Environmental Studies Program

Why study environmental studies?

The Environmental Studies Program at the University of Kansas, established in 1971, is one of the oldest environmental studies programs in the country. The KU Environmental Studies Program provides a rigorous interdisciplinary education and stimulates exchange concerning the environment from natural science, social science, and humanities perspectives. Learning Pathways (http://esp.ku.edu/pathways), thematic areas of study that match student interest to the environmental expertise of our faculty, are a key aspect of our unique program.

The program provides students with the tools they need to investigate environmental phenomena, including soil sampling and freshwater ecology to policy-making and social science. Environmental Studies students learn how to put together what other disciplines take apart.

Our pedagogy is focused on engaged learning. Learning Pathways (http://esp.ku.edu/pathways) concentrations provide options for a deeper dive within our major, with recommended courses, faculty, and experiences. In addition to a vibrant classroom curriculum (http://esp.ku.edu/curriculum), Environmental Studies students are encouraged to participate in the many exciting experiential learning opportunities that KU offers, including study abroad (http://esp.ku.edu/study-abroad), undergraduate research (http://esp.ku.edu/independent-research-projects), co-curricular projects (http://esp.ku.edu/projects), and internships (http://esp.ku.edu/internships).

Environmental Studies equips students to get involved in the intellectual life of the university and to connect to environmental projects in the surrounding community. These experiences enhance the success of students along their path to graduation and rewarding careers.

Undergraduate Programs

This interdisciplinary major gives students a fundamental knowledge of the human environment, the dimensions of human impact on the environment, and holistic approaches to solving problems resulting from this impact. The human environment includes all facets of human activity affecting the environment, such as philosophical and ethical issues, environmental resource use and misuse, population biology, and the chemistry of the atmosphere.

Electives

The goals of the program are

1. To provide a holistic view of the environment, one in which the synergistic nature of perturbations, natural and anthropogenic, can be understood and
2. To provide the technical and evaluative skills for active participation in an environmental career.

The environment is the central theme around which a liberal arts education is focused.

Students may declare an interest in environmental studies or a major in environmental studies by filling out the appropriate forms. CLAS Interest Code and Major Declaration forms are available from College Advising & Student Services (https://collegeadvising.ku.edu), 109 Strong Hall, or in the environmental studies office. Students are strongly encouraged to declare an environmental studies major as soon as possible.

Electives provide the opportunity to specialize, and these can be chosen by consulting the various pathways in the major (http://esp.ku.edu/pathways), which contain a list of faculty members associated with the pathway who are available to help decide on electives and environmental careers. An elective approval form must be submitted to 109 Strong Hall before a student is allowed to graduate. Forms may be obtained from the environmental studies office. Except for study abroad, a maximum of 8 hours of nonclassroom course work may be counted toward electives (e.g., internship or research).

Exceptions and Substitutions

All substitutions must be approved by a student’s environmental studies faculty advisor. A student must submit a requirement substitution form to the environmental studies faculty advisor. Forms can be obtained from the environmental studies office.

Internships

Internships allow majors to develop new skills and test their abilities and educational backgrounds. Students can assess their career objectives in professional settings. Internships are done in city, county, state, and federal agencies and in environmental organizations and private companies or agencies. Students are encouraged to participate at the end of the sophomore or junior year. Completion of an internship by the end of the junior year provides an opportunity to make career changes and final elective selections before the senior year. It is not possible to participate in an internship after graduation. The applicant must have a grade-point average of 2.5 or above, must have completed 12 hours of required environmental studies courses, and must have a suitable internship opportunity. A maximum of 3 hours may be applied to the 12 hours of required electives.

Professional Science Masters

The Professional Science Masters professional graduate degree is designed for graduates of bachelor’s programs in physical/natural sciences, environmental studies, civil/environmental engineering or related fields who are currently employed in private firms, public agencies, and not-for-profit organizations that address a range of environmental issues. Key foci in the science curriculum of this program are environmental impact assessment; soils, water, and ecosystems; geospatial analysis; environmental health and policy; and an understanding of environmental law and policy and the regulatory environment.

The P.S.M. degree is a unique professional degree grounded in natural science, technology, engineering, mathematics and/or computational sciences and designed to prepare students for direct entry into a variety of career options in industry, business, government, or non-profit organizations. P.S.M. programs prepare graduates for high-level careers in science that have a strong emphasis on such skill areas as management, policy, entrepreneurship, communication and project management. P.S.M. programs consist of 2 years of academic training in an emerging or interdisciplinary area, along with a professional component that may include internships and “cross-training” in workplace skills.
Graduate Certificate in Environmental Studies

The Graduate Certificate in Environmental Studies is designed to give students already admitted to a graduate program at KU the opportunity for interdisciplinary coursework in Environmental Studies, spanning the humanities, natural/physical sciences, and social sciences.

Graduate Certificate in Environmental Assessment

The Certificate in Environmental Assessment is designed for graduates of bachelor’s programs in physical/natural sciences, environmental studies, civil/environmental engineering or related fields who are currently employed in private firms, public agencies, and not-for-profit organizations that address a range of environmental issues. Key foci in the science curriculum of this program are environmental impact assessment; soils, water, and ecosystems science; geospatial analysis; environmental health and policy; and an understanding of environmental law and policy and the regulatory environment.

Courses

EVRN 103. Environment and History. 3 Hours H.
Nature is our oldest home and newest challenge. This course surveys the environmental history of the earth from the extinction of the dinosaurs to the present with a focus on the changing ecological role of humans. It analyzes cases of ecological stability, compares cultural attitudes toward nature, and asks why this ancient relationship seems so troubled. (Same as HIST 103.) LEC.

