

GEOGRAPHY AND ENVIRONMENTAL SCIENCES

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Overview

Undergraduate Information

The discipline of Geography focuses on the spatial analysis of human/physical patterns and processes. Geographers explore factors that drive the distribution of people and their activities on the surface of the earth in order to seek meaningful solutions to contemporary environmental and social problems. This discipline is an ideal for liberal arts students seeking a broad, holistic approach to the study of modern questions centered around human interactions with the environment. This degree program provides students with exposure to the concepts and techniques for investigating the physical sciences, environmental and sustainability, socioeconomic problems and planning policies.

The major offers 4 degree options:

1. General Geography
2. Environmental Science
3. Environment, Society & Sustainability
4. Urban Studies & Planning

The program curriculum combines a broad and integrative scientific education with state-of-the-art training in geo-spatial analysis (e.g., computer mapping, GIS, remote sensing). The program is designed to provide students with the background necessary for obtaining a rewarding career in government (federal, state, local) or private industry, as well as preparing students for graduate study. Graduates from our program work in a broad range of jobs in environmental resource policy and management, city government and planning, economic development, environmental education, earth science research, and the geospatial sciences.

Departmental Honors

Departmental honors is a privilege for students who demonstrate exceptional academic performance and promise at CU Denver. The minimum criteria for honors in GES are an overall GPA of 3.3 in all courses at CU Denver (minimum of 30 semester hours for transfer students) and a GPA of 3.75 for all courses taken in the Department of Geography and Environmental Sciences (regardless of the BA option that students are pursuing). A student who meets these criteria shall work with a GES faculty sponsor who agrees to guide an honors thesis. Students must successfully complete and defend an honors thesis that demonstrates independent research, written and presentation skills. Additionally, students are required to sign up for and successfully complete 3 honors thesis credits the semester that they are graduating with honors. Departmental honors will be awarded based on successful completion and defense of the honors thesis, subject to faculty sponsor and committee approval. For more information, please contact the GES undergraduate advisor and/or chair.

Graduate Information

Please go to the **Graduate** catalog to read about our graduate programs.

Programs

- Geography, BA (<http://catalog.ucdenver.edu/cu-denver/undergraduate/schools-colleges-departments/college-liberal-arts-sciences/geography-environmental-sciences/geography-ba/>)
- Geography - Environment, Society and Sustainability Option, BA (<http://catalog.ucdenver.edu/cu-denver/undergraduate/schools-colleges-departments/college-liberal-arts-sciences/geography-environmental-sciences/geography-environment-society-sustainability-option-ba/>)
- Geography - Environmental Science Option, BA (<http://catalog.ucdenver.edu/cu-denver/undergraduate/schools-colleges-departments/college-liberal-arts-sciences/geography-environmental-sciences/geography-environmental-science-option-ba/>)
- Geography - Urban Studies and Planning, BA (<http://catalog.ucdenver.edu/cu-denver/undergraduate/schools-colleges-departments/college-liberal-arts-sciences/geography-environmental-sciences/geography-urban-studies-planning-ba/>)
- Environmental Sciences Minor (<http://catalog.ucdenver.edu/cu-denver/undergraduate/schools-colleges-departments/college-liberal-arts-sciences/geography-environmental-sciences/environmental-sciences-minor/>)
- Geography Minor (<http://catalog.ucdenver.edu/cu-denver/undergraduate/schools-colleges-departments/college-liberal-arts-sciences/geography-environmental-sciences/geography-minor/>)
- Urban Studies and Planning Minor (<http://catalog.ucdenver.edu/cu-denver/undergraduate/schools-colleges-departments/college-liberal-arts-sciences/geography-environmental-sciences/urban-studies-planning-minor/>)
- Geographic Information Science Undergraduate Certificate (<http://catalog.ucdenver.edu/cu-denver/undergraduate/schools-colleges-departments/college-liberal-arts-sciences/geography-environmental-sciences/geographic-information-science-undergraduate-certificate/>)
- Free and Open Source Software for Geospatial Applications Undergraduate Certificate (<http://catalog.ucdenver.edu/cu-denver/undergraduate/schools-colleges-departments/college-liberal-arts-sciences/geography-environmental-sciences/free-open-source-software-geospatial-applications-undergraduate-certificate/>)
- Sustainable Urban Agriculture Undergraduate Certificate (<http://catalog.ucdenver.edu/cu-denver/undergraduate/schools-colleges-departments/college-liberal-arts-sciences/geography-environmental-sciences/sustainable-urban-agriculture-undergraduate-certificate/>)

Faculty

Professors:

Anne Chin, PhD, Arizona State University

Pamela Jansma, PhD, Northwestern University (CLAS Dean)

Rafael Moreno-Sanchez, PhD, Colorado State University

Gregory Simon, PhD, University of Washington

Professors Emeriti:

Rudi Hartmann, PhD, Technical University of Munich

Wesley E. LeMasurier, PhD, Stanford University

Martin Lockley, PhD, University of Birmingham, England

John W. Wyckoff, PhD, University of Utah

Associate Professors:

Peter Anthamatten, PhD, University of Minnesota

Christy Briles, PhD, University of Oregon

Frederick B. Chambers, PhD, Arizona State University

Brian Page, PhD, University of California, Berkeley

Bryan S. Wee, PhD, Purdue University

Assistant Professors:

Benjamin Crawford, PhD, University of British Columbia, Vancouver

Katharine Kelsey, PhD, University of Colorado Boulder

Lisa Kelley, PhD, University of California Berkeley

Assistant Professors Clinical Teaching Track:

Yi-Chia Chen, PhD, Louisiana State University

Thomas Duster, PhD, University of Notre Dame

Senior Instructors:

Amanda Weaver, PhD, University of Denver

Instructors:

Kirsten Christensen, MSS, MURP, University of Colorado Denver

Lecturers:

Richard Ashmore

Jonathan Burton

Hope Dalton

Amy DePierre

Ricardo Oliveira

Mandy Rees

Geography (GEOG)

GEOG 1102 - World Regions Global Context (3 Credits)

Analyzes world regions and their global interconnectedness, including the dynamic and complex relationships between people and the world they inhabit. Demographic and cultural (political, economic, and historic) issues are examined as well as interactions between human societies and natural environments. Term offered: fall, spring, summer. Max hours: 3 Credits. GT: Course is approved by the Colorado Dept of Higher Education for statewide guaranteed transfer, GT-SS2.

Grading Basis: Letter Grade

Additional Information: Denver Core Requirement, Social Sciences; GT courses GT Pathways, GT-SS2, Soc Behav Sci: Geography.

Typically Offered: Fall, Spring, Summer.

GEOG 1111 - First Year Seminar (3 Credits)

Restriction: Restricted to Freshman level students. Max hours: 3 Credits.

Grading Basis: Letter Grade

Restriction: Restricted to Freshman level students

GEOG 1202 - Introduction to Physical Geography (3 Credits)

The science that studies the processes, forms, and spatial or geographic structures of natural systems operating at or near the earth's surface, including weather, climate, and landform processes. Term offered: fall, spring, summer. Max hours: 3 Credits. GT: Course is approved by the Colorado Dept of Higher Education for statewide guaranteed transfer, GT-SC2.

