

BACHELOR OF SCIENCE IN ENVIRONMENTAL SCIENCE

DEPARTMENT OF GEOLOGY AND ENVIRONMENTAL SCIENCE

WWW.GEOLOGY.PITT.EDU

58 credits minimum

Updated 09/14/2022

Visit the Department web page and click on “Undergrad Programs” for a complete range of advising information plus the latest Environmental Science requirements.

To graduate with a B.S. in Environmental Science **you must have a 2.0 grade point average** in your Environmental Science core classes and electives, a 2.0 average for your co requisites, and a 2.0 average overall. For any grades below a C in core classes, co-requisites, and electives you must receive advisor approval.

CORE COURSES (check each as completed):

(28 credits)

Take each of the following:

- ___ GEOL 0840 Environmental Science (3) [Fall, Spring]
(Other introductory Geology classes may be approved by advisor with additional biology coursework)
- ___ GEOL 0055 Geology Laboratory (2) [Fall, Spring] **This is a prerequisite for many courses!**
- ___ GEOL 1015 Geology Colloquium (1 credit pass/fail) [Fall, Spring]
- ___ GEOL 1030 Oceans, Atmosphere, and Climate (3) [Fall, Spring]
- ___ GEOL 1051 Groundwater Geology (4) [Spring]
OR GEOL 1050 Surface Water Hydrology (4) [Fall]
(may substitute CEE 1412 Hydrology and Water Resources)
- ___ GEOL 1060 Geomorphology (4) [Spring]
OR GEOL 1062 Gemorphology (4) [Alternate Years, Fall, Shelef]
- ___ GEOL 1445 GIS, GPS, and Computer Methods for Earth Scientists (3) [Fall, Spring, Summer]
(may substitute an equivalent GIS course such as URBNST 1102 or PUBSRV 1320)
- ___ GEOL 1516 Environmental Geochemistry w/ Lab (4) [Fall, Spring]
- ___ GEOL 1641 Ecosystem Ecology (4) [Fall] (may substitute BIOSC 0370 Ecology **AND** BIOSC 0390 Lab)

CO-REQUIREMENTS (check each as completed):

(min 21 credits)

- ___ MATH 0220 Analytical Geometry and Calculus 1 (4)
- ___ CHEM 0110 General Chemistry 1 (4) (may substitute CHEM 0960)
- ___ PHYS 0174 Basic Physics for Science and Engineering 1 (4) **OR** PHYS 0110: Introduction to Physics 1 (3)

Plus at least THREE of the below:

- ___ MATH 0230 Analytical Geometry and Calculus 2 (4)
- ___ CHEM 0120 General Chemistry 2 (4) (may substitute CHEM 0970)
- ___ PHYS 0175 Basic Physics for Science and Engineering 2 (4) **OR** PHYS 0111: Introduction to Physics 2 (3)
- ___ BIOSC 0835 Our Changing World for Nonmajors (3)
- ___ BIOSC 0150 Biology I (3) **AND** BIOSC 005X Biology Lab (1)
- ___ BIOSC 0160 Biology II (3) **AND** BIOSC 006X Biology Lab (1)
- ___ STAT 1000 Applied Statistical Methods (4) **OR** STAT 0200 Basic Applied Statistics **OR** STAT 1100 Statistics and Probability for Business Management
(A statistics course is **STRONGLY RECOMMENDED**)
- ___ STAT 1221 Applied Regression (4) [prerequisite STAT 1000]

THREE ELECTIVES (check each as completed):

(min 9 credits)

Take one Writing Course

- ___ GEOL 1315 **W** Communication in the Geosciences (3) [Offered occasionally]
- ___ GEOL 1313 **W** Scientific Communication for Environmental Professionals (3) [Fall, Spring]
- ___ GEOL 1342 **W** Environmental Issues (3) [Fall, Spring]
- ___ GEOL 0060 [Spring] **AND** GEOL 1020 [Fall] (8)

Note: The combination of GEOL 0060 and GEOL 1020 counts as one of your writing courses for your general education requirements but will not show up in PeopleSoft.

