Sneak preview – coming in Fall 2024 (may have minor changes)

Environmental Science - Earth Systems Science Concentration, BS (121C)

⇦Return to: Programs of Study

Program Code: 121*/121C
CIP Code: 03.0104

General Education Requirements (44 Hours)

- General Education Requirements

CHE 1101/CHE 1110 & CHE 1102/CHE 1120 *fulfills Science Inquiry. MAT 1110 or STT 2820 fulfills Quantitative Literacy requirement.*

Major Requirements (87-88 Hours)

Not including 12 hours already counted in General Education Requirements, above

2.0 major GPA is required for graduation. Major GPA calculation will include all courses taken in the major department, plus any other courses under Major Requirements. Minimum of 18 semester hours of courses taken to fulfill major requirements must be courses offered by Appalachian.

Environmental Science Core Requirements (32 Hours)

- BIO 1801 - Biological Concepts I (4)
- or
- BIO 1802 - Biological Concepts II (4)
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- CHE 1101 - Introductory Chemistry I (3)
- CHE 1110 - Introductory Chemistry Laboratory I (1)
- CHE 1102 - Introductory Chemistry II (3)
- CHE 1120 - Introductory Chemistry Laboratory II (1)
- GES 1010 - Introduction to Environmental Sciences (3)
- GES 1101 - Introduction to Physical Geology (4)

- MAT 1110 - Calculus With Analytic Geometry I (4)
- PHY 1150 - Analytical Physics I (5)
- STT 2820 - Reasoning with Statistics (4)

Additional Core Science Courses (4-5 Hours)

- PHY 1151 - Analytical Physics II (5)
- or
- MAT 1120 - Calculus With Analytic Geometry II (4)
- or
- BIO 1801 - Biological Concepts I (4)

Additional Geological and Environmental Science Courses (18-23 Hours)

GES 2750 ***[WID]*** *must be taken in the Sophomore or Junior year.*

- GES 2250 - Evolution of the Earth (4)
- GES 2750 - Preparation for Careers in the Earth and Environmental Sciences (3) [WID]
- GES 2752 - Environmental Science Field Methods (1)
-
- CHE 3310 - Global Biogeochemical Cycles (3)
- or
- GES 3310 - Global Biogeochemical Cycles (3)
- or
- CHE 4620 - Environmental Chemistry (4)
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- GES 3455 - Quantitative Data Analysis for Earth and Environmental Scientists (3)
- GES 4630 - Hydrogeology (3)

- GES 4105 - Analysis and Implications of Environmental Issues (1) [CAP]
- or
- GES 4510 - Senior Honors Thesis (3) [CAP]

Geospatial Data Analysis (3 Hours)

- GHY 2812 - Geospatial Technology in a Changing World (3)
- or
- PLN 2812 - Geospatial Technology in a Changing World (3)

Computational and Multivariate Data Analysis (3-4 Hours)

- CS 2435 - Introduction to Scientific Programming (4)
- GES 4025 - Introduction to Multivariate Data in the Earth and Life Sciences (3)
- GES 3140 - Quantifying Environmental Change (3)

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Environmental Policy (3 hours)

- GES 2301 - Energy Extraction in Appalachia (Past, Present, and Future) (3)
- or
- AS 2301 - Energy Extraction in Appalachia (Past, Present, and Future) (3)
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- GES 3703 - Issues in Environmental Geology (3)
- GES 3110 - Environmental Regulation and Enforcement (3)
- IDS 3010 - H2O: We are Water (3)
- PLN 3730 - Land, Property, and Law (3)
- PLN 4460: Environmental Policy and Planning (3)

Earth Systems Science Electives (24 Hours)

Choose 15 hours from one area + 9 from other area(s). If a course is chosen in one category, it may not be used elsewhere in the program of study (e.g., if GES 3140 was chosen in the Computational and Multivariate Data Analysis Courses above, it cannot be applied in the Hydrosphere or Atmosphere electives below). Courses in this section may still be double counted towards gen ed requirements as allowed. At least 15 credit hours total must be from laboratory classes at the 2000 level or higher (marked with an asterisk).