EVRN 140. Global Environment I: The Discovery of Environmental Change. 5 Hours GE3N / U / LFE.
This interdisciplinary course and laboratory sections survey the foundations of environmental understanding and the process of scientific discovery from perspectives that combine the principles and methodologies of the humanities, physical, life and social sciences. Key topics include the history of environmental systems and life on earth, the discovery of biotic evolution, ecological change, and climate change. Laboratory sections apply the principles and methodologies of the humanities, physical, life and social sciences to earth systems and the development of environmental understanding using historical and present-day examples. (Same as GEOG 140 and HIST 140.) LEC.

EVRN 142. Global Environment II: The Ecology of Human Civilization. 5 Hours GE3S / U.
This interdisciplinary course and its laboratory sections survey the history of humanity’s relationship with the natural world over the long term from perspectives that combine the principles and methodologies of the humanities, physical, life and social sciences. Key topics include the evolution of Homo sapiens and cultural systems; the development of hunter, gatherer, fisher, agricultural, and pastoral lifeways; the ecology of colonialism and industrial civilization, and the emergence of ideological and ethical perspectives on the relationship between nature and culture. Laboratory sections apply the principles and methodologies of the humanities, physical, life and social sciences to the humanity's engagement with the global environment using historical and present-day examples. (Same as GEOG 142 and HIST 142.) LEC.

EVRN 144. Global Environment I: Discovery of Environmental Change, Honors. 5 Hours GE3N / U / LFE.
This interdisciplinary course surveys the foundations of environmental understanding and the process of scientific discovery from perspectives that combine the principles and methodologies of the humanities, physical, life and social sciences. Key topics include the history of environmental systems and life on earth, the discovery of biotic evolution, ecological change, and climate change. Laboratory sections apply the principles and methodologies of the humanities, physical, life and social sciences to earth systems and the development of environmental understanding using historical and present-day examples. (Same as GEOG 144 and HIST 144.) Open only to students admitted to the University Honors Program or by permission of instructor. LEC.

EVRN 145. Global Environment II: The Ecology of Human Civilization, Honors. 5 Hours GE3S / U.
This interdisciplinary course and its laboratory sections survey the history of humanity's relationship with the natural world over the long term from perspectives that combine the principles and methodologies of the humanities, physical, life and social sciences. Key topics will include the evolution of Homo sapiens and cultural systems; the development of hunter, gatherer, fisher, agricultural, and pastoral lifeways; the ecology of colonialism and industrial civilization, and the emergence of ideological and ethical perspectives on the relationship between nature and culture. Laboratory sections apply the principles and methodologies of the humanities, physical, life and social sciences to the humanity's engagement with the global environment using historical and present-day examples. (Same as GEOG 145 and HIST 145.) Open only to students admitted to the University Honors Program or by permission of instructor. LEC.

EVRN 148. Scientific Principles of Environmental Studies. 3 Hours NB GE3N / N.
This course provides the scientific knowledge necessary to understand the changing relationships between humans and the natural environment, with an emphasis on the assessment of current environmental problems and critical evaluation of potential solutions. Major topics include fundamental scientific concepts and principles, interactions among the biological and physical components of the environment, implications of a growing human population, water resources, the atmosphere, climate, and energy sources. (Same as GEOG 148.) LEC.

EVRN 149. Scientific Principles of Environmental Studies, Honors. 3 Hours NB GE3N / N / LFE.
This course presents an overview of our understanding of environmental processes and issues. Topics include scientific principles, resource issues, pollution and global change, among others. This course gives students a rigorous understanding of interactions between humans and their environment and provides students with a scientific basis for making informed environmental decisions. An honors section of EVRN 148, designed for superior students. (Same as GEOG 149.) Prerequisite: Membership in the University Honors Program or approval of instructor required. LEC.

EVRN 150. Environment, Culture and Society. 3 Hours SC GE3S / S.
An introduction to geographic approaches to the study of the environment, emphasizing societal and cultural factors that influence human interaction with the biosphere, hydrosphere, lithosphere and atmosphere. The course involves analysis of a broad range of contemporary environmental issues from the local to global scales. (Same as GEOG 150.) LEC.

EVRN 170. Introduction to Kansas Landscapes. 1 Hour N.
A course focused on the land and environment of Kansas. Field trips provide students with direct experience of the diverse landscapes in our area. Coursework also emphasizes the dynamic nature of the current landscape and the natural and cultural processes that have shaped it. LEC.
EVRN 171. Understanding Kansas Landscapes. 1 Hour N.
An introduction to the research methods used by scholars in diverse fields, applied to environmental issues introduced in EVRN 170. Prerequisite: EVRN 170. LEC.

EVRN 172. Kansas Landscape Projects. 1 Hour N.
Students participate in the design and execution of a simple research project focused on a local environmental topic. Prerequisite: EVRN 170, and EVRN 171. LEC.

EVRN 177. First Year Seminar: ____. 3 Hours GE11 / U.
A limited-enrollment, seminar course for first-time freshmen, addressing current issues in Environmental Studies. Course is designed to meet the critical thinking learning outcome of the KU Core. First-Year Seminar topics are coordinated and approved by the Office of First-Year Experience. Prerequisite: First-time freshman status. LEC.

EVRN 200. Study Abroad Topics In: ____. 1-6 Hours S.
This course is designed for the study of special topics in Environmental Studies. Coursework must be arranged through the Office of Study Abroad. May be repeated for credit if content varies. LEC.

