, odd years.
466. **Urban Wildlife Management** - Three semester hours, three hours lecture per week. Techniques of managing wildlife population in urban/suburban landscapes. Includes nuisance wildlife and habitat restoration. Prerequisite: FOR 152. Spring only, even years.
470. **Forest Consulting** - Three semester hours, three hours lecture per week. An overview of the forestry consulting business. Focus will be on consulting as a career and provide skills/applications essential for becoming a successful consultant. Prerequisite: junior, senior or graduate standing. Spring only, odd years.
475. **GIS Applications in Wildlife Management** - Three semester hours, two hours lecture and three hours lab per week. Applications of GIS to common tasks and analyses used in wildlife ecology, conservation and management. Prerequisite: GIS 224. Course fee required. Fall only.
486. **Mammalogy** - Four semester hours, three hours lecture, three hours lab per week. Classification, evolution, natural history and distribution of mammals. Emphasis on natural history and identification of regional species in lab. Field trips required. Requires outside readings and/or research projects. Course fee required. Requires concurrent enrollment in lab. Prerequisite: BIO 133 or permission of the instructor. Cross-listed as BIO 436. Fall only.

COURSES IN GEOGRAPHIC INFORMATION SYSTEMS (GIS)

201. **Introduction to Geographic Information Systems** - Three semester hours, two hours lecture and three hours lab per week. Overview of computer-based GIS concepts and components. Topics include spatial (location) and attributes (description of features), base maps, spatial data manipulation and analysis. Course designed for non-forestry/ environmental science majors who want a broad overview of GIS. Course fee required. Fall only.
224. **Introduction to Spatial Science** - Three semester hours, two hours lecture and three hours lab per week. An introduction to the spatial disciplines of aerial photography, satellite remote sensing, global positioning systems and geographic information systems as applied to mapping, monitoring and managing natural resources. Course fee required.
301. **GIS Applications** - Three semester hours, two hours lecture and three hours lab per week. Advanced overview of GIS applications. Develop GIS topics such as geodata-base construction, thematic map analysis, spatial modeling, data classification and verification, and GIS application design. Prerequisite: GIS 201. Course fee required. Spring only.
390. **GIS in Natural Resources** - Three semester hours, two hours lecture and three hours lab per week. Specific approaches to applications of

geographic information systems, global positioning systems and remote sensing to problems in natural resource analysis. Prerequisite: GIS 224. Course fee required.

395. **GIS Database Management** - Three semester hours, two hours lecture and three hours lab per week. Instruction will cover geospatial database design, functions, applications and management. Prerequisite: GIS 301. Course fee required. Fall only.
400. **GIS Programming** - Three semester hours, two hours lecture and three hours of lab per week. Introduction to GIS programming language fundamentals such as data types, control structures and functions. Program design and spatial problem solving with a high-level programming language will be included. Prerequisite: GIS 301. Course fee required. Fall only.
405. **Remote Sensing Applications** - Three semester hours, two hours lecture and three hours lab per week. Application of analog and digital remote sensing technologies for natural and cultural resource assessment. Specific topics include: stereoscopy, scale, map coordinates, map reading, area and distance estimation, acquiring photos, photo geometry, parallax measurements, electromagnetic spectrum, atmospheric and surface interactions, spectral signatures, film and filters, aerial photo interpretation, digital image acquisition, image resolution, image sensors, radiometric correction, geometric correction, image classification and accuracy assessment. Prerequisites: GIS 201 or GIS 224 and 301 or GIS 390. Course fee required. Fall only.
410. **Landscape Modeling** - Application of geographic information systems to solving management of spatial applications for natural and cultural resources. Formulation, calculation, writing and implementation of multiple use spatial management for natural resource and cultural resources. Prerequisites: GIS 201, GIS 224 and 301, or GIS 390. Course fee required. Spring only.
411. **Emergency Management GIS** - Three semester hours, two hours of lecture and three hours lab per week. Instruction in incident response protocols, evaluation and transformation of critical infrastructure datasets and post event mitigation using geospatial techniques. Prerequisites: GIS 201 or 224.
415. **Spatial Analysis** - Three semester hours, two hours lecture and three hours lab per week. The understanding of spatial process is a fundamental step toward the conservation and management of natural resources. This course is intended to acquaint students with a range of common spatial analysis techniques used to identify and describe spatial patterns and processes operating in natural systems. Prerequisites: GIS 201 or GIS 224 and GIS 301 or GIS 390 and MTH 220. Course fee required. Spring only.
420. **Ecological Planning** - Three semester hours, two hours lecture and three hours lab per week. Application of geographic information systems to solving management of spatial applications for natural and cultural resources. Formulation, writing and implementation of multiple-use spatial management and planning. Prerequisites: GIS 201 or 224 and; GIS 301 or 390; and GIS 405, GIS 410. Fall only.

- 425. Mobile and Field GIS** - Three semester hours. GIS data management with focus on building geodatabase and field mapping and inventory using mobile GPS/GIS devices. Students will be working on projects related to GIS data collection and processing using GIS/GPS. Prerequisites: GIS 201 or 224. Course fee required.
- 460. GIS Internship** - Three semester hours. Studies in applications of geographic informational systems and/or global positioning systems in an operational setting under the supervision of an approved company/organization. Must be arranged in advance and approved by the dean's office. May be repeated for a maximum of six credit hours. Course fee required.
- 463. Special Problems** - One, two or three semester hours. Individual study in the area of GIS, GPS or other areas of spatial science. Must be arranged in advance and approved by the dean's office. May be repeated for a maximum of six credit hours. Course fee required.
- 464. Contemporary Topics in Geospatial Science** - Three semester hours. Classes conducted on current topics in spatial science. May be repeated for a maximum of nine credit hours. Course fee required.

DIVISION OF ENVIRONMENTAL SCIENCE

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AREAS OF STUDY AND DEGREES

B.S. Environmental Science Tracks:

- Land and Water Resources
- Environmental Planning and Management

INTERDISCIPLINARY FACULTY

Professors

Wesley Brown, Brent Burt,
Christopher Comer, Kenneth
W. Farrish, I-Kuai Hung, Gary
Kronrad, David L. Kulhavy, Matthew
Kwiatkowski, Matthew W. McBroom,
Brian P. Oswald, Stephen C.
Wagner, Hans M. Williams, James
Van Kley, Alexandra Van Kley,
Daniel R. Unger

Associate Professors

Chris A. Barker, Alex S. Frantzen,
Sheryll Jerez, Michael Mauer,
Daniel G. Scognamillo, Kevin
Stafford, Yanli Zhang

Assistant Professors

Jennifer Gumm, Yuhui Weng

College Advisers

Brandy Bishop, Kara Goodson

OBJECTIVES

The Division of Environmental Science is a collaborative unit of the Arthur Temple College of Forestry and Agriculture and the College of Sciences and Mathematics. The objectives of the Division of Environmental Science are:

- to provide superior education programs in environmental science that produce graduates capable of understanding and addressing the complex environmental problems facing modern society,
- to conduct research directed at developing understanding of and finding solutions to environmental problems, and
- to provide outreach and service in environmental science.

