DEPARTMENT OF SOIL AND CROP SCIENCES

Undergraduate Students who complete the undergraduate course of study receive the degree of Bachelor of Science in Plant and Environmental Soil Science or Turfgrass Science.

The B.S. degrees require a minimum of 120 credit hours. Details of course requirements are given below and in the Texas A&M University Undergraduate Catalog. Information on undergraduate admissions, including how to order a catalog, can be obtained from the Office of Admissions (http://admissions.tamu.edu). We encourage prospective students to make an appointment with an academic advisor prior to applying.

Undergraduates are required to complete an internship, undergraduate research or study abroad. Soil and Crop Sciences offers a wide variety of experiential learning opportunities for students to achieve their graduation needs. Students are able to complete their experiential learning requirement regionally, nationally, or internationally. Information about undergraduate research and internship opportunities can be obtained from students’ academic advisors and professors.

Faculty

Aitkenhead, Jacqueline A, Associate Professor
Soil & Crop Sciences
PHD, University of New Hampshire, 2000

Awika, Joseph M, Professor
Soil & Crop Sciences
PHD, Texas A&M University, 2003

Bagavathiannan, Muthukumar V, Assistant Professor
Soil & Crop Sciences
PHD, University of Manitoba, Canada, 2010

Baltensperger, David D, Professor
Soil & Crop Sciences
PHD, New Mexico State University, 1981

Carson, Katherine H, Instructional Assistant Professor
Soil & Crop Sciences
PHD, University of Arkansas, 1999

Cralle, Harry T, Associate Professor
Soil & Crop Sciences
PHD, University of Minnesota, 1979

Deng, Youjun, Associate Professor
Soil & Crop Sciences
PHD, Texas A&M University, 2001

Finlayson, Scott A, Associate Professor
Soil & Crop Sciences
PHD, University of Calgary, 1994

Gentry, Terry J, Professor
Soil & Crop Sciences
PHD, University of Arizona, 2003

Hague, Steven S, Associate Professor
Soil & Crop Sciences
PHD, Texas A&M University, 2000

Hays, Dirk B, Professor
Soil & Crop Sciences
PHD, University of Calgary, 1997

Heilman, James L, Professor
Soil & Crop Sciences
PHD, Kansas State University, 1977

Howe, Julie A, Associate Professor
Soil & Crop Sciences
PHD, University of Wisconsin - Madison, 2004

Ibrahim, Amir M, Professor
Soil & Crop Sciences
PHD, Colorado State University, 1998

Jessup, Russell W, Associate Professor
Soil & Crop Sciences
PHD, Texas A&M University, 2005

McInnes, Kevin J, Professor
Soil & Crop Sciences
PHD, Kansas State University, 1985

Morgan, Cristine L, Professor
Soil & Crop Sciences
PHD, University of Wisconsin, 2003

Murray, Seth C, Associate Professor
Soil & Crop Sciences
PHD, Cornell University, 2008

Neely, Haly L, Assistant Professor
Soil & Crop Sciences
PHD, Texas A&M University, 2013

Okumoto, Sakiko, Associate Professor
Soil & Crop Sciences
PHD, Tubingen University, 2003

Rajan, Nithya, Associate Professor
Soil & Crop Sciences
PHD, Texas Tech University, 2007

Rooney, William L, Professor
Soil & Crop Sciences
PHD, University of Minnesota, 1992

Schwab, Arthur P, Professor
Soil & Crop Sciences
PHD, Colorado State University, 1981

Septiningsih, Endang M, Assistant Professor
Soil & Crop Sciences
PHD, Cornell University, 2002

Smith, C W, Professor
Soil & Crop Sciences
PHD, University of Tennessee, 1974
Stelly, David M, Professor
Soil & Crop Sciences
PHD, University of Wisconsin - madison, 1983

Thomson, Michael J, Professor
Soil & Crop Sciences
PHD, Cornell University, 2002

Wherley, Benjamin G, Associate Professor
Soil & Crop Sciences
PHD, North Carolina State University, 2008

White, Richard H, Professor
Soil & Crop Sciences
PHD, Virginia Tech, 1985

Zhang, Hongbin, Professor
Soil & Crop Sciences
PHD, University of California, Davis, 1990

Majors

- Bachelor of Science in Plant and Environmental Soil Science, Crops Emphasis (http://catalog.tamu.edu/undergraduate/agriculture-life-sciences/soil-crop-sciences/plant-environmental-soil-science-crops-bs-emphasis)
- Bachelor of Science in Plant and Environmental Soil Science, Soil and Water Emphasis (http://catalog.tamu.edu/undergraduate/agriculture-life-sciences/soil-crop-sciences/plant-environmental-soil-science-soil-water-bs-emphasis)
- Bachelor of Science in Turfgrass Science (http://catalog.tamu.edu/undergraduate/agriculture-life-sciences/soil-crop-sciences/turfgrass-science-bs)

Minors


Courses

SCSC 105 World Food and Fiber Crops
Credits 3. 2 Lecture Hours. 2 Lab Hours.
AGRI 1307 and AGRI 1107 World Food and Fiber Crops. Plant relationships, structure and development; environmental factors affecting plants; technological aspects of agricultural practices; food production for an increasing population.