EVRN 304. Environmental Conservation. 3 Hours NE GE3N / N.
A survey of current methods of describing and modeling the function, structure, and productivity of natural and anthropogenically modified earth resource systems, along with a discussion of contemporary views of what constitutes a natural landscape. Fundamental natural science principles about the interplay among lithospheric, atmospheric, hydrospheric, and biospheric components of earth systems are emphasized. Uses of natural resources, including fossil fuels, minerals, and water, are described with attention to the earth's total energy budget. Human activities that affect preservation, conservation, and multiple uses of earth regions receive attention. Systems under stress through population and other contemporary forces serve as examples. (Same as GEOG 304.) LEC.

EVRN 320. Environmental Policy Analysis. 3 Hours N.
An historical and analytical study of the formulation, implementation, and consequences of environmental policy in the United States. Attention will be directed at relevant interest groups, issues specific to both rural and urban populations, relationships between national policies and international organizations concerned with environmental problems. Prerequisite: EVRN 140/GEOG 140/HIST 140 or EVRN 142/GEOG 142/HIST 142; or EVRN 144/GEOG 144/HIST 144 or EVRN 145/GEOG 145/HIST 145; or EVRN 148/GEOG 148; or concurrent enrollment. LEC.

EVRN 330. Sculpture Intercepting the Waste Stream. 3 Hours N.
An introductory course using engaged learning to exploring the genre of ecological art practice (eco-art.) Class focuses on the waste stream particularly as it affects the Kansas River. Through remediation events, students build works of art from trash, in turn auctioned for environmental efforts. Creative attention is focused on ecological imbalance. (Same as SCUL 330.) Prerequisite: Visual Art major or minor, or instructor permission. LAB.

EVRN 332. Environmental Law. 3 Hours U.
An introduction to how the American legal process improves, transforms, and damages the natural environment. Emphasizes and compares shifting responsibilities of legal forces and institutions: judges and litigants, legislators and statutes, agencies and administrations, and citizens and regulated entities. Prerequisite: EVRN 140/GEOG 140/HIST 140 or EVRN 142/GEOG 142/HIST 142; or EVRN 144/GEOG 144/HIST 144 or EVRN 145/GEOG 145/HIST 145; or EVRN 148/GEOG 148; or concurrent enrollment. LEC.

EVRN 335. Introduction to Soil Geography. 4 Hours N / LFE.
This course focuses on the properties and processes of soils as they occur in their environment. The student is introduced to the nature of soil as it functions as a body; genesis of soils; properties of soil solids, especially colloids; soil chemical composition, properties, and reactions; interaction between solid, liquid, and gaseous components in soils; plant-soil-water relationships; biological interactions with soil; classification of soils; and the distribution of soils on the landscape. Not open to students who have taken EVRN 535 or GEOG 535. (Same as GEOG 335.) Prerequisite: GEOG 104 or GEO 101 or consent of instructor; BIOL 100 and CHEM 190 and CHEM 191 recommended. LEC.

EVRN 336. Ethics, Ideas and Nature. 3 Hours AE51 / H.
This course examines the ethical frameworks developed for thinking about, using, and protecting the natural world. Examples of topics include indigenous approaches to nature, the history of ecological ideas, environmental movements, the role of the state in managing resources, utilitarianism and progressivism, environmental lawmaking, wilderness advocacy, nature and theology, the rights of nature, and environmental justice. Students are introduced to the theories of duty ethics, justice ethics, utilitarianism, and rights ethics, and required to apply ethical decision making to contemporary and historical environmental issues. Multiple perspectives on the history of human interactions with nature demonstrate the importance of reflecting upon the value systems inherent in human-centered environmental ethics and nature-centered environmental ethics. (Same as HIST 336.) LEC.

EVRN 338. Permaculture Design. 6 Hours N.
Students learn how a local, sustainable design system known as permaculture design creates an ecologically sound and economically viable way of living. The course consists of lecture, field, and practicum sessions. Lecture topics include food security, permaculture ethics, ecological principles, system design, sustainable soils, food production, food forests, earth works, and construction of human habitats. LEC.

EVRN 347. Environmental History of North America. 3 Hours H.
A survey of changes in the landscape and in people's perceptions of the natural world from 1500 to present. Topics include agriculture, water and energy, the impact of capitalism, industrialism, urbanization, and such technologies as the automobile and the origins of conservation. (Same as HIST 347.) LEC.

EVRN 360. Environmental Policy Analysis. 3 Hours N.
An introductory course exploring the genre of ecological art practice (eco-art) through a series of engaged learning projects that focus on habitat, the waste stream and natural resources, local ecologies and interventionist creative strategies that focus attention on ecological imbalance. (Same as SCUL 362.) Prerequisite: Visual Art major or minor, or instructor permission. LAB.

EVRN 363. Introduction to Environmental Hydrology and Water Resources. 3 Hours N.
Water is vital to life on earth. In this course we cover components of the water or "hydrologic" cycle, how management has altered them, and how they are predicted to change with the changing climate. We discuss the evolution of water policy, its implications for managements and the economic impact of human perturbation on water. We study the physical processes that govern the water cycle, learn how they are measured, and estimate hydrologic fluxes. (Same as GEOG 336.) Prerequisite: GEOG 104 or GEO 101 or GEO 102. LEC.