Two additional electives

- ___ GEOL 0060 History of the Earth (4) [Spring]
- ___ GEOL 1006 Environmental Modeling (3) [Offered Occasionally]
- ___ GEOL 1001 Mineralogy (4) [Fall]
- ___ GEOL 1003 Igneous and Metamorphic Petrology (4) [Spring, has prerequisites]
- ___ GEOL 1020 Sedimentology and Stratigraphy (4) [Fall]
- ___ GEOL 1045 Statistics for Earth Science (3) [Alternate Years]
- ___ GEOL 1051 Groundwater Geology (4) [Spring] (not if you are using this as a core course)
- ___ GEOL 1050 Surface Water Hydrology (4) [Fall] (not if you are using this as a core course)
- ___ GEOL 1052 Paleoclimatology (3) [Alternate years]
- ___ GEOL 1055 Environmental Ethics, Science, and Public Policy (3) [Fall, Spring]
- ___ GEOL 1240 Vertebrate Paleontology (3) [Alternate years]
- ___ GEOL 1312 Environmental Law and Policy [Offered Occasionally]
- ___ GEOL 1331 Health and Safety (HAZWOPER) (3) [Fall]
- ___ GEOL 1333 Sustainability (3) [Fall, Spring]
- ___ GEOL 1309 Limnology (3) [Offered occasionally]
- ___ GEOL 1410 Exploration Geophysics (3) [Alternate years]
- ___ GEOL 1446 Advanced Geographic Information Systems (3) [Spring]
- ___ GEOL 1460 Introduction to Remote Sensing (3) [Fall] (only 8 credits can overlap with the GIS certificate)
- ___ GEOL 1510 Aquatic/Sedimentary Geochemistry (3) [Alternate years]
- ___ GEOL 1701 Geology of the Planets (3) [Offered Occasionally]
- ___ GEOL 1xxx Other upper-level classes (GEOL 1000 or higher) may be approved by your advisor.
- ___ BIOSC 0370 Ecology (not if you are using this as a core course)
- ___ BIOSC 1xxx Upper-level Ecology classes (BIOSC 1000 or higher) may be approved by your advisor.
This includes most courses taught at the Pymatuning Ecology Lab
- ___ CEE 1503 Introduction to Environmental Engineering (3)
- ___ CHEM 0250 Introductory Analytical Chemistry (3) **AND** CHEM 0260 Introductory Analytical Lab (1)
- ___ PS 1542 Global Environmental Politics
- ___ URBNST 1104 Applied GIS (only 8 credits can overlap with the GIS certificate)

You may take graduate classes (GEOL 2xxx) for upper-level science electives, but ***you must get instructor permission.***

- ___ GEOL 2054 Soils: Geobiochemical Landscapes [Offered occasionally]
- ___ GEOL 2460 Applied Remote Sensing and GPS Techniques [Offered occasionally]
- ___ GEOL 2520 Isotope Geochemistry [Offered occasionally]
- ___ GEOL 2525 Stable Isotopes [Offered occasionally]
- ___ GEOL 2640 Advanced Geohazards and Risk Management [Offered occasionally]
- ___ GEOL 3853 Watershed Hydrology and Biogeochemistry [Offered occasionally]

CAPSTONE EXPERIENCE

(3 to 6 credits)

Choose one of the following capstone experiences.

You may complete more than one and count others as electives for the major. However, you cannot double count something as both an elective and a capstone experience.

Please see your advisor for help about choosing the best capstone experience to prepare you for your career goals.