ADVISING AND STUDENT SERVICES

All students in the environmental science degree program with 60 hours or less must consult an academic adviser prior to each registration period. Students in this category will automatically have an advising hold that can only be cleared by the adviser following an advising session. Students with 61 hours or more must meet with an academic adviser at least once per academic year; however, it is recommended that every student, regardless of completed semester hours, consult with an adviser prior to each registration period to help ensure satisfactory progress on his or her degree program.

SCHOLARSHIPS

The ATCOFA annually awards numerous scholarships totaling more than \$100,000 to environmental science, forestry and spatial science students. These are available to undergraduate (including incoming freshmen) and graduate

students and are awarded based on academic excellence and/or financial need. Scholarship applications are due by Feb. 1, and are available online on the Financial Aid Office website. Information about other sources of financial aid, including work-study and loans, is available from the Financial Aid Office.

STUDENT ORGANIZATIONS

The primary student organization for environmental science students is the National Association of Environmental Professionals. The SFA chapter of the NAEP provides students with opportunities to develop leadership skills, network with practicing professionals and engage in social activities.

DEFINITION OF THE MAJOR

The Bachelor of Science degree program in environmental science requires 124 semester credit hours of coursework. The degree program requires completion of:

1. Core Curriculum (42 Hours)

- A. Communication Component Area (6 hours)
 - Three hours from: ENG 131, 133H
 - Three hours from: COM 111, 170, 215
- B. Component Area Option (6 hours)
 - Three hours from: ENG 132
 - Three hours from: BCM 247, ENG 273, FRE 131, 132, GER 131, POR 131, 132, SPA 131, 132 SPH 172, 272
- C. Mathematics Component Area (3 hours)
 - Three hours from: MTH 138, 233
- D. Life and Physical Sciences (6 hours)
 - Three hours from: CHE 133 (*CHE 133L must be taken concurrently)
 - Three hours from: CHE 134 (*CHE 134L must be taken concurrently)
- E. Language, Philosophy, and Culture (3 hours)
 - Three hours from ENG 200, 209, 211, 212, 221, 222, 229, 230, 233H, HIS 151, 152, PHI 153, 233
- F. Creative Arts (3 hours)
 - Three hours from: ART 280, 281, 282, DAN 140, MHL 245, MUS 140, THR 161, 163
- G. American History (6 hours)
 - Six hours from: HIS 133, 134
- H. Government/Political Science (6 hours)
 - Six hours from: PSC 141, 142
- I. Social and Behavioral Sciences (3 hours)
 - Three hours from: ECO 232

2. The environmental science core is designed to provide additional basic science foundation and applied environmental science knowledge and skills. (62 hours)

- Eight hours from: BIO 131, BIO 133 Zoology (labs required)
- Three hours from: BIO 313, ENV 209
- Three hours from: BLW 478
- One hour from: CHE 133L*(must be taken concurrently with CHE 133)
- One hour from: CHE 134L*(must be taken concurrently with CHE 134)
- Four hours from: CHE 330 (lab required)
- Three hours from ENV 110 (lab required)
- Twenty-four hours from: ENV 210, ENV 310 ENV 349, ENV 402, ENV 403,

ENV 412, ENV 420, ENV 450

- Four hours from: ENV 415
- One hour from: ENV 470
- Three hours from: FOR 457, ENV 348
- Six hours from: GIS 224, GIS 390
- Three hours from: MTH 220

3. Student must complete one of two environmental science tracks:

A. Land and Water Resources (21 hours)

- Four hours from: BIO 309, 450, CHE 420 (lab required)
- Four hours from: CHE 231 (labs required)
- Four hours from: GOL 131 (lab required)
- Six hours of approved electives**

B. Environmental Planning and Management* (21 hours)

- Three hours from: MGT 370
- Fifteen hours approved electives**

4. Core Curriculum Requirements: A grade of at least C in each freshman

English course; a C average at SFA; a C average in major courses taken at SFA; a C average in minor courses taken at SFA. These required averages are based on those courses in each category that are included in the student's official degree plan.

**Requires the student to complete a minor or second major in a complementary discipline area. Recommended areas include biology, business, chemistry, communications, forestry, geography, geology and spatial science. Student must use approved electives to complete the selected minor.*

***Approved electives: Courses selected with approval of adviser.*

Total semester hours required for degree = 124 hours

Second Major or Minor in Environmental Science

A second major in environmental science requires completion of the entire environmental science core; a minimum grade of C is required for all courses in the Environmental Science Core for students seeking a second major. A minor in environmental science requires completion of ENV 110 plus 15 additional semester hours from ENV 210, 310, 348, 349, 402, 403, 412, 450 and BLW 478. At least six semester hours must be at the advanced (300-400) level.

GRADUATE DEGREE PROGRAMS

The Division of Environmental Science offers the Master of Science degree in environmental science. The 36-semester hour curriculum is a collaborative program with the University of Texas Health Science Center at Tyler. Students select from two tracks of study. The occupational and environmental health track focuses on environmental concerns related to human health. The land and water resources track focuses on protection and management of natural ecosystems.

DEGREE PLAN AND FINAL GRADUATION PLAN

Prior to the end of the sophomore year, students must select a degree program and prepare a degree plan. The student should see the student adviser in the ATCOFA for assistance in preparation of the degree plan. A final degree plan must be filed prior to pre-registration for the semester in which graduation is expected.

COURSE INFORMATION

Courses are offered in the semesters indicated. Except for courses numbered 460 and 463, all undergraduate courses must have a minimum of 10 students. Unless otherwise indicated, each course carries three semester hours credit.

