Requirements: Environmental Studies

Interdisciplinary

The major and concentration bring together the different perspectives of the life sciences, physical sciences, social sciences and humanities to help students understand the interactions between the human and natural systems that affect our environment. The academic program is enhanced by five green centers: the Office of Green Initiatives, the Kenyon Farm, the Kokosing Nature Preserve, the Philander Chase Conservancy and the 480-acre Brown Family Environmental Center (BFEC). The BFEC, within walking distance of campus, features a wide range of natural and managed habitats and includes part of the Kokosing River.

The program's goals are for students to understand the interplay among humans, together with their social and cultural institutions, and the physical, chemical and biological processes of the natural world; approach complex problems from an analytical perspective and apply logic, scientific principles and quantitative tools to their solutions; understand the social, historical, philosophical, spiritual and literary traditions that define the relationships between humans and their environment; and persuasively communicate ideas and logical arguments both orally and in writing as active participants in the environmental problem-solving process. Consequently, the major and concentration knit together many traditional academic disciplines, drawing on coursework in anthropology, economics, philosophy, political science, religious studies and sociology, in addition to biology, chemistry and physics.

The Kenyon College faculty voted to change from Kenyon units to semester hours. This change will go into effect for all students who start at the College in the fall of 2024. Both systems will be used throughout the course catalog with the Kenyon units being listed first.

First-year and New Students

Students interested in environmental studies are encouraged to take ENVS 112 in their first year.

Other appropriate courses for first-year or new students include:

ANTH 111: Introduction to Biological Anthropology
BIOL 115: Energy in Living Systems
ECON 101: Principles of Microeconomics
PHIL 190: Anthropocene Philosophical Problem
SOCY 101: Powers, Energies and Peoples

Requirements for the Major

The environmental studies major requires a total of 8.25–8.75 units/66-70 semester hours, including a 2.0–2.5 unit/16-20 semester hour curricular focus. Students who complete an approved second major, minor or concentration have completed the curricular focus requirement and require a total of 6.25 units/50 semester hours to complete the major.

Common Core

Six Required Courses
BIOL 115: Energy in Living Systems
ECON 101: Principles of Microeconomics
ECON 336: Environmental Economics
ENVS 112: Introduction to Environmental Studies
ENVS 231: Earth Systems Science
ENVS 461: Seminar in Environmental Studies

Choose one additional living systems course
BIOL 228: Ecology
BIOL 352: Aquatic Systems Biology
ENVS 341: The Science of Climate Change
ENVS 342: Disease Ecology
ENVS 343: Managed Ecosystems

Choose one quantitative skills course
ENVS 220: Applied Environmental Analysis
MATH 258: Mathematical Biology

Choose one lab skills course
BIOL 229: Ecology Laboratory
BIOL 353: Aquatic Systems Lab
ENVS 210: Introductory Environmental Lab

Choose one additional skills course
CHEM 110: Environmental Chemistry
CHEM 121: Introductory Chemistry
ENVS 104: Solar Power Systems: Science, Policy and Practicum
ENVS 261: Geographical Information Science

Choose one policy course
PSCI 310: Public Policy
PSCI 342: Politics of Development
PSCI 363: Global Environmental Politics
PSCI 463: American Environmental Politics and Policy
PSCI 480: Science and Politics

Choose two courses in cultures, societies and environments (one each in two different disciplines)
ANTH 111: Introduction to Biological Anthropology
ANTH 112: Introduction to Archaeology
ANTH 113: Introduction to Cultural Anthropology
ANTH 256: Habitat and Humanity
ENGL 268: Climate Emergencies
HIST 360: Corn, Farming and the Roots of American Cultures
HIST 481: Feast, Fast Famine: Food in the Premodern World
PHIL 190: The Anthropocene as a Philosophical Problem
PHIL 245: Philosophy of Natural Science
PSYC 235: Environmental Psychology
SOCY 101: Powers, Energies and Peoples
SOCY 238: Environmental Sociology
SOCY 233: Sociology of Food
SOCY 242: Science, Society and the Environment
RLST 350: Religion and Nature

