SOIL, WATER, AND ECOSYSTEM SCIENCES

Not all courses are offered every semester. Refer to the schedule of courses for each term's specific offerings.
More Info (https://one.uf.edu/soc/)

Unless otherwise indicated in the course description, all courses at the University of Florida are taught in English, with the exception of specific foreign language courses.

Department Information

The Soil, Water, and Ecosystem Sciences Department researches and teaches about soil, water, and environmental sciences in urban, agricultural, and natural ecosystems. Since its origins over 100 years ago, the department has made significant contributions to improving the productivity of Florida's agriculture, helping protect the state's unique ecosystems, and contributing to soil and water science at national and international levels.
Website (https://soils.ifas.ufl.edu/)

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Map (http://campusmap.ufl.edu/#/index/0495)

Curriculum

- Combination Degrees
- Environmental Management in Agriculture and Natural Resources | Interdisciplinary Studies
- Interdisciplinary Studies | Environmental Management in Agriculture and Natural Resources UF Online
- Soil, Water, and Ecosystem Sciences
- Soil, Water, and Ecosystem Sciences Minor

Courses

AGG 4502 Nanotechnology in Food, Agriculture, and Environment 3 Credits
Grading Scheme: Letter Grade
Application of nanotechnology in crop production, food processing and preservation, and environmental remediation; behavior of engineered nanoparticles in plant, soil and the environment, and environmental toxicology and regulations of engineered nanoparticles.
Prerequisite: SWS 3022.
Attributes: Artificial Intelligence

ALS 3133 Agricultural and Environmental Quality 3 Credits
Grading Scheme: Letter Grade
Analysis of effects of agriculture on environmental quality; emphasis on agricultural wastes and practices; potential for using agricultural systems for disposal of other wastes; effects of pollution on the agricultural environment.
Prerequisite: ABE 2062 or BOT 2010C or BSC 2005 or BSC 2010 or BSC 2862 or EVR 2001 or SWS 2008.

SWS 2007 The World of Water 3 Credits
Grading Scheme: Letter Grade
Introductory course addressing the roles of water in the environment. Topics range from basic properties of water to importance of water to development of human civilizations to worldwide distribution of water and its importance to earth's ecosystems. This course affords students the ability to critically examine and evaluate the principles of the scientific method, model construction, and use the scientific method to explain natural experiences and phenomena.
Attributes: General Education - Physical Science

SWS 2008 Land and Life 3 Credits
Grading Scheme: Letter Grade
Course will focus on relationships between human activities and soil and environmental quality. Lectures will concentrate on fundamentals of soil and environmental science, using case studies to illustrate basic principles. Intended for non-majors.
Attributes: General Education - Biological Science

SWS 2801 Unintended Consequences In The Environment 3 Credits
Grading Scheme: Letter Grade
Humans' impact on the Earth is so profound that a new geological epoch - the Anthropocene - has begun. Human decisions often have unintended effects on the environment. For example, Indonesia government jeopardized the conservation efforts of the Javan hawk eagle by declaring it a National Rare animal. In another example, subsidies that promote energy-efficient appliances often backfire by increasing energy consumption and greenhouse gas emissions. Why did these unintended consequences happen? How can we better predict and prevent them? To answer these questions, we will seek to explore the complex relationships between humans and the environment using a systems approach. This course affords students the ability to critically examine and evaluate the principles of the scientific method, model construction, and use the scientific method to explain natural experiences and phenomena.
Attributes: Quest 2, General Education - Biological Science

SWS 3022 Introduction to Soils in the Environment 3 Credits
Grading Scheme: Letter Grade
Fundamentals of soil science emphasizing the physical, chemical, and biological properties of soils in relation to growth of native and agricultural plants and environmental uses.
Prerequisite: Junior or Senior standing.

SWS 3022L Introduction to Soils in the Environment Laboratory 1 Credit
Grading Scheme: Letter Grade
Hands-on exposure to soils-related properties and processes.
Prerequisite: BSC 2005 or BSC 2010.
Corequisite: SWS 3022.

