

Environmental Science (ES)

ES 100 Introduction to Environmental Sciences (3 credit hours)

Interrelationships between human populations and the natural environment. Human population trends, agriculture, air and water pollution, biological diversity, forest and land use, energy and mineral resources, and toxic substances. Consideration of related economic factors, laws, politics, political behavior, and ethical questions.

GEP Global Knowledge, GEP Interdisciplinary Perspectives
Typically offered in Fall, Spring, and Summer

ES 111 Applications of Environmental Sciences (1 credit hours)

Exploration and practical experience with personal manifestation as an environmental scientist. Examination of one or more student-selected environmental topics through assignments and class discussions on career readiness, science communication, research processes, and engaging diverse stakeholders. Application of concepts learned in ENV100, ENV 101, ES100, and ES 150. Environmental Sciences majors only.

Corequisite: ES 100 or student has received transfer or AP credit for ES100; Environmental Sciences majors only
Typically offered in Spring only

ES 113 Earth from Space (3 credit hours)

This course takes an orbital perspective on Earth and its natural resources. Particular attention is paid to how humans are changing Earth, challenges to sustainably managing natural resources, and how satellite Earth observation has enabled these discoveries. Students will gain a fundamental understanding of how satellite sensor systems work, how they enable us to understand the dynamic Earth, and the role that remote sensing plays in natural resource challenges.

GEP Global Knowledge, GEP Natural Sciences
Typically offered in Fall only

ES 150 Water and the Environment (3 credit hours)

This interdisciplinary course focuses on the essential role of water in supporting all life on earth, and the expected impacts of rapidly changing water resources. Aspects of water issues will include physical sciences and engineering, life sciences, and social sciences. Case studies outline the importance of water in the global context and in specific settings, including North Carolina. The course will help prepare students for living in a rapidly changing world.

GEP Global Knowledge, GEP Interdisciplinary Perspectives
Typically offered in Spring only

ES 200 Climate Change and Sustainability (3 credit hours)

This course explores the relationships between humans and the environment with interdisciplinary content. Focus is on past impacts of climate change on human activities and future prospects. Course content is based on lectures with students also responsible for developing and presenting seminars.

GEP Global Knowledge, GEP Interdisciplinary Perspectives
Typically offered in Fall and Spring

ES 295 Special Topics in Environmental Science (1-4 credit hours)

Provides instruction on rapidly emerging curriculum. Also provides courses on an experimental basis before incorporation into the curriculum. See specific course offering for course details.

Typically offered in Fall and Spring

ES 300 Energy and Environment (3 credit hours)

This course explores relationships between humans, energy, and the environment with interdisciplinary context. Themes include environmental impacts of energy production, distribution and use with discussion of new technologies. Half of the course content is from subject lectures and half from self-selected student projects. Student projects emphasize analytical approaches to solving environmental problems, and enhance skills in writing, seminars, and team work.

Prerequisite: CH 101 or PY 212 or PY 208

GEP Global Knowledge, GEP Interdisciplinary Perspectives
Typically offered in Fall, Spring, and Summer

ES 400 Analysis of Environmental Issues (3 credit hours)

A capstone course for students in environmental sciences or related majors. The course teaches use of analytical approaches for solving environmental problems, and for communicating results. The course emphasizes development of student projects that lead to environmental decision-making, such as devising a resource management plan, developing a predictive model, prioritizing risk, identifying tipping points, designing new software or technologies, or predicting outcomes of environmental policies. Individual student projects fit within a team framework to simulate a work environment. Students enhance writing and seminar skills. Student may incur extra expenses with projects for this course.

Prerequisite: ES 100, ES 200, ES 300 and Senior standing
Typically offered in Fall and Spring

ES 425/NR 425/ES 525/NR 525 Water Quality and Health (3 credit hours)

The water we drink is intricately linked to our wellbeing. This course provides an introduction to contaminants in drinking water supplies and disparities in safe water access, globally and nationally. We will review how contaminants enter water systems, their effects on health and methods for their detection and removal. We will cover case studies of local, domestic and international water safety crises (e.g., lead, PFAS) and waterborne disease epidemics (e.g., cholera).

Prerequisite: Junior Standing
Typically offered in Spring only

ES 433 Genetically Modified Organisms (GMOs) for Conservation and Society (3 credit hours)

CRISPR and other advances in molecular biology are revolutionizing biotechnology's place in the world and raising a host of important questions: What new applications of biotechnology are possible? How can we pursue innovation responsibly? When and how should biotechnology be used in conservation and other new realms? This course delves into both the biological and social science ideas necessary to grapple with these questions and the opportunities and challenges posed by emerging biotechnologies. Using a mixture of in-class discussions, real world case studies, readings, and guest lectures, students will develop the insights and skills necessary to productively navigate these issues in their careers and everyday lives.

