

SOIL AND CROP SCIENCE (SCSCI)

SCSCI 1240 Introduction to Plant Science 3 Credits

This course introduces students to the broad spectrum of disciplines which make up the plant sciences, within the context of resilience and long-term sustainability. The objectives of this course are to gain understanding of the fundamental principles of plant morphology and physiology, identification, propagation, management, and cultural practices. This course will utilize lectures, demonstrations, theoretical activities, and hands-on learning activities.

Components: Laboratory, Class

Cross Offering: ENVHORT 1240

SCSCI 2230 Soils 4 Credits

Origin, nature, and environment for plants; productivity as influenced by soil, cropping system, and management.

Components: Laboratory, Class

SCSCI 2260 Crop Production and Agroecology 3 Credits

In-depth coverage of the impacts of environmental conditions and management practices on crop production. Emphasis will be placed on crop productivity and resource requirements, effects on soil and water resources, associated environmental issues, and system concepts relating to sustainability and resilience of agroecosystems.

Components: Class

Prereqs/Coreqs: P. SCSCI 1240 and SCSCI 2230, or instructor consent

SCSCI 3200 Integrated Pest Management 3 Credits

The basic principles of weed, insect, and disease pest identification and integrated pest management (IPM) in agricultural and urban environments involving biological, cultural, and chemical control of pests as it relates to production decisions, environmental impacts, and management of pest resistance.

Components: Laboratory, Class

Prereqs/Coreqs: P. SCSCI 1240 or ENVHORT 1240 or BIOLOGY 1350 or consent of instructor

SCSCI 3210 Principles of Plant Physiology and Biochemistry 3 Credits

Students will learn the basic principles and concepts pertaining to plant anatomy, phytochemistry, and the plant physiological processes, such as plant water relations, mineral nutrition, photosynthesis, respiration, assimilation of mineral nutrients, the environmental factors influencing vegetative growth and reproduction, physiological effects of plant hormones and their roles in crop production.

Components: Laboratory, Class

Prereqs/Coreqs: P. SCSCI 1240 or ENVHORT 1240 or BIOLOGY 1350

SCSCI 3220 Plant Development and Biotechnology 4 Credits

Students will use the methods of science as employed through plant cell culture and biotechnology to explore the development of plant tissues and organs in vitro. Topics include plant anatomy and growth regulators, development of axillary and adventitious shoots, direct and indirect somatic embryogenesis, the use of biotechnology for plant improvement, and biometric statistical analysis and data interpretation. Students will be expected to review and critique published scientific articles, conduct statistical analysis of data and write interpretive papers based on results gained from experiments conducted in the laboratory.

Components: Laboratory, Class

GE: Natural Science

Prereqs/Coreqs: P. ENVHORT 1240 or SCSCI 1240 or BIOLOGY 1350 or consent of instructor

SCSCI 3260 Seed and Grain Crops 3 Credits

Principles and practices used in the production and evaluation of seed for sale and commercial market grain crops.

Components: Laboratory, Class

Prereqs/Coreqs: P. SCSCI 1260 or SCSCI 1240 or ENVHORT 1240 or consent of instructor

SCSCI 3280 Precision Agriculture Technologies 3 Credits

This course will provide an overview of precision agriculture technologies and their practical application to site-specific agricultural management. Topics will cover the most current knowledge and tools from soil and crop science, agricultural engineering, and geostatistics used to make data-driven on-farm decisions.

Components: Class

Prereqs/Coreqs: P. SCSCI 2260

SCSCI 3310 Agronomy, Horticulture and Ecological Restoration Seminar 1 Credit

Review of current literature, career exploration, and professional development.

Components: Seminar

Cross Offering: ECORES 3310, ENVHORT 3310

Prereqs/Coreqs: P. ENVHORT 1240 or SCSCI 1240 or ENVHORT 1320 or SCSCI 1260 or ECORES 1010 or BIOLOGY 1350, junior standing or consent of instructor

SCSCI 3330 Soil Morphology and Classification 3 Credits

Morphology and classification of soils, interpreting and using soil survey information, describing and mapping soil properties.

Components: Laboratory, Class

Prereqs/Coreqs: P. SCSCI 2230

SCSCI 3340 Soil Nutrient Management 3 Credits

Management of nutrients in agrosystems and its affects on the equality of our environment. Application of soil fertility principles to fields and farms. Development of state-compliant nutrient management plans.

Components: Laboratory, Class

Prereqs/Coreqs: P. ENVHORT 1240 or SCSCI 1240 or ENVHORT 1320 OR SCSCI 1260 or SCSCI 2230 or consent of instructor

SCSCI 3350 Soil Fertility and Fertilizers 3 Credits

In-depth exploration of the physical, chemical, and biological properties of soils in relation to productivity and management. Discussion of the use, composition, and production of soil amendments including lime, fertilizers, and manure. Laboratory techniques for soil testing and interpretations of soil test results.

Components: Laboratory, Class

Prereqs/Coreqs: P. SCSCI 2230 and CHEMISTRY 1050 or CHEMISTRY 1140 or CHEMISTRY 1450

SCSCI 3360 Applied Agricultural Hydrology 3 Credits

Applied, hands-on, field-based course designed to provide students with the skill set necessary to monitor surface and groundwater resources and understand the effects of agricultural practices on water quality. This course will be of interest to students pursuing careers in agriculture, horticulture production, natural resource conservation and management, civil and environmental engineering, and reclamation.

Components: Field Studies, Laboratory, Class

Prereqs/Coreqs: P. SCSCI 2230 or consent of instructor

SCSCI 3380 Special Problems in Soil Science 1-3 Credits

Individual study in specialized areas of soils.