SWS 4116 Environmental Nutrient Management 3 Credits
Grading Scheme: Letter Grade
Consumption, existing reserves, formulation, chemical and physical properties, and manufacture of commercial fertilizers; basic chemical reactions of fertilizer materials with the soil and the fate of the nutritional elements whether it be loss by leaching, plant uptake, fixation or soil retention.
Prerequisite: SWS 3022.

SWS 4180 Earth System Analysis 3 Credits
Grading Scheme: Letter Grade
Analysis of global-scale interdependences between climate, biogeochemical cycles and humans using a systems approach.
Prerequisite: MAC 2233 or PHY 2048.

SWS 4204 Urban Soil and Water Systems 3 Credits
Grading Scheme: Letter Grade
Issues and opportunities related to soil and water quality in urban systems. Students will learn and discuss consequences of human population growth on soil and water systems in urban areas.
Prerequisite: SWS 3022.

SWS 4207 Sustainable Agricultural and Urban Land Management 3 Credits
Grading Scheme: Letter Grade
Agricultural and urban water quality issues in Florida, their bases, land and nutrient management strategies and the science and policy behind Best Management Practices (BMPs). Students will learn to evaluate BMP research and analyze its role in determining practices and policies that protect water quality.
Prerequisite: SWS 3022 or instructor permission.

SWS 4223 Environmental Biogeochemistry 3 Credits
Grading Scheme: Letter Grade
To gain understanding of the earth as a biogeochemistry system in the context of global change.
Prerequisite: (BSC 2005 and BSC 2005L) or (BSC 2010 and BSC 2010L) and (CHM 2045 and CHM 2045L).

SWS 4231C Soil, Water and Land Use 3 Credits
Grading Scheme: Letter Grade
Suitabilities and limitations of soils for different uses; using soil surveys and related information to plan use/management of land; behavior of water in soils and landscapes; policies for and implications of water allocation among urban, agricultural and natural resource uses.
Prerequisite: Junior or Senior standing.

SWS 4233 Soil and Water Conservation 3 Credits
Grading Scheme: Letter Grade
Soil and water resources, historical erosions and sediment problems, geologic vs. accelerated erosion, erosion prediction equations and government conservation programs; water conservation, irrigation, drainage and salinity; stormwater management; and case studies in erosion and sedimentation.
Prerequisite: Junior or Senior standing.

SWS 4244 Wetlands 3 Credits
Grading Scheme: Letter Grade
Introduces wetland ecosystems with emphasis on principles and problems associated with their functions and values as related to water quality. Become familiar with basic and applied concepts in hydrology, soils, and vegetation of both constructed and natural wetlands.
Prerequisite: Junior or Senior standing.

SWS 4245 Water Resource Sustainability 3 Credits
Grading Scheme: Letter Grade
Quantitative effects of human impacts on hydrologic ecosystems (aquifers, watersheds, coastal zones, lakes, and wetlands). Case studies illustrate detrimental effects of unsustainable resource utilization and beneficial management strategies.
Prerequisite: Junior or Senior standing.

SWS 4303C Soil Microbial Ecology 3 Credits
Grading Scheme: Letter Grade
Occurrence and activities of soil microorganisms and their influence on soil productivity and environmental quality.
Prerequisite: (BSC 2005 and BSC 2005L) or (BSC 2010 and BSC 2010L).

SWS 4307 Ecology of Waterborne Pathogens 3 Credits
Grading Scheme: Letter Grade
Survival strategies, gene regulation and metabolism of waterborne pathogens. Methods for microbe detection and control.
Prerequisite: MCB 3020 or MCB 3023 or MCB 4203, or equivalent.

SWS 4451 Soil and Water Chemistry 3 Credits
Grading Scheme: Letter Grade
Physico-chemical processes such as mineral weathering and formation, sorption, and ion exchange. Also includes introduction to diffuse double-layer theory.
Prerequisite: Junior or Senior standing.