- a) **GEOL 1900 Internship** (3) An internship should focus on the kind of work you are interested in pursuing for a career. It should not involve mere busywork but should be a substantial training experience that draws upon the skills you learned as an undergraduate and better prepares you for a career after you graduate. Before starting an internship, you should meet with the department's internship coordinator. Equivalent internship courses in other departments may be taken with advisor approval.
- b) **GEOL 1903 Undergraduate Research** (3). This class entails at least a semester of work that results in substantial results, as determined by the faculty member overseeing your research, and the production of a final report. To pursue undergraduate research requires you to start working with a faculty member as early as possible in your career. Many start with a trial semester as a lab worker; if you prove diligent and competent in the lab, you should explore the possibility of independent undergraduate research with the relevant faculty member. To find work in a lab, contact the professor in who's research you are interested. Equivalent research courses in other departments may be taken with advisor approval.
- c) **GEOL 1910 Undergraduate Thesis** (3). This class is the culmination of at least two semesters of undergraduate research. You will gather substantial data, become familiar with the relevant academic literature, and write a thesis in the style of a formal academic article that could be submitted for publication. If your GPA is above 3.25, a successful thesis would earn you departmental honors. Equivalent thesis courses in other departments may be taken with advisor approval.

- d) **Research Experiences for Undergraduates** (REUs) are funded research projects advertised by researchers around the country. To do an REU, apply to the researchers around the country who are advertising their REU. Once you have completed an REU, hand in a summary of your research results and conclusions to your advisor. This usually comes in the form of the presentation or poster that you complete as part of the summer REU.
- e) **GEOL 1960 Field Camp** (4-6 credits) [Summer] Although traditional geology field camps require most of the core courses required in the Geology major, there are several hydrology or environmental geology field camps that you can find in this [list of field camps](#)). Sign up for one through the host university, and then [transfer in the credits](#). To satisfy the field camp capstone, a field course must include opportunity for independent work with field data. Therefore, courses such as the Yellowstone Field Study do not fulfill this requirement, but the Spring Creek Wyoming Field Studies in Ecology and Paleontology does. Pymatuning Ecology Lab courses other than BIOSCI 0370 can be used toward the 4-6 credits of field study if they are not used as electives. Check with your advisor if you are not sure whether a course will count towards a capstone.

Departmental Honors Requirements: Complete the requirements for *one* of the following three options:

Course Option: Complete the minimum degree requirements, earn an overall QPA of 3.25 or more, and:

1. Satisfactorily complete a total of at least nine additional credits from other formal GEOL courses (excluding the 0800 series) or from any of the following: BIOSCI 0370; CHEM 0250, 0260, 0310, 0320, 1410, 1540; MATH 0250; PHYS 0160, 0577, 1150;
2. Include within the requirements listed above a minimum of three credits in either geochemistry (e.g., GEOL 1309, 2500, or 2520) or geophysics (e.g., GEOL 1410, 1446, or 1460).

Research Option: Complete the minimum degree requirements, earn an overall QPA of 3.25 or more, and complete an Undergraduate Thesis (GEOL 1910) under the supervision of a faculty member from the Department of Geology and Environmental Science. This research must culminate in a written thesis that documents original research conducted by the student. Acceptance of the thesis will be contingent upon approval of the faculty supervisor and two additional faculty members. The results of the student's research are to be presented orally in a departmental seminar.

Internship Option: Complete the minimum degree requirements, earn an overall QPA of 3.25 or more, and work as an intern for a professional firm in the field of environmental science while under the supervision of a faculty member from the Department of Geology and Environmental Science. A minimum of three credits of Internship (GEOL 1900) will culminate in written and oral reports documenting the project conducted by the student. Acceptance will be contingent upon approval of the faculty supervisor and two additional faculty members. NOTE: This internship must be completed in addition to your capstone (i.e. be a second internship or in addition to completing undergraduate research).

Let your advisor know if you are seeking Departmental Honors!

