Minor in Environmental Analysis

- **Deep training**: Courses in analysis, critical thinking, and problem solving
- **Accessible**: Most courses do not have prerequisites
- **Application and problem solving**: Many opportunities for interdisciplinary, collaborative, project-based, and community-engaged learning

This minor was developed to prepare students to tackle real-world environmental challenges by providing more robust opportunities for interdisciplinary knowledge and skill development. The minor is structured to provide students with opportunities to strengthen their critical analysis and problem-solving skills through participation in team-based, experiential, often community-engaged learning around “wicked” real-world problems. Must courses do not have prerequisites.

**Required Courses**

- ENST 356W: Environmental Writing (Every Spring)
- ENST 375: Environmental Problem Solving (Every Spring)
- ENST 380: Introduction to GIS (Every Semester)

**One Interdisciplinary Project-Based Capstone Course**

- ENST 405: Sustainability Exchange (Every Semester)
- ENST 406: Urban Ecosystem Principles Integration (Every Fall)
- ENST 411: Sustainable Urban Water Management (Every Fall)
- ENST 539: Interdisciplinary Environmental Clinic (Every Semester)

**One Advanced Elective in Natural Science**

- ENST 364: Field Methods for Environmental Science (Every Fall)
- ENST 365: Applied Conservation Biology (Every Spring)
- ENST 491: Advanced GIS (Every Semester)
- EPSC 454: Exploring and Environmental Geophysics (Every Fall)

**One Advanced Elective in Social Science/Humanities**

- ECON 451: Environmental Policy (Every Fall)*
- ENST 310: Ecological Economics (Every Spring)
- ENST 315: Field Studies: Analyzing Texts & Narratives of the Nuclear Era (Every Spring)
- ENST 335: Environmental Ethics (Every Semester)
- HIST 3068: Human History of Climate Change (Every 1-2 years, SP18)

**UNIQUE COURSES WITH FIELD EXPERIENCES FOR FIRST YEAR STUDENTS**

- **ENST 122**: A Sense of Place: Discovering the Environment of St. Louis (Every Fall, Martin) Through exploration in and around St. Louis rivers, prairies, and urban landscapes, students learn about their “home” for the next four years. Through field trips, readings, interviews and discussion, students see first-hand what challenges face the environment and the people who live here, and why it is important to understand the community at a local level.

**ENST 215**: Introduction to Environmental Humanities (NEW IN FA18) (Every Fall, Loui) In this seminar we will consider texts illustrating how American citizens evolved in their perception, use, and expectations of the natural world during the nineteenth and early twentieth centuries, especially but not limited to the practice of agriculture. Topics will include: agrarian democracy, settlement of the Great Plains by immigrant farmers; the Dust Bowl; fragmentation of the Sioux ecosystem. This cultural research will frame our visits to the Tyson Research Center. First and second year students only.

**BIOL 1181**: First-Year Opportunity: Research and Conservation in Zoos and Botanical Gardens (NEW IN FA18) (Every Fall, Less) An introduction to the world of zoos and botanical gardens. Students will learn of the diverse and cutting-edge ways in which scientists and conservationists study the world’s biological diversity and work to conserve it. Students will take weekly field trips to local institutions to hear how researchers conduct conservation science.

**BIOL 2431 / 2: Missouri’s Natural Heritage** (Every Fall/Spring, Braude) Missouri’s Natural Heritage is for freshmen who want to get outdoors and learn about Missouri’s natural history. The first semester of the sequence will focus on Missouri’s biological, geological, and cultural heritage. The second semester will focus on Missouri’s archaeology, climate, and natural resources. This will provide a foundation on which to examine the ecology, restoration, and management of our diverse habitats (prairie, forest, glade, and stream) and the biology of our diverse plant and animal wildlife (arthropods, mollusks, fish, salamanders, lizards, birds, and mammals).

**INTRODUCTORY LEVEL COURSES FOR NON-MAJORS**

**I50 INTERDISCIPLINARY COURSES**

- **I50 LEVEL COURSES**

**INTRODUCTORY COURSES FOR MAJORS AND MINORS**

**ENST 250**: One Health Linking the Health of Humans, Animals, and the Environment (NEW IN FA18) (Every Fall, DePalma) This course is an introduction to One Health; an interdisciplinary and collaborative approach to understanding the health of humans and the environment. Students will learn about the complex interactions between humans, animals, and the environment, and the importance of understanding these relationships in order to achieve optimal health for all. Students will also learn about the role of public health professionals in addressing these issues and how they work with others to develop strategies for improving health outcomes.