SCSC 201 Great Plains Settlement and Farming
Credits 3. 3 Lecture Hours.
American Indian hunting and farming; transformation by Manifest destiny, Homestead Act, railroads, Indian Wars, U.S. Army, crops and farm families; effects of World Wars, Great Depression, Dust Bowl, irrigation, fertilization, pest controls, precision farming.

SCSC 205 Problem Solving in Plant and Soil Systems
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Problems in management of soils, crops, and natural resources; problem solving skills including collecting, interpreting, using and communicating scientific and nonscientific data.

SCSC 289 Special Topics In...
Credits 0 to 4. 0 to 4 Other Hours.
Selected topics in an identified area of soil and grain sciences. May be repeated for credit.

SCSC 291 Research
Credits 1 to 3. 1 to 3 Lecture Hours.
Research conducted under the direction of faculty member in agronomy. May be repeated 2 times for credit.
Prerequisites: Freshman or sophomore classification and approval of instructor.

SCSC 301 Soil Science
Credits 4. 3 Lecture Hours. 2 Lab Hours.
Evaluation of the nature and properties of soils; explanation of the various soils, their components and roles in the environment using the scientific methods and technology.
Prerequisite: Junior or senior classification, or approval of instructor.

SCSC 302 Recreational Turf
Credits 3. 3 Lecture Hours.
Principles underlying construction and maintenance practices for turf facilities including athletic fields, golf courses, parks and home lawns; aesthetic, safety and economic aspects of turf varieties, soil conditions, plant protectants and maintenance equipment.
Prerequisite: Biology or approval of instructor.

SCSC 304 Plant Breeding and Genetics
Credits 3. 3 Lecture Hours. 0 Lab Hours.
Genetic improvement of crops by hybridization and selection; special breeding methods and techniques applicable to naturally self-pollinated, cross-pollinated and asexually reproduced plants.
Prerequisite: SCSC 105 or approval of instructor.

SCSC 305 Professional Development in Agronomy
Credit 1. 2 Lab Hours.
Enhancement of human relation skills related to a career in soil and crop sciences; field trip to Mississippi to interact with leadership from a global agricultural company; on-campus experiences to improve effective learning practices, job seeking and retention and setting and achieving near-term and long-term professional goals.
Prerequisites: Junior or senior classification or approval of instructor.

SCSC 307 Crop Biology and Physiology
Credits 4. 3 Lecture Hours. 2 Lab Hours.
Emphasis on seed biology, germination, development of cells and tissues, anatomy, and growth and development of crop plants; plant hormones and tropisms, membranes and membrane transport, water absorption and transport through plants, photosynthesis, respiration and carbohydrate metabolism, and flowering; environmental effects on crop adaptation, growth, development, and productivity.
Prerequisites: SCSC 205, junior or senior classification, or approval of instructor.
SCSC 309 Water in Soils and Plants  
Credits 4. 3 Lecture Hours. 2 Lab Hours.  
Fundamentals of plant water use, and water movement and storage in soils; evapotranspiration, plant water requirements and irrigation scheduling; issues impacting irrigation and water quality; techniques for measuring soil and plant water relations.  
Prerequisite: Junior or senior classification, or approval of instructor.

SCSC 310 Soil Morphology and Interpretations  
Credits 2. 1 Lecture Hour. 3 Lab Hours.  
Field study of morphological features of soil profiles and the morphological characterization of important soils of Texas in relation to soil use and management.  
Prerequisite: SCSC 301 or registration therein.

SCSC 311 Principles of Crop Production  
Credits 3. 3 Lecture Hours.  
Review of plant physiology and crop adaptation to mesoclimates; crop management factors of planting, pest control, plant nutrition, irrigation, GIS, and harvesting techniques; special units on organic farming, conservation agriculture, farming in low-rainfall climates, and bioenergy crops; influence of markets, government policies, and the global economy on cropping strategies.  
Prerequisites: SCSC 307, junior or senior classification, or approval of instructor.

