SOIL AND WATER SCIENCES

AGG 5607 Communicating in Academia 3 Credits
Grading Scheme: Letter Grade
Teaching graduate students about academic writing, specifically focused on research proposals, theses, dissertations, manuscripts, grant proposals, and CVs. Also teaching students about aspects of academic writing that are not normally part of graduate curriculum but are necessary to succeed.

AGG 6503 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 toxicity and regulations of engineered nanoparticles.

ALS 5027 Reusable Learning Objects 1 Credit, Max 2 Credits
Grading Scheme: Letter Grade
Developing online learning material using a variety of modern digital media, including audio recordings, videos, photographs, and graphics. Gain knowledge on how to organize material, present and describe learning content, and formulate effective assessment questions which reinforce learning.
Prerequisite: Department approval is required to ensure students have basic knowledge in Windows OS; web browsing; Power Point; a robust/high-speed Internet connection; and basic knowledge in environmental sciences or agriculture and life sciences.

ALS 5155 Global Agroecosystems 3 Credits
Grading Scheme: Letter Grade
Focusing on the principles of agroecology and presentation of topics that integrate ecological with agricultural principles to optimize resource conservation, productivity, societal benefit, and profitability.
Prerequisite: SWS 3022 or SWS 5050 & ALS 3153 & AGR 4214C or equivalents.

CWR 6537 Contaminant Subsurface Hydrology 3 Credits
Grading Scheme: Letter Grade
Physical-chemical-biological concepts and modeling of retention and transport of water and solutes in unsaturated and saturated media. Applications of environmental aspects of soil and groundwater contamination.
Prerequisite: MAP 2302 or 4341 or equivalent; CGS 2420 or equivalent; SWS 4602C or ABE 6252 or CWR 5125 or CWR 5127 or equivalent; or EES 6208 or equivalent.

SWS 5050 Soils for Environmental Professionals 3 Credits
Grading Scheme: Letter Grade
Fundamentals of soil properties and processes that explain the central role soils play in the environment. Geared to environmental professionals with little knowledge of soil science. Also offered as a distance education course.

SWS 5050L Soils for Environmental Professionals Laboratory 1 Credit
Grading Scheme: Letter Grade
Hands-on laboratory experience with many tools and techniques used in soil and water science, in relation to the environment.
Corequisite: SWS 5050: Soils for Environmental Professionals or consent of instructor.

SWS 5115 Environmental Nutrient Management 3 Credits
Grading Scheme: Letter Grade
Consumption, manufacture, properties, and reserves of fertilizer materials. Methods of application, effects on soil reaction, and plant requirements of fertilizer nutrients. Understanding specific fertilizer reactions. Also offered as a distance education course.
Prerequisite: SWS 3022 or SWS 5050: Soils for Environmental Professionals.

SWS 5132 Tropical Soil Management 3 Credits
Grading Scheme: Letter Grade
Characteristics and management of tropical soils. Technologies that minimize industrial inputs.
Prerequisite: SWS 3022 or SWS 5050.

SWS 5182 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: None MAC 2233, PHY 2048, or Similar Would Be Useful But Not A Requirement.

SWS 5208 Sustainable Agricultural and Urban Land Management 3 Credits
Grading Scheme: Letter Grade
Studying 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 equivalent course or with instructor approval.

SWS 5224 Environmental Biogeochemistry 3 Credits
Grading Scheme: Letter Grade
Overviewing of the biogeochemical processes affecting elemental cycling (carbon, nitrogen, phosphorus, sulfur) in global environmental systems.
Prerequisite: BSC 2009 and BSC 2009L or equivalent courses, OR BSC 2010 and BSC 2010L or equivalent courses, OR CHM 2045 and CHM 2045L or equivalent courses.

SWS 5234 Environmental Soil, Water, and Land Use 3 Credits
Grading Scheme: Letter Grade
Suitability of soils for different uses. Proper use of soil survey reports, topographic maps, and related information. Relationships between land uses and water behavior in soils and landscapes. Water use and allocation. Also offered as a distance education course.

