MS in Natural Resources with Emphasis in Soil, Environmental and Atmospheric Sciences

Master of Science in Soil, Environmental and Atmospheric Sciences

The MS degree in Natural Resources with an emphasis in Soil, Environmental and Atmospheric Sciences is designed to prepare students for academic careers in research and teaching or other advanced scientific or professional careers. Students entering the MS program are required to have a BS degree.

MS candidates conduct original research under the supervision of a faculty advisor or advisors and with the participation of a master’s committee. The Soil, Environmental and Atmospheric Sciences program expects students to take part in professional and educational activities by giving presentations at conferences and presenting seminars. MS candidates complete a thesis and are expected to publish their research results in peer-reviewed scientific journals. A non-thesis option is also available that requires additional coursework and a research project.

Degree Requirement

The degree program with emphasis in SEAS must include:

- 30 hours of graduate credit, with at least 15 hours comprised of 8000- or 9000-level courses.
- Not more than 12 hours of the minimum 30 hours are permitted for research, problems, special investigations and special readings.
- A minimum of one credit hour of graduate seminar must be included in each student’s graduate program.
- All students enrolled in graduate programs are required to participate in a supervised teaching activity.
- All students are required to attend a workshop on ethics and professionalism.
- Students must maintain a GPA of 3.0 (A=4.0) in all course work presented for the degree.

For an atmospheric science focus area, appropriate atmospheric science courses must be selected and approved in consultation with the student’s advisor and graduate thesis committee.

For a soil science focus area, at least 12 credit hours of soil science courses at the 7000, 8000, and 9000 levels, exclusive of problems and thesis research, must be included in the student’s graduate program.

For an environmental science focus area, at least six credit hours of environmental science courses at the 7000, 8000, and 9000 levels, exclusive of problems and thesis research, must be included in the student’s graduate program. To meet the six credit hour requirement, courses must be selected from the following list of approved environmental science courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATM_SC 7520</td>
<td>Environmental Biophysics</td>
<td>3</td>
</tr>
<tr>
<td>ENV_SC 7305</td>
<td>Environmental Soil Physics</td>
<td>3</td>
</tr>
<tr>
<td>ENV_SC 7306</td>
<td>Environmental Soil Physics Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>ENV_SC 7312</td>
<td>Environmental Soil Microbiology</td>
<td>3</td>
</tr>
<tr>
<td>ENV_SC 7318</td>
<td>Environmental Soil Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>ENV_SC 7320</td>
<td>Hydrologic and Water Quality Modeling</td>
<td>3</td>
</tr>
<tr>
<td>ENV_SC 8400</td>
<td>Solute Transport in the Vadose Zone</td>
<td>3</td>
</tr>
<tr>
<td>FOREST 7390</td>
<td>Watershed Management and Water Quality</td>
<td>3</td>
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<tr>
<td>FOREST 8390</td>
<td>Physical Hydrology</td>
<td>3</td>
</tr>
<tr>
<td>SOIL 7308</td>
<td>Soil Conservation</td>
<td>3</td>
</tr>
<tr>
<td>SOIL 7313</td>
<td>Soil Fertility and Plant Nutrition Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>SOIL 7314</td>
<td>Soil Fertility and Plant Nutrition</td>
<td>2</td>
</tr>
<tr>
<td>SOIL 7320</td>
<td>Genesis of Soil Landscape</td>
<td>4</td>
</tr>
<tr>
<td>SOIL 9422</td>
<td>Pedology</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits: 41

To complete the environmental science focus area, an additional six credit hours must be selected from courses listed above or from the following programs: biochemistry, biological engineering, biological sciences, chemical engineering, chemistry, civil and environmental engineering, fisheries and wildlife sciences, forestry, geography, geological sciences, and natural resources. Selection of these courses will be determined in consultation with faculty members serving on a student’s thesis committee.

Integrated B.S./M.S. Program

Undergraduate students enrolled in Environmental Sciences are eligible to apply for the integrated degree program in soil, environmental and atmospheric sciences that will enable outstanding undergraduates in Environmental Sciences to obtain a B.S. and a M.S. (thesis required) after the successful completion of both degree requirements in five years. The program provides a challenging curriculum that will include opportunities and training in undergraduate and graduate-level research and prepare the student for a successful professional career. Increasingly, employers in competitive technical fields are looking for highly-motivated students with graduate training to meet the demands for their workforce and this program will provide talented students with a unique and expedited pathway to develop their educational background and professional skills.

Overview

Undergraduate students in Environmental Sciences interested in the integrated B.S./M.S. program will be encouraged to participate in an undergraduate research experience during the summer of their sophomore year. They will apply and then be selected to enter the integrated B.S./M.S. program during the second semester of their junior year. Selected students will need to meet admission requirements for the Graduate School. Once selected the students will initiate work on their research during the summer of their junior year. During their senior year they will complete their undergraduate credits and can take up to 12 graduate-level credits (courses with numbering 7000 or higher) under MU’s dual enrollment program. After completing the B.S. degree, students will continue their research and take the remaining coursework on their M.S. plan of study necessary to meet the 30 credit hour minimum required by the Graduate School for the M.S. degree. Several scholarships are currently available at the University of Missouri to assist outstanding students for the costs of their undergraduate and graduate education and for conducting undergraduate research, including the Honors College Discovery Fellowships Program and CAFNR and Life Sciences Undergraduate Research Fellowships.

