

Environmental Science Major

The Environmental Science program prepares students to understand and critically examine environmental issues from an interdisciplinary perspective, to teach in various outdoor settings, and to engage in scientific research. The program utilizes biological, chemical, and ecological course work and field experiences to prepare students for further academic studies or professional training and provides opportunities for career preparation and professional development through independent projects, teacher education, internships, and seminars.

The Environmental Science Discipline

Environmental Science specialists are needed in order to understand and help solve the ecological problems posed by the 21st century. While these specialists must be knowledgeable in ecology, environmental science, experimental design, mathematical modeling, and physics, they also must be acquainted with ideas drawn from a wide range of related disciplines, including environmental philosophy, ethics, theology, history, literature, policy, law, and psychology. They must be skilled in research methods, written and oral communication, and conflict resolution.

Why Study Environmental Science at Montreat College?

The program is unique. Montreat College's program is distinctively different. The program integrates a liberal arts education with a Christ-centered worldview. The student trained in environmental science will gain more than a solid understanding of basic principles. They will possess an understanding of the ethical and worldview implications involved in the application of environmental knowledge. Small, intimate classes foster discussion and interaction in every course. Students receive personalized attention and this allows for further integration of the Christian perspective into the environmental science curriculum. The instructors are highly accessible and genuine in their approach to students, serving as professors, mentors, and advisors. Faculty members work closely with each student based on his/her interests and career aspirations. It is our goal to help students transition from passive learner to budding colleague.

Montreat College also has vital connections with the International Au Sable Environmental Institute, the Council for Christian Colleges and Universities, and the Appalachian College Association.

The program is integrative and academically rigorous. We expect much from our students but they receive much in return. By providing a strong foundation in environmental science, Montreat College's program successfully prepares the student for graduate studies in a wide array of disciplines, including environmental science, plant and animal ecology, environmental economics, physical geography, environmental education, forest science, wildlife and fishery science, natural resource management, and medical research. It also

provides opportunities to establish collaborative relationships with various groups, such as the Forest Service, the National Park Service, environmental organizations, research laboratories, and industry.

The program is situated within the ecologically diverse Southern Appalachian Mountains. Located in one of the most ideal areas for environmental Science in the Eastern United States, Montreat College is in close proximity to four major wilderness areas, several national and state forests, the Great Smoky Mountains National Park, Mt. Mitchell State Park, Grandfather Mountain Biosphere Preserve, and numerous unique and diverse ecosystems. These range from Southern Appalachian cove forests to heath bald communities to high elevation spruce-fir forests. Through immersion in the natural environment, an experiential approach to learning, and a Christian perspective, Montreat College ultimately prepares the student for a lifelong adventure with many chances for success.

The Environmental Science major allows much room for individualization. Possible academic choices are the Pre-professional Concentration, the Conservation Biology and Natural Resource Management Concentration, and the Special Emphasis (self-designed) Concentration. These options ensure a well-tailored education for any student.

After Graduation

Upon completion of the Environmental Science program at Montreat College, the student has a wide selection of options, such as ecologist, fish or wildlife biologist, naturalist, environmental economist, environmental educator, or environmental consultant. Additionally, students might wish to receive a North Carolina State Certificate in Environmental Education or attend graduate school, thereby expanding their career choices. Government agencies and private companies eagerly look to the present generation to staff their offices as a source of youthful creativity, mature beliefs, and a strong environmental science background.

Requirements for a Major in Environmental Science

√ Degree Component

- Completion of the General Education Core (56 credits)
 - BL 101 or 103 and 102 or 104; MT 121 or higher; and IS 202 are required in the Gen-Ed
 - OE 310 is recommended for Gen-Ed oral competency
- Completion of the General Education Competencies
- Completion of the Environmental Science Major Core (31.5 credits)
- Completion of an Environmental Science Concentration (18-34 credits)
- Completion of required electives to bring total up to 120 credits (~1-1.5credits)

Completion of 27 credits at the 300-level or above.