SWS 5235 South Florida Ecosystems 3 Credits
Grading Scheme: Letter Grade
Five modules address major disciplines of science and interest. Modules focus on broad subject areas critical to understanding this framework and man's interaction with South Florida ecosystems.

SWS 5246 Water Resource Sustainability 3 Credits
Grading Scheme: Letter Grade
Quantitative description of human impacts on hydrologic ecosystems (aquifers, watersheds, coastal zones, lakes, and wetlands). Case studies show the detrimental effects of unsustainable resource use and beneficial management strategies. Also offered as a distance education course.

SWS 5247 Hydric Soils 2 Credits
Grading Scheme: Letter Grade
Concepts, field identification, and delineation of hydric soils. Instruction in accordance with the National Technical Committee for Hydric Soils and with regulatory agencies. Also offered as a distance education course.
SWS 5248 Wetlands and Water Quality 3 Credits
Grading Scheme: Letter Grade
Introduction to natural and constructed wetland ecosystems. Problems associated with eutrophication and water quality. Hydrology, soils, and biogeochemistry. Also offered as a distance education course.
Prerequisite: CHM 2040.

SWS 5305C Soil Microbial Ecology 3 Credits
Grading Scheme: Letter Grade
Occurrence and activities of soil microorganisms and their influence on soil productivity and environmental quality. Also offered as a distance education course.
Prerequisite: SWS 3022 or SWS 5050, MCB 2000C.

SWS 5308 Ecology of Waterborne Pathogens 3 Credits
Grading Scheme: Letter Grade
Prerequisite: MCB 3020, or MCB 3023, or MCB 4203, or equivalent.

SWS 5406 Soil and Water Chemistry 3 Credits
Grading Scheme: Letter Grade
Theoretical background and current approaches to agricultural and environmental problems. Also offered as a distance education course.
Prerequisite: SWS 3022 or SWS 5050; CHM 3120.

SWS 5424C Soil Chemical Analysis 3 Credits
Grading Scheme: Letter Grade
Practical and theoretical aspects of instrumentation and techniques commonly used in analyzing soils and plants.
Prerequisite: CHM 3120.

SWS 5551 Soils, Water, and Public Health 3 Credits
Grading Scheme: Letter Grade
Highlights important instances where soil and water science and public health overlap. Develops skills required for competency in both disciplines.
Corequisite: Graduate status.

SWS 5605C Environmental Soil Physics 3 Credits
Grading Scheme: Letter Grade
Transport processes for water, solutes, gases, and heat in the root zone. Important soil properties (physical, chemical, and biological) that influence the transfer processes characterized in the field and laboratory. Also offered as a distance education course.
Prerequisite: CHM 2040, MAC 2312, PHY 2004, SWS 5050.

SWS 5716C Environmental Pedology 4 Credits
Grading Scheme: Letter Grade
Soils in the environment. Heavily oriented toward field applications of pedological principles and processes. Also offered as a distance education course.
Prerequisite: SWS 3022, SWS 5050, or consent of instructor.

SWS 5721C GIS in Land Resource Management 3 Credits
Grading Scheme: Letter Grade
Introduction to basic concepts and use of "Arc GIS" to address land resource management issues. Also offered as a distance education course.

SWS 5805 Environmental Soil and Water Monitoring Techniques 3 Credits
Grading Scheme: Letter Grade
Introducing students to the principles, objectives, and practices in environmental monitoring. Students will learn the proper techniques in planning for monitoring projects, sampling design, sample collection, basic principles of laboratory analysis, and basic data analysis. Quality assurance and quality control requirements are introduced and emphasized.
Prerequisite: BSC 2010 & BSC 2010L; CHM 2045 & CHM 2045L.

SWS 6134 Soil Quality 3 Credits
Grading Scheme: Letter Grade
State-of-the-art studies/knowledge on soil quality. Principle assessment of soil quality with respect to biological production, plant and animal health, food security, and environmental quality. Also offered as a distance education course.
Prerequisite: SWS 5050 or consent of instructor.