COURSES IN ENVIRONMENTAL SCIENCE (ENV)

- 110. Introduction to Environmental Science (ENVR 1301)** - Three semester hours, two hours lecture and three hours lab per week. Introduction to the multidisciplinary study of the environment using the scientific method. Course fee required. Fall, spring and summer.
- 209. Forest Ecology** - Three semester hours, two hours lecture and three hours lab per week. Climatic, edaphic and biotic factors and their relationship to woody plant growth and development. Required field trips. Prerequisite: BIO 131. Course fee required. Fall and spring.
- 210. Environmental Measurements** - Three semester hours, two hours lecture and three hours lab per week. Introduction to sampling and measuring biological, chemical and physical parameters of atmospheric, aquatic and terrestrial systems. Prerequisite ENV 110. Course fee required. Fall only.
- 310. Environmental Health and Safety** - Three semester hours, three hours lecture per week. The course provides students with an overview of environmental health and safety practices, including EPA and OSHA regulations. Topics include pollution prevention, environmental management, industrial hygiene, and waste management. Spring only. Prerequisite: CHE 133.
- 348. Natural Resource Policy** - Three semester hours, three hours lecture per week. Forest history and natural resource policy in the United States, including effects of the environmental movement.
- 349. Environmental Soil Science** - Three semester hours, two hours lecture and three hours lab per week. Physical, chemical and biological properties of soils. Role of soils in environmental quality, biogeochemical cycles and management concerns. Prerequisite: CHE 134. Course fee required. Fall only.
- 402. Wetland Delineation and Function** - Three semester hours, two hours lecture and three hours lab per week. Introduction to the history, regulations and current technical criteria for the identification and delineation of wetland boundaries and the functional assessment of wetlands. Prerequisite: ENV 349. Course fee required. Fall only.
- 403. Remediation and Reclamation of Disturbed Land** - Three semester hours, two hours lecture and three hours lab per week. Remediation and reclamation of contaminated or disturbed lands. Required field trips, including one all day trip. Prerequisites: ENV 349, FOR 349 or AGN 331 or permission of instructor. Course fee required. Spring only.
- 405. Environmental Communication and Interpretation** - Three semester hours, three hours lecture per week. Overview of the field of natural resource communication and interpretation. Of particular interest to those whose careers require public interaction. Fall only.
- 412. Environmental Hydrology** - Three semester hours, two hours lecture and three hours lab per week. Study of the effects of human activities

on water quality and quantity, including soil erosion and aquatic habitat implications. Required field trips. Prerequisite: ENV 349. Course fee required. Fall only.

415. **Environmental Assessment and Management** - Four semester hours, three hours lecture and three hours lab per week. Environmental planning in the U.S. with reference to the principles and procedures for preparing environmental assessments and impact statements. Prerequisite: senior standing or permission of instructor. Course fee required. Spring only.
420. **Landscape Ecology and Planning** - Three semester hours, two hours lecture and three hours lab per week. Structure, function and change within ecosystems measured on a landscape scale. Evaluation of current management techniques for their effects on landscapes. Required field trips. Prerequisites: GIS 224 or AGM 325, BIO 313 or FOR/ENV 209. Course fee required. Spring only.
450. **Air Quality Assessment** - Three semester hours, three hours lecture per week. Fundamentals of air sampling, chemical analysis of samples, data analysis for particles and gases and air permitting. Instrumentation and techniques relevant to ambient air quality monitoring, source emission testing and occupied indoor environments. Prerequisites: junior or senior standing or permission of instructor. Course fee required. Spring only.
460. **Internship in Environmental Science** - Three semester hours. Studies of environmental science in an operational setting under the supervision of a cooperating organization. Must be arranged in advance and approved by the director's office. May be repeated for credit for a maximum of nine credit hours.
463. **Special Problems in Environmental Science** - One, two or three semester hours. Individual study in an area of the student's choice. Must be arranged in advance and approved by the director's office. May be repeated for credit for a maximum of nine credit hours.
464. **Contemporary Problems in Environmental Science** - Three semester hours. Classes conducted on current topics in environmental science. May be repeated for credit for a maximum of nine credit hours.
470. **Senior Seminar** - One semester hour. A participatory seminar where students condense, review and present research findings on focused topics. Subject matter varies by semester. Prerequisite: 15 credit hours in environmental science or permission of instructor. Fall only.

DEPARTMENT OF AGRICULTURE

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AREAS OF STUDY AND DEGREES

B.S. Agriculture

Majors:

- Agricultural Business
- Agricultural Development
- Agricultural Engineering Technology
- Animal Science
- Animal Science – Equine Emphasis
- Animal Science – Pre-Vet
- Horticulture
- Poultry Science

OBJECTIVES

The Department of Agriculture seeks to provide a dynamic, intellectual community primarily for the purpose of fostering academic learning and professional growth for its students. A focus on effective teaching, research and service provides opportunities to:

- develop critical thinking skills needed to compete in the diverse industry of agriculture,
- develop effective communication skills, and
- collaborate effectively within educational, cultural, economic and professional environments in order to disseminate new and existing knowledge to agriculture's stakeholders.

Modern facilities such as the SFA Mast Arboretum, Pineywoods Native Plant Center, Ruby Mize Azalea Garden, Gayla Mize Garden, Walter Todd Agricultural Research Center, Swine Laboratory, Poultry Research Center and Feed Mill, Broiler Research Center, Equine Laboratory and SFA Soil, Plant, Water and Forage Analysis Laboratory provide opportunities for hands-on instruction.

DEFINITION OF MAJORS

Agribusiness

The area of agribusiness involves the manufacture and distribution of agricultural supplies; production operations on the farm; and the storage, processing and distribution of farm commodities. The study of agribusiness focuses on integrating technical knowledge with economic theory for decision

FACULTY

Professor

Dale Perritt

Associate Professors

Joey Bray, Erin Brown,
Michael Maurer, Craig Morton,
Leland C. Thompson

Assistant Professors

Jared Barnes, Stephanie Jones, John
Michael Mehaffey

Lecturer

Emily Payne

making concerning the use of scarce productive resources to produce food and fiber for distribution to society.

Agricultural Development

Agricultural development is a course of study designed to prepare the student for a career in teaching, extension or with agricultural service agencies whose purpose is to disseminate information related to the industry of agriculture. Special emphasis will be placed on communication skills and effective teaching strategies.

Agricultural Engineering Technology

Agricultural machinery is a course of study designed to prepare the student for a career in the management of agricultural systems, including the design and marketing of agricultural machinery, agricultural structures and agricultural environments.

Animal Science

The field of animal science provides exciting and challenging opportunities for graduates desiring to pursue careers in animal production, animal health or health services, feed formulation and manufacturing, processing/further processing and the marketing of animals and animal products. Specialty areas include beef cattle science, poultry science, swine production, equine science and pre-veterinary medicine.