Grading Basis: Letter Grade

Additional Information: Denver Core Requirement, Biol Phys Sci - No Lab; GT courses GT Pathways, GT-SC2, Nat Phy Sci: Lec w/o Req Lab.

Typically Offered: Fall, Spring, Summer.

GEOG 1302 - Introduction to Human Geography (3 Credits)

This introductory course explores the relevance of geographic concepts to contemporary human challenges by examining the social, political, and economic processes that create the world in which we live. Students investigate how spatial relationships shape topics of the social construction of place, cultural landscapes, globalization, urban growth, agricultural development and change, economic growth and decline, and human population dynamics by examining relevant processes at global and local scales. Term offered: fall, spring. Max hours: 3 Credits.

Grading Basis: Letter Grade

Additional Information: Denver Core Requirement, Social Sciences.

Typically Offered: Fall, Spring.

GEOG 1602 - Urban Studies and Planning (3 Credits)

Surveys the process of urbanization, emphasizing the development of American cities, using Denver as an example. Topics covered include: evolution of metropolitan form/land use patterns, cultural landscape formation, city planning and architectural design, and urban social and policy issues. Note: This course is a prerequisite for GEOG 4680 Urban Sustainability: Perspectives and Practice AND GEOG 4640 Urban Geography Denver and the US. Term offered: fall, spring. Max hours: 3 Credits. GT: Course is approved by the Colorado Dept of Higher Education for statewide guaranteed transfer, GT-SS2.

Grading Basis: Letter Grade

Additional Information: Denver Core Requirement, Social Sciences; GT courses GT Pathways, GT-SS2, Soc Behav Sci: Geography.

Typically Offered: Fall, Spring.

GEOG 2080 - The Power of Maps: Introduction to Geospatial Sciences (3 Credits)

Introduction to the power of maps covering spatial thinking, Earth coordinate systems, cartographic techniques, critical map analysis, and the role of geographic information technology in a global society. Students must complete this course with a B- or better to apply the credit to a GIS certificate or stacked credential. Term offered: fall, spring. Max hours: 3 Credits.

Grading Basis: Letter Grade

Typically Offered: Fall, Spring.

GEOG 2939 - Internship (1-3 Credits)

Experiences involving application of specific, relevant concepts and skills in supervised employment situations. Note: students must work with the Experiential Learning Center advising to complete a course contract and gain approval. Prereq: sophomore standing or higher. Repeatable. Max Hours: 9 Credits.

Grading Basis: Letter Grade

Repeatable. Max Credits: 9.

Restriction: Sophomore standing or higher.

GEOG 3100 - Geography of Colorado (3 Credits)

An analysis of the physical environment, history of settlement, and resource base of Colorado in relation to present economic patterns of the state. Max hours: 3 Credits.

Grading Basis: Letter Grade

GEOG 3120 - Geography of Europe (3 Credits)

An analysis of the physical environment, resource utilization, economic development and cooperation in Europe. A cultural and political geography which focuses on continuity and change in Eastern and Western Europe. Note: This course may count for the International Studies major or minor. See your INTS advisor for more information. Max hours: 3 Credits.

Grading Basis: Letter Grade

GEOG 3130 - Central America and the Caribbean (3 Credits)

The course explores the dynamic and complex relationships between people and the physical environment in Central America and the Caribbean Islands. Examines critical regional and national culture, history, environment, population, and contemporary environmental and socioeconomic changes. Note: This course may count for the International Studies major or minor. See your INTS advisor for more information. Max hours: 3 Credits.

Grading Basis: Letter Grade

GEOG 3140 - Geography of South America (3 Credits)

The physical environment, cultural development, and political instability within the area are analyzed. Influence of the landscape and climate, as well as Iberian cultural and land tenure patterns on historic settlement and modern growth are discussed. Problems associated with population, economics, politics, education, and geography are emphasized. Term offered: spring. Note: This course may count for the International Studies major or minor. See your INTS advisor for more information. Max hours: 3 Credits.

Grading Basis: Letter Grade

Typically Offered: Spring.

GEOG 3150 - Middle East (3 Credits)

Physical, cultural, and economic approach to the arid lands of the Middle East, including Arab land of the Sahara. Note: This course may count for the International Studies major or minor. See your INTS advisor for more information. Max hours: 3 Credits.

Grading Basis: Letter Grade

GEOG 3160 - Geography of China (3 Credits)

Geographic survey of the physical, cultural, and economic features characterizing the geography of China. Max hours: 3 Credits.

Grading Basis: Letter Grade

GEOG 3232 - Weather and Climate (3 Credits)

Introduces the processes and systems that govern both day-to-day weather and longer-term climate variations. Covers instrumentation and weather forecasting techniques. Prereq: ENVS 1044 and 1045 or ENVS 1042 or GEOG 1202 with a C- or higher. Cross-listed with ENVS 3232. Term offered: fall, spring, summer. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: ENVS 1044 and 1045 or ENVS 1042 or GEOG 1202 with a C- or higher.

Typically Offered: Fall, Spring, Summer.

GEOG 3240 - Colorado Climates (3 Credits)

Provides a broad overview of the various weather and climate patterns that are found within the state of Colorado. To accomplish this, the state of Colorado will be divided into regions which (hopefully) have a large degree of homogeneity in terms of weather and climate controls. Note: Taught in a seminar style with students giving presentations and reports on their findings about a given region. Prereq: GEOG 3232 with a C- or higher, or instructor permission. Term offered: spring. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: GEOG 3232 with a C- or higher.

Typically Offered: Spring.

GEOG 3401 - Geography of Food and Agriculture (3 Credits)

An overview of food systems and agriculture as they impact an increasingly urbanized planet. We will survey historical food production and preservation, food justice and insecurity, land-use and preservation, as well as local and global systems of distribution and consumption. Note: This course may count for the International Studies major or minor. See your INTS advisor for more information. Term offered: fall. Max hours: 3 Credits.

Grading Basis: Letter Grade

Typically Offered: Fall.

GEOG 3412 - Globalization and Regional Development (3 Credits)

Addresses global political-restructuring and its implications for regional development in the U.S. Both historical and contemporary processes of globalization are examined. Topics include: the environmental basis of American industrial growth, the relationship between technological change and geographical shifts, the rise and decline of Fordism, the transfer of Japanese manufacturing methods to the U.S., the role of regional and national industrial policy, and the social consequences of globalization for labor and communities. Note: This course may count for the International Studies major or minor. See your INTS advisor for more information. Students will not earn credit for GEOG 3412 if they have already earned credit for GEOG 3411. Term offered: fall, spring. Max hours: 3 Credits.

Grading Basis: Letter Grade

Additional Information: Denver Core Requirement, International Perspectives.

Typically Offered: Fall, Spring.