Completion of the Major Field Test

Completion of 120 credit hours with a minimum GPA of 2.0 (two terms and 32 credit hours must be completed at Montreat College)

*Students wishing to become a North Carolina Certified Environmental Educator should take OE 220 as an elective.

Environmental Science Major Courses (31.5 hours)

- BL 205 Animal Diversity and Ecology (4)
- BL 406 Conservation Biology (3)
- CH 101 General Chemistry I (4)
- CH 102 General Chemistry II (4)
- ES 150 Introduction to Environmental Science (4)
- ES 206 Ecology (4)
- ES 230 Sophomore Science Seminar I (0.5)
- ES 301 Physical & Environmental Geography (4)
- ES 340 Research Methods (3)
- ES 445 Senior Science Seminar (1)

Choose from three Environmental Science Concentrations:

- Pre-Professional (34 credits)
- Conservation Biology and Natural Resource Management (32 credits)
- Special Emphasis (18 credits)

Pre-Professional Concentration (34 credits)

The Pre-professional track offers a wide range of courses designed to prepare students for graduate studies in the health and science professions, including diverse fields such as applied technology (environmental consulting), biochemistry, ecological research, genetics, environmental science, medicine/medical research, nursing, ecophysiology, toxicology, and veterinary science.

Pre-Professional Courses

Choose one:

- BL 311 Plant Physiology (3) **OR**
- BL 206 Human Anatomy & Physiology I (4)
- BL 410 Genetics (4)
- CH 220 Organic Chemistry I (4)
- CH 221 Organic Chemistry II (4)
- ES 440 Senior Project or Internship (3)**
- MT 191 Applied Calculus I (4)
- MT 192 Applied Calculus II (4)
- PC 131 College Physics I (4)
- PC 132 College Physics II (4)

Recommended electives (not required):

BL 420 Biochemistry/Toxicology (3)

**Students in the Pre-Professional concentration are required to enter into a professional experience through a cooperative, employment, internship, or research arrangement. Environmental Science faculty serve as mentors, and each project must be approved and debriefed with the faculty member for the completion of this requirement. Students must make arrangements to set up the professional experience and make a presentation to the faculty for approval before the experience is initiated. The student does not have to complete this experience for credit. If students simultaneously seek credit for the experience, they must enroll in ES 440 each semester of the professional experience. A regular debriefing is required for all professional experiences. If the student has applied for credit, the debriefing each semester of enrollment will be required for credit and grade designation. The student's experience will be assessed each semester whether or not credit is given.