Horticulture

Horticulture is the science, business and art of growing and marketing fruits, vegetables, flowers and ornamental plants. Horticulture includes site planning and preparation, seed and vegetative propagation, plant growth and development, harvest, distribution, marketing, utilization and human issues associated with a wide diversity of crops for nutrition, beauty and utility. An emphasis in turfgrass is available as a part of the major in horticulture.

Poultry Science

Poultry Science is a course of study designed to prepare the student for a challenging career in the poultry industry. The curriculum includes all aspects of live production, waste management, computer technology, nutrition and product processing. Upon completion of the course requirements, a student will be prepared for entry-level management positions within the industry.

DEFINITION OF MINORS (18-21 HOURS)

Students desiring a minor in any of the above majors are required to complete 18 to 21 hours in agriculture with at least 12 hours having the course prefix of the minor area. Six hours must be advanced.

COURSE REQUIREMENTS FOR MAJORS

1. Core Curriculum (42 Hours)

- A. Communication (6 hours)
 - Three hours from: ENG 131, 133
 - Three hours from: COM 111, 170, 215
- B. Mathematics (3 hours)
 - Three hours from: MTH 110, 138, 143, 220, 233
- C. Natural Sciences (6 hours)
 - Six hours from: BIO 131 or 133 and ENV 110; CHEM 133 or 134; PHY 101 and 102 for agricultural engineering technology majors

- D. Language, Philosophy and Culture (3 hours)
 - Three hours from: ENG 200, 209, 211, 212, 221, 222, 229, 230, 233, HIST 151, 152, 153, PHI 223
- E. Creative Arts (3 hours)
 - Three hours from: ART 280, 281, 282; DAN 140, MHC 245, MUS 140, THR 161, 163
- F. American History (6 hours)
 - Six hours from History: HIS 133, 134
- G. Government/Political Science (6 hours)
 - Six hours from Political Science: PSC 141, 142
- H. Social and Behavioral Sciences (3 hours)
 - Three hours from: ANT 231; ECO 231, 232; GEO 131; PSY 133; SOC 137.
- I. Component Area Option (6 hours)
 - Three hours from: ENG 132
 - Three hours from: FRE 131, 132; GER 131, 132; POR 131, 132; SPA 131, 132; SPH 172, 272; BCM 247; or ENG 273

*Six credits of science counted in Core; two credits counted in major.

2. **Major course requirements** are listed under course requirements for each major. Twenty-one hours must be advanced with 12 advanced being completed at SFA.
3. **Enough additional hours** to total 120. This total shall include a minimum of 42 hours of residence credit of which 36 must be advanced.
4. **Students must meet minimum standards** related to student success initiatives mandated in legislation. Maintenance of a C average in coursework completed at SFA and coursework completed at SFA in the major and minor fields considered separately.
5. **A grade of at least C** in each freshman English course; a C average at SFA; a C average in major courses taken at SFA; a C average in minor courses taken at SFA. These required averages are based on those courses in each category that are included in the student's official degree plan.

Agribusiness

University General Education Core: (42 hours)

Additional Courses required for major: (nine hours)

- Nine hours from: MTH 220 and CHEM 111, 112 or 133 and BIO 131L or 133L or ENV 110L

Agriculture Core: (26 hours)

- One hour from: AGR 100
- Three hours from: AGN 110
- Four hours from: AGM 120 (Lab required)
- Three hours from: ANS 131
- One hour from: ANS 150
- Four hours from: AGN 331 (Lab required)
- Three hours from: ANS 333
- One hour from: AGD 400

Select three hours from:

- AGD 361 or 371

Select three hours from:

- PLS 317 or AGN 410/AGM/HRT 325

Agribusiness Major: (24 hours)

- Fifteen hours from: AEC 261, 344, 349, 442, 451

Agriculture Electives: (9 hours)

- Select nine hours (six advanced) from: AGN 462, AGN 367, AGN 448, PLS 437, PLS 237, PLS 340, ANS 243, ANS 260, ANS 343, ANS 342, HRT 321, HRT 325, HRT 326, HRT 413, HRT 416, AGM 421, AGM 425, AGM 315, AGM 310, AGM 325, AGM 326

Required Minor in General Business: (18 hours)

- Three hours from: BLW 335
- Select three hours from: ACC 101 or 231
- Select three hours from: ECO 231, 232, 311, 331, 480, or ACC 232
- Select nine hours advanced from College of Business

(No more than six hours in one prefix)

General Electives: (0-2 hours)**Grand Total: 120 hours****Agricultural Engineering Technology****University General Education Core: (42 hours)****Additional Courses required for the major: (6 hours)**

- Six hours from: CHEM 111 or 133 (Lab required)PHY 101L and PHY 102L.

Agriculture Core: (28 hours)

- One hour from: AGR 100
- Three hours from: AGN 110
- Four hours from: AGM 120
- Three hours from: AEC 261
- Three hours from: PLS 317
- Four hours from: AGN 331
- One hour from: AGD 400
- Three hours from: AEC 451
- Select three hours from: AGN 367, 445, 462
- Select three hours from: AGD 361 or 371

Agricultural Engineering Technology Major: (33 hours)

- Six hours from: AGM 236 and 310
- Three hours from: AGM-HRT 325
- Six hours from: AGM 383 and 410
- Three hours from: PLS 420
- Three hours from: AGM 421
- Three hours from: AGM 425
- Three hours from: AGM 315 or AGM/HRT 326

Agriculture Electives

- Select seven hours from: ANS 131, ANS 150 (1), HRT 212, PLS 237, AEC 344, AEC, 349, AEC 442, AGN 469, AGD 481

General Electives (0-3 hours)**Additional courses required for major: (9-12 hours)**

- ACC 101 or 231; MKT 351; BLW 335; MGT 370; BCM 450; AGR 431 (four hours)

Grand Total: 120 hours

Animal Science

University General Education Core: (42 hours)

Additional Courses required for major: (13 hours)

- Eight hours from: CHEM 111 and 112 or 133 and 134
- Two hours from: BIO 131L or BIO 133L or ENV 110L
- Three hours from: ACC 101 or GBU 147 or MTH 220

Agriculture Core: (28 hours)

- One hour from: AGR 100
- Three hours from: AGN 110
- Four hours from: AGM 120
- Three hours from: AEC 261
- Four hours from: AGN 331
- One hour from: AGD 400
- Three hours from: AEC 451
- Select three hours from: AGD 361 or 371
- Select three hours from: AGN 367, 448, or 462
- Select three hours from: AGM 410; PLS 420 or 465, AGM 325 or HRT 325

Animal Science Major: (31 hours)

- Three hours from: ANS 131
- One hour from ANS 150
- Three hours from: ANS 333
- Three hours from ANS 260
- Six hours from: ANS 428 and 441
- Select three hours from: ANS 444 or PLS 440
- Select 12 hours from: (nine hours must be advanced) ANS 201, 241, 242, 243, 244, 250, 301, 343, 351, 352, 442, 444; PLS 237, 340, 437, 440

Agriculture Electives: (3-6 hours)

- AGR 475, 480, 431 (4), 432 (4)

General Electives (0-3 hours)

Grand Total: 120 hours

Students majoring in animal science desiring an emphasis in equine science may complete the following sequence of courses.

