Environmental Sciences (ESCI)

ESCI 195 Introductory Mentored Research (2 or 4)
Students will gain hands-on experience with the practice of field or laboratory research in the context of a faculty member's research program. Students will be introduced to research methods, hypothesis-driven research, and/or approaches to long-term environmental monitoring. This course may be repeated for credit at the discretion of the instructor. *Prerequisite: Instructor prerequisite override required.*

ESCI 205 Landscape Ecology (4)
Landscape ecology is the study of how spatial patterns in landscapes impact ecological processes. This course will explore how human and natural factors combine to produce landscape patterns. Students will learn to quantify spatial patterns, including the composition of habitat types, the configuration of habitat patches, and their connectivity to each-other. This course will investigate how these spatial characteristics influence ecological processes including species occurrences, extinctions, and ecological function. Finally, students will explore applications in spatial planning, conservation biology, and ecosystem management. *Prerequisite: ENST 101 or FORS 101 or BIOL 101 or ENST 217.*

ESCI 215 Sound, Soundscapes, and the Environment (4)
A study of sound and its roles in terrestrial and aquatic ecology, biodiversity conservation, and environmental justice. Topics include the evolution and ecology of sonic communication and soundscapes, the role of sound in the study and management of ecosystems, the origins and effects of noise pollution, and the future of Earth's sensory richness. Labs emphasize the appreciation, measurement, and analysis of sounds from the local environment. *Prerequisite: BIOL 130 or ENST 101.*

ESCI 220 The Science of Sustainability (4)
In this course, students learn to carry out their own independent research on important issues in environmental management and sustainability. Meetings are focused upon hands-on practice in experimental design, field data collection, data management, basic coding, project management, grant proposal writing, and public speaking. Throughout those experiences, students gain foundational knowledge in the sciences of climate change, carbon sequestration, pollution, and environmental justice. *Prerequisite: One course in Biology (BIOL), Chemistry (CHEM), Environmental Studies (ENST), Environmental Sciences (ESCI), Forestry (FORS), Geology (GEOL), Mathematics Physics (PHYS), or Statistics (STAT).*

ESCI 222 Data Storytelling and Sustainable Development (4)
Data science plays a critically important role in guiding and monitoring sustainable development goals that seek to align environmental, social, and economic progress. This course explores the intersection of data science and sustainable development, with a practical focus on several core skills: managing real-world datasets, data visualization design, reproducible workflows, complex project management, and impactful data-driven storytelling. Students learn tools such as interactive data dashboards, data storyboards and blogs, automated report generation, data cleaning, data repositories, version control, and data entry software design. They then apply these skills to investigate and communicate emerging issues in sustainable development.

ESCI 240 Island Ecology (Lab) (8)
This interdisciplinary field course combines the study of geology, oceanography, marine biology, botany, and wildlife behavior in a single coastal island ecosystem. *Prerequisite: Only open to students who have completed ENST 140 and been admitted to the Island Ecology program.*

ESCI 295 Mentored Research (2 or 4)
Supervised field or laboratory investigation in environmental science. Students will work with a faculty member on a research project. Faculty members may pose scientific questions and design experiments, but students will conduct experiments and collect data. This course may be repeated for credit at the discretion of the instructor.

ESCI 310 Oceanography (4)
A multi-disciplinary exploration of the ocean's diversity of dynamics, habitats, and organisms, with an emphasis on the complex processes that connect them. Foundational principles, methods and technology, and the latest progress in the marine sciences are covered. *Prerequisite: ENST 209.*

ESCI 395 Advanced Mentored Research (2 or 4)
This course is designed for students who have a strong background in environmental research and are ready for independent work, ideally leading to the completion of an honors thesis. Students will work with a faculty research mentor to design and carry out data collection and/or analysis aimed to address a novel scientific question. This course may be repeated for credit at the discretion of the instructor. *Prerequisite: ESCI 295 and instructor prerequisite override required..*

ESCI 430 Watershed Science Capstone (4)
Capstone course for students pursuing the watershed science certificate. A multidisciplinary, project-oriented course in which students address issues related to two or more of the following topic areas: the interaction of biological processes and watershed function, chemical processes in streams and watershed, the relation between forested landscapes and hydrologic systems, or geological processes in terrestrial aquatic systems. *Open only to seniors pursuing curricular certificates in watershed science.*

ESCI 444 Independent Study (2 or 4)
A supervised field or laboratory investigation of an interdisciplinary topic in environmental science. This course may be repeated for credit when the topic differs. *Prerequisite: Instructor prerequisite override required.*

ESCI 450 Readings in Environmental Sciences (2)
A course exploring and integrating themes in current and historical literature in archaeology, earth sciences, forestry, geography, spatial analysis, and watershed sciences. Open only to seniors pursuing majors in forestry, geology, or natural resources and the environment. *Open only to seniors pursuing majors in forestry, geology, or natural resources and the environment.*

ESCI 457 Software Engineering (4)
The software systems we often find the most useful and magical are also the largest and most complex to build and understand. To be reliable, maintainable, and secure, these systems must be built according to disciplined and well-founded methods. This course examines these methods, both large-scale (defining requirements, system design, architecture patterns, software processes, etc.) and small-scale (version control, testing, benchmarking, code review, etc.). Students will work in small teams to construct production-quality software. *Prerequisite: CSCI 320.*

ESCI 460 Honors Thesis (1)
This course is for students who are conducting research in environmental science and are working toward an honors thesis. A faculty supervisor(s) will support students as they finalize their research and prepare a written report and an oral presentation at Scholarship Sewanee (or equivalent). *Prerequisite: ESCI 395 (or concurrent enrollment in ESCI 395) and instructor prerequisite override required.*