

# ENVIRONMENTAL SCIENCE (ESCI)

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Environmental science is the multidisciplinary scientific study of the systems, resources, and human-caused problems associated with Earth's near surface environment. Sometimes referred to as the *critical zone*, as it is critical to humanity, the near surface environment spans the upper bedrock to the top of the tree canopy and includes all the fluids, gasses and organisms therein. Environmental Science is an in-demand field, with abundant job prospects as well as opportunities for funded graduate study.

Western's Environmental Science major (ESCI) includes ESCI specific introductory coursework followed by a suite of required courses in biology/ecology, chemistry, geochemistry/hydrology, GIS, physics and math and environmental policy and politics. The major includes an extensive list of elective coursework, allowing students to tailor their ESCI major to their personal scientific interests. A capstone Applied Environmental Science course synthesizes the degree and can be completed during the school year with a group or solo project involving field, lab and/or GIS work on interesting environmental science problems from the Rocky Mountains to the Colorado Plateau, or with a summer REU experience or externally funded research with WCU professors. An ESCI major provides much of the coursework needed to complete several other natural science minors and we strongly encourage ESCI majors to consider minoring in Biology, Chemistry, Geology or obtaining a GIS certificate.

## Program Values

- Applying scientific methods to formulate and test hypotheses, analyze results, and draw valid conclusions supported by evidence
- Utilizing current methodologies and instrumentation to acquire and analyze environmental science data
- Applying biological, chemical, geological and geospatial concepts and tools to solve environmental science related problems
- Conducting independent research of scientific literature, writing scientific papers and reports using accepted formats, and communicating effectively with peer scientists and the general public
- Environmental Science Comprehensive Major: Environmental Science Emphasis (<https://catalog.western.edu/undergraduate/programs/environmental-science/environmental-science-emphasis/>)
- Environmental Science Minor (<https://catalog.western.edu/undergraduate/programs/environmental-science/environmental-science-minor/>)

## Environmental Studies Courses

### ESCI 105. Earth Systems and Resources (with lab). (4 Credits)

An introduction to Earth Science related systems and resources with a focus on human interaction with the surface environment. Topics include geologic hazards like earthquakes, volcanoes and landslides as well as Earth resources like critical minerals, clean water and soils. Laboratory and field trips provide training in map interpretation, rock and mineral identification, surface and groundwater quantification and local and Colorado geological history.

### ESCI 300. Environmental Science Careers. (1 Credit)

Investigation of post-baccalaureate degree options in environmental science. Students receive guidance in finding and applying to job opportunities as well as funded graduate degree programs. Occasional guest speakers will meet with students to discuss their career paths and experiences. Prerequisites: BIOL 151 and ESCI 105, or instructor permission.

### ESCI 400. ENVIRONMENTAL SCIENCE SEMINAR. (1 Credit)

An examination of the environmental sciences through readings of primary literature, secondary literature and discussions of the environmental science discipline. The professional practices, procedures and standards of environmental science are discussed. Students will develop a professional portfolio of an environmental science project. Graded Satisfactory/Unsatisfactory only. Prerequisites: Instructor approval. This course is intended for students at the end of their Environmental Science minor.

### ESCI 450. Applied Environmental Science. (3 Credits)

A mentored research experience in interdisciplinary environmental science. A written research proposal; field, lab or computer-based research project; and oral presentation of results are all required. ESCI majors may substitute a substantial research experience or internship for this course with approval of the ESCI council. Prerequisites: BIOL 301; GEOL 362; GEOG 340; MATH 213; or instructor permission.