GEOG 3430 - Geography of Tourism (3 Credits)

Geographic analysis of trends in recreation, travel, and tourism, and their economic, social, and environmental impacts. Examines growth and change in resorts and tourist destination areas. Note: This course may count for the International Studies major or minor. See your INTS advisor for more information. Note: this course assumes that students have completed GEOG 1302 or GEOG 3411. Max hours: 3 Credits.

Grading Basis: Letter Grade

GEOG 3501 - Geography of Health (3 Credits)

Offers a critical geographic perspective to human health issues, examining disease distributions, how changing relationships between people and their environments (natural, built, and social environments) influence health, and different approaches to the study of health in geography. Max hours: 3 Credits.

Grading Basis: Letter Grade

GEOG 3601 - Urban Sociology (3 Credits)

Explores U.S. cities as built environments, cultural spaces, and sources of community. Topics include the history of urbanization; social and spatial organization of cities; race and residential segregation; suburbanization; and urban problems such as crime, environmental hazards, and gentrification. Taught by the Sociology Department. Restriction: Restricted to students with sophomore standing or higher. Cross-listed with SOCY 3001. Term offered: Fall, Spring. Max hours: 3 Credits.

Grading Basis: Letter Grade

Restriction: Sophomore standing or higher.

Typically Offered: Fall, Spring.

GEOG 3840 - Independent Study: GEOG (1-3 Credits)

Department consent required. Repeatable. Max hours: 6 Credits.

Grading Basis: Letter Grade

Repeatable. Max Credits: 6.

GEOG 3939 - Internship (1-3 Credits)

Designed experiences involving application of specific, relevant concepts and skills in supervised employment situations. Note: students must work with the Experiential Learning Center advising to complete a course contract and gain approval. Prereq: Junior standing or higher. Repeatable. Max Hours: 9 Credits.

Grading Basis: Letter Grade

Repeatable. Max Credits: 9.

Prereq: junior standing or higher

GEOG 3990 - Special Topics (3 Credits)

Investigation of current topics in geography such as analysis of issues (crime, public transportation), techniques (socioeconomic impact analysis), or areas of specialization (climatology). Note: specific necessary prior coursework varies with each topic; students are expected to have completed at least six hours in relevant social or physical science coursework. Repeatable. Max Hours: 9 Credits.

Grading Basis: Letter Grade

Repeatable. Max Credits: 9.

GEOG 4010 - 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. Prereq: GEOL 1073 and GEOL 1074 or GEOL 1072 with a C- or higher, or instructor permission. Cross-listed with GEOL 4010/ENVS 5010. Term offered: spring. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: GEOL 1073 and GEOL 1074 or GEOL 1072 with a C- or higher.

Typically Offered: Spring.

GEOG 4020 - 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 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: ENVS 1044 and 1045 or ENVS 1042 or GEOG 1202, and GEOG 3232 or ENVS 3232 with a C- or higher. Cross-listed with ENVS 5020, GEOL 4020. Term offered: fall. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: ENVS 1044 and 1045 or ENVS 1042 or GEOG 1202, and GEOG 3232 or ENVS 3232 with a C- or higher.

Typically Offered: Fall.

GEOG 4060 - Remote Sensing I: Introduction to Environmental Remote Sensing (3 Credits)

An in-depth treatment of the use of aerial photographs and other forms of imagery for the analysis of urban-industrial patterns, vegetation, agriculture, landforms, and geologic structure. Note: Students must complete this course with a B- or better to apply the credit to a GIS certificate or stacked credential. Prereq: GEOG 2080 with a grade of C or better. Cross-listed with GEOG 5060. Term offered: fall, spring, summer. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: GEOG 2080 with a grade of C or better

Typically Offered: Fall, Spring, Summer.

GEOG 4070 - Remote Sensing II: Advanced Remote Sensing (3 Credits)

Focuses on digital image processing of satellite and aerial images. Students explore the nature of digital image data, gain an understanding of image analysis using PCs, and learn about the use of analysis products in the development of GIS databases. Note: Students must complete this course with a B- or better to apply the credit to a GIS certificate or stacked credential. Prereq: GEOG 4060/5060 with a grade of C or better, or permission of instructor. Cross-listed with GEOG 5070. Term offered: spring. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: GEOG 4060 or GEOG 5060 or GEOL 4060 or GEOL 5060, with a grade of C or better

Typically Offered: Spring.

GEOG 4080 - Introduction to GIS (3 Credits)

Introduces Geographic Information Systems (GIS), including justification, hardware/software, database design, and data conversion. GIS is a computer-based mapping system providing a graphical interface to locational and relational attribute data. Includes hands-on use of a GIS workstation. Note: Students must complete this course with a B- or better to apply the credit to a GIS certificate or stacked credential. Prereq: GEOG 2080 or LDAR 4432/5532 with a C or higher. Cross-listed with GEOG 5080. Term offered: fall, spring, summer. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: GEOG 2080 or LDAR 4432/5532 with a C or higher.

Typically Offered: Fall, Spring, Summer.

GEOG 4081 - Cartography (3 Credits)

Provides an introduction to the art and science of cartography (map making). Students will learn about design principles, tools and techniques of map production, culminating in the creation of a high-quality map through hands-on exercises. Note: Students must complete this course with a B- or better to apply the credit to a GIS certificate or stacked credential. Prereq: GEOG 4080 or GEOG 5080 or CVEN 5381 with a grade of C or better. Cross-listed with GEOG 5081. Term offered: fall, spring. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: GEOG 4080 or 5080 or CVEN 5381 with a grade of C or better

Typically Offered: Fall, Spring.

GEOG 4085 - GIS Applications for the Urban Environment (3 Credits)

Takes a more detailed look at basic concepts presented in the introductory GIS course, concentrating on how GIS is used to solve real-world geographic problems. Various GIS applications within both the natural and social sciences are highlighted. The selection of specific topics is flexible, based on the interests of enrolled students. Note: Students must complete this course with a B- or better to apply the credit to a GIS certificate or stacked credential. Prereq: GEOG 4080 or GEOG 5080 or CVEN 5381 with a grade of C or better, or permission of instructor. Cross-listed with GEOG 5085. Term offered: spring. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: GEOG 4080 or 5080 or CVEN 5381 with a grade of C or better

Typically Offered: Spring.

GEOG 4086 - FOSS4G Systems Integration (3 Credits)

Focuses on the integration of different FOSS4G (Free and Open Source Software for Geospatial Applications) software and technologies to create geospatial information systems that access data from different sources, storage structures, and formats to provide information to support decision making processes. Note: Students must complete this course with a B- or better to apply the credit to a GIS certificate or stacked credential. Prereq: GEOG 4091 or 5091, and GEOG 4092 or 5092 with a C or higher. Cross-listed with GEOG 5086. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: GEOG 4091 or 5091, and GEOG 4092 or 5092 with a C or higher.

GEOG 4090 - Environmental Modeling with Geographic Information Systems (3 Credits)

Students in this course will apply spatial analysis and modeling using GIS systems to study processes and spatial relationships in natural and built environments. Emphasis will be given to GIS raster analytical functions.