**BIO 2590**: Introduction to Environmental Biology (Every Fall, Pardini) This active-learning course teaches principles of environmental biology and general science literacy skills. Four main topics (human population growth, ecosystem carbon and energy, biodiversity, sustainable agriculture) are covered through exploration of the central question, “How can we feed a growing human population and preserve biodiversity without destroying the planet?”

**POLSCI 2010**: Introduction to Environmental Policy (Every Semester, Krummenacher) This course provides an introduction to and overview of environmental policy. Topics covered include the policy process, the behavior of interest groups and political parties, and the actions of policymakers like Congress and the President. We’ll also examine issues such as pollution control, climate change, and biodiversity.
ENST 201: Earth and the Environment (Every Semester, Various) Introduction to the study of the Earth as a dynamic, evolving planet. Emphasis on how internal and surface processes combine to shape the environment. Themes: Earth's interior as revealed by seismic waves; Earth history and global tectonics shown by changes to ocean floors, mountain-building, formation of continents, earthquakes, and volcanism; climate history and global biogeochemical cycles, influenced by circulation of atmosphere and oceans, ice ages, and human activity. Composition and structure of rocks and minerals.

ENST 290: Sophomore Seminar in Sustainability and the Environment (Every Fall, Parkes) This course will provide an opportunity for students to evaluate and explore potential paths in environmental studies, and learn presentation skills to carry forward in their careers.

TOPICAL ELECTIVE COURSES

POLSCI 340: Topics in Politics: Environmental Justice (Every Spring, Krummenacher) This course explores the history and foundations of the environmental justice movement along with current issues and methods of analysis. Policy responses to environmental injustices will be discussed and the class will examine the role of the environmental justice movement in the work of injustice. Focus on the political, institutional, and legal dimensions of environmental justice.

POLSCI 3752: Topics in American Politics: Globalization, Urbanization, & the Environment (Every Fall, Krummenacher) The rapid spread of urbanization has profound consequences for human and environmental health and how local environmental conditions may facilitate the growth of modern mega-cities. Topics include effects of demographic changes on rural communities as young people seek opportunity in cities and the benefit to environmental quality from an expanding middle class.

ENST 461: Introduction to Environmental Law and Policy (Every Fall, Hubertz) Survey of the most prominent federal laws governing environmental contamination, including clean air and water quality standards, hazardous waste, Superfund and wetlands, with special emphasis on water pollution.\n
ENST 402: Topics in Environmental Science: International Energy Politics NEW IN FA18 (Every Fall, Retting) This course analyzes long-term, political, economic, energy, and environmental issues in the context of global issues such as climate change, fossil, nuclear, coal, natural gas, wind, and solar. It examines the effects of energy resources on peace and conflict, on the stability and well-being of democracies and dictatorships, and on the domestic and foreign politics of the United States, the European Union, Russia, Saudi Arabia, Iran, Iraq, Nigeria and Venezuela.

ENST 3615: Environmental Anthropology (Every Spring, O'Leary) This course will provide students with a working knowledge of how the study of humans across space and time has fundamentally impacted the way we understand the idea of nature, the environment and what it means to human. The course will ground students in both historical and cutting-edge anthropological theories with units on subsistence, transformative nature, imagining wilds in the Anthropocene and pluralizing environmentalisms.

ENST 380/580: Applications in GIS (Every Semester, DeMatteo) This introductory course in Geographic Information Systems (GIS) is designed to provide basic knowledge of GIS theory and applications using the existing state-of-the-art GIS software. The first week of the course will provide a broad view of how you can display and query spatial data and produce map products. The remainder of the course will focus on applying spatial analytical tools to address questions and complete a final independent project that integrates material learned during the course.

ENST 481/581: Advanced GIS (Every Fall, Parkes) This course is designed to move beyond tools and skills learned in Applications in GIS and is valuable in all disciplines. Classes will feature hands-on exercises selected to help you master advanced GIS analysis tools and techniques, while providing experience in the planning and execution of real-world projects.

ENST 364: Field Methods for Environmental Science NEW IN FA18 (Every Fall, Ladd) This course provides training in and experience with interdisciplinary field work and the associated data analysis and interpretation. Students will gain the skills and experience to design and implement a field-based project that integrates material learned by working on real-world projects.

ENST 365: Applied Conservation Biology (Every Spring, Ladd) A hands-on introduction to the concepts of conservation biology and applied conservation practice, including designing and implementing conservation projects. Readings, lectures, classroom exercises, and field projects will immerse students in the tools and techniques needed for successful and sustainable conservation outcomes in contemporary landscapes.

