Sustainable Development, M.S.

This interdisciplinary program equips students with higher-order learning skills as well as more practical, applied preparation for a variety of careers in sustainable development. The program’s goal is to produce trainees with not only the fundamental and theoretical understanding expected from more traditional graduate degree recipients, but also the highly marketable, professional skills of someone graduating from an applied field of study.

Learning Outcomes

Graduates will be able to:

- analyze problems, conduct research, and make policy recommendations on topics related to the United Nations Sustainable Development Goals (UN SDGs), and anticipate the social, economic, political, technological, human health, and environmental impacts of their proposed interventions;
- communicate science effectively and responsibly with diverse audiences, from technical peers to potential employers, policymakers and the public, as well as communicate across modern forms of media intended for public engagement and dissemination of advances toward sustainable development goals; and
- demonstrate qualities essential to thrive across a range of careers, including interpersonal skills (e.g., collaboration, teamwork, and cultural competence), problem-solving abilities (e.g., inquiry, critical thinking, and creativity) and professional skills (e.g., work ethic, responsible conduct, management, and leadership).

Requirements

The interdisciplinary Master of Science program in sustainable development requires a total of 30 s.h. of graduate credit to earn the degree without thesis. Students may choose to earn the degree with thesis. All students must maintain a cumulative g.p.a. of at least 2.75.

With the approval of their faculty advisors, students develop a study plan that satisfies the requirements of their chosen curriculum. All students must successfully complete the core courses and take two analytical and methods courses plus elective coursework that is focused around one of the United Nations Sustainable Development Goals (UN SDGs).

The thesis option requires completion of a project with a program partner (e.g., a community, nongovernmental organization (NGO), public agency, or private sector partner) and culminates in a required project portfolio.

The M.S. with a major in sustainable development requires the following coursework.

Core Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDG:4000</td>
<td>The United Nations Sustainable Development Goals: A Blueprint for a Sustainable Future</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:4000</td>
<td>The United Nations Sustainable Development Goals: A Blueprint for a Sustainable Future</td>
<td>3</td>
</tr>
<tr>
<td>CEE:5225</td>
<td>Communicating Data Through Stories</td>
<td>3</td>
</tr>
<tr>
<td>GRAD:5225</td>
<td>Building Future Leaders in Sustainable Development</td>
<td>3</td>
</tr>
<tr>
<td>SDG:5225</td>
<td>Sustainable Communities Lab I</td>
<td>3</td>
</tr>
</tbody>
</table>

Analytical and Methods Courses

Students choose two courses (at least 6 s.h.) offered by supporting programs. The courses provide students with training in analytical competencies necessary for sustainable development, including spatial analysis, statistics, informatics, data management, and decision analysis.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEE:5310</td>
<td>Informatics for Sustainable Systems</td>
<td>3</td>
</tr>
<tr>
<td>IGPI:5311</td>
<td>Water Quality and Flow</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:3050</td>
<td>Geospatial Programming</td>
<td>3</td>
</tr>
<tr>
<td>IGPI:3050</td>
<td>Introduction to Environmental Remote Sensing</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:3500</td>
<td>GIS for Environmental Studies</td>
<td>3</td>
</tr>
<tr>
<td>IGPI:3500</td>
<td>Geographic Visualization</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:4150</td>
<td>Health and Environment: GIS Applications</td>
<td>3</td>
</tr>
<tr>
<td>GHS:4150</td>
<td>GIS for Environmental Studies: Applications</td>
<td>3</td>
</tr>
<tr>
<td>IGPI:4150</td>
<td>Introduction to Geographic Databases</td>
<td>3</td>
</tr>
<tr>
<td>URP:6200</td>
<td>Analytic Methods I</td>
<td>3</td>
</tr>
<tr>
<td>PBAF:6200</td>
<td>Applied GIS for Planning and Policy Making</td>
<td>3</td>
</tr>
<tr>
<td>URP:6225</td>
<td>Spatial Analysis in Planning and Policy Making</td>
<td>3</td>
</tr>
<tr>
<td>PBAF:6225</td>
<td>Systems and Scenario Thinking</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives

Students complete at least 12 s.h. in elective coursework structured around the 2030 Sustainable Development Goals (SDGs). Students are required to focus on one SDG and complete four courses in that specialization area to provide depth in one area.

Affordable and Clean Energy

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>CBE:5405</td>
<td>Green Chemical and Energy Technologies</td>
<td>3</td>
</tr>
<tr>
<td>CEE:5410</td>
<td>Politics and Economics of the Food, Energy, Water Nexus</td>
<td>3</td>
</tr>
<tr>
<td>CHEM:4760</td>
<td>Radiochemistry: Energy, Medicine, and the Environment</td>
<td>3</td>
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</tbody>
</table>
### Clean Water and Sanitation

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEE:4102</td>
<td>Groundwater</td>
<td>3</td>
</tr>
<tr>
<td>CEE:4119</td>
<td>Hydrology</td>
<td>3</td>
</tr>
<tr>
<td>CEE:4150/CBE:4420</td>
<td>Environmental Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>CEE:4385</td>
<td>International Perspectives in Water Sciences and Management</td>
<td>3</td>
</tr>
<tr>
<td>CEE:5350</td>
<td>Watershed Hydrology and Ecosystem Processes</td>
<td>3</td>
</tr>
<tr>
<td>CEE:5440</td>
<td>Foundations of Environmental Chemistry and Microbiology</td>
<td>3</td>
</tr>
<tr>
<td>CEE:5460</td>
<td>Water Quality and Flow</td>
<td>3</td>
</tr>
<tr>
<td>OEH:4240</td>
<td>Global Quality and Flow</td>
<td>3</td>
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</tbody>
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### Climate Action