| Four Year Plan: Bachelor of Science in Environmental Science | | | |
|--|----------------|--|----------------|
| Pre-Professional Concentration | | | |
| Freshman Year | | | |
| Fall Semester | | Spring Semester | |
| IS 102 Foundations of Faith and Learning | 2 | MT 121 College Algebra or higher | 3 |
| BB 101 Survey of Old Testament | 3 | BB 102 Survey of New Testament | 3 |
| EN 101 English Composition | 3 | EN 102 English Composition II | 3 |
| HS 101 History of World Civilization I | 3 | BL 104 Advanced Survey of Biological Principles II | 4 |
| BL 103 Advanced Survey of Biological Principles I | 4 | ES 150 Intro to Environmental Science | 4 |
| | 15 | | 17 |
| Sophomore Year | | | |
| Fall Semester | | Spring Semester | |
| ES 230 Sophomore Science Seminar | 0.5 | BL 205 Animal Diversity and Ecology | 4 |
| BL 206 Human Anatomy and Physiology I (or elective if taking BL 311) | 1.5-4 | CH 102 General Chemistry II | 4 |
| CH 101 General Chemistry I | 4 | CS 102 Computer Applications and Concepts | 3 |
| ES 206 Ecology | 4 | MT 191 Applied Calculus I | 4 |
| Gen-Ed Literature | 3 | | |
| | 13-15.5 | | 15 |
| Junior Year | | | |
| Fall Semester | | Spring Semester | |
| IS 202 Modern Secular-Christian Worldviews | 3 | ES 301 Physical and Environmental Geography | 4 |
| Gen-Ed Oral Competency | 3 | BL 311 Plant Physiology (or elective if taking BL 206) | 1.5-3 |
| Gen-Ed Social Science | 3 | Gen-Ed Humanities | 3 |
| CH 220 Organic Chemistry I | 4 | HS 102 History of World Civilization II | 3 |
| MT 192 Applied Calculus II | 4 | Physical Education Course | 1 |
| | 17 | | 12.5-14 |
| <i>Completion of the General Education competencies by the end of the junior year.</i> | | | |
| Junior Summer | | | |
| ES 440 (0-3) Optional internship or project opportunity | | | |
| Senior Year | | | |
| Fall Semester | | Spring Semester | |
| ES 445 Senior Science Seminar | 1 | BL 406 Conservation Biology | 3 |
| ES 340 Research Methods | 3 | CH 221 Organic Chemistry II | 4 |
| Gen-Ed Humanities | 3 | IS 461 Seminar on Faith and Life | 2 |
| PC 131 College Physics I (offered every other year) | 4 | PC 132 College Physics II (offered every other year) | 4 |
| BL 410 Genetics | 4 | Physical Education Course | 1 |
| | 15 | | 14 |
| <i>Completion of 27 credits at the 300-level or above.</i> | | | |
| <i>Completion of the Major Field Test by the end of the Senior Year.</i> | | | |
| Total hours required for degree: | | | 120 |

The following required, alternate-year courses should be taken in either the junior or senior year:
 BL 410 (4), BL 406 (3), BL 311 (3) *See General Education for optional course offerings

Conservation Biology and Natural Resource Management Concentration (32 credits)

The Conservation Biology and Natural Resource Management concentration is designed to prepare students for graduate studies or for employment in government, industry, consulting, education, and non-profit organizations. This concentration integrates academic coursework with extensive field experience, and provides students with the unique opportunity to study the biologically diverse Southern Appalachian ecoregion. Students learn how to connect scientific principles with conservation and resource management issues and how to develop practical solutions to contemporary environmental issues from an interdisciplinary perspective.

Conservation Biology and Resource Management Courses

- BL 215 Plant Diversity and Ecology (4)
- ES 210 Environmental Sustainability (3)
- ES 305* American Ecosystems (4)
- ES 315 Freshwater Ecosystems (4)
- ES 341 Practicum (3)
- ES 360 Introduction to Geographic Information Systems (3)
- ES 401 Natural Resource Management (3)
- ES 460 Field Studies (1-6) (minimum of 4 credit hours)
- IS 310 Pre-Practicum (1)
- OE 305 Environmental Policy and Law (3)