EVRN 371. Environmental Geopolitics. 3 Hours S.
This course examines how human relationships with the biophysical world are politicized. Examines key contributions to debates surrounding environmental security, resource conflicts, and related issues, as well as geopolitical assumptions on which these debates build. (Same as GEOG 371 and GIST 371.) LEC.
EVRN 374. Vulnerability and Adaptation. 3 Hours S.
The course objective is to understand and analyze human adaptation to environmental change by focusing on disasters and climate change. Each semester, the course rotates topics ranging from oil spills, hurricanes, sea-level rise to infectious disease. It provides undergraduate students with research experience and service learning, and offers opportunities for certificates through the Center for Undergraduate Research and the Center for Civic and Service Responsibility at KU. Students learn theories relevant to the case study, work in groups to generate research themes, conduct literature search and review, learn research methods, and write and present their work. LEC.

EVRN 385. Environmental Sociology. 3 Hours S.
This course invites students to study society and its impact on the environment. Environmental problems are social problems. This course will address such items as social paradigms, theories, inequalities, movements, and research. (Same as SOC 385.) LEC.

EVRN 405. Kansas Power. 3 Hours.
Where does our energy come from? How can we optimize our use of renewable and nonrenewable sources of energy? What are the drivers moving us to more renewable sources of energy? What are the impediments? In this course we will explore the use of fossil fuels, nuclear, wind, geothermal and solar energy in Kansas. We will visit nearby power plants, and alternative energy companies. Students will be expected to design an energy plan for a local entity, and present their ideas. Prerequisite: EVRN 140 and EVRN 142. LEC.

EVRN 410. Environmental Applications of Geographic Information Systems. 3 Hours N.
An introduction to the use, display, and analysis of spatial data. Students will acquire a foundational skill-set in geographic information systems and remote sensing using industry-standard GIS software and will apply these skills using environmental data and case studies. Prerequisite: EVRN 148 or EVRN 149 or GEOG 148 or GEOG 149; EVRN 103 or HIST 103, EVRN 150 or GEOG 150 or EVRN 347 or HIST 347. LEC.

EVRN 412. Ecology: Fundamentals and Applications. 3 Hours.
An introduction to the principles of ecology, with an emphasis on environmental applications. Major topics include physiological and functional ecology, population and community dynamics, biogeography, and ecosystems ecology. Intended for students seeking B.A. or B.G.S. degrees. Prerequisite: EVRN 140 or EVRN 144 or EVRN 148 or EVRN 149 or consent of the instructor. LEC.

EVRN 414. Principles of Ecology. 3 Hours N.
Study of the principles underlying species population density changes, community structure and dynamics, biogeochemical cycles, and energy flow and nutrient cycling in ecosystems. (Same as BIOL 414.) Prerequisite: BIOL 152 or BIOL 153, or consent of the instructor. LEC.

EVRN 420. Topics in Environmental Studies: ______. 1-6 Hours N / LFE.
Courses on special topics in Environmental Science and/or Policy. These courses may be lecture, discussions, or readings. Students may enroll in more than one interest group but may enroll in a given interest group only once. LEC.

EVRN 425. Global Water Scarcity. 3 Hours S.
Though natural factors are introduced, this course focuses primarily on the human factors that contribute to global water scarcity. This course also discusses the consequences of water scarcity and its effects on society. Prerequisite: EVRN 148 or permission of instructor. LEC.

EVRN 445. Introduction to Environmental Health. 3 Hours.
This course is designed to provide a foundation for understanding how the natural and built environment affect human health in industrialized and developing countries by examining the impact of physical, chemical, and biological factors external to humans. Students will gain an understanding of the interaction of individuals and communities with the environment, the potential impact on health of environmental agents, and specific applications of concepts of environmental health. LEC.

EVRN 460. Field Ecology. 3 Hours N / LFE.
An introduction to research methods for environmental science. The course includes fieldwork in diverse ecosystems (lakes, streams, forests, prairies). It emphasizes the development of skills in data analysis and interpretation that are essential to a full understanding of environmental issues. Enrollment limited to environmental studies majors, or by instructor permission. Prerequisite: Junior or Senior standing, completion of the natural sciences requirement of the KU Core (GE3N), and either EVRN 320 or EVRN 332. FLD.

EVRN 490. Internship in Environmental Studies. 1-8 Hours AE61 / N.
Supervised practical experience in a specific environmental area of interest. The advisor will schedule regular meetings to evaluate progress and provide assistance. A written summary of the internship experience and evaluation will be prepared independently by the student, a representative of the cooperating agency, and the advisor. Total credit may not exceed 8 hours. Prerequisite: Junior standing and consent of program director. Restricted to declared Environmental Studies majors. Restricted to students with a 2.5 overall GPA or above. INT.

EVRN 510. Advanced Environmental Applications in Geospatial Techniques. 3 Hours H/N.
This course focuses on applying advanced geospatial mapping and analysis techniques to "real-world" environmental issues. Course content may include lecture/lab time on advanced geospatial topics; a major class project, small-group projects, or individual projects; or half-semester internships with state agencies or campus entities that will culminate in an individual project. The specific nature of projects will be driven largely by student interest and ability, as well as agency/center needs. Prerequisite: EVRN 410 or equivalent course; or permission of the instructor. LEC.

EVRN 519. Sociology of Global Food. 5 Hours U.
The Sociology of Global Food offers a critical examination of the global food system since the Industrial Revolution. Topics include the industrialization of agriculture, sustainable agriculture, and the role of food and agriculture in organizing society. This course discusses the emergence of current debates around food and agriculture including food activism, technological developments, human/environment relationships, and labor issues. There is a lab component to this course. (Same as SOC 519.) Prerequisite: Junior standing. LEC.