<table>
<thead>
<tr>
<th>Code</th>
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</thead>
<tbody>
<tr>
<td>CEE:4159/CBE:4459/GPI:4159</td>
<td>Air Pollution Control Technology</td>
<td>3</td>
</tr>
<tr>
<td>CEE:4180</td>
<td>Fundamentals of Atmospheric Science</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:3331</td>
<td>Human Dimensions of Climate</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:4470</td>
<td>Ecological Climatology</td>
<td>3</td>
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</table>

### Industry, Innovation, and Infrastructure

<table>
<thead>
<tr>
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<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG:3420</td>
<td>Sustainable and Green Building Concepts</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:5300/GHS:5300</td>
<td>Envisioning Future Worlds: Sustainable Development and Its Alternatives</td>
<td>3</td>
</tr>
<tr>
<td>URP:6202</td>
<td>Land Use Planning: Law and Practice</td>
<td>4</td>
</tr>
<tr>
<td>URP:6266/PBAF:6266</td>
<td>Transportation and Land Use Planning</td>
<td>3</td>
</tr>
</tbody>
</table>

### Responsible Consumption and Production

<table>
<thead>
<tr>
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<th>Title</th>
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</tr>
</thead>
<tbody>
<tr>
<td>CEE:4158/OEH:4920</td>
<td>Solid and Hazardous Wastes</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:3070/GHS:3070</td>
<td>Hungry Planet: Global Geographies of Food</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:4750/URP:4750</td>
<td>Environmental Impact Analysis</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:4770/AFAM:4770/GHS:4770</td>
<td>Environmental Justice</td>
<td>3</td>
</tr>
<tr>
<td>GHS:3560</td>
<td>Global Garbage and Global Health</td>
<td>3</td>
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</tbody>
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### Sustainable Cities and Communities

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>CEE:4107/CBE:4410</td>
<td>Sustainable Systems</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:3350</td>
<td>Urban Ecology</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:3400</td>
<td>Iowa Environmental Policy in Practice</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:3760/GHS:3760</td>
<td>Hazards and Society</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:4200/SUST:4200</td>
<td>Sustainability as a System Science</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:5300/GHS:5300</td>
<td>Envisioning Future Worlds: Sustainable Development and Its Alternatives</td>
<td>3</td>
</tr>
<tr>
<td>URP:6245/PBAF:6245</td>
<td>Growth Management</td>
<td>3</td>
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</tbody>
</table>

### The Biosphere (Life Below Water and Life on Land)

<table>
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<tr>
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<tr>
<td>CBE:5405</td>
<td>Green Chemical and Energy Technologies</td>
<td>3</td>
</tr>
<tr>
<td>CEE:5350</td>
<td>Watershed Hydrology and Ecosystem Processes</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:3310</td>
<td>Landscape Ecology</td>
<td>3</td>
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<tr>
<td>GEOG:3320/EES:3260</td>
<td>Wetlands: Function, Geography, and Management</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:3340</td>
<td>Ecosystem Services</td>
<td>3</td>
</tr>
</tbody>
</table>

### Admission

Applicants must meet the admission requirements of the Graduate College; see the Manual of Rules and Regulations and the Graduate College Admission Requirements on the Graduate College website and the sustainable development admission requirements.

Prospective students must hold a baccalaureate degree or the equivalent from an accredited institution with preparation appropriate for advanced study in the field of sustainability. Students with an undergraduate degree in natural and social sciences, technology, engineering, and/or mathematics will be well prepared to thrive in this interdisciplinary degree program. The program is intentionally designed to be inclusive for students coming from different and diverse academic backgrounds given the broad range of perspectives and expertise that are needed in moving society closer toward sustainable development goals.

Application materials must include:

- one- or two-page self-statement describing an applicant’s interest in the sustainable development program, how formal and informal experiences make the applicant a good fit for the program, and how the applicant can uniquely contribute to the program; the statement should briefly discuss the career path(s) the applicant intends to pursue upon completion of the degree;
- a résumé; and
- three letters of recommendation.
Applicants whose first language is not English must submit official test scores to verify English proficiency. They can verify English proficiency by submitting official test scores from the Test of English as a Foreign Language (TOEFL), the International English Language Testing System (IELTS), or the Duolingo English Test (DET).

Career Advancement

Graduates can obtain employment across a variety of sectors that intersect with sustainability and sustainable development, including jobs in public service at the local, state, or federal level in all areas related to the environment (e.g., watershed management coordinators, state natural resource departments, and sustainability directors for cities across the United States, analysts and scientists at governmental agencies such as the U.S. Department of Agriculture or the U.S. Environmental Protection Agency. Graduates may find employment in the private sector as consultants for industries seeking to improve the sustainability of their operations and processes (e.g., sustainable supply chain, waste management, minimization, and sustainability reporting, metric development, and management).

Graduates are better qualified for positions in the private sector including chief sustainability officer, director of sustainability, and sustainability project manager or coordinator. Opportunities also exist for careers in global development, working internationally with nongovernmental organizations (NGOs), and other organizations that strive to advance sustainable development goals worldwide, particularly in resource-constrained areas of the developing world. In addition, degree recipients are well positioned to pursue additional graduate studies toward a Ph.D., M.B.A., or J.D. degree.