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

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

Model Semester Plan

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>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>AEB 2014</td>
<td>Economic Issues, Food and You (Gen Ed Social and Behavioral Sciences)</td>
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<tr>
<td>ECO 2013</td>
<td>Principles of Macroeconomics (Gen Ed Social and Behavioral Sciences)</td>
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<td>ECO 2023</td>
<td>Principles of Microeconomics (Gen Ed Social and Behavioral Sciences)</td>
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<tr>
<td>BSC 2005 &amp; 2005L</td>
<td>Biological Sciences and Laboratory in Biological Sciences</td>
<td>4</td>
</tr>
<tr>
<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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</tr>
<tr>
<td>State Core Gen Ed Composition; Writing Requirement</td>
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<td>3</td>
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</tbody>
</table>
Electives 4

**Semester Two**
- **Credits**: 14-15
- **SWS 4905**: Summer After Semester Six
- **SWS 4715C**: Approved elective
- **SWS 4231C**: Approved elective
- **AEC 3033C**: Semester Six

**Semester Three**
- **Credits**: 16
- **AEC 3030C**: State Core Gen Ed Social and Behavioral Sciences
- **Select one**: Semester Five
- **STA 2023**: Introduction to Statistics 1 (Gen Ed Mathematics)
- **MAC 2312**: Analytic Geometry and Calculus 2 (Gen Ed Mathematics)
- **Gen Ed Composition**: 3
- **Elective**: 2

**Semester Four**
- **Credits**: 15-16
- **CHM 2046**: General Chemistry 2
- **& 2046L**: General Chemistry 2 Laboratory (Critical Tracking: Gen Ed Physical Sciences)
- **PHY 2004**: Applied Physics 1
- **& 2004L**: Laboratory for Applied Physics 1 (Critical Tracking: Gen Ed Physical Sciences)
- **SWS 3022**: Introduction to Soils in the Environment
- **& 3022L**: Introduction to Soils in the Environment Laboratory (Gen Ed Physical Sciences)
- **State Core Gen Ed Humanities**: 3

**Semester Five**
- **Credits**: 15
- **Select one**: 4
- **CHM 3120**: Introduction to Analytical Chemistry and Analytical Chemistry Laboratory
- **SWS 4451**: Soil and Water Chemistry
- **Approved electives**: 8

**Semester Six**
- **Credits**: 15
- **AEC 3033C**: Research and Business Writing in Agricultural and Life Sciences (Writing Requirement)
- **SWS 4231C**: Soil, Water and Land Use
- **SWS 4715C**: Environmental Pedology
- **Approved elective**: 3

**Summer After Semester Six**
- **Credits**: 3-5
- **SWS 4905**: Individual Work
- **or SWS 4941**: or Full-time Practical Work Experience in Soil and Water Science
- **Approved elective**: 2

**Semester Seven**
- **Credits**: 10
- **SWS 4303C**: Soil and Water Conservation
- **SWS 4602C**: Environmental Biogeochemistry
- **Approved electives**: 10

**Semester Eight**
- **Credits**: 13-14
- **SWS 4244**: Introduction to Soils in the Environment
- **SWS 4932**: Honors Thesis Research in Soil and Water Science
- **SWS 4933**: Supervised Research in Soil and Water Science
- **Total Credits**: 120

**Approved Electives**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ALS 3133</td>
<td>Agricultural and Environmental Quality</td>
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<tr>
<td>EES 4401</td>
<td>Public Health Engineering</td>
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<tr>
<td>GEO 3162C</td>
<td>Introduction to Quantitative Analysis for Geographers</td>
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<tr>
<td>GEO 3250</td>
<td>Climatology</td>
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<tr>
<td>GEO 3280</td>
<td>Principles of Geographic Hydrology</td>
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<td>GLY 1150L</td>
<td>Florida Geology Laboratory</td>
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<td>SWS 2007</td>
<td>The World of Water</td>
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<td>SWS 2008</td>
<td>Land and Life</td>
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<td>SWS 3023L</td>
<td>Soil Judging</td>
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<td>SWS 4116</td>
<td>Environmental Nutrient Management</td>
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<td>SWS 4180</td>
<td>Earth System Analysis</td>
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<td>Sustainable Agricultural and Urban Land Management</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>
<td>Soils, Water and Public Health</td>
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<td>SWS 4720C</td>
<td>GIS in Soil and Water Science</td>
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<td>SWS 4905</td>
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<td>Honors Thesis Research in Soil and Water Science</td>
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<tr>
<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.

**Academic Learning Compact**

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>
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Assessment Types
• Case studies
• Field studies
• Lab assignments and reports
• Written analysis
• Exams