ENVIROMENTAL SCIENCE

Director: Katie Costanzo, PhD

Introduction

The Environmental Science major provides both theoretical and applied knowledge for students interested in professional careers in the environmental sciences, e.g., environmental consulting, environmental regulation and monitoring, environmental conservation, environmental health sciences (toxicology, occupational health, health physics, industrial hygiene, water quality industry) and the ecological sciences. In addition, the curriculum facilitates entry into graduate programs in the ecological, environmental health and environmental sciences.

The Environmental Science program is designed to have an interdisciplinary focus with required and recommended courses coming from biology, chemistry, geology, philosophy and social sciences. In addition, it is designed to provide needed job experiences through the completion of two required internships. For students interested in graduate study in the environmental sciences, one internship may be replaced with independent research in the environmental sciences.

For a more detailed description of the faculty, facilities, academic and co-curricular opportunities please visit the Environmental Science website (https://www.canisius.edu/academics/programs/environmental-science).

Qualifications

Students must maintain a 2.0 GPA in their major and support courses and a 2.0 overall average to graduate with a degree in Environmental Science.

Advisement

All students should have an advisor in the major and should contact the department directly to have an advisor assigned if they do not already have one. Meetings with academic advisors are required prior to students receiving their PIN for course registration each semester. All majors should work closely with their advisor in discussing career expectations, choosing their major electives, developing their entire academic program and planning their co-curricular or supplemental academic experiences.

The advisor may be changed at the student’s request.

Dual Majors

Students who wish to expand their educational opportunities may decide to declare a dual major. The decision may be based on career goals or planned graduate studies. Before a student declares a dual major, it is important to meet with the appropriate academic departments for advisement. Some dual major combinations can be completed within the minimum 120 credit hour degree requirement, but in some cases additional course work may be required. In order to declare a dual major, the student must complete the appropriate dual major request form and get the signature of each department chairperson and the appropriate associate dean.

Your advisor will be able to assist with course planning to facilitate a second major, so please let your advisor know if you are considering a dual major.

Minors in other DISCIPLINES

Minors provide students the opportunity to pursue additional interests but generally do not require as many courses as a major. Minors generally range from five to eight required courses. The minors page (http://catalog.canisius.edu/undergraduate/minors) provides a complete list of minors and provides links to each minor. Some majors and minors can be completed within the minimum 120 credit hour degree requirement, but in some cases additional coursework may be required. Students must complete the appropriate minor request form.

Major Experiences

All environmental science majors must complete two internship experiences. Recent internships have included Ecology and Environment, New York State Department of Environmental Conservation, U.S. Fish and Wildlife Service, Iroquois National Wildlife Refuge, Penn Dixie Paleontological and Outdoor Education Center, Tifft Nature Preserve, and the Buffalo Museum of Science. We encourage students to work with any faculty member in the program to find internships that will best meet their goals and needs.

Curriculum

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All undergraduate students must complete either the Canisius Core Curriculum (http://catalog.canisius.edu/undergraduate/academics/curricular-information/core-curriculum) or the All-College Honors Curriculum (http://catalog.canisius.edu/undergraduate/academics/curricular-information/all-college-honors-program). Many schools refer to their college-wide undergraduate requirements as “general education” requirements. We believe that the core curriculum and the honors curriculum are more than a series of required classes, they provide the basis for a Jesuit education both with content and with required knowledge and skills attributes that are central to our mission.

Free Electives

Students may graduate with more but not less than 120 credit hours. Free electives are courses in addition to the Core Curriculum or Honors Curriculum and major requirements sufficient to reach the minimum of 120 credit hours required for graduation.

