# SOIL, WATER, AND ECOSYSTEM SCIENCES

## Program Information

The Soil, Water, and Ecosystem Sciences Department offers Master of Science (thesis or professional non-thesis option) and Doctor of Philosophy degrees in soil, water, and ecosystem sciences with the following specializations: ecology, environmental science, hydrologic science, and soil science. The department also offers Master of Science (thesis or professional option) track in environmental science via distance education for place bound students (http://soils.ifas.ufl.edu/academics/degree-environscience.shtml (http://soils.ifas.ufl.edu/academics/degree-environscience.shtml/)). Requirements for the M.S. and Ph.D. degrees are given in the Graduate Degrees (http://gradcatalog.ufl.edu/graduate/degrees/) section of this catalog.

Students can also develop specializations in several interdisciplinary areas including biogeochemistry, ecology, geographic information systems, hydrologic science, tropical agriculture, turfgrass management, and wetland science. The Department emphasizes (but is not limited to) the following research areas:

- Nutrient, Pesticide, and Waste Management
- Soil, Water, and Aquifer Remediation
- Carbon Dynamics and Ecosystem Services
- Landscape Analysis and Modeling
- Wetlands and Aquatic Ecosystems

Interests of the student and faculty, the facilities, and funding available will determine the student's research area. A specific program of study is prepared by an appointed supervisory committee for each student. Students will present a thesis or dissertation in their major field (M.S. thesis option and Ph.D.). In addition, Ph.D. candidates must pass a qualifying examination covering several areas of soil and water science and related fields.

**Prerequisites:** Students who expect to do graduate work in the Soil, Water, and Ecosystem Sciences Department should hold a bachelor's degree from an accredited college or university with a major in soil, water, and ecosystem sciences or the equivalent background in another field of science. Graduate students should have backgrounds in biology, chemistry, physics, and mathematics and knowledge of basic soil and water science.

For more information, please see our website: http://soils.ifas.ufl.edu.

### Degrees Offered

## Degrees Offered with a Major in Soil, Water, and Ecosystem Sciences

- Doctor of Philosophy
  - without a concentration
  - concentration in Climate Science
  - concentration in Geographic Information Systems
  - concentration in Global Systems Agroecology
  - concentration in Hydrologic Sciences
  - concentration in Tropical Conservation and Development
  - concentration in Wetland Sciences
- Master of Science
  - without a concentration
  - concentration in Agroecology
  - concentration in Climate Science
  - concentration in Geographic Information Systems
  - concentration in Hydrologic Sciences
  - concentration in Research Methods
  - concentration in Tropical Conservation and Development
  - concentration in Wetland Sciences

Requirements for these degrees are given in the Graduate Degrees (http://gradcatalog.ufl.edu/graduate/degrees/) section of this catalog.