Prerequisite: Junior Standing
Typically offered in Spring only

ES 449/PRT 449 Human Dimensions of Natural Resources in Australia/New Zealand (3 credit hours)

This 3.5 week study abroad program examines human dimensions of natural and environmental conservation in Australia. The course will involve an orientation and lectures from faculty at James Cook University. Students will explore the natural environments in Australia including Great Barrier Reef, Tropical Rainforest and Outback and be introduced to Australian culture and history through interactions with communities. Educational travel, active participation, lectures, seminars, and reflective exercises facilitate learning to improve understanding of relationships between human societies and the natural environment. Students must pay program fees, airfare, some meals, and incidentals.

Corequisite: PRT 450

GEP Global Knowledge, GEP Interdisciplinary Perspectives

Typically offered in Summer only

ES 450/PRT 450 Sustaining Natural Resources in Australia/New Zealand (3 credit hours)

This 3.5 week study abroad program will examine issues related to natural history and environmental conservation in Australia. This course will involve an orientation and lectures from Australian university faculty. Students will explore natural environments in Australia including the Great Barrier Reef, Tropical Rainforest and Outback; learn about sustainable development and protection of the natural environment through educational travel, field trips, active participation, lecture presentations and seminars, written assignments, research projects and reflective exercises. Students must apply through NCSU Study Abroad Office. Students must pay program fees, airfare, some meals and incidentals.

Corequisite: PRT 449

GEP Global Knowledge, GEP Interdisciplinary Perspectives

Typically offered in Summer only

ES 495 Special Topics in Environmental Science (1-6 credit hours)

This course provides instruction on rapidly emerging environmental themes not currently covered in the undergraduate curriculum. Also provides courses on an experimental basis. See specific course offering for course detail.

Prerequisite: Junior standing

Typically offered in Fall and Spring

ES 496 Environmental Science Internship (1-3 credit hours)

Students can earn 1-3 credits for completing internships in the public or private sectors. Emphasis is placed on gaining work experience needed to explore and plan careers in the environmental field. Students must prepare an internship proposal. Students must provide own transportation for internship. Students are required to purchase internship liability insurance. Contact university insurance & risk management for details on acquiring the insurance and the current charge. Individualized/Independent Study and Research courses require a Course Agreement for Students Enrolled in Non-Standard Courses be completed by the student and faculty member prior to registration by the department.

Typically offered in Fall, Spring, and Summer

ES 497 Professional Development in Environmental Science (1-3 credit hours)

The course provides 1-3 credits for students who develop skills necessary to organize, promote, and participate in an event such as a workshop, conference or a seminar. Examples of acceptable events include organizing a panel of speakers on a specific topic. A speaker series, a career fair, or a workshop. The formats and topics of events are determined by the organizing student(s). Each student prepares an event proposal before the student can register for ED 497. Students must provide own transportation for professional development in environmental sciences. Individualized/Independent Study and Research courses require a "Course Agreement for Students Enrolled in Non-Standard Courses" be completed by the student and faculty member prior to registration by the department.

Typically offered in Fall, Spring, and Summer

ES 498 Research in Environmental Science (1-3 credit hours)

Students can earn 1 credit in ES 498 for every 50 hours of research during a semester up to a total of 3 credits for 150 of research in a semester. A student cannot complete more than 3 credits of ES 498 research in a single semester, or more than 6 credits in their program of study. Research can be traditional laboratory and/or fieldwork, or other creative activity. The student must produce a final report, seminar, or product that can be evaluated. Typically, the work for 1-3 credit of ES 498 research will be completed in one semester. Individualized/Independent Study and Research courses require a Course Agreement for Students Enrolled in Non-Standard Courses be completed by the student and faculty member prior to registration by the department.

Typically offered in Fall, Spring, and Summer

ES 499 Thesis in Environmental Science (3 credit hours)

ES 499 thesis provides academic credit for students who participate in original, inquiry-based learning and discovery in environmental sciences. Students present the thesis to a community of peers and experts for evaluation. ES 499 thesis requires a thesis proposal signed by the student, ES faculty advisor, a thesis host, and a supporting faculty member. Individualized/Independent Study and Research courses require a "Course Agreement for Students Enrolled in Non-Standard Courses" be completed by the student and faculty member prior to registration by the department.

Typically offered in Fall, Spring, and Summer

ES 525/NR 525/ES 425/NR 425 Water Quality and Health (3 credit hours)

The water we drink is intricately linked to our wellbeing. This course provides an introduction to contaminants in drinking water supplies and disparities in safe water access, globally and nationally. We will review how contaminants enter water systems, their effects on health and methods for their detection and removal. We will cover case studies of local, domestic and international water safety crises (e.g., lead, PFAS) and waterborne disease epidemics (e.g., cholera).

Prerequisite: Junior Standing

Typically offered in Spring only