

# ENVIRONMENTAL SCIENCES (ENVS)

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## ENVS 5010 - Landscape Biogeochemistry (3 Credits)

A holistic approach to studying the role chemical elements play in synthesis/decomposition cycles, and the resultant environment from interaction of the lithosphere with the hydrosphere, atmosphere, biosphere, and pedosphere during geological, and ecological timeframes, together with anthropogenic activities. Note: this course assumes that students have completed an introductory college-level physical geography or environmental science course. Prereq: Graduate standing. Cross-listed with GEOG 4010/GEOL 4010. Term offered: spring. Max hours: 3 Credits.

Grading Basis: Letter Grade

Restriction: Restricted to Graduate and Graduate Non-Degree Majors  
Typically Offered: Spring.

## ENVS 5020 - Earth Environments and Human Impacts (3 Credits)

This course examines the multitude of impacts that humans have exerted on Earth's biomes and physical environment in a systems context, including vegetation, animals, soils, water, landforms and the atmosphere. It considers the ways in which climate changes and modifications in land cover have altered the environment, and how such changes will still accelerate in the coming decades. The course also explores emergent topics such as rewilding, novel and no analogue ecosystems, and ecosystem services. Additionally, it assesses the future impact of a growing human population on the planet within a context of the "anthropocene," an era dominated by human activity. Prereq: Graduate standing. Cross-listed with GEOG 4020, GEOL 4020. Term offered: fall. Max hours: 3 Credits.

Grading Basis: Letter Grade

Restriction: Restricted to Graduate and Graduate Non-Degree Majors  
Typically Offered: Fall.

## ENVS 5280 - Environmental Hydrology (4 Credits)

Examination of hydrologic processes in relation to climate, soils, vegetation, land-use practices, and human interactions. Natural scientific perspectives emphasized; field and laboratory included. Note: this course assumes that students have completed GEOG 1202 and one of: 1) GEOG 3232; 2) GEOG 4240/GEOL 4240/GEOG/5240; 3) GEOG 4010/GEOL 4010/ENVS 5000. Prereq: Graduate standing. Term offered: spring. Max hours: 4 Credits.

Grading Basis: Letter Grade

Restriction: Restricted to Graduate and Graduate Non-Degree Majors  
Typically Offered: Spring.

## ENVS 5300 - Children's Geographies (3 Credits)

This seminar is an investigation of children, childhood, and environment from geographical perspectives. Theoretical and methodological lenses are used to understand young people's interactions with/in different spaces. Cross-listed with GEOG 5300. Restriction: Restricted to Graduate and Graduate Non-Degree majors. Term offered: spring. Max hours: 3 Credits.

Grading Basis: Letter Grade

Restriction: Restricted to Graduate and Graduate Non-Degree Majors  
Typically Offered: Spring.

## ENVS 5305 - Water Quality and Resources (3 Credits)

Introduces water resources aimed at students with little or no background in the field. This is a broad course covering topics ranging from the physical aspects of water to water politics and international law. While the course is largely a lecture format, discussion of current issues is a significant part of the class. Restriction: Restricted to Graduate and Graduate Non-Degree majors. Cross-listed with GEOG 4305. Term offered: spring. Max hours: 3 Credits.

Grading Basis: Letter Grade

Restriction: Restricted to Graduate and Graduate Non-Degree Majors  
Typically Offered: Spring.

## ENVS 5340 - Equity & Culture in Science Education: Local/Global (3 Credits)

This course examines literature in science education related to issues of culture and equity. Topics will be framed by an understanding of equity in diverse classrooms and how it informs research, curriculum and instruction. Cross-listed with SCED 5340 and SCED 4340. Prereq: Graduate standing. Max hours: 3 Credits.

Grading Basis: Letter Grade

Restriction: Restricted to Graduate and Graduate Non-Degree Majors

## ENVS 5403 - Unsaturated Zone Hydrology (3 Credits)

Focuses on water and contaminant transport through the unsaturated zone, infiltration and drainage, and heat and gas transport. Students learn to design, perform field installation, and collect data in order to model and predict contaminant movement on/off site. Note: this course assumes that students have prior coursework in chemistry, physics, or calculus. Prereq: Graduate standing. Max hours: 3 Credits.

Grading Basis: Letter Grade

Restriction: Restricted to Graduate and Graduate Non-Degree Majors

## ENVS 5410 - Aquatic Chemistry (3 Credits)

Course objectives are to: (1) identify and understand chemical and physical principles and processes that control the composition of natural water, (2) prepare students to critically evaluate scientific literature and experimental design related to water quality and environmental remediation, and (3) examine the validity of environmental water data. Note: this course assumes that students have completed general chemistry and/or CHEM 4700. Prereq: Graduate standing. Term offered: spring. Max hours: 3 Credits.