SWS 6136 Soil Fertility 3 Credits
Grading Scheme: Letter Grade
Principles of advanced soil fertility, including soil chemical properties, crop management practices, plant nutritional requirements, soil fertility amendments, and physiological aspects of plant growth.
Prerequisite: SWS 4116, 4213C, SWS 5050 or SWS 5406 or EES 4201.

SWS 6209 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 5050

SWS 6262 Soil Contamination and Remediation 3 Credits
Grading Scheme: Letter Grade
Interdisciplinary study on current topics of soil contamination (types, sources, pathways, impacts, and fates) and soil remediation technologies (chemical, physical, biological, and thermal). Also offered as distance education course.
Prerequisite: SWS 4213C or equivalent.

SWS 6323 Advanced Microbial Ecology 3 Credits
Grading Scheme: Letter Grade
Phylogeny and evolution; diversity of habitat; genetic exchange.
Prerequisite: SWS 5305C or consent of instructor.

SWS 6366 Biodegradation and Bioremediation 3 Credits
Grading Scheme: Letter Grade
Principles of biodegradation of toxic organic chemical; practices in conducting biodegradation studies in soils and water, and in microbial aspects of bioremediation of contaminated soils and water.

SWS 6448 Biogeochemistry of Wetlands and Aquatic Systems 3 Credits
Grading Scheme: Letter Grade
Biogeochemical cycles of carbon, nitrogen, phosphorus, sulfur, and redox cations in wetland soils and sediments, as related to their agronomic, ecological, and environmental significance. Also offered as distance education course.

SWS 6454 Advanced Soil and Water Chemistry 3 Credits
Grading Scheme: Letter Grade
Fundamental principles of surface chemistry as applied to soil and subsurface materials in natural waters. Chemical equilibria in natural systems, aqueous geochemistry, interfacial properties of soil and sedimentary colloids, and sorption of pollutants.
Prerequisite: CHM 3400, or equivalent.
SWS 6456 Advanced Biogeochemistry 3 Credits  
Grading Scheme: Letter Grade  
Global elemental cycles in terrestrial, wetland, and aquatic systems as related to water quality, carbon sequestration, and climate change.

SWS 6722 Soil-Landscape Modeling 3 Credits  
Grading Scheme: Letter Grade  
Various concepts and quantitative methods to model and understand spatial distribution of soil properties.  
Prerequisite: SWS 5721C, STA 6166, SWS 5716C, or equivalent, or consent of instructor.

SWS 6813C Modeling Land Biogeochemistry 3 Credits  
Grading Scheme: Letter Grade  
Modeling the flow of water, carbon and nutrients from an Earth system perspective.  
Prerequisite: BSC 3307C or COP 3272 or MAC 2233 or PHY 2048 or SWS 4180 or ABE 5643C or PCB 5358 or SWS 5182 or SWS 5224.

SWS 6905 Special Problems 1-4 Credits, Max 8 Credits  
Grading Scheme: Letter Grade  
Laboratory, library, and/or field study and research in a particular aspect of soils. Also offered as a distance education course.  
Prerequisite: 15 credits of soil science.

SWS 6910 Supervised Research 1-5 Credits, Max 5 Credits  
Grading Scheme: S/U  
Also offered as a distance education course.

SWS 6920 Journal Colloquium in Environmental Science 1 Credit  
Grading Scheme: Letter Grade  
A discussion-based course to help graduate students in environmental science fields develop skills for critical analysis of literature while exploring current literature topics.  
Prerequisite: Environmental science/earth system science course or consent of the instructor.

SWS 6931 Seminar 1 Credit, Max 3 Credits  
Grading Scheme: Letter Grade  
Presentation of literature, methods of proposed thesis research, and selected topics.

SWS 6932 Topics in Soils 1-4 Credits, Max 8 Credits  
Grading Scheme: Letter Grade  
Also offered as a distance education course.  
Prerequisite: SWS 3022.

SWS 6940 Supervised Teaching 1-5 Credits, Max 5 Credits  
Grading Scheme: S/U  
Also offered as a distance education course.

SWS 6971 Research for Master's Thesis 1-15 Credits  
Grading Scheme: S/U  
Also offered as a distance education course.

SWS 6992 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)].