SWS 4504 Aquatic Toxicology: Science and Applications 3 Credits
Grading Scheme: Letter Grade
Introduces foundational knowledge and concepts of the field of aquatic toxicology. Examines how environmental and chemical properties influence the fate and bioavailability of contaminants in aquatic environments; introduces principles of toxicology and methods used to study aquatic toxicology, as well as applications of knowledge gained from aquatic toxicology studies.
Prerequisite: ((BSC 2005 and BSC 2005L) or (BSC 2010 and BSC 2010L)) and ((CHM 2045 and CHM 2045L) or (CHM 2046 and CHM 2046L)).

SWS 4550 Soils, Water and Public Health 3 Credits
Grading Scheme: Letter Grade
Important instances where soil and water science and public health overlap; develop skills required for competency in both disciplines.
Prerequisite: (CHM 2045 and CHM 2046 and BSC 2010) or instructor permission.

SWS 4602C Soil Physics 3 Credits
Grading Scheme: Letter Grade
Physical processes and properties of soils that influence optimum growth of plants as well as potential for groundwater pollution from agrochemicals and applied wastes. Primary emphasis is given to basic concepts of transport and retention for water and solutes; secondary emphasis is given to air and heat in the root zone of the soil profile; and limited attention is given to mechanical properties of soil that affect the proliferation of plant roots.
Prerequisite: MAC 2311 and PHY 2004 and SWS 3022.

SWS 4715C Environmental Pedology 4 Credits
Grading Scheme: Letter Grade
Study and analysis of soil in the environment and the factors responsible for soil formation and geographic distribution. Development of hydric soil criteria and hydric soil indicators. Emphasis on morphology or hydric/ non-hydric soils and introduction to diagnostic horizons and soil classification. Course also includes abs on soil field techniques.
Prerequisite: SWS 3022.

SWS 4720C GIS in Soil and Water Science 3 Credits
Grading Scheme: Letter Grade
Basic, practical understanding of GIS concepts, technical issues, and applications to soil and water science using ArcGIS geographic information system.
Prerequisite: Junior or Senior standing.

SWS 4800 Environmental Soil and Water Monitoring Techniques 3 Credits
Grading Scheme: Letter Grade
Introduces the principles, objectives, and practices in environmental monitoring. Learn the proper techniques in planning for monitoring projects, sampling design, sample collection, basic principles of laboratory analysis, and basic data analysis. Also introduces and emphasizes quality assurance and quality control requirements.
Prerequisite: BSC 2010 and BSC 2010L and CHM 2045 and CHM 2045L.

SWS 4900 Supervised Extension Experience in Soil and Water Sciences 0-3 Credits
Grading Scheme: S/U
Firsthand, authentic extension experiences in agricultural and life sciences under the supervision of a faculty member. Projects may involve program planning, development, implementation, and evaluation.
Prerequisite: Instructor permission.

SWS 4905 Individual Work 1-3 Credits
Grading Scheme: Letter Grade
Selected topics for qualified students.
Prerequisite: 8 credits of SWS courses and instructor permission.

SWS 4911 Supervised Research in Soil and Water Science 0-3 Credits
Grading Scheme: S/U
Provides firsthand, supervised research. Projects may involve inquiry, design, investigation, scholarship, discovery, or application.
Prerequisite: Instructor permission.

SWS 4915 Honors Thesis Research in Soil and Water Science 0-3 Credits
Grading Scheme: S/U
Independent research in soil and water science leading to an honors thesis. Student will be mentored by a faculty member. Projects may involve inquiry, design, investigation, scholarship, discovery or application.
Prerequisite: junior standing, upper division GPA of 3.75 or higher and completed honors thesis proposal on file.

SWS 4932 Special Topics in Soil and Water Science 1-3 Credits
Grading Scheme: Letter Grade
Variable topics designed to meet students' needs and interests.
Prerequisite: Instructor permission.

SWS 4941 Full-time Practical Work Experience in Soil and Water Science 1-3 Credits
Grading Scheme: S/U
Practical work must be a new experience and related to field of study.
Prerequisite: prior arrangement with advisor, and department and dean permissions.