EVRN 526. Remote Sensing of the Environment I. 4 Hours N.
Introduction to study of the environment through air photos and satellite imagery, including principles of remote sensing, interactions of electromagnetic energy with the atmosphere and earth's surface, aerial photography, satellite systems, and sensors (electro-optical, thermal, and radar). Emphasis in the latter part of the course is on such applications as global monitoring, land cover mapping, forestry, agriculture, and oceanography. Laboratory emphasizes visual interpretation of aerial photography and satellite imagery and an introduction to digital image processing in the department's NASA Earth Science Remote Sensing Laboratory. (Same as GEOG 526.) Prerequisite: MATH 101 or equivalent. GEOG 358 recommended. LEC.

EVRN 528. Environmental Justice and Public Policy. 3 Hours S.
This course provides an overview of environmental justice, both as a social movement and as a public policy initiative. Environmental justice examines the distribution of environmental externalities across different socio-economic and racial groups. We will discuss several different public policy areas that have been impacted by the environmental justice
movement: hazardous waste facility siting, urban redevelopment and Brownfields, transportation policy, and Native American sovereignty. We will also touch upon international environmental policy in an environmental justice context. Throughout the course we will evaluate empirical issues in studying environmental justice. (Same as POLS 528.) Prerequisite: POLS 306, or a statistics class, or consent of instructor. LEC.

EVRN 530. Biodiversity Discovery and Assessment. 2 Hours N.
An integrated lecture and laboratory course designed to provide an overview of modern methods in biodiversity exploration and discovery. Lectures cover the theory and practice of planning fieldwork in remote locations, documenting species and their natural history, how museum collections are made, calculating and comparing species richness estimates, and the process of describing and naming new species. The laboratory component provides students experience in documenting species and their natural history, processing and curating samples of natural history specimens, and the statistical analysis of biodiversity data. (Same as BIOL 530.) Prerequisite: BIOL 152, 153, or equivalent, or permission of instructor. LEC.

EVRN 531. Tropical Fieldwork in Biodiversity Discovery. 1 Hour U.
An introduction to modern field methods of assessing biodiversity. Fieldwork employs insects and various field methods to estimate and compare species diversity between different habitats and field sites. Taught at different sites in tropical South America over Spring Break. Contact Undergraduate Biology, or the Office of Study Abroad. (Same as BIOL 531.) Prerequisite: BIOL 152, 153, or equivalent, or permission of instructor. Concurrent or prior enrollment of BIOL 530 is strongly encouraged. LAB.

EVRN 535. Soil Geography. 4 Hours N / LFE.
A broad study of the principles and properties of soils and their distribution on the landscape. Topics covered include: pedology, clay mineralogy, soil physics, soil chemistry, management of soils, soil biology, taxonomy, and soil geomorphology. Laboratory section and a field project are required. Not open to students who have taken GEOG 335 or EVRN 335. (Same as GEOG 535.) Prerequisite: GEOG 104 or GEOL 101 or consent of the instructor; BIOL 100 and CHEM 130 or CHEM 190 and CHEM 191 recommended. LEC.

EVRN 538. Soil Chemistry. 3 Hours N / LFE.
This course examines the chemical properties and processes of soils and methods of evaluation. Topics include soil and solution speciation, mineral solubility, soil colloidal behavior, ion exchange, surface complexation, soil salinity and sodicity, soil acidity, oxidation-reduction reactions, and kinetics of soil chemical processes. (Same as GEOG 538.) Prerequisite: GEOG 335 or GEOG 535 or EVRN 335 or EVRN 535, CHEM 135 or CHEM 195 and CHEM 196, MATH 125, or consent of the instructor. LEC.

EVRN 540. Ecohydrology. 3 Hours N.
Ecohydrology is the discipline that answers real world hydrologic and biologic questions through integrating knowledge from hydrology, ecology, atmospheric science and biogeochemistry. We focus on the key concepts, methodological approaches and analytical techniques utilized in ecohydrology to understand and quantify: plant water use, evolution of hydrologic properties, groundwater-surface water interactions, controls on landscape patterns, spatial and temporal patterns of soil moisture and nutrient concentrations, and vegetation competition. Students should leave the class having developed critical skills in: 1) reviewing scientific literature, 2) collecting environmental samples, 3) analyzing ecohydrologic data, 4) writing a scientific research paper, 5) working collaboratively and independently. (Same as GEOG 540.) Prerequisite: GEOG 104 or GEOL 101 or GEOL 102, or EVRN 363 or GEOG 336 or permission of instructor. LEC.

EVRN 542. Ethnobotany. 3 Hours S.
Course will involve lectures and discussion of Ethnobotany - the mutual relationship between plants and traditional people. Research from both the field of anthropology and botany will be incorporated in this course to study the cultural significance of plant materials. The course has 7 main areas of focus: 1) Methods in Ethnobotanical Study; 2) Traditional Botanical Knowledge - knowledge systems, ethnolinguistics; 3) Edible and Medicinal Plants of North America (focus on North American Indians); 4) Traditional Phytochemistry - how traditional people made use of chemical substances; 5) Understanding Traditional Plant Use and Management; 6) Applied Ethnobotany; 7) Ethnobotany in Sustainable Development (focus on medicinal plant exploration by pharmaceutical companies in Latin America). (Same as ANTH 582 and ISP 542.) Prerequisite: ANTH 104, ANTH 108, EVRN 148, or consent of instructor. LEC.

EVRN 550. Environmental Economics. 3 Hours U.
This course provides an overview of the theory and empirical practice of economic analysis as it applies to environmental issues. Topics include externalities (a type of market failure), the valuation of nonmarket goods, the practice of benefit-cost analysis, and the efficiency and cost effectiveness of pollution control policies. Most importantly, the course permits students to perform economic field research, using state-of-the-art techniques in a manner accessible to undergraduate students. (Same as ECON 550.) Prerequisite: ECON 104, ECON 140, or ECON 142. LEC.