The skills and knowledge acquired in the course are essential in applying GIS science and technology. Prereq: GEOG 4080 or GEOG 5080 or CVEN 5381 with a grade of C or better, or permission of instructor. Cross-listed with GEOG 5090 Term offered: fall. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: GEOG 4080 or 5080 or CVEN 5381 with a grade of C or better
Typically Offered: Fall.

GEOG 4091 - Open Source Software for Geospatial Applications (3 Credits)

Students will master the individual use and integration of a stack of the most powerful Free and Open Source Software for Geospatial Applications (FOSS4G) to analyze spatial problems and create Spatial Data Infrastructures in different technological, socio-economic and organizational settings. Note: Students must complete this course with a B- or better to apply the credit to a GIS certificate or stacked credential. Prereq: GEOG 4080 or 5080 or CVEN 5381 with a grade of C or better, or permission of the instructor. Cross-listed with GEOG 5091. Term offered: spring. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: GEOG 4080 or 5080 or CVEN 5381 with a grade of C or better
Typically Offered: Spring.

GEOG 4092 - GIS Programming and Automation (3 Credits)

Students will learn the most commonly used programming language to automate GIS geoprocessing tasks and workflows in the latest versions of the most popular GIS systems. Note: Students must complete this course with a B- or better to apply the credit to a GIS certificate or stacked credential. Cross-listed with GEOG 5092. Prereq: grade of B- or higher in GEOG 4080 or 5080 or similar course. Term offered: fall. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: grade of B- or higher in GEOG 4080 or 5080 or similar course
Typically Offered: Fall.

GEOG 4095 - Deploying GIS Functionality on the Web (3 Credits)

Covers the core principles and technologies that allow the deployment of geographic information system (GIS) functionality over the World Wide Web. Hands-on exercises make use of the latest commercial software as well as open source technologies. Note: Students must complete this course with a B- or better to apply the credit to a GIS certificate or stacked credential. Prereq: GEOG 4080 or GEOG 5080 or CVEN 5381 with a grade of C or better, computer science background, or permission of instructor. Cross-listed with GEOG 5095. Term offered: spring. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: GEOG 4080 or 5080 or CVEN 5381 with a grade of C or better
Typically Offered: Spring.

GEOG 4220 - Environmental Impact Assessment (3 Credits)

The objective of this course is to provide the foundation for understanding the environmental impact assessment process, its legal context, and the criteria and methods for procedural and substantive compliance. Cross-listed with GEOG 5220, URPL 6549. Max hours: 3 Credits.

Grading Basis: Letter Grade

GEOG 4230 - Hazard Mitigation and Vulnerability Assessment (3 Credits)

Examines hazard mitigation and its planning and policy implications, emphasizing how vulnerability assessments play an integral role. Students explore how mitigation minimizes the impacts from hazards and use GIS to conduct a local study. Cross-listed with GEOG 5230. Term offered: fall. Max hours: 3 Credits.

Grading Basis: Letter Grade

Typically Offered: Fall.

GEOG 4235 - GIS Applications in the Health Sciences (3 Credits)

Examines how GIS is used throughout the health care industry and public health. Covers environmental health, disease surveillance, and health services research. Students critically review current literature and gain hands-on experience with GIS software. Note: Students must complete this course with a B- or better to apply the credit to a GIS certificate or stacked credential. Note: this course assumes that students have completed GEOG 4080 or GEOG 5080 and/or have a background in public health. Cross-listed with GEOG 5235, HBSC 7235. Max hours: 3 Credits.

Grading Basis: Letter Grade

GEOG 4240 - Applied Geomorphology (3 Credits)

Uses hands-on tasks and field trips to investigate processes behind Earth's changing landforms in a variety of physical landscapes (aeolian, volcanic, coastal, fluvial, karst, glacial and periglacial) as related to rock decay, soils and climatic forcings. Prereq: GEOL 1073 and GEOL 1074 or GEOL 1072 with a C- or higher. Cross-listed with GEOL 4240, 5240 and GEOG 5240. Term offered: fall. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: GEOL 1073 and GEOL 1074 or GEOL 1072 with a C- or higher.
Typically Offered: Fall.

GEOG 4251 - Fluvial Geomorphology (3 Credits)

Examines interactions between Earth's surface and flowing water across spatial and temporal scales. Considers structure and function of the major components of fluvial systems, with particular attention to the variety of fluvial systems to hydrologic, geologic and anthropogenic controls. Prereq: GEOL 1073 and GEOL 1074 or GEOL 1072 with a C- or higher. GEOG 3232 is strongly recommended, though not required. Cross-listed with GEOG 5251, GEOL 4251 and GEOL 5251. Term offered: fall. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: GEOL 1073 and GEOL 1074 or GEOL 1072 with a C- or higher.

Typically Offered: Fall.

GEOG 4260 - Energy and Natural Resource Planning (3 Credits)

This course provides an overview of the issues associated with energy and natural resource planning. Topics include: energy policy; alternative energy development; water resources; extraction/mining; natural resource protection and regulation; resource management, policies, politics, and technologies. Cross-listed with URPL 6510. Max hours: 3 Credits.

Grading Basis: Letter Grade

GEOG 4265 - Sustainability in Resources Management (3 Credits)

Sustainability and sustainable development are the dominant economic, environmental and social issues of the 21st century. Follows a multi-disciplinary approach to these concepts. Case studies demonstrate their implementation in different geographical, ecological and socio-economic conditions worldwide. Note: This course may count for the International Studies major or minor. See your INTS advisor for more information.

Prereq: ENVS 1044 and ENVS 1045 or ENVS 1042 with a C- or higher.

Cross-listed with GEOG 5265. Repeatable. Max Hours: 6 Credits.

Grading Basis: Letter Grade

Repeatable. Max Credits: 6.

Prereq: ENVS 1044 and ENVS 1045 or ENVS 1042 with a C- or higher.

GEOG 4270 - Glacial Geomorphology (3 Credits)

Provides an in-depth view of the processes and systems found in glacial environments. Topics include: evidence of past glaciation; present-day glacial extent; glacier dynamics; glacial erosional processes and landforms; glacial depositional processes and landforms. Note: this course assumes that students have completed GEOG 1202 or GEOL 1072. Prereq: GEOL 1073 and GEOL 1074 or GEOL 1072 with a C- or higher. Cross-listed with GEOG 5270, GEOL 4270 and GEOL 5270. Term offered: fall. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: GEOL 1073 and GEOL 1074 or GEOL 1072 with a C- or higher.

Typically Offered: Fall.

GEOG 4280 - 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. Prereq: ENVS 1044 and 1045 or ENVS 1042 or GEOG 1202, and GEOG 3232 or ENVS 3232 with a C- or higher. Cross-listed with GEOL 4280 and ENVS 5280. Max hours: 4 Credits.

Grading Basis: Letter Grade

Prereq: ENVS 1044 and 1045 or ENVS 1042 or GEOG 1202, and

GEOG 3232 or ENVS 3232 with a C- or higher.