Grading Basis: Letter Grade

Restriction: Restricted to Graduate and Graduate Non-Degree Majors  
Typically Offered: Spring.

## ENVS 5450 - Urban Food and Agriculture: Perspectives and Research (3 Credits)

Provides an overview of research & practices in urban farming. Critically reviews emergent models of local food production/distribution. Compares new practices to traditional agribusiness. Assesses the prospects for solving sustainability problems within the modern agro-food system. Note: this course assumes that students have completed GEOG 3401. Prereq: Graduate standing. Cross-listed with GEOG 4450. Term offered: spring. Max hours: 3 Credits.

Grading Basis: Letter Grade

Restriction: Restricted to Graduate and Graduate Non-Degree Majors  
Typically Offered: Spring.

**ENVS 5460 - Sustainable Urban Agriculture Field Study I (3 Credits)**  
 Provides a field-based overview of urban farm planning & management. Topics: range/land conservation, native/invasive species, water distribution, animal husbandry, government interaction, local markets, community relations, conservation easements and issues pertaining to urban farming. Note: this course assumes that students have completed ENVS 5450. Prereq: Graduate standing. Cross-listed with GEOG 4460. Term offered: fall. Max hours: 3 Credits.  
 Grading Basis: Letter Grade  
 Restriction: Restricted to Graduate and Graduate Non-Degree Majors  
 Typically Offered: Fall.

**ENVS 5470 - Sustainable Urban Agriculture Field Study II (3 Credits)**  
 Provides a field-based overview of current practices in local agricultural production. Emphasis will be placed on sustainable practices and their most efficient situation, Special consideration will be given to plausible solutions for food insecure communities both local and global. Note: this course assumes that students have completed ENVS 5450 and 5460. Prereq: Graduate standing. Cross-listed with GEOG 4470. Term offered: spring. Max hours: 3 Credits.  
 Grading Basis: Letter Grade  
 Restriction: Restricted to Graduate and Graduate Non-Degree Majors  
 Typically Offered: Spring.

**ENVS 5480 - Urban Vegetable CSA: Planning, Production&Distribution (3 Credits)**  
 This course outlines the planning, production, and distribution in an active urban vegetable CSA (community supported agriculture) model. It is offered as a part of the GES Sustainable Urban Agriculture Certificate. Cross-listed with GEOG 4480. Prereq: Graduate standing. Max hours: 3 Credits.  
 Grading Basis: Letter Grade  
 Restriction: Restricted to Graduate and Graduate Non-Degree Majors

**ENVS 5500 - Topics in Environmental Sciences (1-6 Credits)**  
 Topics may vary from one offering to the next. Prereq: Graduate standing. Repeatable. Max Hours: 9 Credits.  
 Grading Basis: Letter Grade  
 Repeatable. Max Credits: 9.  
 Restriction: Restricted to Graduate and Graduate Non-Degree Majors

**ENVS 5600 - Applied Statistics for the Natural Sciences (3 Credits)**  
 Surveys statistical techniques including: quick review of basic statistics, tests for normality and outliers, display of data; simple and multiple regression; ANOVA and its relation to regression. Emphasis on computer or stat-pak analysis and interpretation of statistical results. Note: this course assumes that students have completed college algebra and GEOG 3080 or equivalent. Prereq: Graduate standing. Cross-listed with GEOG 4770. Max hours: 3 Credits.  
 Grading Basis: Letter Grade  
 Restriction: Restricted to Graduate and Graduate Non-Degree Majors

**ENVS 5620 - Health Risk Communication (3 Credits)**  
 We are bombarded all day with communication expressing a sense of risk, of danger, of threats to our individual and communal well-being. This class acquaints students with contemporary theory, research, and practice in health risk communication across a variety of threats both real and imagined. Cross-listed with COMM 5620, COMM 4620, and PBHL 4620. Prereq: Graduate standing. Max hours: 3 Credits.  
 Grading Basis: Letter Grade  
 Restriction: Restricted to Graduate and Graduate Non-Degree Majors

**ENVS 5650 - Environmental Education (3 Credits)**  
 This course links the theory and practice of environmental education to inform curricular development and pedagogical knowledge. Prereq: Graduate standing. Cross-listed with ENVS 4650 and SCED 5650. Max hours: 3 Credits.