Study Abroad

Environmental Science majors can successfully study abroad during the summer or even for an entire semester and still graduate in four years. If you are thinking about study abroad, let your advisor know so they can help you to plan your courses accordingly. Some environmental science majors have taken a semester “off” from their major while on study abroad and focused on general education requirements or another major/minor while abroad. However, there are many great programs for study abroad that offer the opportunity to take field courses or other environmental science electives unavailable at the University of Pittsburgh. There are programs in Iceland and Scandinavia that include trips to arctic glaciers, field programs in the rainforests of Central and South America, conservation programs in the African Savana, and programs in New Zealand and Australia where you can study Marine Biology, among many others. Students who are double majoring in Environmental Science and a foreign language have also taken environmental science electives in places like France, Germany, and Spain. You can find out a lot more about study abroad at [the University of Pittsburgh's Study Abroad website](#).

Words of wisdom:

Take Calculus and Chemistry as early as possible. First, take calculus because it is a prerequisite for hydrology courses and the sooner you take it after High School math, the better. Second, take chemistry early as it is a pre-requisite for several core and elective classes. In addition, if chemistry is a prerequisite for a class, you will have an easier time in that class if you take it soon after you take chemistry.

Take GEOL 0055 as early as possible. Since GEOL 0055: Geology Laboratory is a prerequisite for many upper level courses for the major, take it in your first semester as a major if possible. Other classes you can take before you take GEOL 0055, or concurrent with GEOL 0055 include GEOL 0840 (or other 800 level GEOL classes), GEOL 1445, GEOL 1030, and some of the upper level electives in the department.

Example Luxury Schedule: You picked the environmental science major early.

Fall, First Year	Spring, First Year
GEOL 0840 Introduction to Environmental Science	CHEM 0110: Chemistry 1
GEOL 0055: Geology Laboratory	GEOL 0055 if necessary
MATH 0220: Calculus I	PHYS 0174 Physics for Science and Engineering I
Fall, Second Year	Spring, Second Year
GEOL 1445: GIS, GPS, and Computer Systems	GEOL 1030: Oceans, Atmosphere, and Climate
GEOL 1515: Environmental Geochemistry	GEOL 1051: Groundwater Geology
Choice of Co-requisite class	Choice of Co-requisite class
Fall, Third Year	Spring, Third Year
GEOL 1641: Ecosystem Ecology	GEOL 1060: Geomorphology
Choice of Co-requisite class	Geology or other Environmental Science Elective
Geology or other Environmental Science Elective	GEOL 1015 Geology Colloquium
Find a summer field camp, internship, or REU!	
Fall, Fourth Year	Spring, Fourth Year
Geology or other Environmental Science Elective	

Example Compressed Schedule: You switched to the environmental science major late, but have already had at least one semester of Calculus, Chemistry, and Bio or Physics and have completed most of your general education requirements.

Fall	Spring
GEOL 0840 Introduction to Environmental Science	GEOL 0055 if necessary
GEOL 0055: Geology Laboratory	GEOL 1030: Oceans, Atmosphere, and Climate
PHYS 0174 or another Co-requisite	GEOL 1515: Environmental Geochemistry
GEOL 1445: GIS, GPS, and Computer Systems	Choice of Co-requisite class
Fall	Spring
GEOL 1641: Ecosystem Ecology	GEOL 1060: Geomorphology
Choice of Co-requisite class	GEOL 1051 or Environmental Science Elective
Environmental Science W class	GEOL 1015 Geology Colloquium
GEOL 1050 or Environmental Science Elective	Environmental Science Elective
Find a summer field camp, internship, or REU!	

GIS Certificate

Environmental Science majors may be interested in completing the GIS certificate which requires several courses which are already core courses or electives for the Environmental Science major. The certificate requires 18 credits of coursework including GEOL 1445 and GEOL 1460, 6 credits of electives (many of the required courses for the Environmental Science major count), and 4 credits of GEOL 1901 Independent Study (a GIS or remote sensing project). More information on the Geographic Information Systems Certificate and possible electives can be found [on the website for the GIS certificate](#). Only 8 credits of coursework can overlap between the Environmental Science major and the GIS Certificate.