Animal Science with Equine Emphasis

University General Education Core: (42 hours)

Additional Courses Required: (10 hours)

- Four hours from CHEM 111 or 112 or CHEM 133 or 134, plus two hours from BIO 133L and ENV 110L.

Agriculture Core: (28 hours)

- One hour from: AGR 100
- Three hours from: AGN 110
- Four hours from: AGM 120 (Lab required)
- Three hours from: AEC 261
- Four hours from: AGN 331 (Lab required)
- One hour from: AGD 400
- Three hours from: AEC 451
- Select three hours from: AGD 361 or 371

- Select three hours from: AGN 367, 448, or 462
- Select three hours from: AEC 344; AGM 410; PLS 420 or 465, AGM/HRT 325

Animal Science Major: Equine Emphasis (31-34 hours)

- Three hours from: ANS 131
- One hour from: ANS 150
- Three hours from: ANS 260
- Three hours from: ANS 333
- Six hours from: ANS 428 and 441

Equine Emphasis Continued

- Select 15-18 hours from: ANS 201, 241, 242, 280, 352, 438, 442, 444 or 452; PLS 440

Agriculture Electives: (6 hours)

- Six hours (three advanced) from: AGR 280, AGR 475, AGR 480, AGR 431(4), AGR 432 (4)

General Electives: (0-3 hours)

Grand Total: 120 hours

Animal Science Pre-Vet

Students majoring in animal science and planning to meet the requirements for admission to schools of veterinary medicine must include the following courses in their general education requirements, minors or electives.

General Education Core: (42 hours)

Additional Requirements for Animal Science Pre-Vet Major: (36 hours)

- CHE 331, 332, 452
- STA 320
- CHEM 133L, 134L
- BIO 130, 133, 309, 341
- PHY 131, 132 or PHY 101, 102

Agriculture Core: (13 hours)

- One hour from: AGR 100
- Four hours from: AGM 120
- Four hours from: AGN 331
- One hour from: AGD 400
- Three hours from: AEC 451

Animal Science Major: (22 hours with nine advanced)

- Three hours from: ANS 131
- One hour from: ANS 150
- Three hours from: ANS 333
- Fifteen hours (nine advanced) from: ANS 241, 242, 243, 250, 260, 301, 342, 343, 420, 428, 441, 444; AGR 475 or 480 with approval of adviser; PLS 237, 252, 337, 340, 437

Agricultural Electives:

- Six hours from AGR 280, AGR 475, AGR 480, AGR 431, AGR 432

General Elective: (1 hour)

Grand Total: 120 hours

Horticulture

University General Education Core: (42 hours)

Additional Courses Required for Major: (17 hours)

- Seventeen hours from: CHE 111 and 112 or CHEM 133 & 134 and BIO 353 and 424 (3), BIO 131L and ENV 110L

Agriculture Core: (25 hours)

- One hour from: AGR 100
- Three hours from: AGN 110
- Four hours from: AGM 120 (Lab required)
- Three hours from: ANS 131
- Three hours from: AEC 261
- Four hours from: AGN 331 (Lab required)
- One hour from: AGD 400
- Three hours from: AEC 451
- Select three hours from: AGD 361 or 371

Horticulture Major: (27 hours)

- HRT 323, 324, 416; AGN 469 plus 15 hours from: (nine must be advanced) HRT 210, 212, 213, 239, 247, 315, 321, 322, HRT/AGM 325, HRT/AGM 326, HRT 413, 415, 417, 419; AGM 421; AGN 434, 445

Agriculture Electives: (6-9 hours)

- Select 6-9 hours from: FOR 304, AGN 434, AGN 462, PLS 420, ANS 333

Electives: (0-3 hours)

Grand Total: 120 hours

Poultry Science

General Education Core: (42 hours)

Additional Courses Required for the Major: (6 hours)

- Six hours from: CHEM 111 or 112 or 133 or 134, BIO 133L, ENV 110L

Agriculture Core: (26 hours)

- One hour from: AGR 100
- Three hours from: ANS 131
- One hour from: ANS 150
- Three hours from: AGN 110
- Four hours from: AGM 120
- Three hours from: AEC 261
- Four hours from: AGN 331
- One hour from: AGD 400
- Three hours from: AEC 451
- Select three hours from: AGN 367, 448 or 462

Poultry Science Major: (27 hours)

- ANS 260, 333; PLS 237, 252, 337, 340, 437
- Select six hours from: PLS 420, 440, 465; AGR 480; or ANS 444

Electives: (15 hours) (9 hours must be advanced)

1. Production Option
 - AGR 431(4), 432(4), 433(4), 475, 480

2. Business Option
 - ACC 101; GBU 147; ECO 231, 232; MGT 370, 371; MKT 351, 353; BLW 330, 335
3. Science Option
 - BIO 309, 341; PHY 131, 132; CHE 331, 332, 452, 453

General Electives: (4 hours)

Grand Total: 120 hours

Agricultural Development (123 hours)

- Refer to the teacher certification requirements in this bulletin (located in the College of Education section) for teaching options. Additional requirements for the degree include:
- CHEM 111 or 133, BIO 131L or BIO 133L and ENV 110L (six hours)

AGRICULTURAL INTERNSHIP

The internship program in agriculture may be used by qualified majors in agriculture. It is designed to strengthen the major and provide a stronger base of employment. The internship consists of spending one regular semester in a full-time, on-the-job, prescribed training program in an agricultural or related business. Twelve hours credit may be earned for a 15- to 16-week internship in the regular semester and eight hours credit for a 10- to 11-week internship during the summer. A one-summer term internship will be awarded four credit hours. Applicants for this program should initiate inquiry with the adviser regarding their eligibility no later than the beginning of their first junior semester. Application should be made at least one semester prior to internship. The internship may be used for agriculture electives but not for major courses.