Grading Basis: Letter Grade  
 Restriction: Restricted to Graduate and Graduate Non-Degree Majors

**ENVS 5660 - Introduction to Smart Cities (3 Credits)**  
 This course will explore some of the most change-making technological innovations in the 21st century and their impact on public policy in cities through a survey of best practices, model policies, and lessons learned from cities across the United States and globe. Restriction: Restricted to Graduate and Graduate Non-Degree Majors. Cross-listed with ENGR 6299, PUAD 5627, and URPL 6299. Max hours: 3 Credits.  
 Grading Basis: Letter Grade  
 Restriction: Restricted to Graduate and Graduate Non-Degree Majors

**ENVS 5700 - Synthesis for Interdisciplinary Science (3 Credits)**  
 Synthesis is an approach in interdisciplinary research and education that links ideas, data and methods. This course develops synthesis skills through the lens of systems theory. It includes exercises for synthetic thinking, examination of integrative tools, and a service-learning project. Cross-listed with GEOG 4700. Breadth and depth training in environmental sciences. Interest in interdisciplinary collaboration. Prereq: Graduate standing. Max hours: 3 Credits.

Grading Basis: Letter Grade  
 Restriction: Restricted to Graduate and Graduate Non-Degree Majors

**ENVS 5720 - Climate Change: Causes, Impacts and Solutions (3 Credits)**  
 Examines science behind past, present & future climate change & environmental, social & political implications & solutions. Explores recent scientific research, syntheses & mainstream literature advancing knowledge about causes & consequences of natural & anthropogenic climate change. Cross-listed with GEOG 4720/ GEOG 5720/ ENVS 4720. Prereq: Graduate standing. Term offered: fall. Max hours: 3 Credits.  
 Grading Basis: Letter Grade  
 Restriction: Restricted to Graduate and Graduate Non-Degree Majors  
 Typically Offered: Fall.

**ENVS 5730 - Air Quality Modeling and Analysis (3 Credits)**  
 Emphasizes the use of air dispersion modeling tools. Topics include: sources and effects of air pollution, use of the WWW, and analysis of modeling results. Note: For graduate students in environmental sciences or engineering, and for those working in the environmental field. Prereq: Graduate standing. Max hours: 3 Credits.  
 Grading Basis: Letter Grade  
 Restriction: Restricted to Graduate and Graduate Non-Degree Majors

**ENVS 5731 - Mountain Biogeography (4 Credits)**  
 This hands-on research course will focus on the current and past distribution of plants and changes in disturbance regimes in the mountains using environmental proxy data preserved in lake sediment cores. A field trip will occur early in the semester. Restriction: Restricted to Graduate and Graduate Non-Degree students. Cross-listed with GEOG 4731. Term offered: fall. Max hours: 4 Credits.  
 Grading Basis: Letter Grade  
 Restriction: Restricted to Graduate and Graduate Non-Degree Majors  
 Typically Offered: Fall.

**ENVS 5740 - Soil Science and Geography (3 Credits)**

Reviews chemical and physical properties of soils, soil development, and geographic distributions of soil types in the context of the role that soils play in natural and human-altered ecosystems. Prereq: graduate standing or permission of instructor. Cross-listed with GEOG 4740, GEOG 5740, ENVS 4740. Term offered: fall. Max hours: 3 Credits.

Grading Basis: Letter Grade

Restriction: Restricted to Graduate and Graduate Non-Degree Majors  
Typically Offered: Fall.

**ENVS 5750 - Beeography: Geography of Bees (4 Credits)**

Beeography is an introduction to the bee world and the amazing diversity in Colorado and beyond. The course will examine the distribution of bees and the pressures they face in different environmental and cultural contexts. It will examine different methods to support and increase bee populations and pollination services, especially in populated environments, including backyard beekeeping of honeybee and native bee populations. Field and lab activities will include beekeeping, native bee collection and identification, bee dissections, pollen processing and identification, and trips to area bee museum collections and apiaries.

Restriction: Restricted to Graduate and Graduate Non-Degree Majors.

Cross-listed with GEOG 4750, GEOG 5750, and ENVS 4750. Term offered: summer. Max hours: 4 Credits.

Grading Basis: Letter Grade

Restriction: Restricted to Graduate and Graduate Non-Degree Majors  
Typically Offered: Summer.

**ENVS 5757 - Urban Climate and Air Quality (3 Credits)**

Explores how people alter climates on micro- to regional scales, and how this in turn affects human health and society. Focuses on recent scientific research, physical processes within cities, and the role of urbanization in global climate change. Restriction: Restricted to Graduate and Graduate Non-Degree Majors. Cross-listed with GEOG 5757. Max hours: 3 Credits.