GEOG 4301 - Population, Culture, and Resources (3 Credits)

World populations are examined in the context of local, regional and global resources. Opposing viewpoints are studied, and students are required to complete a case study of self-selected country. Note: This course may count for the International Studies major or minor. See your INTS advisor for more information. Students may not receive credit for this course if they have already received credit for GEOG 3301. Prereq: GEOG 1302 or ENVS 1342 with a C- or higher or instructor consent. Cross-listed with GEOG 5301. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: GEOG 1302 or ENVS 1342 with a C- or higher or instructor consent.

Typically Offered: Fall, Spring.

GEOG 4305 - 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. Cross-listed with ENVS 5305.

Term offered: spring. Max hours: 3 Credits.

Grading Basis: Letter Grade

Typically Offered: Spring.

GEOG 4335 - Climate Change & Society (3 Credits)

Our focus in this class is to critically examine and engage with important and ongoing environmental issues, with particular emphasis on those related to climate change. Together we will explore issues ranging from deforestation and sea level rise to climate justice, paying attention not only to their societal drivers and impacts, but to the dynamics of power and authority that affect how these issues come to be studied, represented, addressed, and experienced. The goal of this course is less to build topical expertise in any single domain than it is to broaden and deepen your capacity to engage with, participate in, and critically dissect climate-society relations. Cross-listed with GEOG 5335. Term offered: spring. Max hours: 3 Credits.

Grading Basis: Letter Grade

Typically Offered: Spring.

GEOG 4350 - Environment and Society in the American Past (3 Credits)

Overview of the geographical development of North American society from the late 15th century to the mid-20th century. A comparative regional approach emphasizing relationships between natural resource exploitation, cultural landscape formation and environmental change. Cross-listed with GEOG 5350. Term offered: fall. Max hours: 3 Credits.

Grading Basis: Letter Grade

Typically Offered: Fall.

GEOG 4420 - The Politics of Nature (3 Credits)

Examines how economic systems, scientific discovery, institutional policies, and environmental knowledge converge to shape the environment and mediate the way societies understand, manage and respond to environmental changes in both the United States and the developing world. Cross-listed with GEOG 5420. Term offered: spring. Max hours: 3 Credits.

Grading Basis: Letter Grade

Typically Offered: Spring.

GEOG 4440 - Science, Policy and the Environment (3 Credits)

Examines the social, economic and political forces shaping scientific discovery and the development and enforcement of environmental policy. Students will examine perspectives on issues such as risk, expertise, uncertainty and objectivity that influence the problem-defining, standard-setting and policy-making process. Cross-listed with GEOG 5440. Term offered: fall. Max hours: 3 Credits.

Grading Basis: Letter Grade

Typically Offered: Fall.

GEOG 4450 - 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. Cross-listed with ENVS 5450. Term offered: spring. Max hours: 3 Credits.

Grading Basis: Letter Grade

Typically Offered: Spring.

GEOG 4460 - 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 GEOG 4450. Cross-listed with ENVS 5460. Term offered: fall. Max hours: 3 Credits.

Grading Basis: Letter Grade

Typically Offered: Fall.

GEOG 4625 - Urban America (3 Credits)

This course will explore how Americans experienced their rapidly growing and changing cities during the past two hundred years. This course will cover a wide range of urban themes, including segregation and gentrification, self-invention and policing, ethnic gangs and race riots, skyscrapers and suburbia, and commercial sex and Hollywood. The course will ultimately chart how a range of Americans - including immigrants, teenagers, laborers, women, LGBTQ+ people, and people of color – all fought for their own "right to the city". Cross-listed with HIST 4225, HIST 5225, WGST 4225, WGST 5225, GEOG 4625. Max hours: 3 Credits.

Grading Basis: Letter Grade

GEOG 4640 - Urban Geography: Denver and the U.S. (3 Credits)

Uses a combined lecture/seminar format to explore research themes in urban geography. Topics covered include both historical and contemporary processes of urban development and transformation. Particular emphasis is placed on the U.S. and Colorado's Front Range. Cross-listed with GEOG 5640. Prereq: GEOG 1602 with a grade of C- or higher or permission from instructor. Term offered: spring. Max Hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: GEOG 1602 with a grade of C- or higher.

Typically Offered: Spring.

GEOG 4680 - Urban Sustainability and Resiliency: Perspectives and Practice (3 Credits)

Society is facing an uncertain future. Our cities are growing, and anthropogenic climate change is upon us, and cities are a significant contributors towards this "wicked problem". We cannot turn back the clock, but our cities can become more resilient and, as a result, more sustainable. The course will focus on the techniques used to address resiliency and sustainability through planning, greening and eco-city, physical, ecological, social, environmental justices, and management approaches. Cross-listed with GEOG 5680. Prereq: ENVS 1342 or GEOG 1602 with a grade of C- or higher or permission from instructor. Term offered: fall. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: ENVS 1342 or GEOG 1602 with a grade of C- or higher.

Typically Offered: Fall.

GEOG 4710 - Disasters, Climate Change, and Health (3 Credits)

Provides a review of the impacts of disasters and climate change on human health, using a broad framework of preparedness, mitigation, response, recovery, and adaptation. Note: this course assumes that students have completed GEOG 3501. Term offered: spring. Max hours: 3 Credits.

Grading Basis: Letter Grade

Typically Offered: Spring.

GEOG 4720 - 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. Prereq: GEOG 3232 with a C- or higher. Cross-listed with GEOG 5720/ ENVS 4720/ ENVS 5720. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: GEOG 3232 with a C- or higher.

GEOG 4731 - 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. Prereq: ENVS 1044 and 1045 or ENVS 1042 or GEOG 1202 with a C- or higher. Cross-listed with ENVS 5731. Term offered: fall. Max hours: 4 Credits.

Grading Basis: Letter Grade

Prereq: ENVS 1044 and 1045 or ENVS 1042 or GEOG 1202 with a C- or higher.

Typically Offered: Fall.

GEOG 4740 - 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. Cross-listed with GEOG 5740, ENVS 4740, ENVS 5740. Term offered: fall. Max hours: 3 Credits.

Grading Basis: Letter Grade

Typically Offered: Fall.

GEOG 4750 - 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. Prereq: ENVS 1044 and 1045 or BIOL 2010 (or 2061/2097/2030) and BIOL 2011 (or 2081/2098/2031) or BIOL 2020 (or 2051/2095/2040) and BIOL 2021 (or 2071/2096/2041) with a C- or higher. Cross-listed with GEOG 5750, ENVS 4750, and ENVS 5750. Term offered: summer. Max hours: 4 Credits.

Grading Basis: Letter Grade

Prereq: ENVS 1044 and 1045 or BIOL 2010 (or 2061/2097/2030) and BIOL 2011 (or 2081/2098/2031) or BIOL 2020 (or 2051/2095/2040) and BIOL 2021 (or 2071/2096/2041) with a C- or higher.

Typically Offered: Summer.

GEOG 4757 - 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. Cross-listed with GEOG 4757, GEOG 5757, ENVS 4757, and ENVS 5757. Max hours: 3 Credits.