COURSE CREDIT

All courses listed are three semester hours credit, three hours lecture per week unless otherwise noted. In courses with both lecture and laboratory, students must take both concurrently and the same grade will be assigned in both.

COURSES IN AGRICULTURE

AGRIBUSINESS AND ECONOMICS (AEC)

261. **Agricultural Economics (AGRI 2317)** - Production economics, agricultural prices, money, banking, credit, land economics and public finance. Prerequisite: six semester hours of agriculture.
344. **Agricultural Finance** - Analysis of capital requirements for farming and ranching; determination of credit needs; lending sources and requirements; risks, costs and legal aspects of credit.
349. **Marketing of Agricultural Products** - Marketing system as it applies to the farmer, and methods of reducing costs and improving efficiency of agricultural marketing. Farmer's cooperatives emphasized.
442. **Natural Resource Economics** - Economic, institutional and physical factors involved in the utilization and control of natural resources as they are related to agriculture.
451. **Farm Management** - Two hours lecture, two hours lab per week. Application of business principles to farming, organization and

management of farms, farm records and farm accounts. Prerequisite: 12 semester hours of agriculture.

AGRICULTURAL DEVELOPMENT (AGD)

- 361. Agricultural Development** - Study of the structure and function of agricultural delivery systems and their impact on the industry of agriculture. Specific emphasis on the development of agricultural policy, agricultural research, market development, agricultural service agencies, ethics in agriculture and the adoption and diffusion of new technology. Laboratory field experience required. Prerequisite: 12 hours of agriculture.
- 371. Agriculture Leadership** - Study of the various leadership functions and management styles necessary to effectively work within the professional industry of agriculture. Specific emphasis on oral communication, parliamentary procedure and the function of youth organizations and adult volunteer groups as support organizations in the agricultural community. Prerequisite: 12 hours of agriculture.
- 400. Senior Seminar** - One hour lecture. Provides the student with information needed for transition from the college environment to a professional career in the industry of agriculture. Specifically addresses current trends shaping career opportunities, résumé development, interviewing skills, intern opportunities, research and development activities, professional organizations, personal investing and retirement planning, community development and service opportunities, and critical issues facing agriculture.
- 481. Methods of Teaching Agricultural Sciences in the Secondary School** - Instructional methods and techniques that emphasize practical applications of the teaching-learning process. Special emphasis on reading in the content area, student evaluation, classroom management and discipline, and essential curriculum/programmatic elements unique to agricultural science and technology. Prerequisite: nine hours professional education.
- 482. Cooperative Extension Education** - The philosophy of cooperative extension and extension's role within the Land Grant system will be emphasized. History, organization, program areas and guiding principles of the Cooperative Extension System will be examined. Cooperative extension's relationship with the other two branches of the Land Grant System (teaching and research) will be examined.
- 491. Student Teaching** - Nine semester hours. Class observation, development of lesson plans, and methods of teaching in-school and adult classes. Prerequisites: AGD 361, 371 and 481.

AGRICULTURAL ENGINEERING TECHNOLOGY

- 120. Fundamentals of Agricultural Technology** - Four semester hours, three hours lecture, two hours lab per week. Introductory course to acquaint students with a wide range of basic concepts, principles, procedures and applications of engineering and machinery in agriculture. Emphasis on skill areas and fundamental principles of agricultural operations and application. Lab fee \$5.

- 236. Welding and Metals** - One hour lecture, four hours lab per week. Arc welding, oxyacetylene welding, hot and cold metal work, plumbing, and sheet metal work. Lab fee \$20.
- 310. Internal Combustion Engines** - Two hours lecture, two hours lab per week. Study of the theory and operation of single- and multi-cylinder internal combustion engines. Emphasis directed toward the application, maintenance, diagnosis and repair of internal combustion engines used in agricultural environments. Lab fee \$5.
- 315. Agricultural Electrification** - Two hours lecture, two hours lab per week. Electricity master controls, lighting and heating; maintenance of electric motors; safety; and automated equipment. Lab fee \$5.
- 325. Design Application Software I (CAD)** - Two hours lecture, two hours lab per week. Introduction to the use of computer-assisted design software. Acquaints students with basic 2-D design principles, utilizing the latest CAD and architectural software in a computer lab setting. Prerequisites: CSC 121 or 101; AGM 120, or consent of instructor. Lab fee \$10. (Same as HRT 325).
- 326. Design Application Software II (CAD)** - Two hours lecture, two hours lab per week. Advanced course on the use of computer-assisted design software. Emphasis on three-dimensional drawing and customized design. Experience with latest architectural, mechanical and landscape software. Prerequisites: AGM/HRT 325. Lab fee \$10. (Same as HRT 326).
- 383. Agricultural Machinery Design and Structure** - One hour lecture, four hours lab per week. Mechanical design and construction of equipment. Metal fabrication. Prerequisite: AGR 236. Lab fee \$20.
- 410. Agricultural Machinery Operation and Performance** - Two hours lecture, two hours lab per week. Study of the operation, performance and management of agricultural machinery. Prerequisite: AEC 261. Lab fee \$5.
- 421. Principles of Irrigation** - Designed to quantify the parameters necessary for the design, installation and operation of various types of irrigation systems. Emphasis on the fundamental principles of irrigation, water application systems and water distribution systems. Prerequisite: junior standing.
- 425. Mobile Hydraulics in Agriculture** - Two hours lecture, two hours lab per week. Basic principles of hydraulics, hydrodynamics and hydrostatics; diagnosis and testing; hydraulic valves; and the history of hydraulics. Prerequisite: six hours of agriculture. Lab fee \$5.

AGRONOMY - PLANT AND SOIL SCIENCE (AGN)

- 110. Crop Science** - Basic principles of plant growth as they relate to the production of major horticultural and agronomic crops.
- 331. Soil Science** - Four semester hours, three hours lecture, two hours lab per week. Physical, biological and chemical properties, classification and fertilization of soil. Prerequisite: CHE 111 or 133. Lab fee \$5.
- 367. Weed Science** - Study of control of weedy plant species in row crops, pastures, fruit and vegetable crops, turf and around the home. Includes applicator calibration. Prerequisite: CHE 112.