Grading Basis: Letter Grade

Restriction: Restricted to Graduate and Graduate Non-Degree Majors  
Typically Offered: Fall.

**ENVS 5780 - Aquatic Ecology (3 Credits)**

This course explores the physical, chemical, and biological (including human) properties of aquatic ecosystems, and how the interrelationships between these properties define and influence advanced ecological processes. Special focus is given to lakes, reservoirs, wetlands, streams, rivers, and groundwater. Learning is facilitated through lectures, discussions, student presentations, laboratory and data exercises, and periodic (often virtual) field excursions. Restriction: Restricted to Graduate and Graduate Non-Degree Majors. Cross-listed with ENVS 4780, BIOL 4780, and BIOL 5780. Max hours: 3 Credits.

Grading Basis: Letter Grade

Restriction: Restricted to Graduate and Graduate Non-Degree Majors

**ENVS 5840 - Independent Study: ENVS (1-3 Credits)**

Department consent required. Note: Students must submit a special processing form completely filled out and signed by the student and faculty member, describing the course expectations, assignments and outcomes, to the CLAS Graduate Academic Services Coordinator for approval. Repeatable. Max hours: 3 Credits.

Grading Basis: Letter Grade

Repeatable. Max Credits: 6.

Typically Offered: Fall, Spring, Summer.

**ENVS 5880 - Directed Research (1-6 Credits)**

Students will engage in original research projects supervised and mentored by faculty. Students must work with faculty prior to registration to develop a proposal for their project and receive permission to take this course. Note: Students must submit a special processing form completely filled out and signed by the student and faculty member, describing the course expectations, assignments and outcomes, to the CLAS Graduate Academic Services Coordinator for approval. Repeatable. Max Hours: 6 Credits.

Grading Basis: Letter Grade

Repeatable. Max Credits: 6.

**ENVS 5939 - Internship (1-6 Credits)**

Note: Students must submit a special processing form completely filled out and signed by the student and faculty member, describing the course expectations, assignments and outcomes, to the CLAS Graduate Academic Services Coordinator for approval. Repeatable. Max Hours: 9 Credits.

Grading Basis: Letter Grade

Repeatable. Max Credits: 9.

**ENVS 5995 - Global Study Topics (3-9 Credits)**

This course is reserved for CU Denver faculty-led study abroad experiences. The course topic will vary based on the location and course content. Students register through the Office of Global Education.

Prereq: Graduate standing. Cross-listed with ENVS 4995, GEOG 4995, and GEOG 5995. Repeatable. Max hours: 12 Credits.

Grading Basis: Letter Grade

Repeatable. Max Credits: 12.

Restriction: Restricted to Graduate and Graduate Non-Degree Majors  
Additional Information: Global Education Study Abroad.

**ENVS 6000 - Environmental Sciences Seminar (1 Credit)**

Student and faculty presentations of UCDHSC research projects and other current environmental sciences topics. All environmental sciences students are encouraged to attend, but credit is given only to students who present seminars. Two semesters of this course are required to receive a M.S. in Environmental Science degree: these students must register for this seminar and give presentations the first semester they are in the M.S.E.S. program and the semester in which they defend their master's project. Prereq: Graduate standing. Term offered: fall. Repeatable. Max Hours: 2 Credits.

Grading Basis: Letter Grade

Repeatable. Max Credits: 2.

Restriction: Restricted to Graduate and Graduate Non-Degree Majors  
Typically Offered: Fall.

**ENVS 6002 - Research Topics in Environmental Sciences (3 Credits)**

Introduces research and professional development in the environmental sciences, focusing on current issues and trends in the field, methods of developing research, reading scientific literature, and guiding students in designing their course of study. Students are introduced to the environmental sciences faculty and their research programs. Prereq: Graduate standing. Repeatable. Max hours: 6 Credits.

Grading Basis: Letter Grade

Repeatable. Max Credits: 6.

Restriction: Restricted to Graduate and Graduate Non-Degree Majors  
Typically Offered: Fall, Spring.

**ENVS 6004 - Research Methods in Environmental Science (3 Credits)**

This core MS Environmental Science course will explore a range of methods commonly encountered in environmental science fields and how to develop a research project and proposal. Prereq: ENVS 6002 with a C or higher. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: ENVS 6002 with a C or higher.