SCSC 312 Professional Development in Turfgrass  
Credit 1. 2 Lab Hours.  
Includes but not limited to fertilizer, pesticide, irrigation calculations; turfgrass, insect and weed identification and management, soils and rootzone construction; irrigation system operation and auditing; sprayer and spreader operation and calibration; builds upon and allows application of information obtained in SCSC 302; designed to better prepare those intending to compete in the GCSAA and STMA Collegiate Turf Bowl competitions.  
Prerequisite: SCSC 302 or registration therein.

SCSC 330 Social and Ethical Aspects of International Cropping Systems  
Credits 3. 3 Lecture Hours. 0 Lab Hours.  
Philosophical basis of ethical decisions; includes slavery, war, population growth, migration, farm workers, chemical inputs, genetically modified organisms, soil and water conservation and protection of wild species.  
Prerequisite: Junior or senior classification.

SCSC 401/FIVS 401 Forensic Soil Science  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Examination of soils biology, chemistry and physical attributes to solve crimes; soil and geologic characteristics associated with crime scene examination; physical, biological and chemical characteristics and use of trace evidence.  
Prerequisite: Grade of C or better in ENTO 482; junior or senior classification.  
Cross Listing: FIVS 401/SCSC 401.

SCSC 402 Crop Stress Management  
Credits 4. 3 Lecture Hours. 2 Lab Hours.  
Identification, measurement, biology, physiology and management of crop stress; limitations of specific environments to crop productivity; morphological and physiological crop stress response mechanisms.  
Prerequisites: SCSC 307, junior or senior classification, or approval of instructor.

SCSC 405 Soil and Water Microbiology  
Credits 3. 3 Lecture Hours.  
Roles of soil and water microorganisms in the sustainability and productivity of various ecosystems with specific emphasis on plant-microbial interactions, nutrient cycling, degradation of pesticides and other xenobiotics, generation of trace gases, and soil and water quality; hands-on laboratory experience with current techniques in soil and water microbiology.  
Prerequisites: Junior or senior classification, or approval of instructor.

SCSC 406 Soil and Water Microbiology Laboratory  
Credit 1. 2 Lab Hours.  
Hands-on experience with current techniques for examining the types, numbers, activity and roles of soil and water microorganisms with specific application to the carbon, nitrogen and sulfur cycle; plant-microbial interactions; soil and water quality.  
Prerequisites: SCSC 405 or concurrent enrollment; junior or senior classification or approval of instructor.

SCSC 410 International Agricultural Systems  
Credits 3. 3 Lecture Hours.  
Contrast modern agriculture systems with those in developing countries; emphasis on natural resources and technologies interacting with economic and social development on a global scale.  
Prerequisite: Junior or senior classification, or approval of instructor.

SCSC 411 Biotechnology for Crop Improvement  
Credits 3. 3 Lecture Hours.  
Use of biotechnology to improve agricultural, horticultural and forest crops; techniques and methods used and case studies where biotechnology has been used to alter traits such as pathogen resistance, protein or oil consumption, ripening, fertility and wood properties.  
Prerequisite: BIOL 111 or equivalent.  
Cross Listing: MEPS 411 and GENE 411.

SCSC 420 Brazilian Agriculture and Food Production Systems  
Credits 3 to 6. 3 to 6 Lecture Hours.  
Comparison and study of Brazilian and U.S. agriculture and culture related to soil, water, and forest conservation and management in Brazil; tour and learn about Amazon River, rain forest, Brasilia, farm, ranch, and floral production systems, agricultural cooperatives and research, sugar and alcohol production, phosphate mining and production; visit points of interest.  
Prerequisite: Junior or senior classification or approval of instructor.

SCSC 421 International Agricultural Research Centers - Mexico  
Credits 3. 3 Lecture Hours.  
International agricultural research; CIMMYT interaction; modern and underdeveloped tropical agricultural systems; introduction to Mexican culture; critical evaluation of complex and international agricultural issues and research programs.  
Prerequisites: Junior or senior classification and approval of instructor.

SCSC 422 Soil Fertility and Plant Nutrient Management  
Credits 3. 3 Lecture Hours.  
Chemical and biological reactions in soils that influence nutrient availability to plants; environmental aspects associated with nutrient availability and fertilization, especially for nitrogen (N) and phosphorus (P).  
Prerequisites: SCSC 301, junior or senior classification, or approval of instructor.
SCSC 423 Natural Resources and Agricultural Sustainability in UK
Credits 3. 3 Lecture Hours.
Environmental impacts and sustainability of United Kingdom and U.S. agriculture compared; soil, water, crop, and environmental management; conservation of watersheds; production of hydropower; sustainable use of water resources; cultural immersion.
Prerequisites: Junior or senior classification and approval of instructor.