- 434. **Soil Fertility** - Two hours lecture, two hours laboratory per week. Soil properties, liming and fertilization in relation to plant growth. Prerequisite: AGN 331.
- 445. **Plant Breeding** - Improvement of crops through hybridization and selection with special emphasis on methods of breeding self-pollinated, cross-pollinated and vegetatively propagated plants. Prerequisite: BIO 341 or consent of the instructor.
- 448. **Range Management** - Principles of range management. Characteristics of rangelands and range plants, management of grazing animals, and vegetation. Prerequisite: junior standing (Same as FOR 448).
- 462. **Forages** - Study of annual and perennial forages, including their management for hay and grazing. Includes characteristics, adaptability, establishment, maintenance, harvesting and quality of the forage.
- 469. **Plant Protection** - Two hours lecture, two hours lab per week. Biological, chemical, cultural and physical control of insects, diseases and weeds, including the concepts of integrated pest management. Prerequisites: BIO 353 plus 12 hours of agriculture or biology.

ANIMAL SCIENCE (ANS)

- 131. **Introductory Animal Science (AGRI 1319)** - Three hours lecture per week. Introductory course in the modern methods of producing, processing, and marketing animals and animal products.
- 150. **Animal Science Practicum** – One hour practicum provides the opportunity to learn basic livestock and equine management techniques along with different breeds and nomenclature commonly used for livestock anatomy.
- 201. **Basic Horsemanship** - A beginning-riding course that addresses the fundamental techniques and principles of horsemanship. Students will ride horses each day, learning the basic athletic maneuvers of the equine under saddle. Students are expected to provide an appropriate saddle and blanket. Students will be required to wear an appropriate riding helmet at all times during the lab.
- 241. **Horse Production** - Two hours lecture, two hours lab per week. Survey of the western working and pleasure-horse industry. Fundamentals of selection, nutrition, breeding, health and training pleasure horses.
- 242. **Equitation** - Six hours lab per week. In-depth study of the finer points of riding involving athletic maneuvers of the horse essential to all performance horse events. Case studies in the behavior, communication and psychology between rider and the modern performance horse. Techniques for evaluation of pleasure and performance horse competition. Co-requisite or prerequisite: ANS 201.
- 243. **Beef Cattle Science** - Two hours lecture, two hours lab per week. Selection, breeding, feeding, management and health care of beef cattle.
- 250. **Artificial Insemination** - One hour lecture, four hours lab per week. Basic reproductive physiology as related to artificial insemination, techniques of insemination, semen handling, heat detection, heat synchronization and breeding records. Prerequisite: ANS 131 or permission of instructor.

- 260. Introductory Livestock Anatomy and Physiology** - Three hours lecture per week. Introductory principles and concepts of anatomy and physiology for domesticated farm animals. Detailed study of organ systems and bodily functions in both avian and mammalian species.
- 280. Advanced Horsemanship** - This course addresses advanced techniques and principles of horsemanship associated with both Western and English riding. Students will ride horses each day, implementing techniques and developing skills in a logical progression of advancement for both the rider's ability and the horse's training. Students will be required to wear an approved riding helmet and appropriate footwear at all times.
- 301. Livestock Evaluation** - Two hours lecture, two hours lab per week. Techniques of evaluation and selection of livestock for various agricultural uses. Subjective appraisal of breeding feeder and market swine, as well as beef cattle and sheep. Prerequisite: six hours of ANS, including ANS 131.
- 333. Animal Nutrition** - Nature, function and metabolism of nutrients in animal production. Prerequisites: AGR 131; CHE 112 or 134; and junior standing.
- 342. Swine Production** - Two hours lecture, two hours lab per week. Production practices in the management of swine. Breeding, feeding and health care. Prerequisite: AGR 131.
- 343. Dairy Science** - Introduction to the basic principles and modern practices of dairy production and dairy products technology. Latest advances in record keeping, selection, breeding, feeding, location, facilities and milk marketing. Prerequisite: ANS 131.
- 352. Training Performance Horses** - English - Riding and training the English performance horse to compete in hunt-seat horsemanship, stadium jumping, cross country jumping and dressage events.
- 428. Animal Reproductive Physiology** - Two hours lecture, two hours lab per week. Concepts and applications of reproduction in farm animals. Endocrinology, anatomy and physiology, spermatogenesis, oogenesis, fertilization, gestation, parturition and behavior are studied with practical application toward increasing animal production. Prerequisites: ANS 131 and junior standing.
- 438. Training the Young Horse** - Three credit hours practicum. An advanced riding and training course where students will learn the proper techniques to initiate training of young horses and build a foundation upon which more advance training can be applied. Prerequisites: ANS 242, 351 or consent of instructor.
- 441. Principles of Animal Breeding** - Selection and systems of breeding livestock. Traits of economic importance. Genetic and statistical principles as they apply to farm animal selections. Prerequisites: BIO 320 or 341 and 12 semester hours of animal science or consent of instructor.
- 442. Equine Production and Management** - Two hours lecture, one hour lab per week. Provides the senior-level student with the scientific application of biological and biotechnological principles of horse production and management. Emphasis on reproduction, nutrition, genetics, disease, health and exercise physiology that is unique to the horse.

444. **Feedstuffs, Feeding and Formulation** - Two hours lecture, two hours lab per week. Feedstuffs, feed formulation, feed processing and livestock feeding. Prerequisite: ANS 333. Lab fee \$5.
452. **Equine Law Studies** - The development of a basic understanding of the legal principles involved in common problems associated with horse ownership and horse production.

POULTRY SCIENCE (PLS)