Area of Curricular Focus

Students develop depth of knowledge in a curricular area in one of three ways: by completing an approved second major, an approved minor or concentration, or an area of curricular focus. Focal area requirements change frequently as course options change, so students should contact the program chair or administrative assistant for a current schedule of focal area requirements. Students may propose a customized focal area with approval of a program co-chair. If a student chooses to meet the focal area requirement with a relevant major, minor or concentration, the program chair must approve the student's program of study. The program chair may require the major, minor or concentration to include particular courses to ensure the relevance of the program to the environmental studies major. A required major areas form (PDF) must be completed and submitted to the Registrar's Office, indicating the area of curricular focus. Each area of curricular focus must exhibit the following characteristics:

Focal areas must comprise no less than two units and may require more.

Focal areas must exhibit a clear pedagogical rationale and will be designed to develop curricular depth for the student. Such depth may or may not be contained within a single traditional discipline.
Focal areas must contain at least one 300-level or 400-level course.

Experiential Community Exercise

Each student must complete an applied environmental exercise that provides a practical application of the knowledge and skills developed in the program within a community setting. The principal elements of the project: A student must conceptualize, plan and/or execute a project, and it must benefit, or be in partnership with, some community. The student may be part of a team, but the student must be a principal in the project, not simply an observer. The Senior Capstone may not serve as the experiential community exercise, but may arise out of it. Examples of potentially acceptable experiences include, but are not limited to approved courses with a practicum or community engagement component; a field-based study-abroad program that requires students to complete individual research; participation in NFS REU (Research Experiences for Undergraduates) research with community implications; an internship in which the student completes a significant environmental project; independent research with a faculty member; or an independent study working with a faculty member and a professional staff member at one of Kenyon's green centers.

Senior Capstone

Majors will undertake a substantial, independent research project that demonstrates the development of depth in their environmental education and their ability to approach environmental issues from a systems-based, interdisciplinary perspective. Senior Capstones usually take the form of a research paper of around 20 to 30 pages, but may also take the form of substantial creative works for those whose area of curricular focus is in the arts. The choice of topic should reflect the student's area of curricular focus in consultation with, and with approval from, the chair and the faculty advisor. Students are encouraged to consult with any faculty member whose expertise supports their investigation. The faculty supervisor will generally be a member of the environmental studies faculty, but the chair may approve other willing faculty members when their areas of expertise are appropriate to the topic. Projects are due early in the spring semester of the senior year.

Requirements for the Concentration

The concentration requires a total of 3.50 units/28 semester hours. Affiliated courses are offered in anthropology, biology, chemistry, economics, English, history philosophy, physics, political science, religious studies and sociology.

Required Environmental Studies Course: 0.50 units/4 semester hours

ENVS 112: Introduction to Environmental Studies

Core Courses in Environmental Studies: 1.50 units/12 semester hours

Take 12 semester hours of ENVS courses

Elective courses for Environmental Studies: 1.50 units/12 semester hours from the elective course list in at least two departments:

Anthropology:
ANTH 111: Introduction to Biological Anthropology
ANTH 256: Habitat and Humanity
ANTH 320: Anthropology of Food
ANTH 324: Human Ecology: Biocultural Adaptations

Biology:
BIOL 106: Conservation Biology
BIOL 115: Energy in Living Systems
BIOL 228, 229: Ecology and Ecology Laboratory
BIOL 328: Global Ecology and Biogeography
BIOL 352, 353: Aquatic Systems Biology and Aquatic Systems Lab

Chemistry:
CHEM 110: Environmental Chemistry
CHEM 121: Introductory Chemistry
CHEM 122: Chemical Principles
CHEM 231, 233: Organic Chemistry I and Organic Chemistry Lab I
CHEM 341: Instrumental Analysis

Economics:
ECON 101: Principles of Microeconomics
ECON 336: Environmental Economics
ECON 342: Economics of Regulation
ECON 347: Economics of the Public Sector

English:
ENGL 206: Introduction to Science and Nature Writing
ENGL 268: Climate Emergencies