**ENVS 6100 - Research Topics in Environmental Management (3 Credits)**

This is one of 4 core MS Environmental Science courses that will review and apply the principles and methods involved in designing and implementing effective environmental management. Prereq: ENVS 6002 with a C or higher. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: ENVS 6002 with a C or higher.

**ENVS 6200 - Risk Assessment (3 Credits)**

The process of determining the likelihood and extent of harm that may result from an activity or event. Topics covered are: hazard identification, dose-response evaluation, exposure assessment, and risk characterization. The subjects of risk management, risk perception, and risk communication are also discussed. Cross-listed with HBSC 7340.

Prereq: Graduate standing. Term offered: fall. Max hours: 3 Credits.

Grading Basis: Letter Grade

Restriction: Restricted to Graduate and Graduate Non-Degree Majors

Typically Offered: Fall.

**ENVS 6210 - Human Health and Environmental Pollution (3 Credits)**

Examines the roles of technology and society in the etiology and control/prevention of adverse health outcomes associated with releases of toxic substances. Examples come from experience and the literature on occupational cancer and reproductive hazards, occupational and environmental regulation of hazardous wastes, air, and water pollution. Cross-listed with HBSC 7210. Prereq: Graduate standing. Max hours: 3 Credits.

Grading Basis: Letter Grade

Restriction: Restricted to Graduate and Graduate Non-Degree Majors

**ENVS 6220 - Toxicology (3 Credits)**

Introduces the field of toxicology. Emphasizes the mechanisms by which chemicals produce toxic effects and the methods for assessing toxicity. Note: Designed for students in the environmental sciences and occupational health fields. Note: this course assumes that students have completed one year of college chemistry and one year of college biology.

Prereq: Graduate standing. Cross-listed with HBSC 7360. Term offered: spring. Max hours: 3 Credits.

Grading Basis: Letter Grade

Restriction: Restricted to Graduate and Graduate Non-Degree Majors

Typically Offered: Spring.

**ENVS 6230 - Environmental Epidemiology (3 Credits)**

Provides a basic understanding of the methods used to study the effects on human health of exposures to physical, chemical, or biological factors in the external environment. The course explains the use of epidemiologic methods through a problem solving approach to investigating environmental health case studies. Note: this course assumes that students have completed a basic statistics course. Prereq: Graduate standing. Cross-listed with HBSC 7310. Max hours: 3 Credits.

Grading Basis: Letter Grade

Restriction: Restricted to Graduate and Graduate Non-Degree Majors

**ENVS 6800 - Community-Based Research Practicum (4 Credits)**

For students to apply the concepts and skills presented throughout the masters program in a community setting. Students will participate in a real-world, studio-based project that meets the needs of a government, non-governmental, or private sector organization and will produce a scoped product. Prereq: ENVS 6002 with a grade of B- or higher. Cross-listed with GEOG 6800. Term offered: spring. Max hours: 4 Credits.

Grading Basis: Letter Grade

Prereq: ENVS 6002 with a grade of B- or higher.

Typically Offered: Spring.

**ENVS 6840 - Independent Study: ENVS (1-3 Credits)**

Note: Students must submit a special processing form completely filled out and signed by the student and faculty member, describing the course expectations, assignments and outcomes, to the CLAS Graduate Academic Services Coordinator for approval. Prereq: Graduate standing. Department consent required. Repeatable. Max hours: 3 Credits.

Grading Basis: Letter Grade

Repeatable. Max Credits: 3.

Restriction: Restricted to Graduate and Graduate Non-Degree Majors

**ENVS 6950 - Master's Thesis (1-6 Credits)**

Department consent required. Note: Students must submit a special processing form completely filled out and signed by the student and faculty member, describing the course expectations, assignments and outcomes, to the CLAS Graduate Academic Services Coordinator for approval. Prereq: Graduate standing. Repeatable. Max hours: 11 Credits.

Grading Basis: Letter Grade with IP

Repeatable. Max Credits: 11.

Restriction: Restricted to Graduate and Graduate Non-Degree Majors

Additional Information: Report as Full Time.

**ENVS 6960 - Master's Report (3-6 Credits)**

Department consent required. Note: Students must submit a special processing form completely filled out and signed by the student and faculty member, describing the course expectations, assignments and outcomes, to the CLAS Graduate Academic Services Coordinator for approval. Prereq: Graduate standing. Repeatable. Max hours: 6 Credits.

Grading Basis: Letter Grade with IP

Repeatable. Max Credits: 6.

Restriction: Restricted to Graduate and Graduate Non-Degree Majors

Additional Information: Report as Full Time.