Surface Processes Electives

- GES 3810 - The Reef Environment and Geology of Modern Carbonate Systems (3)*
- GES 2751 - Geology Field Methods (2)*
- GES 3140 - Quantifying Environmental Change (3)*
- GES 3150 - Principles of Structural Geology and Tectonics (3)*
- GES 3333 - Geomorphology (3)*
- GES 3680 - Geoarchaeology (3)
- GES 3160 - Introduction to Geophysics (3)*
- GES 3800 - Sedimentology & Stratigraphy (3)*
- GES 4705 - Engineering Geology (3)*
- GHY 3110 - Ecoregions and Dynamic Landforms (3)
- SD 3155 - Soil and Soil Fertility Management (3)

Hydrosphere Electives

- GES 3140 - Quantifying Environmental Change (3)*
- GES 3810 - The Reef Environment and Geology of Modern Carbonate Systems (3)*
- GES 4705 - Engineering Geology (3)*
- BIO 3310 - Marine Sciences (4)*
- CHE 4620 - Environmental Chemistry (4)*
- CHE 2210 - Quantitative Analysis (3) and CHE 2211 - Quantitative Analysis Laboratory (1)*
- GHY 3100 - Weather and Climate (3)
- GHY 3600 - Snow and Ice (3)

- IDS 3010 - H2O: We are Water (3)
- TEC 4607 - Wind and Hydro Power Technology (3)
- TEC 3606 - Sustainable Water and Wastewater Technology (3)

Atmosphere Electives

- BIO 3320 - Air Pollution Effects on Plants and People (3)
- CHE 2600 - Global Atmospheric Chemistry (3)
- CHE 4620 - Environmental Chemistry (4)*
- GHY 3100 - Weather and Climate (3)
- GHY 4620 - Atmospheric Circulation (3)
- PHY 3150 - Atmospheric Science (3)
- PHY 3140 - Environmental Physics (3)
- GES 3140 - Quantifying Environmental Change (3)*

Earth Materials Electives

- GES 2451 - Geological Sample Preparation (1)*
- GES 2751 - Geology Field Methods I (2)*
- GES 3220 - Fundamentals of Mineralogy (3)*
- GES 3715 - Petrology and Petrography (3)*
- GES 3025 - Principles of Paleontology (3)*
- GES 3150 - Principles of Structural Geology and Tectonics (3)*
- GES 3160 - Introduction to Geophysics (3)*
- GES 3680 - Geoarchaeology (3)
- GES 4705 - Engineering Geology (3)*
- CHE 2210 - Quantitative Analysis (3) and CHE 2211 - Quantitative Analysis Laboratory (1)*
- PHY 4860 - Physical Principles of Electron Microscopy (4)
- PHY 4845 - Nanoscience and Technology (3)
- BIO 4564 - Microscopy (4)*

Biosphere Electives

- GES 3025 - Principles of Paleontology (3)*
- BIO 2000 - Introduction to Botany (4)*
- BIO 3302 - Ecology (4)*
- BIO 3313 - Global Change Ecology (4) [WID]*
- BIO 3315 - Conservation Biology (3) [WID]
- BIO 4240 - Aquatic Biology (4)*
- BIO 4555 - Plant Physiology (4)*
- BIO 4575 - Ecotoxicology (4) [CAP]*
- BIO 4620 - Landscape Ecology (4)*
- BIO 3330 - Local Flora (4)*
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- CHE 2101 - Fundamentals of Organic Chemistry (3) and CHE 2102 - Fundamentals of Organic Chemistry Laboratory (1)*

- OR
- CHE 2201 - Organic Chemistry I (3) and CHE 2203 - Organic Chemistry Laboratory I (1)*
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- GHY 3130 - Geography of Biodiversity (3)
- SD 3100 - Principles of Agroecology (3)
- SD 3200 - Agroforestry and Farm Forestry Systems (3)
- SD 3420 - Agroecology for Climate Action (3) [WID]

Note

**Pre-/Co-requisites are not included in the 120 hours required for the degree.*

Minor (optional)

Electives (0-1 Hours)

Taken to total a minimum of 120 hours for the degree

Total Required (120 Hours)