History:
HIST 260: Corn, Farming and the Roots of American Cultures

Philosophy:
PHIL 110: Introduction to Ethics
PHIL 115: Practical Issues in Ethics
PHIL 190: The Anthropocene as a Philosophical Problem

Physics:
PHYS 108: Geology

Political Science:
PSCI 310: Public Policy
PSCI 342: Politics of Development
PSCI 363: Global Environmental Politics
PSCI 463: American Environmental Politics and Policy
PSCI 480: Science and Politics

Religious Studies:
RLST 350: Religion and Nature

Sociology:
SOCY 101: Powers, Energies and Peoples
SOCY 233: Sociology of Food
SOCY 238: Environmental Sociology
SOCY 242: Science, Society and the Environment

Transfer Credit Policy

Because careful course selection is necessary to achieve specific objectives, students are urged to consult as early as possible with the program director and other faculty members in the Environmental Studies Program.

A maximum of two off-campus courses may be applied to the core of the major. A maximum of two additional off-campus courses may be applied to the area of curricular focus unless this is being satisfied by a minor, concentration or second major. In those cases, that program's requirement must be met. A maximum of 1.00 unit/8 semester

hours off-campus courses may be applied to the concentration. Students planning to take a course for transfer credit should consult the program director in advance as all transfer credit must be approved.

Courses in Environmental Studies

Solar Power Systems: Science, Policy and Practicum
ENVS 104 Credits: 0.5/4
Photovoltaic power generation is proving to be a viable renewable alternative to fossil fuels, and Kenyon College is embarking on a multi-year plan to install PV systems on several buildings across campus. This course is uniquely situated to take advantage of this endeavor. We discuss the role energy serves in society and examine the basic physics of energy in general before discussing and comparing traditional fossil fuels versus alternatives. Focusing our attention on PV electrical energy, a series of hands-on lab exercises explores the science of electricity, PV power generation and linking such systems to the grid. Determining potential locations for installing Kenyon's growing network of solar power systems is addressed via a combination of spatial analysis exercises and visits to past and future installation sites. Additional field trips to local residential and commercial agricultural PV systems and conversations with their owners augment these efforts. Through conversations with leaders of Kenyon's campus efforts and online virtual meetings with leaders in the industry at the state, regional and national levels, we learn the ins and outs of designing, planning, installing and financing PV systems from the perspectives of buyers, sellers and investors. During semesters when an installation is in process, we are directly involved in site evaluations and closely follow along with the design and construction of the system. During these times, students help plan and host a public flip-the-switch event at system sites when these new systems are commissioned and officially energized and connected to the grid. This counts toward the additional skills requirement for the major. This interdisciplinary course does not count toward the completion of any diversification requirement. No prerequisite. Offered every year.

Reading the Ohio Landscape
ENVS 106 Credits: 0.5/4
Kenyon’s campus sits on glacial sediments marking the farthest extent of the Laurentide Ice Sheet, with glaciated till plains to our west and unglaciated Appalachian foothills to our east. Below these glacial sediments lies the Black Hand Sandstone, formed 350 million years ago from the erosion of the young and massive Appalachian Mountains. Through literary readings, local field trips and hands-on activities, this course explores the geologic forces that have shaped Ohio’s landscape. Students develop a connection to place through repeated field observations – including sketching, photography, and writing – of a location on Kenyon property. In addition, we discuss topics such as the intersection between science and Indigenous knowledge, diversity and representation in outdoor spaces, and science communication. This

counts toward the cultures, societies and environments requirement for the major. This interdisciplinary course does not count toward the completion of any diversification requirement. No prerequisite. Offered every other fall.