*See Financial Information in the Academic Catalog for information on course fee

| Four Year Plan: Bachelor of Science in Environmental Science Conservation Biology and Natural Resource Management Concentration | | | |
|--|-------------|--|--------------|
| Freshman Year | | | |
| Fall Semester | | Spring Semester | |
| IS 102 Foundations of Faith and Learning | 2 | MT 121 College Algebra or higher | 3 |
| BB 101 Survey of Old Testament | 3 | BB 102 Survey of New Testament | 3 |
| EN 101 English Composition | 3 | EN 102 English Composition II | 3 |
| HS 101 History of World Civilization I | 3 | BL 104 Advanced Survey of Biological Principles II | 4 |
| BL 103 Advanced Survey of Biological Principles I | 4 | ES 150 Intro to Environmental Science | 4 |
| | 16 | | 17 |
| Sophomore Year | | | |
| Fall Semester | | Spring Semester | |
| ES 230 Sophomore Science Seminar | 0.5 | BL 205 Animal Diversity and Ecology | 4 |
| BL 215 Plant Diversity and Ecology | 4 | CH 102 General Chemistry II | 4 |
| CH 101 General Chemistry I | 4 | CS 102 Computer Applications & Concepts | 3 |
| ES 206 Ecology | 4 | ES 210 Environmental Sustainability | 3 |
| Gen-Ed Literature | 3 | | |
| | 15.5 | | 14 |
| Junior Year | | | |
| Fall Semester | | Spring Semester | |
| IS 202 Modern Secular-Christian Worldviews | 3 | ES 301 Physical and Environmental Geography | 4 |
| OE 310 Environmental Interpretation | 3 | Gen-Ed Humanities | 3 |
| Gen-Ed Social Science | 3 | IS 310 Pre-Practicum | 1 |
| ES 315 Freshwater Ecosystems | 4 | HS 102 History of World Civilization II | 3 |
| ES 360 Intro to Geographic Information Systems | 3 | Physical Education Course | 1 |
| | 16 | | 12 |
| <i>Completion of the General Education competencies by the end of the junior year.</i> | | | |
| Sophomore or Junior Summer | | | |
| ES 305 American Ecosystems | | | 4 |
| Senior Year | | | |
| Fall Semester | | Spring Semester | |
| ES 445 Senior Science Seminar | 1 | BL 406 Conservation Biology | 3 |
| ES 340 Research Methods | 3 | OE 305 Environmental Policy and Law | 3 |
| ES 341 Practicum | 3 | ES 460 Field Studies | 2 |
| ES 401 Natural Resource Management | 3 | IS 461 Seminar on Faith and Life | 2 |
| Gen-Ed Humanities | 3 | Elective | 1 |
| ES 460 Field Studies | 2 | Physical Education Course | 1 |
| | 15 | | 12 |
| <i>Completion of 27 credits at the 300-level or above.</i> | | | |
| <i>Completion of the Major Field Test by the end of the Senior Year.</i> | | | |
| Total hours required for degree: | | | 120.5 |

Alternate Year Courses: BL 406; ES 305; ES 315; ES 460

*See General Education for optional course offerings

Special Emphasis Concentration (18 credits)

The Special Emphasis concentration allows students to design a program of study focused on an area of interest outside the core ES curriculum. Past examples include programs in sustainable agriculture, watershed studies, environmental economics, wildlife and fisheries science, and geology. Working with an ES faculty member, the student selects courses from Montreat College or other institutions that can be integrated into an environmental discipline. Such programs must be approved by the academic advisor and by the Environmental Science Faculty by the end of the sophomore year. *In addition to the student developing their own program, below are a few pre-approved Special Emphasis programs:*

Special Emphasis Requirements

ES 305* American Ecosystems (4)
4 additional courses with a minimum of 14 credit hours, selected in consultation with the faculty advisor.

*See Financial Information in the Academic Catalog for information on course fee

Pre-Approved Special Emphasis Programs of Study with Au Sable Institute

Au Sable Institute of Environmental Studies' Certificate Program [<http://www.ausable.org>] is pre-approved as Special Emphasis Concentration plans of study. The student selecting an Au Sable certificate program must adhere to the Au Sable certification guidelines and fulfill all components of the certification program and Special Emphasis requirements. The student must be awarded the certificate by Au Sable. All six courses can be pursued at Au Sable, but if a certification program does not provide the full complement of 6 courses, the additional courses can be pursued at Montreat College or other approved institution. Final plans of how all components of the Special Emphasis are to be fulfilled are prepared with your department advisor and submitted to the department faculty for approval.

Pre-Approved Certification Programs:

Certified Naturalist
Certified Land Resources Analyst
Certified Water Resources Analyst
Certified Environmental Analyst
[Full list of courses offered through Au Sable for Montreat College can be found on the Au Sable web site.]

Environmental Science Minor

Requirements for a minor in Environmental Science (21 credits)

BL 101 Survey of Biological Principles I, II (4)

BL 102 Survey of Biological Principles II (4)

ES 150 Introduction to Environmental Science (4)

ES 206 Ecology (4)

A minimum of five (5) additional hours chosen from BL, CH, or ES