EVRN 553. Comparative Environmental Politics. 3 Hours S.
This course compares environmental politics and policies across a number of countries, including those in North America, Western Europe, East Asia, and Latin America. (Same as POLS 553.) LEC.

EVRN 562. United States Environmental History in the 20th Century. 3 Hours H.
Americans dramatically changed the natural world between 1900 and 2000. This course asks how transformed environments shaped the American experience during a century of technological innovation, democratic renewal, economic expansion, global conflict, and cultural pluralism. Topics include food and markets, energy and transportation, law and politics, protest and resistance, suburbanization, and environmentalism's fate in a global information era. (Same as HIST 562.) LEC.

EVRN 563. U.S. Environmental Thought in the 20th Century. 3 Hours H.
Explores both leading and dissident ideas that Americans have had about the natural world since 1900. Broad chronological periods are explored in some depth, including the Progressive Era, New Deal, Cold War, the Sixties, and the Reagan Eighties. The course uses articles and books, as well as visual and aural forms of communication. Commercial speech, as well as scholarly and literary works, are considered. (Same as HIST 563.) Prerequisite: EVRN 148 or HIST 129, or by permission of instructor. LEC.

EVRN 611. Water Quality, Land Use, and Watershed Ecosystems. 3 Hours N.
Water quality issues are integrated with land use planning and the development of watershed management strategies. Interrelationships among the hydrologic cycle, atmospheric deposition, nutrient transformations and pesticide use are examined in regards to stream, lake, and groundwater quality. Prerequisite: CHEM 110 or CHEM 130 and BIOL 414, or consent of instructor. LEC.

EVRN 615. Capstone Project. 3 Hours AE61 / N.
The capstone project provides students with a broad-based, interdisciplinary educational experience and allows them to integrate and synthesize the knowledge they have gained in their environmental studies major. It rejoins the cohort that has separately pursued the BA/BGS and BS tracks and places them in situations in which they address real world
environmental issues with a team approach and produce professionally meaningful analytical reports. Prerequisite: Junior standing; EVRN 320, EVRN 332, and EVRN 460. Restricted to declared Environmental Studies majors. LEC.

EVRN 616. Environmental Impact Assessment. 3 Hours N.
This course provides an overview of environmental laws and regulations. Additional focus is given to the process described in the National Environmental Policy Act (NEPA). Students will learn when NEPA is triggered, the difference between Environmental Impact Statements (EIS) and Environmental Assessments (EIA), and how to write an EIS/EIA. Prerequisite: An introductory course in environmental law, or consent of instructor. LEC.

EVRN 620. Environmental Politics and Policy. 3 Hours S.
Analysis of environmental politics and the formulation and implementation of environmental policy. Examines the history and development of environmental politics as well as current trends. Themes include interest groups, business interests, political institutions, and specific environmental policy issues. (Same as POLS 624.) LEC.

EVRN 624. Independent Study. 1-9 Hours AE61 / N.
A research course, in any of the fields of environmental studies, consisting of either experimental research, original policy analysis, or the preparation of an extensive paper based on library investigation. Project topic to be agreed upon in advance with supervising faculty member. Prerequisite: Consent of instructor. IND.

EVRN 625. Honors Research in Environmental Studies. 3 Hours AE61 / N.
A course giving eligible majors the opportunity to earn Departmental Honors by engaging in an intensive program of study leading to an original piece of research. Prerequisite: Senior standing, approval of the Environmental Studies Program, the Honors Project Director, and an overall 3.25 cumulative grade point average during the semester of enrollment. Restricted to declared Environmental Studies majors. IND.

EVRN 628. The Politics of Public Health. 3 Hours S.
This course examines the social, institutional and political context of public health policy in the United States. We will examine factors that shape the nation's public health, explore the role of government in reducing risk and promoting well being, and analyze the major institutions responsible for monitoring, protecting and promoting general public health. Themes include the social determinants of health, health disparities, emerging infectious diseases, food safety, transportation, and environmental health. (Same as POLS 628.) Prerequisite: POLS 110 and POLS 306 are recommended. LEC.

EVRN 635. Soil Physics. 3 Hours N.
Provides theoretical and practical foundations for understanding physical properties and processes of variably-saturated porous media. Focus is on the transport, retention, and transformation of water, heat, gas, and solutes through the soil. We examine modern vadose zone measurement methods, analytical tools, and numerical models for data collection and interpretation. (Same as GEOG 635.) Prerequisite: GEOG 335 or EVRN 335; or GEOG 535 or EVRN 535, and MATH 125, PHSX 114; or consent of instructor. LEC.

EVRN 636. Globalization and Environment. 3 Hours.
The focus is on the sociological facets of global environmental problems (e.g., climate change, biodiversity, fresh water problems, toxic waste; invasive species) and especially their relationship to globalization, growth, and what environmental sociologists have called the "human exemptionalist model." We address global environmental problems, political divisions over them, environmental movements and justice, and adaptation and mitigation strategies. The sociological literature on these issues and different environmental social theories are discussed (e.g., ecological modernization, treadmill theory, metabolic rift). Special attention is given to the impact of globalization and expansion of the global economy relative to the biosphere and consequent spikes in the consumption of resources and production waste. (Same as SOC 635.) Prerequisite: SOC 104 or EVRN 103 or EVRN 140 or permission of the instructor. LEC.