Introduction to Environmental Studies
ENVS 112 Credits: 0.5/4
This course examines contemporary environmental problems, introducing the major concepts pertaining to human interactions with the biosphere. We explore this interaction on both local and global scales. Course topics include basic principles of ecology (flows of energy, cycling of matter and the role of feedback), the impacts of human technology, the roots of our perceptions about and reactions to nature, the social and legal framework for responding to problems, and economic issues surrounding environmental issues. We discuss methods for answering questions regarding the consequences of our actions and, using a systems approach, focus on methods for organizing information to evaluate complex issues. The course is three-quarters discussion and lecture and one-quarter workshop. The workshops include field trips, experience with collecting data, and application of systems thinking. This course taken at Kenyon, paired with any biology course, counts toward the natural science diversification requirement. This course is required for the major. No prerequisite. Offered every year.

Introductory Environmental Lab
ENVS 210 Credits: 0.25/2 QR
This course is an introduction to the field and laboratory techniques used in environmental science. Students receive an overview of scientific and research methods, data handling and field techniques to assess water quality, soil characteristics and ecosystem composition and health. This is a community-engaged learning course: Students will travel to a local farm (transportation provided by instructor) to assess the long-term environmental effects of switching from conventional to sustainable agricultural practices. This course counts toward the lab skills major requirement. This interdisciplinary course does not count toward the completion of any diversification requirement. Prerequisite: ENVS 112. Offered every fall semester.

Applied Environmental Analysis
ENVS 220 Credits: 0.5/4 QR
This course examines the processes used to understand, analyze and solve environmental problems. Students are introduced to the use of mathematics and statistics to analyze environmental data. Problems involving stock, dimensions, mass balance, energy and population analysis are studied. Applied static and dynamical modeling of environmental problems is emphasized. This counts toward the quantitative skills requirement for the major. This interdisciplinary course does not count toward the completion of any diversification requirement. Prerequisite: ENVS 112 and declared environmental studies major. Offered every fall.

Earth Systems Science
ENVS 231 Credits: 0.5/4
Earth systems science is an integrated approach to studying the world in which we live. At the highest level, the four most basic interacting subsystems are air (atmosphere), water (hydrosphere), land (geosphere) and life (biosphere). This course introduces students to the physical, chemical and biological processes of these major subsystems (and the interactions among them) by examining past and present states of the Earth system. Humans, as relatively late-coming members of the biosphere, are part of the overall Earth system, and we examine our interactions within and among the subsystems at the level of the individual and of society. Lectures and laboratories on these broad topics are supplemented by field trips to witness Earth's systems in context and by conversations with community members whose work is at the forefront of human interactions within the system. This course is required for the major. This interdisciplinary course does not count toward the completion of any diversification requirement. Prerequisite: ENVS 112. Offered every spring semester.

Permaculture and Homestead Winter Farming
ENVS 240 Credits: 0.5/4
This course intends to explore the principles of permaculture that link ecology, sustainability and community to farming. It is a holistic alternative to the destructive patterns and chemical abuse of agriculture. Our world is facing a long future of food insecurity as human population rises rapidly and land is turned over to housing and infrastructure. We need to bring ourselves back into balance with nature. In this course, students learn to apply some of the principles of permaculture to extending a developing academic-year winter-harvest plan on the homestead Kenyon Farm and to year-round prospects. Students enrolling in this spring course are asked to assist with planting in the late fall, with harvest occurring in winter months of the spring semester when the course is in session. The course is interdisciplinary, linking biology, sociology and sustainable farming strategies. This interdisciplinary course does not count toward the completion of any diversification requirement. Prerequisite: ENVS 112 or BIOL115.

Sustainable Agriculture
ENVS 253 Credits: 0.5/4
The purpose of this limited enrollment course is to introduce students to the principles of sustainable agriculture through hands-on experience on local farms and through readings of current literature. The course thus combines fieldwork and seminar-style discussion. Work on the farm is varied, determined by the seasons and farm projects under-way. In addition, students may be taken to the local Producers Livestock Auction and other off-farm sites as the time and season allow. Students can expect to handle and feed animals, clean barns, harvest and plant crops, prepare farm products for market, build and repair fences, bale hay and work with, repair or clean equipment and buildings. Readings are drawn from relevant books, current environmental literature and the news media. Discussions are student-led and combine readings and their experiences in the field. Students must have available in their academic

schedule four continuous hours (plus travel time) one day per week to spend working at a local organic farm. In addition, students participate in a weekly seminar discussion of assigned readings, lasting from an hour and a half to two hours. Preference is given to juniors and seniors. Completion of ENVS 112 is highly recommended. This interdisciplinary course does not count toward the completion of any diversification requirement. Permission of instructor required. Offered every fall.