Major Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BIO 111</td>
<td>Introductory Biology I</td>
<td>4</td>
</tr>
<tr>
<td>&amp; 111L</td>
<td>and Introductory Biology Laboratory I</td>
<td></td>
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<tr>
<td>BIO 112</td>
<td>Introductory Biology II</td>
<td>4</td>
</tr>
<tr>
<td>&amp; 112L</td>
<td>and Introductory Biology Laboratory II</td>
<td></td>
</tr>
<tr>
<td>BIO 211</td>
<td>Biochemistry and Cell Biology I</td>
<td>4</td>
</tr>
<tr>
<td>&amp; 211L</td>
<td>and Biochemistry and Cell Biology Lab I</td>
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</tr>
<tr>
<td>CHM 111</td>
<td>General Chemistry I</td>
<td>4</td>
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<tr>
<td>&amp; 111L</td>
<td>and General Chemistry I Laboratory</td>
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</tr>
<tr>
<td>CHM 112</td>
<td>General Chemistry II</td>
<td>4</td>
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<tr>
<td>&amp; 112L</td>
<td>and General Chemistry II Laboratory</td>
<td></td>
</tr>
<tr>
<td>CHM 227</td>
<td>Organic Chemistry I</td>
<td>4</td>
</tr>
<tr>
<td>&amp; 227L</td>
<td>and Organic Chemistry I Laboratory</td>
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</tr>
<tr>
<td>PSY 201</td>
<td>Basic Statistics for Behavioral Sciences</td>
<td>3-4</td>
</tr>
<tr>
<td>or MAT 141</td>
<td>Inferential Statistics and Computers for Science</td>
<td>3-4</td>
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<tr>
<td>PSY 401</td>
<td>Advanced Statistics Seminar</td>
<td>3-4</td>
</tr>
<tr>
<td>or MAT 111</td>
<td>Calculus I</td>
<td></td>
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<tr>
<td>BIO 320</td>
<td>Field Ecology</td>
<td>4</td>
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<td>BIO 360</td>
<td>Environmental Health</td>
<td>3</td>
</tr>
<tr>
<td>CHM 232</td>
<td>Environmental Analytical Chemistry</td>
<td>4</td>
</tr>
<tr>
<td>&amp; 232L</td>
<td>and Environmental Analytical Chemistry Laboratory</td>
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</tbody>
</table>
Environmental Science

ENV 100 Introduction to Environmental Science Seminar 1 Credit
Introduction to the field of environmental science. Information about a variety of careers is included. Required in freshman or sophomore year. Offered: spring 2017.

ENV 200 Introductory Hydrology 4 Credits
Introduction to hydrologic processes, methods for quantifying hydrologic parameters and processes, and practical exposure to conducting and reporting hydrological studies. Lab required.
Prerequisite: GEOL 120 & GEOL 120L.
Offered: anticipated spring 2018.

ENV 352 Environmental Science Seminar II 1 Credit
Students attend scientific talks and present information relevant to their internship experiences. Career preparations also included.
Prerequisite: ENV 100
Offered: spring.

ENV 401 Independent Research 1-3 Credits
Independent laboratory research in environmental science conducted under the supervision of a faculty member. Arrangements must be made prior to registration.
Prerequisite: written permission of faculty member & program director.
Offered: fall & spring.

Learning Goals & Objectives

Learning Goal 1
Students will develop competency with respect to knowledge having a firm grasp of the basic concepts in environmental science.
Students will:
• Objective A: Demonstrate an understanding of general environmental concepts from ecology, geology, hydrology, and analytical chemistry;
• Objective B: Demonstrate detailed knowledge within at least two areas of environmental science;
• Objective C: Connect previously learned material with real-life environmental situations.

Learning Goal 2
Students will develop problem-solving skills being able to perform the following.
Students will:
• Objective A: Read and interpret data;
• Objective B: Design an experiment to address a specific hypothesis;
• Objective C: Critically analyze an article from the original scientific literature or a professional report.

Learning Goal 3
Students will demonstrate mastery with respect to technical skills.
Students will:
• Objective A: Effectively communicate scientific material in written form;
• Objective B: Draw a graph;
• Objective C: Design a table.

Courses

Environmental Science Courses

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Prerequisite: written permission of faculty member & program director.
Offered: fall & spring.
ENV 498 Environmental Science Internship I 1-3 Credits
Practical experiences in the environmental sciences. Students must complete two internships in different areas of environmental sciences. Internships require an application and approval by the associate dean.
**Prerequisite:** junior or senior standing, minimum GPA of 2.0 in the major, a positive recommendation from a faculty member, & a completed & approved internship application.
**Offered:** fall & spring.

ENV 499 Environmental Science Internship II 1-3 Credits
Practical experiences in the environmental sciences. Students must complete two internships in different areas of environmental sciences. Internships require an application and approval by the associate dean.
**Prerequisite:** junior or senior standing, minimum GPA of 2.0 in the major, a positive recommendation from a faculty member, & a completed & approved internship application.
**Offered:** fall & spring.

**Geology Course**

GEOL 120 Introductory Geology 3 Credits
Basic concepts, including uniformitarianism, the rock cycle, the hydrologic cycle, tectonics and surface processes. Also covers how humans affect and are affected by their environment. Lab required. Students may not receive credit for both GEOL 120 and PHY 130.
**Corequisite:** GEOL 120L.
**Fulfills College Core:** Field 6 (Natural Sciences)
**Offered:** anticipated fall 2017.

GEOL 120L Introductory Geology Laboratory 1 Credit
Required lab for GEOL 120.
**Corequisite:** GEOL 120.