Notable Courses:

- ATM_SC 7520: Environmental Biophysics (3 credits)
- ENV_SC 7305: Environmental Soil Physics (3 credits)
- ENV_SC 7306: Environmental Soil Physics Laboratory (2 credits)
- ENV_SC 7312: Environmental Soil Microbiology (3 credits)
- ENV_SC 7318: Environmental Soil Chemistry (3 credits)
- ENV_SC 7320: Hydrologic and Water Quality Modeling (3 credits)
- ENV_SC 8400: Solute Transport in the Vadose Zone (3 credits)
- FOREST 7390: Watershed Management and Water Quality (3 credits)
- FOREST 8390: Physical Hydrology (3 credits)
- SOIL 7308: Soil Conservation (3 credits)
- SOIL 7313: Soil Fertility and Plant Nutrition (3 credits)
- SOIL 7314: Soil Fertility and Plant Nutrition Laboratory (2 credits)
- SOIL 7320: Genesis of Soil Landscape (4 credits)
- SOIL 9422: Pedology (3 credits)
Thesis/Non-Thesis Requirements

Thesis
A thesis, which is a research report of original research on a specialized soil, environmental or atmospheric science problem conducted by the student, must be presented to the student’s graduate committee and successfully defended.

Non-Thesis Option
Under special circumstances, a non-thesis program in the soil science, environmental science or atmospheric science focus area may be approved by the student’s advisory committee, the SEAS Emphasis Area Coordinator and the Director of Graduate Studies. Not more than 6 hours of the minimum 30 hours are permitted for non-thesis research, problems, special investigations and special readings. At least 15 hours of the minimum 30 hours must be 8000- or 9000-level courses. A minimum of one credit hour of graduate seminar must be included in each student’s graduate program. The student is required to participate in a supervised teaching activity and attend a workshop on ethics and professionalism. A student in the non-thesis option must form a graduate advisory committee and have that committee approve of the student taking the non-thesis option, the proposed course plan, and a project for the student to complete to meet the requirements of the non-thesis option. The student will complete a written report for the project which must be approved by the student’s advisory committee.

Admissions

Admission Contact Information
Dr. Stephen Anderson, graduate emphasis area coordinator (andersons@missouri.edu)
Soil, Environmental and Atmospheric Sciences
University of Missouri
302 Anheuser-Busch Natural Resources Building
Columbia, MO 65211 USA
(Tel. No. (573) 882-6303

Applicants are required to meet two sets of minimum qualifications for admission: the requirements of the MS in Natural Resources with emphasis in Soil, Environmental and Atmospheric Sciences (https://gradstudies.missouri.edu/gradecategory/natural-resources) and the minimum requirements of the Office of Graduate Studies (http://gradstudies.missouri.edu/admissions/eligibility-process). Because requirements vary, you must refer to a degree program's graduate admission page to learn about specific admission criteria, application deadlines, eligibility and application process. Your application materials will be reviewed by both the Office of Graduate Studies and the degree program to which you've applied before official admission to the University of Missouri.

Recommended Preparation
Appropriate undergraduate majors in preparation for graduate studies in the soil, environmental and atmospheric sciences emphasis area include: agronomy, atmospheric science, biochemistry, biology, biogeochemistry, botany, chemistry, earth science, civil and environmental engineering, environmental science, forestry, geosciences, hydrology, mathematics, microbiology, physics, soil science, and watershed management. Check with the Emphasis Area Coordinator for specific recommendations for preparation for each graduate focus area.

Completion of a BS Degree
Undergraduate GPA of 3.0 for the last 60 hours of coursework

- Atmospheric science focus area applicants: undergraduate program should include integral calculus and one year of college physics.
- Environmental science focus area applicants: undergraduate program should include general and organic chemistry, introductory biology, calculus, geology, physics, and ecology.
- Soil science focus area applicants: completed courses in general and organic chemistry, calculus, geology and physics. Inadequacies in courses must be remedied through additional course work immediately after admission.

Financial Aid from the Program
Check the School website (https://snr.missouri.edu/) or contact individual faculty for details on graduate assistantships that may be available.

Admission Procedures for the Integrated BS/MS
Students seeking admission into the program should submit an application to the SEAS Graduate Emphasis Area Coordinator at the beginning (i.e., January 30th) of the Spring semester of their junior year. A faculty committee will consider several criteria for admission into the Integrated B.S./M.S. Program including:

1. the student’s undergraduate GPA (60 or more credits; minimum GPA of 3.5 at the time of enrollment)
2. a formal statement of interest indicating the intended emphasis area (i.e., soil science, environmental science or atmospheric science)
3. three letters of recommendation with one letter being a formal nomination letter from a SEAS faculty member

A student who meets the eligibility requirements will be extended an offer of admission by the middle of the Spring semester. All students must select a faculty mentor/advisor after admission to the program. A faculty advisory committee will be selected for each student and they will meet during the semester to approve a course of study and assist the student in designing and conducting their research program. Students will prepare a research proposal to be reviewed and accepted by their advisory committee. After approval of the research proposal, students will initiate their research during the summer of their junior year. Formal application of the student into the Graduate School will take place during the final semester of the student’s senior year and is contingent on the student’s successful completion of B.S. degree requirements and meeting eligibility requirements for the graduate program. Students will be required to maintain a cumulative 3.0 GPA during the program, write an M.S. thesis and meet other M.S. degree requirements.

For more information about the program, contact either of the following people:

Dr. Stephen Anderson, Undergraduate Degree Program Coordinator
Environmental Sciences
University of Missouri
302 ABNR Bldg
Columbia, MO 65211 USA
Tel. No. (573) 882-6303
Fax No. (573) 884-5070
Email: andersons@missouri.edu
or

Dr. Stephen Anderson, Graduate Emphasis Area Coordinator
Soil, Environmental and Atmospheric Sciences
University of Missouri
302 ABNR Bldg
Columbia, MO 65211 USA
Tel. No. (573) 882-6303
Fax No. (573) 884-5070
Email: andersons@missouri.edu