SOIL AND WATER SCIENCES | SOIL SCIENCE

Students majoring in soil and water sciences complete core requirements that stress a balance between an application of fundamental science principles in relation to environmental and agricultural systems and a foundation in the humanities, social sciences, business and natural science. A capstone experience through which a student will gain employment skills needed to solve environmental and agricultural problems is required.

About this Program

- **College:** Agricultural and Life Sciences
- **School:** Natural Resources and Environment
- **Degree:** Bachelor of Science
- **Credits for Degree:** 120
- **Specializations:** Soil Science | Water Science
- **Additional Information:** Soil Science | Water Science
- **Related Soil and Water Sciences Programs**

To graduate with this major, students must complete all university, college, and major requirements.

Students are trained in managing land and water resources in a wide range of ecosystems, including agricultural, forested, range, urban and wetlands through different degree programs. Specializations within this degree program are designed to give the student a strong background in soil and water sciences with a core of required courses taken during their junior and senior years. Beyond the core courses, students can select from several groups of electives that provide flexibility in their program.

Students may also prepare for professional schools by selecting appropriate elective courses.

Related Soil and Water Sciences Programs

- Combined Degree
- Soil and Water Sciences minor

Soil Science

Areas of study include soil and land use (with an emphasis on natural resources and the environment), environmental management (with an emphasis on agricultural and other applied aspects of soil sciences), physical and biological sciences (with an emphasis on physics, microbiology, botany and/or other biological sciences) and business (with an emphasis on policy, economics, business administration or entrepreneurship).

Critical Tracking records each student’s progress in courses that are required for entry to each major. Please note the critical-tracking requirements below on a per-semester basis.

Equivalent critical-tracking courses as determined by the State of Florida Common Course Prerequisites may be used for transfer students.

### Semester 1

- Complete 2 of 5 critical courses, excluding labs:
  - BSC 2005/BSC 2005L or BSC 2010/BSC 2010L
  - CHM 2045/CHM 2045L, CHM 2046/CHM 2046L, MAC 2311, PHY 2004/PHY 2004L
  - 2.0 GPA required for all critical-tracking courses
  - 2.0 UF GPA required

### Semester 2

- Complete 1 additional critical-tracking course, excluding labs
  - 2.0 GPA required for all critical-tracking courses
  - 2.0 UF GPA required

### Semester 3

- Complete 1 additional critical-tracking course, excluding labs
  - 2.0 GPA required for all critical-tracking courses
  - 2.0 UF GPA required

### Semester 4

- Complete 1 additional critical-tracking course, excluding labs
  - 2.0 GPA required for all critical-tracking courses
  - 2.0 UF GPA required

### Semester 5

- Complete all critical-tracking courses, including labs
  - 2.0 GPA required for all critical-tracking courses
  - 2.0 UF GPA required

To remain on track, students must complete the appropriate critical-tracking courses, which appear in bold. These courses must be completed by the terms as listed above in the Critical Tracking criteria.

This semester plan represents an example progression through the major. Actual courses and course order may be different depending on the student’s academic record and scheduling availability of courses. Prerequisites still apply.

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester One</th>
<th>Title</th>
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<td>AEB 2014</td>
<td>Economic Issues, Food and You (Gen Ed Social and Behavioral Sciences)</td>
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<td>Principles of Macroeconomics (Gen Ed Social and Behavioral Sciences)</td>
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<td>BSC 2005 &amp; 2005L</td>
<td>Biological Sciences and Laboratory in Biological Sciences (Critical Tracking; State Core Gen Ed Biological and Physical Sciences)</td>
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<td>BSC 2010 &amp; 2010L</td>
<td>Integrated Principles of Biology 1 and Integrated Principles of Biology Laboratory 1 (Critical Tracking; State Core Gen Ed Biological and Physical Sciences)</td>
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<td>State Core Gen Ed Composition; Writing Requirement</td>
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<tr>
<td>Electives</td>
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<td>Credits</td>
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Soil and Water Sciences | Soil Science

Semester Two
IUF 1000 What is the Good Life (Gen Ed Humanities) 3
MAC 2311 Analytic Geometry and Calculus 1 (Critical Tracking: State Core Gen Ed Mathematics) 4
MCB 2000 Microbiology 4
&amp; 2000L and Microbiology Laboratory
State Core Gen Ed Social and Behavioral Sciences 3
Elective 2

Credits 16

Semester Three
AEC 3033C Effective Oral Communication 3
or SPC 2608 or Introduction to Public Speaking
CHM 2045 General Chemistry 1 4
&amp; 2045L and General Chemistry 1 Laboratory (Critical Tracking: Gen Ed Physical Sciences)
Select one:
STA 2023 Introduction to Statistics 1 (Gen Ed Mathematics) 3-4
MAC 2312 Analytic Geometry and Calculus 2 (Gen Ed Mathematics)
Gen Ed Composition 3
Elective 2

