Earth Science

MAJOR
CONCENTRATION IN ENVIRONMENTAL SCIENCE

Contact: Richard Russo (Chair), Department of Geography
Participating Faculty:
Professor: Precht (Geography)
Associate Professors: Allen (Geography), Bogart (Geography), Crawford (Chemistry), Moore (Physics), Norris (Chemistry), Pegg (Biology), Ramspott (Geography)
Assistant Professors: Flood (Geography), Wetherholt (Geography)
Lecturers: T. Edwards (Geography), A. Lewis (Geography)

- This is a multidisciplinary program administered by the Department of Geography.
- An optional internship is available in Earth Science.
- There is no minor in Earth Science.

Program Requirements

<table>
<thead>
<tr>
<th></th>
<th>MAJOR</th>
<th>ENV. SCIENCE CONC.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours Required in Geography:</td>
<td>37</td>
<td>35-40</td>
</tr>
<tr>
<td>Hours Required in Other Fields:</td>
<td>14-16</td>
<td>28-33</td>
</tr>
<tr>
<td>Total Hours Required:</td>
<td>51-53</td>
<td>66-70</td>
</tr>
</tbody>
</table>

Requirements for Major in Earth Science

1. Required Core Courses: (21 hours)
   GEOG 103/113 Physical Geography (GEP Group C)
   GEOG 207 Physical Geology and Geomorphology
   GEOG 208 Earth Systems History
   GEOG 275 Fund. of Geographic Data Handling (Tech. Fluency)
   MATH 109 Elements of Applied Probability and Statistics (Core Skill 3)
   GEOG 380 Research Methods in Geography

2. Required Supporting Science Sequence (8 hours)
   Complete one of the following science sequences:
   CHEM 201/202 General Chemistry I & II (GEP Group C)
   PHY 215/216 General Physics I & II (GEP Group C)
   PHY 261/262 Principles of Physics I & II (GEP Group C)
   ENES 102 Statics/220 Mechanics of Materials

3. Advanced Electives (9-10 hours)
   Complete three of the following courses:
   GEOG 340 Soils: Genesis, Nature and Characteristics
   GEOG 405 Physical Climatology
   GEOG 406 Management and Conservation of Natural Resources
   GEOG 430 Surface Water Hydrology
   GEOG 431 Quaternary Environments
   or GEOG 441 Soil Analysis
   GEOG 445 Biogeography
   GEOG 460 Natural Hazards in the Physical Environment
   GEOG 476 Fluvial/Coastal Geomorphology
   or GEOG 475 Glacial/Periglacial Geomorphology
   CHEM 420 Environmental Chemical Analysis
   or CHEM 320 Quantitative Analytical Chemistry
   or CHEM 460 Environmental Chemistry

4. Technique Courses (3 hours)
   Complete one of the following courses:
   GEOG 310 Fundaments of Cartography
   GEOG 317 Principles of Geographic Information Science
   GEOG 433 Remote Sensing – Image Interpretation
   GEOG 433 Surveying and Field Techniques

5. Additional Mathematics Course (3-4 hours)
   Complete one of the following courses:
   MATH 119 College Algebra (Core Skill 3)
   MATH 220 Calculus for Applications I
   MATH 236 Calculus I (Core Skill 3)
   MATH 237 Calculus II

6. Senior Requirement (6 hours)
   Complete one of the following options:
   A. Research Option
      GEOG 482 Senior Project (I)
      GEOG 483 Senior Project (II)
   B. Technical Option
      Take one additional course from Advanced Electives and one from Technique Courses.

7. Capstone Experience (1 hour)
   GEOG 486 Earth Science Capstone

If you are interested in teaching earth science ...

Students wishing to teach earth science at the secondary school level (middle and high school) can obtain both a
Bachelor of Science in Earth Science and a Master of Arts in Teaching – Secondary (MATS) in five years through the following pathway offered by the MATS program. This pathway allows students to take up to nine credits of required graduate courses while completing their undergraduate program in geography. These nine graduate credits will be used as electives toward their undergraduate degree as well as the requirements of the MATS.

Students interested in this pathway should:

1. Discuss the MATS pathway option with their first-year advisor.
2. Meet with the MATS Coordinator as a first-year or sophomore.
3. Apply to the MATS program in the Spring of their sophomore year (February 1 application deadline).
4. Once conditionally admitted (a requirement for the following graduate courses to count as electives in the undergraduate program as well as in the MATS program) take:
   a. REED 517 Reading in the Content Area (Fall or Spring of Junior or Senior year).
   b. SPED 551 Adapting Instruction in Diverse Classrooms (Fall Senior year).
   c. SCED 510 Secondary Methods in Curriculum (Spring Senior year).

Please note that students who are considering this pathway should work with their advisor to create a plan of study that allows these nine credits of graduate courses to be taken in the Junior and Senior years in addition to a minimum of 12 undergraduate credits per semester.