237. **Introductory Poultry Science (AGRI 1327)** - Two hours lecture, two hours lab per week. Introduction to the scope and the importance of the poultry industry. Introduction to the basics of poultry science and modern methods of producing, processing and marketing of poultry and poultry products. Lab fee \$5.
252. **Poultry Selection and Evaluation** - Two hours lecture, two hours lab per week (three credit hours). Techniques of evaluation and selection of poultry and poultry products. Subjective evaluation of breeders, broilers, commercial layers and market products.
317. **Applied Agriculture Data Applications** - Two hours lecture, two hours lab per week. Introduction to the use of computerized applications that deal directly with agriculture and allied industries. Examples include feed mill operations, hatchery complexes, environmental control systems, office applications, as well as Web design and its impact on the agriculture industry. Prerequisite: six hours of agriculture.
337. **Broiler Production** - Study of production practices for the commercial broiler production industry with specific in-depth study in broiler houses and equipment, grow-out phases and disease control for typical broiler operations.
340. **Advanced Poultry Science** - Two hours lecture, two hours lab per week. In-depth study of avian anatomy and physiology, incubation, poultry diseases, poultry genetics and breeding. Lab fee \$5. Prerequisite: ANS 237.
420. **Agricultural Waste Management** - Principles of agricultural waste management, addressing animal and human waste, as well as management and disposal of agricultural chemicals. Prerequisite: junior standing.
437. **Applied Poultry Production** - Two hours lecture, two hours lab per week. Advanced study of poultry nutrition, and organization and management of commercial poultry production and processing operations. Use of computers in designing, planning and managing a modern commercial poultry operation. Lab fee \$5. Prerequisite: ANS 237.
440. **Non-Ruminant Nutrition and Feeding** - Focuses on nutrition and feeding of non-ruminant animals. Addresses the interactions between nutrition and carcass product quality, immunology and environments in monogastric animals. Prerequisite: ANS 333. Junior standing.
465. **Agriculture Products Processing** - Study of the technological processes involved in the preparation, processing and packaging of agricultural products, including, livestock, poultry, fish, fruits, nuts, vegetables and dairy. Study of consumer trends, governmental regulations and research efforts affecting agricultural products processing. May require an overnight field trip. Prerequisite: junior standing.

HORTICULTURE (HRT)

- 210. Ornamental Horticulture** - Two hours lecture, two hours laboratory per week. An overview of the ornamental horticulture industry, including landscaping, nursery management, retail sales, floriculture and other types of enterprises. Emphasis is placed on the propagation, production, and use of bedding, tropical foliage and indoor plants. Lab fee \$5.
- 212. Fruit and Vegetable Production** - Two hours lecture, two hours lab per week. Factors influencing the successful growing, harvesting, storing and marketing of fruit and vegetable crops. Special focus on low-input farming systems, irrigation efficiency, pest management and alternative crops and technology. Lab fee \$5.
- 213. Annuals and Perennials** - Two hours lecture, two hours lab per week. Principles and practices of herbaceous landscape color plants, including annuals, perennials, tropicals and bulbs. Emphasis is placed on identification, production, use and maintenance of year-round bedding plants in East Texas.
- 239. Basic Landscape Design** - Two hours lecture, two hours lab per week. History and basic principles, formal and informal designs and community planning and zoning. Lab fee \$5. Prerequisite: AGM 120 or some drawing experience.
- 247. Landscape Installation** - Two hours lecture, two hours lab per week. Application of design principles, including interpretation of plans, costs and bidding, site preparation, construction materials, planting and maintenance.
- 315. Turfgrass Science I** - Principles of turfgrass production and selection; establishment and maintenance of turfgrass for residential and commercial landscape applications.
- 321. Greenhouse Management** - Two hours lecture, two hours lab per week. Principles of greenhouse management. Prerequisite: HRT/AGN 110. Lab fee \$5.
- 322. Floriculture** - Two hours lecture, two hours lab per week. Principles and practical applications of commercial production of pot plants, cut flower crops, flower arrangements, post-harvest handling and marketing techniques. Lab fee \$20.
- 323. Environmental Horticulture Physiology** - Three hours lecture. Fundamental concepts underlying the science of horticultural crop production and management, including abiotic and biotic environmental factors relative to their effects on plant physiology.
- 324. Landscape Plant Materials I** - One hour lecture, four hours lab. Emphasis on the plants most commonly used in East Texas landscapes. Requires the identification of 175 small trees, shrubs, vines, ground covers and herbaceous perennials. Prerequisites: six hours of agriculture or consent of instructor. Lab fee \$5.
- 325. Design Application Software I (CAD)** - Two hours lecture, two hours lab per week. Introduction to the use of computer-assisted design software. Acquaints students with basic 2-D design principles, utilizing the latest CAD and architectural software in a computer lab setting. Prerequisites:

CSC 121 or 101; AGM 120, or consent of instructor. Lab fee \$10. (Same as AGM 325).

- 326. Design Application Software II (CAD)** - Two hours lecture, two hours lab per week. Advanced course on the use of computer-assisted design software. Emphasis on three-dimensional drawing and customized design. Experience with latest architectural, mechanical and landscape software. Lab fee \$10. Prerequisite: AGM-HRT 325 or HMS 414. (Same as AGM 326).
- 413. Nursery Management** - Two hours lecture, two hours lab per week. Study of the principles and practices involved in commercial production, marketing and management of nursery crops. Prerequisite: six hours of agriculture or equivalent. Lab fee \$5.
- 416. Plant Propagation** - Two hours lecture, two hours lab per week. Physiological relationships involved in plant propagation-environmental factors as they relate to plant growth structures and nursery conditions. Prerequisite: six hours of agriculture or consent of instructor. Lab fees \$5.
- 417. Advanced Landscape Design** - Practical design applications for landscape situations using various plant materials, cost estimation, contracting, construction and maintenance. Prerequisites: HRT 239 and/or HRT-AGM 325. Lab fee \$5.
- 419. Turfgrass Management II** - Focuses on the skills needed by golf course, park, and athletic field managers to develop cost-effective management practices for facilities under intensive use. Emphasis is placed on site-specific needs, including substrate modification, irrigation and drainage, fertilization and pest management.

GENERAL AGRICULTURE (AGR)

- 100. The Agriculture Industry (AGRI 1131)** - One semester hour credit, one-hour lecture per week. Introduction to agriculture and its relationship to the sciences, as well as careers and opportunities in agriculture. Required for all agriculture majors.
- 275. Special Problems** - One to four semester hours. Individual instruction in laboratory or field problems. May include enterprise projects. Prerequisites: six hours of agriculture. May be repeated.
- 280. Special Topics** - One to four semester hours. Study of specific areas of agriculture approved by the agriculture curriculum committee and by the department chair. May be repeated.
- 431. Agricultural Internship** - Four semester hours, 40 hours per week for five weeks of work experience using equipment and materials of production in the intern's major field. Prerequisite: 12 hours of agriculture.
- 432. Agricultural Internship II** - Four semester hours, 40 hours per week for five weeks. Production practices basic to the intern's major field of interest. Prerequisite: 12 hours of agriculture.
- 433. Agricultural Internship III** - Four semester hours, 40 hours per week for five weeks of applied management practices related to the intern's major field of interest. Prerequisite: 12 hours of agriculture.

475. **Special Problems** - One to four semester hours. Individual instruction in laboratory or field problems. Prerequisite: 12 hours of agriculture. May be repeated.
480. **Topics in Agriculture** - One to four semester hours. Study of specific areas of agriculture approved by the agriculture curriculum committee and by the chair of the department.