Sustainability Certificate

The Mascaro Center for Sustainable Innovation offers a Sustainability Certificate applies concepts from engineering, natural sciences, social sciences and humanities to sustainable systems, engineering practices, and society. The Certificate requires two core courses across both the DSAS and SSOE tracks:

ENGR 1905 Introduction to Sustainability (3)

ENGR 1907 Sustainability Capstone Experience (3).

In addition, students must take either GEOL 1030 (DSAS track) **OR** CEE 1610 (SSOE track) and three electives (only one of which may be in the student's home department). Information on the Sustainability Certificate and possible electives can be found [on the website for the sustainability certificate](#).

Civil and Environmental Engineering Minor:

The Department of Civil and Environmental Engineering offers a Minor in Environmental Engineering to B.S. degree students in other engineering or science departments of the University of Pittsburgh. Information on the Minor in Environmental Engineering can be found [on the website for the environmental engineering minor](#). The Minor requires the completion of a minimum of 15 credits of course work in the environmental area. However, some of the required courses may also satisfy a requirement for the Major. The minor requires the following four core courses:

CEE 1412 Hydrology and Water Resources (may be able to substitute GEOL 1050 or GEOL 1051)

CEE 1503 Introduction to Environmental Engineering (prerequisite: General Chemistry 1 & 2)

CEE 1513 Environmental Engineering Processes (prerequisite CEE 1503)

CEE 1514 Environmental Impact Assessment (prerequisite CEE 1503)

and one of the following electives:

CEE 1505 Water Treatment and Distribution System Design

CEE 1515 Wastewater Collection Pumping and Treatment (prerequisite CEE 1503)

CEE 1609 Life Cycle Assessment Methods & Tools

CEE 1610 Engineering and Sustainable Development

CEE 1618 Design for the Environment

Master of Arts in Teaching Science Education: Earth and Space Science

Students interested in going on to complete a master's degree towards a teaching certification in Earth and Space Science are recommended to take the following courses in addition to the core courses for the Environmental Science major.

General Chemistry I and II (with labs); Introduction to Physics I (with lab) (Env. Sci. corequisites)

GEOL 0060 History of the Earth (Env. Sci. elective)

GEOL 1701 Geology of the Planets (Env. Sci. elective) or a course in Astronomy

A course in physical geology

You can find out more information about the University of Pittsburgh's program on the School of Education's [Master of Arts in Teaching Science Education website](#).

Pitt's Environmental and Occupational Health Accelerated 4+1 BS/MS Program

If you are interested in a degree in Public Health, the University of Pittsburgh has an accelerated 4+1 program where you begin a master's in public health during your senior year and complete it in a fifth year. The [Environmental and Occupational Health BS/MS program](#) merges particularly well with the Environmental Science degree. Visit the [School of Public Health's Accelerated Bachelor's/Master website](#) to learn how to prepare for and apply to the 4+1 BS/MS programs. In brief, you apply for the program during your third undergraduate year and, if accepted, you complete your undergraduate degree and begin your master's degree during your fourth year. Up to 20 credits can overlap between your Master's degree and Bachelor's degree; the following courses can count as co-requisites or electives for the Environmental Science major.

BIOST 2041 Intro to Statistical Methods 1 (Env. Sci. corequisite)

BIOST 2049: Applied Regression Analysis (Env. Sci. corequisite)

EOH 2504 Principles of Environmental Exposure (Env. Sci. elective)

EOH 2122 Transport & Fate Environmental Agents (Env. Sci. elective)

EOH 2013 Environmental Health and Disease (Env. Sci. elective)

EOH 2180 Introduction to Risk Sciences (Env. Sci. elective)

PUBHLT 2011 Essentials of Public Health (Env. Sci. elective)