Credits 15-16

Semester Four
CHM 2046 General Chemistry 2 4
&amp; 2046L and General Chemistry 2 Laboratory (Critical Tracking: Gen Ed Physical Sciences)
PHY 2004 Applied Physics 1 4
&amp; 2004L and Laboratory for Applied Physics 1 (Critical Tracking: Gen Ed Physical Sciences)
SWS 3022 Introduction to Soils in the Environment 4
&amp; 3022L and Introduction to Soils in the Environment Laboratory (Gen Ed Physical Sciences)
State Core Gen Ed Humanities 3

Credits 15

Semester Five
Select one:
CHM 2200 Fundamentals of Organic Chemistry 4
&amp; 2200L and Fundamentals of Organic Chemistry Laboratory
CHM 3120 Introduction to Analytical Chemistry 4
&amp; 3120L and Analytical Chemistry Laboratory
SWS 4451 Soil and Water Chemistry 3
Approved electives 8

Credits 15

Semester Six
AEC 3033C Research and Business Writing in Agricultural and Life Sciences (Writing Requirement) 3
SWS 4231C Soil, Water and Land Use 3
SWS 4715C Environmental Pedology 4
Approved elective 3

Credits 13

Summer After Semester Six
SWS 4905 Individual Work 1-3
or SWS 4941 or Full-time Practical Work Experience in Soil and Water Science
Approved elective 2

Credits 3-5

Semester Seven
SWS 4303C Soil Microbial Ecology 3

SWS 4602C Soil Physics (State Core Gen Ed Physical Sciences) 3
Approved electives 10

Credits 16

Semester Eight
SWS 4244 Wetlands 3
Approved electives 10-11

Credits 13-14

Total Credits 120

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<tr>
<th>Code</th>
<th>Title</th>
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<td>EES 4401</td>
<td>Public Health Engineering</td>
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<td>GEO 3162C</td>
<td>Introduction to Quantitative Analysis for Geographers</td>
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<td>GEO 3250</td>
<td>Climatology</td>
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<td>GEO 3280</td>
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<td>GLY 1150L</td>
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<td>SWS 4223</td>
<td>Environmental Biogeochemistry</td>
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<td>SWS 4233</td>
<td>Soil and Water Conservation</td>
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<td>SWS 4245</td>
<td>Water Resource Sustainability</td>
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<td>SWS 4307</td>
<td>Ecology of Waterborne Pathogens</td>
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<td>SWS 4550</td>
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<td>Supervised Research in Soil and Water Science</td>
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<td>Honors Thesis Research in Soil and Water Science</td>
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<td>SWS 4932</td>
<td>Special Topics in Soil and Water Science</td>
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Electives are chosen with the student’s advisor. There are four areas of specialization: soil, water and land use, environmental soil and water management, physical sciences and biological sciences. The student is encouraged to take electives from a range of course groupings that include biology, building construction, chemistry, earth science, environmental science, hydrology, mathematics, physics, policy, production systems, programming and statistics.

The soil and water sciences major enables students to identify and to describe the morphology of soils, to differentiate soils according to soil taxonomy and to distinguish soil forming factors. Students will use this knowledge to assess properties of soils in relation to plant growth and environmental uses and to apply this knowledge to different soil uses in agriculture, natural resources and urban settings.

Before Graduating Students Must

- Pass the soil and water sciences competency exam, given in four parts. One part will be given in each of these required courses:
  - SWS 3022 Soils in the Environment
  - SWS 4451 Soil and Water Chemistry
  - SWS 4602C Soil Physics
  - SWS 4715C Environmental Pedology
• Satisfactorily complete an approved research project in SWS 4905 or SWS 4941.
• Achieve minimum grades of C in AEC 3030C and AEC 3033C. These courses are graded using rubrics developed by a faculty team.
• Complete requirements for the baccalaureate degree, as determined by faculty.

Students in the Major Will Learn to
Student Learning Outcomes (SLOs)

Content
1. Apply fundamental principles of chemistry and physics in relation to critical zone processes in the pedosphere and hydrosphere.
2. Classify fundamental biological processes and differentiate basic organism function in soil and hydrologic systems.
3. Utilize field observations, case study evidence and experimental data to describe soil formation, morphology and interactions of the varied components of the hydrologic cycle.

Critical Thinking
4. Critically evaluate the sustainability of water resources in relation to human needs and natural ecosystem function.
5. Demonstrate quantitative problem-solving abilities by applying, analyzing and synthesizing content knowledge related to soil and water chemistry and physics.

Communication
6. Create, interpret and analyze written text, oral messages and multimedia presentations used in agricultural and life sciences.

Curriculum Map

<table>
<thead>
<tr>
<th>Courses</th>
<th>SLO 1</th>
<th>SLO 2</th>
<th>SLO 3</th>
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Assessment Types
• Case studies
• Field studies
• Lab assignments and reports
• Written analysis
• Exams