Geographic Information Science
ENVS 261 Credits: 0.5/4
This course is for all students interested in improving their spatial literacy, or the ability to use spatial information to communicate, reason and solve problems — in this case environmental problems, nearly all of which have a spatial component. Following a review of maps (coordinate and projection systems, cartographic principles, etc.) we survey a number of online mapping applications (e.g., Google Earth) and use these to produce informative maps. We also explore the nature of the Global Positioning System (GPS) and how data can be collected in the field for future analysis and presentation. The focus of the course eventually settles onto the nature of computer-based geographic information systems (GIS) and the ways in which this powerful suite of tools can be used to analyze geographic data, model spatial processes and make informed decisions. Lectures introduce fundamental concepts such as scale and resolution, the nature and structure of spatial data models, and the construction of GIS queries. A series of laboratory case studies presents real-world applications of GIS while offering students opportunities to apply the fundamental concepts discussed in lectures. This counts toward the additional skills requirement for the major. This interdisciplinary course does not count toward the completion of any diversification requirement. No prerequisite. Sophomore standing.

The Science of Climate Change
ENVS 341 Credits: 0.5/4
Climate change is the defining environmental issue for our time, permeating conversations about economics, human rights and international relations. In order to engage in these conversations, it is critical to have a solid understanding of Earth’s climate system and how humans are altering it. We begin by examining the natural state of Earth’s climate system and the factors that have caused past climate variability. We investigate how humans have altered the climate system as well as some of the most significant impacts of anthropogenic warming. We end with a discussion of some proposed science-based approaches to mitigating climate change. This interdisciplinary course does not count toward the completion of any diversification requirement. This counts toward the living systems requirement for the major. Prerequisite: ENVS 112 and either ENVS 220 or MATH 258. Offered every other year.

Disease Ecology
ENVS 342 Credits: 0.5/4

Hosts, pathogens and vectors are parts of complex ecosystems. To understand the impacts of disease, this course examines the effects of disease on ecosystems (including humans) and explores the ecological and evolutionary processes that drive disease dynamics. Diseases do not follow national boundaries, but disease incidence and mitigation approaches differ dramatically by country and continent. Thus, exploring ecological systems and disease dynamics requires a global approach. This course includes case studies, problem-based learning and discussions that focus on the global aspects of disease. Also emphasized are global change (climate change; urbanization and development; movement of people, animals and pathogens; and habitat loss and alteration) and impacts on emerging and re-emerging diseases. This counts toward the upper-level environmental biology requirement in the biology major and as an additional living systems elective in the environmental studies major. This interdisciplinary course does not count toward the completion of any diversification requirement. Prerequisite: BIOL 115 or ENVS 112 and sophomore standing.

Managed Ecosystems
ENVS 343 Credits: 0.5/4
Nearly all ecosystems are managed in some way. Management can have a variety of goals including species conservation, food production, recreational opportunities or ecosystem resilience. This course focuses on understanding how ecosystems function, how they are managed and why management does or does not work as intended. We use primary literature, field trips to local managed ecosystems, and case studies from a range of systems, like fisheries, national parks, agricultural lands, and urban ecosystems to explore the scientific and human dimensions of natural resource management. We study historical and current approaches to ecosystem management and apply ecological concepts to work toward developing management plans that meet social, economic and environmental sustainability goals. This course counts toward the living systems requirement for the major. Prerequisites: ENVS 112 or BIOL 115 and sophomore standing. Offered every spring.