SCSC 427 Sports Field Construction
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Development of knowledge, skills, and experiences for the design and construction of a turfgrass-based sports field; case studies and visits to model fields, guest lectures from sports field owners, designers, and construction company managers; hands-on construction of a small-scale sand-based sports field.
Prerequisites: SCSC 309, junior or senior classification, or approval of instructor.

SCSC 428 Advanced Turf Ecology and Physiology
Credits 3. 3 Lecture Hours.
Examination of how environmental stresses, genetics, and cultural management practices influence the growth, development, and physiology of turfgrasses; exploration of how turf communities function within urban landscapes; introduction to environmental, social, and political issues encountered when managing these areas.

SCSC 429 Turf Management Systems
Credits 4. 3 Lecture Hours. 2 Lab Hours.
Development of turf management plans for large turfgrass sites including parks, golf courses and sports facilities; use of case studies to critically analyze turf management programs.
Prerequisite: SCSC 428.

SCSC 430 Turfgrass Maintenance
Credits 3. 3 Lecture Hours.
Effective leadership and management strategies, organizational structures, human resource management, employee training and motivational strategies, effective professional communication approaches with clientele, employees and within a leadership team within a turfgrass facility framework; emphases on ethics, professional development and life-long learning.
Prerequisite: SCSC 429 or approval of instructor.

SCSC 432 Soil Fertility and Plant Nutrient Management Laboratory
Credit 1. 3 Lab Hours.
Methods used in soil testing, fertilizer recommendations, chemical and physical properties of soils, and determination of specific characteristics of a collected and analyzed soil sample.
Prerequisites: SCSC 301; SCSC 422 or registration therein, junior or senior classification, or approval of instructor.

SCSC 441 Advances in Agronomic Sciences
Credits 3. 3 Lecture Hours.
Synthesis, integration and extension of agronomic and related concepts for understanding the functioning and management of agricultural cropping systems.
Prerequisite: Senior classification or approval of instructor.

SCSC 444 Forage Ecology and Management
Credits 3. 3 Lecture Hours.
Investigation of multidisciplinary approaches toward the development of integrated forage, livestock, and wildlife production systems that are economically feasible and environmentally sustainable.
Prerequisite: Junior or senior classification or approval of instructor.

SCSC 446 Weed Management and Ecology
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Practical information related to weed management and ecology for various vegetative systems to include turf and agronomic crops; calibration of applicators, herbicide labels, mode of action of herbicides, herbicide-resistant weed management.
Prerequisites: BIOL 111 or 101, junior or senior classification.

SCSC 452 Chemical Weed Control Laboratory
Credit 1. 0 Lecture Hours. 2 Lab Hours.
Important weed problems in Texas; herbicides and equipment used for herbicidal application.
Prerequisite: SCSC 450 or registration therein.

SCSC 453 Essentials for Weed Systematic Identification and Management in Agronomy
Credits 3. 3 Lecture Hours.
Fundamental understanding and hands-on training on the basics of plant weed identification and management; relevant to agronomy, turf, horticulture and rangeland science and vegetation identification and management.
Prerequisite: Junior or senior classification.

SCSC 455 Environmental Soil and Water Science
Credits 3. 3 Lecture Hours.
Discussion of physical, chemical, and biological properties of soil and water and the impact on productivity and sustainability of various ecosystems; application of the knowledge of properties and soil processes to develop and evaluate strategies for protecting and/or improving soil and water quality.
Prerequisite: SCSC 301 or approval of instructor.

SCSC 458 Watershed, Water and Soil Quality Management
Credits 3. 3 Lecture Hours.
Land use impact on surface and ground water chemistry; legislation impacting water quality; surface and groundwater impairment and restoration.
Prerequisite: CHEM 101 or equivalent or approval of instructor; junior or senior classification.

SCSC 481 Senior Seminar
Credits 2. 2 Lecture Hours.
Capstone course bringing together student experiences, exams, and exercises necessary for completing and assessing curriculum program learning outcomes.
Prerequisite: Senior classification.

SCSC 484 Internship
Credits 0 to 4. 0 to 4 Other Hours.
Practical on-the-job experience in the student’s area of specialization.
Prerequisites: Junior or senior classification; approval of instructor; 2.0 or better GPR in major and overall.

SCSC 485 Directed Studies
Credits 0 to 4. 0 to 4 Other Hours.
For advanced undergraduates to permit field or laboratory investigation or study of subject matter not included in established courses.
Prerequisite: 10 hours of junior and senior agronomy or approval of instructor.

SCSC 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of agronomy. May be repeated for credit.
Prerequisite: Approval of department head.
SCSC 491 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in agronomy. May be repeated 2 times for credit. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded.
Prerequisites: Junior or senior classification and approval of instructor.