Components: Independent Study

Prereqs/Coreqs: P. SCSCI 2230 or consent of instructor

SCSCI 3390 Special Problems in Crop Science 1-3 Credits

Crop experimentation or research interpretation in breeding, physiology, crop production, or crop chemicals.

Components: Independent Study

Prereqs/Coreqs: P. SCSCI 1240 or ENVHORT 1240 and consent of instructor

SCSCI 3410 Regional Geomorphology and Soil Classification 1-3 Credits

Soil and landscape description and classification on a regional scale. The course will focus on a different regions and soils each semester.

Components: Class

Prereqs/Coreqs: P. SCSCI 2230 and instructor consent

SCSCI 3750 Soil and Crop Science Internship 3-6 Credits

Supervised experiential learning opportunities in collaboration with businesses and public agencies related to soil and crop science.

Components: Field Studies

Prereqs/Coreqs: P. 45 credits completed or IP and 12 credits of SCSCI completed or IP and good standing, and approval of internship coordinator

SCSCI 3850 Pre-Capstone Seminar in Plant and Soil Sciences 1 Credit

This course will instruct students in the formation of a proposal for their capstone experience/project. Students will engage in professional development activities.

Components: Seminar

Cross Offering: ENVHORT 3850, RECLAM 3850

Prereqs/Coreqs: P. SCSCI 1240 / ENVHORT 1240 or ECORES 1010, and junior standing, or consent of instructor

SCSCI 4240 Plant Breeding 4 Credits

Students will study the methods and principles used for the genetic improvement of important agronomic and horticultural crops. Topics include plant reproduction and pollination; gene recombination, structure and inheritance; use of mutations, fertility-regulating mechanisms, induction of polyploidy and biotechnology in plant improvement; plant selection; breeding of self-pollinated, cross-pollinated and clonally propagated crops; and establishment of field plots, recording data and use of statistics to analyze genetic traits and experimental treatments used to modify plant genomes.

Components: Class, Laboratory

Prereqs/Coreqs: P. ENVHORT 1240 or SCSCI 1240 or BIOLOGY 1350 or BIOLOGY 3330 or consent of instructor

SCSCI 4250 Weed Science 3 Credits

Identification of weeds; chemical, biological and cultural methods of control; influence on production.

Components: Laboratory, Class

Prereqs/Coreqs: P. ENVHORT 1240 or SCSCI 1240 or consent of instructor

SCSCI 4310 Capstone Experience in Plant and Soil Sciences 3 Credits

A capstone course for students in their last year of study focused on solving practical agronomic, horticultural, or environmental problems using knowledge and skills gained through coursework and experience.

Components: Practicum

Cross Offering: ENVHORT 4310, RECLAM 4310

Prereqs/Coreqs: P. ENVHORT 3850 / SCSCI 3850 / RECLAM 3850 and Junior Standing or Consent or Instructor

SCSCI 4320 Forage Crops 3 Credits

Plants that provide feed for domestic animals, particularly emphasizing the methods of production and management of grass and legume crops and the harvesting and processing of quality hay, pasturage, and silage.

Components: Laboratory, Class

Prereqs/Coreqs: P. ENVHORT 1240 or SCSCI 1240 or ANSCI 1000 or consent of instructor

SCSCI 4340 Plant Physiology 3 Credits

In-depth coverage of various principles and concepts pertaining to plant physiology including plant cellular constituents and their biosynthesis, photosynthesis, respiration, plant water relations, mineral nutrition, and assimilation of inorganic nutrients, transport processes in plant cells and tissues, the physiological aspects of vegetative growth and plant reproduction, signal transduction, physiological effects of plant hormones, and plant responses to biotic and abiotic stresses.

Components: Class, Laboratory

Prereqs/Coreqs: P. (ENVHORT 1240 or SCSCI 1240) and (BIOLOGY 1350 or BIOLOGY 1650) and junior standing or consent of instructor

SCSCI 4350 Soil and Water Conservation 3 Credits

The application of physical, chemical, and biological principles to soil and water conservation.

Components: Class, Laboratory

Prereqs/Coreqs: P. SCSCI 2230

SCSCI 4360 Soil Microbiology 3 Credits

This course will provide an introduction to soil microorganisms, soil ecology, microbial activity in the context of biogeochemical cycling, plant-microbe interactions, influence of soil microbes on plant growth and development, effects of cropping systems on microbial diversity, and management of soil microbes in different ecosystems.

Components: Laboratory, Class

SCSCI 4370 Physical Properties of Soils 3 Credits

Physical properties, moisture relations, and methods of physical analysis of soil with respect to soil structure, soil water, soil air, and soil temperature.

Components: Laboratory, Class

Prereqs/Coreqs: P. SCSCI 2230 or consent of instructor

SCSCI 4380 Undergraduate Research in Soil Science 1-3 Credits

Students will conduct research projects directed by faculty in Soil and Crop Science.

Components: Research

Prereqs/Coreqs: P. SCSCI 1240 or ENVHORT 1240

SCSCI 4390 Undergraduate Research in Crop Science 1-3 Credits

Students will conduct research projects with faculty in Soil and Crop Science.

Components: Research

Prereqs/Coreqs: P. SCSCI 1260 or SCSCI 1240 or ENVHORT 1240

SCSCI 4530 Plant Pathology 3 Credits

This course covers the major aspects of plant disease including abiotic and biotic causes, disease and symptom recognition, how disease occurs, and methods and techniques for prevention and control.

Components: Laboratory, Class

Cross Offering: BIOLOGY 4530

Prereqs/Coreqs: P. ENVHORT/SCSCI 1240 and BIOLOGY 1350 (or BIOLOGY 1650) and Junior Standing or Consent of Instructor