Environmental Science Concentration in Earth Science

- The Environmental Science concentration is dedicated to the study of the relationships between humans and their environments.
- You will become sensitive, articulate, and knowledgeable about increasingly complex environmental issues facing contemporary society.
- Course work in this concentration will provide the theoretical and practical background as well as the skills necessary to study environmental science from a wide range of perspectives.
- You must meet certain criteria and deadlines prior to enrollment in either GEOG 488 or GEOG 492.
- You must select 2 other members for your advisory committee in addition to your advisor from the faculty in participating departments. At least 1 member of the committee must be from Geography.

Summary of Requirements for Environmental Science Concentration in Earth Science

1. Introductory Level Courses: (13 hours)
   - GEOG 103/113 Physical Geography (GEP Group C)
   - GEOG 104/114 Human Geography (GEP Group D or F)
     or GEOG 110 World Regional Geography: Cultural Diversity (GEP Group D or F)
   - GEOG 275 Fundamentals of Geographic Data Handling (Tech. Fluency)
   - MATH 119 College Algebra (Core Skill 3) –or any other MATH 220 or above

2. Required Advanced Courses: (13 hours)
   - GEOG 380 Research Methods in Geography
   - GEOG 406 Management and Conservation of Natural Resources
   - GEOG 445 Biogeography
   - GEOG 472 Environmental Planning or GEOG 473 Environmental Law
   - GEOG 486 Earth Science Capstone

3. Required Supporting Science Sequence: (16 hours)
   - BIOL 149 General Biology I (GEP Group C)
   - BIOL 160 General Zoology
     or BIOL 161 General Botany
   - CHEM 201 General Chemistry I (GEP Group C)
   - CHEM 202 General Chemistry II

4. Electives: (24-25 hours)
   Select two courses in each group:**

GROUP I Advanced Biology
   - BIOL 340 General Ecology
   - BIOL 406 Ornithology
   - BIOL 409 Plant Taxonomy or BIOL 405 Dendrology
   - BIOL 421 Sample Design and Analysis of Plant Communities
   - BIOL 422 Herpetology
   - BIOL 423 Mammalogy
   - BIOL 430 Introductory Limnology

GROUP II Advanced Techniques
   - GEOG 310 Fundamentals of Cartography
   - GEOG 317 Principles of Geographic Information Science
   - GEOG 413 Remote Sensing - Image Interpretation
   - GEOG 420 Topics in the Mapping and Geospatial Sciences
   - GEOG 433 Surveying and Field Techniques

GROUP III Advanced Physical Geography
   - GEOG 335 Oceanography
   - GEOG 340 Soil: Genesis, Nature and Characterization
   - GEOG 405 Physical Climatology
   - GEOG 430 Surface Water Hydrology
   - GEOG 431 Quaternary Environments
   - GEOG 432 Groundwater Hydrology
GEOG 460 Natural Hazards in the Physical Environment
GEOG 469 Principles of Atmospheric Science

**GROUP IV Advanced Human Systems**

*Take two of the following from two different disciplines:*

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMST 365</td>
<td>Environmental Communication</td>
</tr>
<tr>
<td>ECON 410</td>
<td>Resource and Environmental Economics</td>
</tr>
<tr>
<td>ENGL 440</td>
<td>Literature of the Environment</td>
</tr>
<tr>
<td>GEOG 300</td>
<td>Economic Geography</td>
</tr>
<tr>
<td>GEOG 330</td>
<td>Global Climate Change</td>
</tr>
<tr>
<td>GEOG 360</td>
<td>Food Systems</td>
</tr>
<tr>
<td>GEOG 410</td>
<td>Locational Analysis</td>
</tr>
<tr>
<td>GEOG 425</td>
<td>Geography of Transportation</td>
</tr>
<tr>
<td>GEOG 452</td>
<td>Rural Geography</td>
</tr>
<tr>
<td>HIST 409</td>
<td>World Environmental History</td>
</tr>
<tr>
<td>HIST 418</td>
<td>Native Peoples of the Americas</td>
</tr>
<tr>
<td>HIST 420</td>
<td>Green: Environment and Economy in US History</td>
</tr>
<tr>
<td>PHIL 315</td>
<td>Philosophy and the Environment</td>
</tr>
<tr>
<td>POSC 450</td>
<td>Environmental Public Policy</td>
</tr>
<tr>
<td>PSYC 488</td>
<td>Environmental Psychology</td>
</tr>
<tr>
<td>RECR 394</td>
<td>Environmental Interpretation</td>
</tr>
<tr>
<td>RECR 443</td>
<td>Issues &amp; Risk Management in Recreation &amp; Parks</td>
</tr>
<tr>
<td>RECR 448</td>
<td>Principles of Ecotourism</td>
</tr>
<tr>
<td>SOCI 345</td>
<td>Sociology of the Environment</td>
</tr>
<tr>
<td>SUST 455</td>
<td>Seminar in Sustainability Studies</td>
</tr>
</tbody>
</table>

**some of these courses may require additional prerequisite course work.**