Grading Basis: Letter Grade

Typically Offered: Spring.

GEOG 4840 - Independent Study: GEOG (1-3 Credits)

Independent research primarily for undergraduate majors. Prereq: Permission of department. Repeatable. Max Hours: 12 Credits.

Grading Basis: Letter Grade

Repeatable. Max Credits: 12.

GEOG 4880 - 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. Repeatable. Max Hours: 6 Credits.

Grading Basis: Letter Grade

Repeatable. Max Credits: 6.

GEOG 4950 - Honors Thesis (3 Credits)

A capstone course designed to promote critical thinking, research methodology, and writing/oral presentation skills. Students design and develop a research project under the supervision of a faculty advisor. Each student gives an oral presentation or defense of his or her thesis at the end of the semester in which they enroll. Prereq: Junior standing or higher. Department consent required. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: junior standing or higher

Additional Information: Report as Full Time.

GEOG 4990 - Special Topics (1-6 Credits)

Repeatable. Max hours: 9 Credits.

Grading Basis: Letter Grade

Repeatable. Max Credits: 9.

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

Grading Basis: Letter Grade

Repeatable. Max Credits: 12.

Additional Information: Global Education Study Abroad.

Geology (GEOL)**GEOL 1073 - Physical Geology: Surface Processes (3 Credits)**

This survey course develops a basic understanding of surface processes and landforms in geology. It includes one all-day field trip. Students must also take the accompanying laboratory GEOL 1074. No co-credit with GEOL 1072. Prereq or Coreq: GEOL 1074. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq or Co-req: GEOL 1074

Additional Information: Denver Core Requirement, Biol Phys Sci - Lec.

GEOL 1074 - Physical Geology: Surface Processes Laboratory (1 Credit)

Introduces the basic scientific approach through investigations, observations, and experiments in surface processes and landforms in geology. Students must also take the accompanying lecture GEOL 1073. Prereq or Coreq: GEOL 1073. Max hours: 1 Credit.

Grading Basis: Letter Grade

Prereq or co-req: GEOL 1073

Additional Information: Denver Core Requirement, Biol Phys Sci - Lab.

GEOL 1083 - Physical Geology: Internal Processes (3 Credits)

This survey course develops a basic understanding of physical geology emphasizing the earth's interior, covering internal processes and properties, with plate tectonics as the underlying theme. Includes one all-day field trip. Students must also take the accompanying laboratory GEOL 1084. No co-credit with GEOL 1082. Prereq or Coreq: GEOL 1084. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq or co-req: GEOL 1084

Additional Information: Denver Core Requirement, Biol Phys Sci - Lec.

GEOL 1084 - Physical Geology: Internal Processes Laboratory (1 Credit)

Introduces the basic scientific approach through investigations, observations, and experiments in internal geologic processes and properties of the earth's interior with plate tectonics as the underlying theme. Prereq or Coreq: GEOL 1083. Max hours: 1 Credit.

Grading Basis: Letter Grade

Prereq or co-req: GEOL 1083

Additional Information: Denver Core Requirement, Biol Phys Sci - Lab.

GEOL 1111 - First Year Seminar (3 Credits)

Restriction: Restricted to Freshman level students. Max hours: 3 Credits.

Grading Basis: Letter Grade

Restriction: Restricted to Freshman level students

GEOL 1202 - Introduction to Oceanography (3 Credits)

Surveys modern scientific knowledge of the world's oceans. Intended for non-science students, the course offers a non-quantitative introduction to the major facts and principles of physical, chemical, biological, and geological oceanography. The impact of natural and anthropic events on the marine environment are included. Max hours: 3 Credits.

Grading Basis: Letter Grade

GEOL 1840 - Independent Study: GEOL (1-3 Credits)

Department consent required. Repeatable. Max hours: 3 Credits.

Grading Basis: Letter Grade

Repeatable. Max Credits: 3.

GEOL 2939 - Internship (1-3 Credits)

Experiences involving application of specific, relevant concepts and skills in supervised employment situations. Note: students must work with the Experiential Learning Center advising to complete a course contract and gain approval. Prereq: 15 hours of 2.75 GPA. Repeatable. Max Hours: 9 Credits.

Grading Basis: Letter Grade

Repeatable. Max Credits: 9.

GEOL 3032 - Geology of Colorado (3 Credits)

Introductory course focused on the geology of Colorado. The course is divided into two parts: the first half covers general principles of geology, and the second is devoted to the observation of rock types, structures, and geologic relationships in the field. Discussion of plate tectonics, rock formation, construction and interpretation of geologic maps, the geologic time scale, geologic provinces of Colorado, evolution of major landforms, formation and development of mineral resources of Colorado, and current topics in environmental geology. Max hours: 3 Credits.

Grading Basis: Letter Grade

GEOL 3840 - Independent Study: GEOL (1-3 Credits)

Department consent required. Repeatable. Max hours: 6 Credits.

Grading Basis: Letter Grade

Repeatable. Max Credits: 6.

GEOL 3939 - Internship (1-3 Credits)

Designed experiences involving application of specific, relevant concepts and skills in supervised employment situations. Note: students must work with the Experiential Learning Center advising to complete a course contract and gain approval. Prereq: Junior standing or higher. Department consent required. Repeatable. Max hours: 9 Credits.

Grading Basis: Letter Grade

Repeatable. Max Credits: 9.

Prereq: junior standing or higher

GEOL 4010 - 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. Prereq: GEOL 1073 and GEOL 1074 or GEOL 1072 with a C- or higher, or instructor permission. Cross-listed with GEOG 4010 and ENVS 5010. Term offered: spring. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: GEOL 1073 and GEOL 1074 or GEOL 1072 with a C- or higher.

Typically Offered: Spring.

GEOL 4020 - 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 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: ENVS 1044 and 1045 or ENVS 1042 or GEOG 1202, and GEOG 3232 or ENVS 3232 with a C- or higher. Cross-listed with ENVS 5020, GEOG 4020. Term offered: fall. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: ENVS 1044 and 1045 or ENVS 1042 or GEOG 1202, and GEOG 3232 or ENVS 3232 with a C- or higher.

Typically Offered: Fall.

GEOL 4240 - Applied Geomorphology (3 Credits)

Uses hands-on tasks and field trips to investigate processes behind Earth's changing landforms in a variety of physical landscapes (aeolian, volcanic, coastal, fluvial, karst, glacial and periglacial) as related to rock decay, soils and climatic forcings. Prereq: GEOL 1073 and GEOL 1074 or GEOL 1072 with a C- or higher. Cross-listed with GEOG 4240, 5240 and GEOL 5240. Term offered: fall. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: GEOL 1073 and GEOL 1074 or GEOL 1072 with a C- or higher.

Typically Offered: Fall.