Research in Environmental Science
ENVS 385 Credits: 0.25/2
This course is intended to reward students with academic credit for their research activities, provide opportunities to develop skills related to communicating science, and encourage students to gain exposure to ongoing environmental science research. Students select their own research problems in consultation with an ENVS faculty member and/or a mentor at one of the Green Centers. Instead of frequent class meetings, students are expected to spend 6-10 hours per week working on their research project in close collaboration with their mentor. To develop communication skills, students present their work to their colleagues and compose a final manuscript that describes their research progress during the semester. This interdisciplinary course does not count toward the completion of any diversification requirement. This course is repeatable for credit. Prerequisite: BIOL 109Y-110Y or ENVS 210.

Seminar in Environmental Studies
ENVS 461 Credits: 0.5/4
The intention of this capstone seminar is to draw together and apply the concepts learned in earlier courses in the Environmental Studies Concentration. The focus of the course is on case studies of natural-resource management, with specific topic areas to be determined. In this strongly interdisciplinary effort, we explore ecological, economic, social and legal issues that influence how people exploit natural resources, and whether that exploitation is sustainable. Students are expected to develop and communicate their understanding of the complex and inseparable relationships of human well-being, ecosystem services and environmental management. This course is required for the major. This interdisciplinary course does not count toward the completion of any diversification requirement. Prerequisite: senior standing and declared environmental studies major or concentrator. Offered every spring.

Individual Study
ENVS 493 Credits: 0.25-0.5/2-4
Because environmental studies is a broad interdisciplinary field, the nature of an individual study necessarily varies depending on the home discipline of the faculty member guiding the course. Details regarding the expected number of contact hours per week, workload and assessment are left to the discretion of the faculty member guiding the individual study. There are no formal restrictions on who can pursue an individual study in environmental studies. Individual studies may, upon consultation with an environmental studies co-chair, serve as an elective course in fulfilling the requirements for environmental studies, up to 0.5 units. To enroll in an individual study, a student must identify a member of the ENVS faculty willing to mentor the project and, in consultation with him or her, draft a syllabus, including readings, schedule and assignments, which must be approved by a co-chair of the program. At a minimum, it is expected that the student meet regularly with his or her instructor, at least once per week or the equivalent, at the discretion of the instructor. At a minimum, the amount of work submitted for a grade in an IS should approximate that required, on average, for courses of equivalent units in the home department of the faculty mentor. In the case of a group individual study, a single course syllabus may be submitted, assuming that all group members will follow the same syllabus. Because students must enroll for individual studies by the end of the seventh class day of each semester, they should begin discussion of the proposed individual study by the semester before, so that there is time to devise the proposal and seek departmental approval. This interdisciplinary course does not count toward the completion of any diversification requirement.

Concentration

Courses that meet the requirement for this concentration:

ANTH 111	Introduction to Biological Anthropology
ANTH 256	Habitat and Humanity
ANTH 320	Anthropology of Food

ANTH 324	Human Ecology: Biocultural Adaptations
BIOL 106	Conservation Biology
BIOL 115	Energy in Living Systems
BIOL 228	Ecology
BIOL 229	Ecology Laboratory
BIOL 352	Aquatic Systems Biology
BIOL 353	Aquatic Systems Lab
CHEM 110	Environmental Chemistry
CHEM 121	Introductory Chemistry
CHEM 122	Chemical Principles
CHEM 231	Organic Chemistry I
CHEM 232	Organic Chemistry II
CHEM 341	Instrumental Analysis
ECON 101	Principles of Microeconomics
ECON 336	Environmental Economics
ECON 342	Economics of Regulation
ECON 347	Economics of the Public Sector
PHIL 110	Introduction to Ethics
PHIL 115	Practical Issues in Ethics
PHIL 190	The Anthropocene as a Philosophical Problem
PHYS 108	Geology
PSCI 310	Public Policy
PSCI 342	Politics of Development
PSCI 361	Globalization
PSCI 363	Global Environmental Politics
PSCI 463	American Environmental Politics and Policy
PSCI 480	Science and Politics
RLST 350	Religion and Nature
SOCY 101	Powers, Energies and Peoples
SOCY 233	Sociology of Food
SOCY 238	Environmental Sociology
SOCY 242	Science, Society and the Environment