ENST 375: Urban Ecology (Every Spring, Parks) Urban Ecology is a field of study within ecology that focuses on the urban environment as an ecosystem and attempts to understand how humans and nature can better coexist in these highly modified environments. The ultimate goal is to aid efforts for more sustainable cities through better urban planning and practices. It is a multidisciplinary study including topics from ecology, evolution, and conservation biology, as well as architecture, economics, and business.

BIO 381: Introduction to Ecology (Every spring, Pardini/Mangan) This course explores the science of ecology, including factors that control the distribution and population dynamics of organisms and the structure and function of biological communities. It touches on applications of these principles such as conservation, restoration, and disease ecology. Principles of experimental design, quantitative data analysis and interpretation, and mathematical models are critical to the field of ecology and are emphasized throughout the course.

ADVANCED ELECTIVES FOR CRITICAL THINKING, PROBLEM SOLVING, AND COMMUNICATION

ENST 350W: Environmental Writing (Every Spring, Martin) This course aims to provide students with the writing skills they need to be successful in the environmental field upon graduation. Students will examine environmental issues through review of data and facts underlying positions and decisions. They will be asked to analyze the role they play in addressing these issues and to develop a stakeholder focus.

ENST 357: Environmental Problem Solving (Every Spring, Martin) This course aims to provide students with the opportunity to develop and apply problem-solving skills in the context of environmental challenges. Students will learn basic frameworks of decision-making through readings and role-play. Through the role-play students will grapple with the perspectives of multiple stakeholders, the interplay of science and policy, and the ambiguity and uncertainty inherent in decision-making processes.

ENST 400: Topics in Environmental Science: Beyond the Evidence (Every Spring, Pardini) This class explores how people’s beliefs, identity, and emotions play a role in how we understand and confront environmental issues. It provides a critical lens for looking at epistemological and normative frameworks in light of reflective writing, and discussion of how we explore the role of world view, political ideology, cultural cognition, and unconscious cognitive processes can shape our beliefs and behaviors with special attention to the care of human and environment studies.

ENST 315: Fallout: Analyzing Texts and Narratives of the Nuclear Era (Every Spring, Loui) In this environmental humanities course students compare and integrate diverse texts from the era through which Americans have developed a complex relationship with nuclear technology. Using texts such as literary, non-fiction, history, environmental anthropology, natural history and public health, students explore aspects of the Manhattan Project, the Chernobyl Nuclear Reactor accident, and debates over the current and future use of nuclear energy. This course emphasizes critical thinking and writing.

HIST 3068: The Human History of Climate Change (Every 1-2 years, Blar) Climate change is not a new concern: Advisors to the king of France warned against deforestation in the 18th and 19th centuries and experiments revealed the arrival of acid rain in the industrial centers of Great Britain. This course explores how societies have addressed climate change and how changes have been addressed as a scientific, political, and environmental issue. The course will also introduce students to the field of environmental history and explore how the methods of this field of inquiry challenge traditional historical categories.

INTERDISCIPLINARY, PROJECT-BASED CAPSTONE COURSES

These courses engage students in collaborative work in interdisciplinary teams on projects, usually with a university- or community partner. Students engage in design, research, implementation and evaluation of projects and experience the value of interdisciplinarity in addressing complex environmental problems.

ENST 405: Sustainability Exchange: Community and University Practicums (Every Semester, Lowry and others) The Sustainability Exchange brings together students working in trans-disciplinary teams to tackle real-world environmental and sustainability problems through experiential education. Students participate in projects with clients or partners off-campus, developed with and guided by faculty mentors, with the intention of delivering an applicable end-product that explores “wicked” problems requiring innovative methods and solutions.

ENST 452: International Climate Negotiation Seminar (Every Fall, Martin) This course is a three-credit advanced seminar for students who will represent Washington University at the annual United Nations Conference of the Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC). Students learn the basics of the UNFCCC process, how to identify, analyze and evaluate policy positions in context of science. Students begin to see the interaction between climate policy, science, technology, and political contexts, and their role in shaping change.

ENST 539: Interdisciplinary Environmental Clinic (Every Semester, Miller, Goode, Hubertz and others) This course constitutes the technical component of an interdisciplinary environmental clinic based at the Law School. Engineering and Arts & Sciences students participate in interdisciplinary teams with law students, handling environmental projects for public interest, environmental or community organizations or individuals.