GEOL 4251 - Fluvial Geomorphology (3 Credits)

Examines interactions between Earth's surface and flowing water across spatial and temporal scales. Considers structure and function of the major components of fluvial systems, with particular attention to the variety of fluvial systems to hydrologic, geologic and anthropogenic controls. Cross-listed with GEOG 4251, GEOG 5251 and GEOL 5251. Prereq: GEOL 1073 and GEOL 1074 or GEOL 1072 with a C- or higher. GEOG 3232 is strongly recommended, though not required. Term offered: fall. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: GEOL 1073 and GEOL 1074 or GEOL 1072 with a C- or higher.

Typically Offered: Fall.

GEOL 4270 - Glacial Geomorphology (3 Credits)

Provides an in-depth view of the processes and systems found in glacial environments. Topics include: evidence of past glaciation; present-day glacial extent; glacier dynamics; glacial erosional processes and landforms; glacial depositional processes and landforms. Prereq: GEOL 1073 and 1074 or GEOL 1072 with a C- or better. Cross-listed with GEOG 4270, GEOG 5270 and GEOL 5270. Term offered: fall. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: GEOL 1073 and GEOL 1074 or GEOL 1072 with a C- or higher.

Typically Offered: Fall.

GEOL 4840 - Independent Study: GEOL (1-3 Credits)

Department consent required. Repeatable. Max hours: 12 Credits.

Grading Basis: Letter Grade

Repeatable. Max Credits: 12.

GEOL 4880 - 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. Repeatable. Max hours: 6 Credits.

Grading Basis: Letter Grade

Repeatable. Max Credits: 6.

GEOL 4995 - 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: GEOL 1073 and GEOL 1074 or GEOL 1072 and GEOL 1083 and GEOL 1084 or GEOL 1082 with a C or higher and instructor permission. Cross-listed with GEOL 5995. Repeatable. Max hours: 12 Credits.

Grading Basis: Letter Grade

Repeatable. Max Credits: 12.

Prereq: GEOL 1073 and GEOL 1074 or GEOL 1072 and GEOL 1083 and GEOL 1084 or GEOL 1082 with a C or higher and instructor permission.

GEOL 5001 - RM-MSMSP Earth Processes I (4 Credits)

Systematic study of geological concepts, rock and mineral formation, plate tectonics, volcanism and earthquakes, landforms and weathering, historical environmental interpretation. Includes a field component. This course is not applicable toward any degree in the College of Liberal Arts and Sciences. Note: students should obtain permission of project director prior to enrolling in this course. Prereq: Graduate standing. Max hours: 4 Credits.

Grading Basis: Letter Grade

Restriction: Restricted to Graduate and Graduate Non-Degree Majors

GEOL 5002 - RM-MSMSP Earth Sciences II - Sedimentology and Paleontology (4 Credits)

Field and lecture course building on Earth Sciences I, which covers internal earth processes. Students learn about erosional processes and how sedimentary rocks are deposited and may be preserved; the different ways fossils are preserved; describing rocks in the field; and collecting, preparing and describing fossils. Provides an overview of the geology of the area so that students can place the detailed studies in context. This course is not applicable toward any degree in the College of Liberal Arts and Sciences. Prereq: GEOL 5001 with a B- or higher. Max hours: 4 Credits.

Grading Basis: Letter Grade

Prereq: GEOL 5001 with a B- or higher.

GEOL 5003 - RM-MSMSP Earth Science in Context (4 Credits)

Designed for teachers in the RM-MSMSP program. Topics include global climate change, glaciers, coastal geology, volcanism, and their effects on culture. Monuments such as Florissant Fossil Beds, Ice Core, Cave of the Winds and a quarry will be visited. Note: This course is not applicable toward any degree in the College of Liberal Arts and Sciences. Prereq: Graduate standing. Max hours: 4 Credits.

Grading Basis: Letter Grade

Restriction: Restricted to Graduate and Graduate Non-Degree Majors

GEOL 5004 - RM-MSMSP Research Experience for Teachers - Geology Cohort (1-6 Credits)

A five-week research exploration in which RM-MSMSP teachers will raise their level of relevant scientific understanding by engaging in a "hands-on" workshop, transforming what they have learned into new curricular materials that will improve the scientific abilities of their students and hopefully stimulate them to consider a STEM career. Note: credit may not apply toward any CLAS degree. Prereq: Graduate standing. Department consent required. Max hours: 6 Credits.

Grading Basis: Letter Grade

Restriction: Restricted to Graduate and Graduate Non-Degree Majors

GEOL 5240 - Applied Geomorphology (3 Credits)

Uses hands-on tasks and field trips to investigate processes behind Earth's changing landforms in a variety of physical landscapes (aeolian, volcanic, coastal, fluvial, karst, glacial and periglacial) as related to rock decay, soils and climatic forcings. Note: this course assumes that students have completed GEOG 1202 or GEOL 1072 and GEOG 3232. Prereq: Graduate standing. Cross-listed with GEOG 4240, 5240 and GEOL 4240. Term offered: fall. Max hours: 3 Credits.

Grading Basis: Letter Grade

Restriction: Restricted to Graduate and Graduate Non-Degree Majors

Typically Offered: Fall.

GEOL 5251 - Fluvial Geomorphology (3 Credits)

Examines interactions between Earth's surface and flowing water across spatial and temporal scales. Considers structure and function of the major components of fluvial systems, with particular attention to the variety of fluvial systems to hydrologic, geologic and anthropogenic controls. Cross-listed with GEOG 4251, GEOG 5251 and GEOL 4251. Restriction: Restricted to Graduate and Graduate Non-Degree students. GEOG 3232 is strongly recommended, though not required. Term offered: fall. Max Hours: 3 Credits.

Grading Basis: Letter Grade

Restriction: Restricted to Graduate and Graduate Non-Degree Majors

Typically Offered: Fall.

GEOL 5270 - Glacial Geomorphology (3 Credits)

Provides an in-depth view of the processes and systems found in glacial environments. Topics include: evidence of past glaciation; present-day glacial extent; glacier dynamics; glacial erosional processes and landforms; glacial depositional processes and landforms. Note: this course assumes that students have completed GEOG 1202 or GEOL 1072. Prereq: Graduate standing. Cross-listed with GEOG 4270, GEOG 5270 and GEOL 4270. Max hours: 3 Credits.

Grading Basis: Letter Grade

Restriction: Restricted to Graduate and Graduate Non-Degree Majors

GEOL 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.

GEOL 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. Prereq: Graduate standing. Department consent required. Repeatable. Max hours: 9 Credits.

Grading Basis: Letter Grade

Repeatable. Max Credits: 9.

Restriction: Restricted to Graduate and Graduate Non-Degree Majors

GEOL 5950 - Master's Thesis (1-8 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: 8 Credits.

Grading Basis: Letter Grade with IP

Repeatable. Max Credits: 8.

Restriction: Restricted to Graduate and Graduate Non-Degree Majors

Additional Information: Report as Full Time.

GEOL 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 GEOL 4995. Repeatable. Repeatable. Max Hours: 12 Credits.

Grading Basis: Letter Grade

Repeatable. Max Credits: 12.

Restriction: Restricted to Graduate and Graduate Non-Degree Majors

GEOL 6840 - Independent Study: GEOL (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. 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

GEOL 6950 - Master's Thesis (1-8 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: 8 Credits.