EVRN 640. Natural Resource Management from an Indigenous Perspective. 3 Hours.
The purpose of this course is to provide students with a solid understanding of how crucial the management of natural resources is, with emphasis on Indigenous communities. Indigenous communities are often ignored in such courses even though these peoples have distinctive views of how resources should be managed. This course allows students to focus on case studies and philosophical principles that compare management techniques derived from European based science with those derived from the cultural traditions and beliefs of Indigenous peoples and communities. Prerequisite: EVRN 140 and EVRN 142; or EVRN 144 and EVRN 145. LEC.

EVRN 645. Native and Western Views of Nature. 3 Hours.
This course emphasizes comparison of the attitudes and perspectives towards the natural world that have been developed by different cultural traditions. The primary example with which most of us are familiar is the contemporary Western attitude which emerges from traditions derived from Western European philosophy, i.e. the assumption that humans are autonomous from, and in control of, the natural world. A different approach is presented by Traditional Ecological Knowledge (TEK) of Indigenous peoples of the world, which are based on close observation of nature and natural phenomena; combined with a concept of community membership, which differs from that of Western political and social thought. Prerequisite: EVRN 140 and EVRN 142; or EVRN 144 and EVRN 145. LEC.

EVRN 656. Ecosystem Ecology. 3 Hours N.
An introduction to the patterns and processes that affect terrestrial ecosystems. Emphasis is placed on understanding nutrient cycles (e.g., carbon nitrogen phosphorous), hydrologic cycles, and patterns of net primary productivity. The role of both natural and anthropogenic disturbances in structuring terrestrial ecosystems is examined in the context of global land-use patterns. Discussion of current research literature will be expected. (Same as BIOL 656.) Prerequisite: BIOL 414 and CHEM 130. LEC.

EVRN 673. Environmental Justice. 3 Hours NW / U.
An examination of the impact of environmental justice and security in Indigenous communities throughout the world with a focus on tactics and strategies that incorporate Indigenous perspectives in responses and mitigation schemes. A survey of mining, dumping, and storage of toxic and radioactive waste activities as related to Indigenous peoples. Case study analyses of economic, military and mining interests contrasted with perspectives emerging from cultural traditions and beliefs of Indigenous peoples and communities. (Same as ISP 673.) Prerequisite: Permission of instructor. LEC.

EVRN 700. The Anthropocene: Interdisciplinary Perspectives on Environmental Change. 3 Hours.
Have human activities become so pervasive that we have initiated a unique human epoch of earth history? This introductory, interdisciplinary graduate seminar will explore this question while examining the ways that different disciplines approach the understanding of environmental change, its impact on natural and human systems, and how these understandings have changed over time. SEM.
EVRN 701. Climate Change, Ecological Change and Social Change. 3 Hours.
This interdisciplinary graduate seminar examines the history of climate change from natural and physical science, social science, and humanities perspectives. The class explores the ways that different disciplines approach understanding climate change and its impact on natural and human systems and how these understandings have changed over time. The course is team-taught by faculty from the natural and physical sciences, social sciences, humanities, and professional schools, and will include faculty guest speakers from KU and off-campus. Students will write a research paper on a climate change topic of their choice that reflects the historical and interdisciplinary approaches of the seminar. A goal of the seminar is to assemble student papers for presentation and possible publication. Prerequisite: Consent of instructor. LEC.

EVRN 702. Energy, Ecology and Community in Kansas. 3 Hours.
This interdisciplinary graduate seminar examines the role of climate in shaping energy, ecology, and community in Kansas from natural and physical science, social science, and/or humanities perspectives. The class will combine lectures, group projects, and field research to understand the ways that climate change and energy production are reshaping the human and natural systems in Kansas and the Great Plains. The course is team-taught by faculty from the natural and physical science, social science, humanities and professional schools, and will include faculty guest speakers from KU and off-campus. LEC.

EVRN 720. Topics in Environmental Studies: ____. 1-6 Hours.
Courses on special topics in Environmental Studies. These courses may be lecture, seminars, or readings. Students may enroll in more than one interest group but may enroll in a given interest group only once. LEC.

EVRN 721. Environmental Regulation and Policy. 3 Hours.
This course provides a survey of the environmental regulations, environmental problems, and environmental solutions that must be dealt with by environmental scientists in agencies and industry. Considers both theoretical and practical/applied aspects of environmental practices. LEC.

EVRN 725. Environmental Security. 3 Hours.
This course examines environmental issues, concerns, and policy as they relate to security through the framework of geopolitics. National security and conflict are increasingly discussed in relation to the environment, such as concerns regarding environmental change as well as stresses and demands on natural resources, e.g., water, energy, deforestation, desertification. The course will examine key contributions to the environmental security, resource conflicts, climate security and related literatures. LEC.

EVRN 730. Environmental Toxicology. 3 Hours.
Examines the effects of toxic chemicals on individuals, populations, communities and ecosystems. Topics include major classes of pollutants, movement, distribution and fate of pollutants in the environment, mechanisms of action, toxicity testing, and environmental assessment. LEC.

EVRN 735. Scientific Communication. 3 Hours.
Principles of English communication skills for the professional scientist. The course begins by exploring the role of narrative in all forms of scientific communication; it then applies the use of narrative tools to scientific writing, message honing and speaking. The course covers written and verbal communication of primary research. Students must have an independent research project on which to focus their communication assignments. (Same as BIOL 735.) LEC.

EVRN 736. Environmental Remote Sensing. 3 Hours.
Covers fundamentals of remote sensing, including electromagnetic radiation principles and data collection and processing, followed by an introduction to the various remote sensing techniques and their application in understanding and managing environmental systems. Exercises are provided for students to be actively involved in evaluating, critically analyzing and interpreting images and data to determine implications for practice. Prerequisite: Graduate standing. LEC.