### Courses

## Soil, Water, and Ecosystem Sciences Departmental Courses

| Code | Title | Credits |
|---|---|---|
| AGG 5607 | Communicating in Academia | 3 |
| AGG 6503 | Nanotechnology in Food, Agriculture, and Environment | 3 |
| ALS 5155 | Global Agroecosystems | 3 |
| CWR 6537 | Contaminant Subsurface Hydrology | 3 |
| SWS 5050L | Soils for Environmental Professionals Laboratory | 1 |
| SWS 5050 | Soils for Environmental Professionals | 3 |
| SWS 5115 | Environmental Nutrient Management | 3 |
| SWS 5132 | Tropical Soil Management | 3 |
| SWS 5182 | Earth System Analysis | 3 |
| SWS 5208 | Sustainable Agricultural and Urban Land Management | 3 |
| SWS 5224 | Environmental Biogeochemistry | 3 |
| SWS 5234 | Environmental Soil, Water, and Land Use | 3 |
| SWS 5246 | Water Resource Sustainability | 3 |
| SWS 5247 | Hydric Soils | 2 |
| SWS 5248 | Wetlands and Water Quality | 3 |
| SWS 5305C | Soil Microbial Ecology | 3 |
| SWS 5308 | Ecology of Waterborne Pathogens | 3 |
| SWS 5406 | Soil and Water Chemistry | 3 |
| SWS 5424C | Soil Chemical Analysis | 3 |
| SWS 5551 | Soils, Water, and Public Health | 3 |
| SWS 5605C | Environmental Soil Physics | 3 |
| SWS 5716C | Environmental Pedology | 4 |
| SWS 5721C | GIS in Land Resource Management | 3 |
| SWS 5805 | Environmental Soil and Water Monitoring Techniques | 3 |
| SWS 6117 | Fertilizer Technology and Use | 3 |
| SWS 6134 | Soil Quality | 3 |
| SWS 6136 | Soil and Nutrient Diagnostics for Agricultural Production | 3 |
| SWS 6209 | Urban Soil and Water Systems | 3 |
| SWS 6323 | Advanced Microbial Ecology | 3 |
| SWS 6366 | Biodegradation and Bioremediation | 3 |
| SWS 6448 | Biogeochemistry of Wetlands and Aquatic Systems | 3 |
| SWS 6454 | Advanced Soil and Water Chemistry | 3 |
| SWS 6456 | Advanced Biogeochemistry | 3 |
| SWS 6722 | Soil-Landscape Modeling | 3 |
| SWS 6813C | Modeling Land Biogeochemistry | 3 |
| SWS 6905 | Special Problems | 1-4 |

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| SWS 6910 | Supervised Research | 1-5 |
| SWS 6920 | Journal Colloquium in Environmental Science | 1 |
| SWS 6931 | Seminar | 1 |
| SWS 6932 | Topics in Soils | 1-4 |
| SWS 6940 | Supervised Teaching | 1-5 |
| SWS 6950 | Professional Development in Soil, Water, and Ecosystem Sciences | 2 |
| SWS 6971 | Research for Master's Thesis | 1-15 |
| SWS 6992 | Aquatic Toxicology: Science and Applications | 3 |
| SWS 7979 | Advanced Research | 1-12 |
| SWS 7980 | Research for Doctoral Dissertation | 1-15 |

# College of Agricultural and Life Sciences Courses

| Code | Title | Credits |
|---|---|---|
| ALS 5156 | Agricultural Ecology Principles and Applications | 3 |
| ALS 5905 | Individual Study | 1-4 |
| ALS 5932 | Special Topics | 1-4 |
| ALS 6046 | Grant Writing | 2 |
| ALS 6166 | Exotic Species and Biosecurity Issues | 3 |
| ALS 6921 | Colloquium on Plant Pests of Regulatory Significance | 1 |
| ALS 6925 | Integrated Plant Medicine | 4 |
| ALS 6931 | Plant Medicine Program Seminar | 1 |
| ALS 6935 | Topics in Biological Invasions | 3 |
| ALS 6942 | Principles of Plant Pest Risk Assessment and Management | 3 |
| ALS 6943 | Internship in Plant Pest Risk Assessment and Management | 1-10 |
| ANS 6936 | Graduate Seminar in Animal Molecular and Cell Biology | 1-2 |
| BCH 5045 | Graduate Survey of Biochemistry | 4 |
| STA 6093 | Introduction to Applied Statistics for Agricultural and Life Sciences | 3 |
| STA 6329 | Matrix Algebra and Statistical Computing | 3 |

## Student Learning Outcomes

# soil and water science (PHD)

SLO 1 Theories and Concepts
Describe and explain theories and concepts in soil and water sciences

SLO 2 Skills
Apply, analyze, and synthesize content knowledge by identifying component parts, relationships and ideas

SLO 3 Professional Behavior
Display ethical behaviors, cultural sensitivity, teamwork, professional conduct and communication

# Soil and water science (MS)

SLO 1 Theories and Concepts in Soil and Water Sciences
Describe and explain theories and concepts in soil and water sciences

SLO 2 Skills
Apply, analyze, and synthesize content knowledge by identifying component parts, relationships and ideas

SLO 3 Professional Behavior
Display ethical behaviors, cultural sensitivity, professional conduct and effective communication