EVRN 737. Water Resource Sustainability. 3 Hours.
Provides a framework for learning about our water future and ways we might define and achieve sustainability in water use and management. Concerns of ethics, culture, economics, politics, and environmental health will be discussed within the contexts of issues such as the global water crisis, water footprints, water pollution, human water systems, water security, and sustainable water technologies. Prerequisite: Graduate standing. LEC.

EVRN 740. Soil Science for Environmental Assessment. 3 Hours.
Provides students with a solid understanding of soils in the environment, particularly as it relates to environmental assessment. Topics include soil geomorphology, soil physics/chemistry/biology, management of soils, and soil contaminants. Prerequisite: CHEM 130 or CHEM 190 recommended or consent of the instructor. LEC.

EVRN 743. Natural Hazards and Environmental Risks. 3 Hours.
This course investigates the geophysical processes of the earth-atmospheric system that can create disastrous impacts on human life, society, and economics. Hazards, including earthquakes, tsunamis, floods, hurricanes, mass movements, wildfires, and many others, are examined by analyzing spatial and temporal dynamics as well as any precursory indicators that may be present. Attention is also given to management and mitigation strategies. Case studies are utilized to examine interaction between society and natural hazards. Prerequisite: Graduate standing. LEC.

EVRN 745. Environmental Data Analysis and Statistics. 3 Hours.
Survey of common statistical methods for analyzing environmental data. Includes techniques for environmental monitoring, impact assessment, and site reclamation, as well as methods for handling censored data, time series, and spatial analysis. Sampling design, data interpretation, and presentation of statistical results will be emphasized. Prior coursework or practical experience in statistics is expected. Prerequisite: Permission of instructor. LEC.

EVRN 747. Fluvial Geomorphology. 3 Hours.
This course develops an understanding of the research processes as applied to river systems by means of qualitative and quantitative research methods and approaches to solve problems. Applications of fluvial principles to river management and stream restoration are examined, as well as interactions between land use and geomorphic processes. Prerequisite: Graduate standing. LEC.

EVRN 750. Environmental Air Quality Assessment. 3 Hours.
Addresses scientific, regulatory, and technical aspects of air quality monitoring, including pollutant formation and dispersion, pollution control, national emissions standards, and methods for monitoring pollutants and air quality. Prerequisite: CHEM 130 or CHEM 190 recommended or consent of the instructor. LEC.

EVRN 755. Energy and Environment. 3 Hours.
This interdisciplinary course provides students with a broad understanding of the current energy system, including its challenges, with focus on changing global energy needs, current energy sources, developing and emerging renewable energy sources, and their economic, environmental, and societal implications. Analysis of energy fundamentals, fossil fuel exploration and use, nuclear energy, renewable energy sources, and subsequent environmental impacts. LEC.
EVRN 771. Project Management for Science and Technical Managers. 3 Hours.
Students will learn to use current project planning tools to develop project plans that aid in bringing a project to completion on time and within budget. They will demonstrate the ability to manage projects within a science organization. LEC.

EVRN 772. Organizational Management and Leadership in Science and Technical Organizations. 3 Hours.
Explores concepts and practices in leadership, organizational behavior and change management. Emphasis is placed on understanding dynamics of individuals and groups in organizational structures focused on research and innovation. Students will tackle organizational culture, management approaches, performance-building, and creativity and innovation management in science organizations. LEC.

EVRN 773. Organizational Communication and Supervision in Science and Technical Organizations. 3 Hours.
Explores the duties and responsibilities of a supervisor/manager. Addresses management of an integrated team, recruitment and interviewing, professional development of employees, performance management, effective workplace communications; collaboration, and managing organizational conflict. LEC.

EVRN 774. Financial Management in Science and Technical Organizations. 3 Hours.
The goal of this course is to gain an understanding of finance, budget, and accounting in a science organization. The student will learn how to interpret and understand basic financial statements; how to make good decisions based on them; learn essential accounting concepts and characteristics of accounting systems; and budgeting/forecasting in a science-based organization. LEC.

EVRN 775. Technical Communication for Scientists. 1 Hour.
Addresses challenges and approaches of communicating science concepts and results to technical and non-technical as well as internal and external audiences. Focuses on techniques to improve the effectiveness of written and oral communication, including technical writing of project and research proposals, scientific presentations, and effective workplace communications. LEC.

This course provides an overview of basic patent law, the patent process, patent interpretation (claims and prior art) and intellectual property law in science. LEC.

EVRN 777. Professional Development for Science Managers. 1 Hour.
Addresses professional development of the scientist as managers. Students will develop a personal and professional development plan and understand how to apply it to their own professional career, future career transitions, and lifelong career progression. LEC.

EVRN 778. Topics in Science and Technical Management. 1-3 Hours.
Addresses special topics in Science Management. Students may enroll in more than one interest group but may enroll in a given interest group only once. LEC.

EVRN 815. Professional Science Masters Capstone. 1-3 Hours.
A culminating experience to develop a workforce project and produce a written report to be presented orally to a committee that includes an industry member. Students will develop an applied workforce project in the student's place of employment for full time employees or an internship for full time students. The students will document their project in a written report and present their project to the Environmental Studies faculty (2), and the student's employer or representative if practical. Prerequisite: Minimum 20 credit hours completed in program. LEC.

EVRN 915. Capstone. 3 Hours.
The goal of this research seminar is to discuss individual students' research, culminating in the completion of a paper in Environmental Studies for presentation at a professional meeting and/or publication in a professional journal. SEM.