Grading Basis: Letter Grade with IP

Repeatable. Max Credits: 8.

Restriction: Restricted to Graduate and Graduate Non-Degree Majors

Additional Information: Report as Full Time.

GEOL 6960 - Master's Project (1-8 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: 8 Credits.

Grading Basis: Letter Grade with IP

Repeatable. Max Credits: 8.

Restriction: Restricted to Graduate and Graduate Non-Degree Majors

Additional Information: Report as Full Time.

Environmental Sciences (ENVS)

ENVS 1044 - Introduction to Environmental Sciences (3 Credits)

This survey course develops a basic understanding of ecological relationships and environmental systems. Issues such as the effects of human activities on earth's environment, extinction or diversity, greenhouse effect, hazardous or toxic wastes and human population growth are discussed. Students must also take the accompanying laboratory ENVS 1045. No co-credit with ENVS 1042. Prereq or Coreq: ENVS 1045. Term offered: fall, spring, summer. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq or co-req: ENVS 1045

Additional Information: Denver Core Requirement, Biol Phys Sci - Lec.

Typically Offered: Fall, Spring, Summer.

ENVS 1045 - Introduction to Environmental Sciences Laboratory (1 Credit)

Introduces the basic scientific approach through investigations, observations, and experiments in environmental science. Students must also take the accompanying lecture ENVS 1044. No co-credit with ENVS 1042. Prereq or Coreq: ENVS 1044. Term offered: fall, spring, summer. Max hours: 1 Credit.

Grading Basis: Letter Grade

Prereq or co-req: ENVS 1044

Additional Information: Denver Core Requirement, Biol Phys Sci - Lab.

Typically Offered: Fall, Spring, Summer.

ENVS 1342 - Environment, Society and Sustainability (3 Credits)

Overview of perspectives on environmental issues within the context of sustainable development and taking a systems approach. The focus is on social science approaches to explore the human footprint on the earth, environmentalism, scientific uncertainty, policy creation and social change. Note: This course is a prerequisite for GEOG 4680 Urban Sustainability: Perspectives and Practice. Term offered: fall, spring, summer. Max hours: 3 Credits. GT: Course is approved by the Colorado Dept of Higher Education for statewide guaranteed transfer, GT-SS2.

Grading Basis: Letter Grade

Additional Information: Denver Core Requirement, Social Sciences; GT courses GT Pathways, GT-SS2, Soc Behav Sci: Geography.

Typically Offered: Fall, Spring, Summer.

ENVS 2939 - Internship (3 Credits)

Experiences involving application of specific, relevant concepts and skills in supervised employment situations. Note: students must work with the Experiential Learning Center advising to complete a course contract and gain approval. Prereq: sophomore standing or higher. Repeatable. Max Hours: 9 Credits.

Grading Basis: Letter Grade

Repeatable. Max Credits: 9.

Restriction: Sophomore standing or higher.

ENVS 3082 - Energy and the Environment (3 Credits)

For students of various backgrounds who wish to increase their understanding of the environmental and technical issues of supplying the energy demands of our society. Alternative energy sources and conservation are explored as solutions to promote a sustainable society.

Note: One college-level science course and MATH 1110 or equivalent are strongly recommended as preparation for optimal student success. Cross-listed with PHYS 3082. Term offered: fall. Max hours: 3 Credits.

Grading Basis: Letter Grade

Typically Offered: Fall.

ENVS 3232 - Weather and Climate (3 Credits)

Introduces the processes and systems that govern both day-to-day weather and longer-term climate variations. Covers instrumentation and weather forecasting techniques. Prereq: ENVS 1044 and 1045 or ENVS 1042 or GEOG 1202 with a C- or higher. Cross-listed with GEOG 3232.

Term offered: fall, spring, summer. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: ENVS 1044 and 1045 or ENVS 1042 or GEOG 1202 with a C- or higher.

Typically Offered: Fall, Spring, Summer.

ENVS 3500 - Topics in Environmental Sciences (1-6 Credits)

Note: Topics may vary from one offering to the next. Repeatable.

Grading Basis: Letter Grade

Repeatable. Max Credits: 9.

ENVS 4500 - Topics In Environmental Sciences (1-6 Credits)

Note: Topics may vary from one offering to the next. Note: Necessary prior coursework varies according to the topic. Students should consult with the instructor. Repeatable. Max hours: 6 Credits.

Grading Basis: Letter Grade

Repeatable. Max Credits: 6.

ENVS 4650 - Environmental Education (3 Credits)

This course links the theory and practice of environmental education to inform curricular development and pedagogical knowledge. Cross-listed with ENVS 5650 and SCED 5650. Max hours: 3 Credits.

Grading Basis: Letter Grade

ENVS 4720 - 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. Prereq: GEOG 3232 with a C- or higher. Cross-listed with GEOG 4720/ GEOG 5720/ ENVS 5720. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: GEOG 3232 with a C- or higher.

ENVS 4740 - 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. Cross-listed with GEOG 4740, GEOG 5740, ENVS 5740. Term offered: fall. Max hours: 3 Credits.

Grading Basis: Letter Grade

Typically Offered: Fall.

ENVS 4750 - 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. Prereq: ENVS 1044 and 1045 or BIOL 2010 (or 2061/2097/2030) and BIOL 2011 (or 2081/2098/2031) or BIOL 2020 (or 2051/2095/2040) and BIOL 2021 (or 2071/2096/2041) with a C- or higher. Cross-listed with GEOG 4750, GEOG 5750, and ENVS 5750. Term offered: summer. Max hours: 4 Credits.

Grading Basis: Letter Grade

Prereq: ENVS 1044 and 1045 or BIOL 2010 (or 2061/2097/2030) and BIOL 2011 (or 2081/2098/2031) or BIOL 2020 (or 2051/2095/2040) and BIOL 2021 (or 2071/2096/2041) with a C- or higher.

Typically Offered: Summer.

ENVS 4757 - 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. Cross-listed with GEOG 4757, GEOG 5757, ENVS 4757, and ENVS 5757. Term offered: spring. Max hours: 3 Credits.

Grading Basis: Letter Grade

Typically Offered: Spring.

ENVS 4780 - 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. Prereq: BIOL 2010 (or 2061/2097/2030) and BIOL 2011 (or 2081/2098/2031) with a C- or higher. Cross-listed with ENVS 5780, BIOL 4780, and BIOL 5780. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: BIOL 2010 (or 2061/2097/2030) and BIOL 2011 (or 2081/2098/2031) with a C- or higher.

ENVS 4840 - Independent Study: ENVS (1-3 Credits)

Department consent required. Repeatable. Max hours: 6 Credits.

Grading Basis: Letter Grade

Repeatable. Max Credits: 6.

ENVS 4880 - 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. Repeatable. Max Hours: 6 Credits.

Grading Basis: Letter Grade

Repeatable. Max Credits: 6.

ENVS 4995 - 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.

Repeatable. Max hours: 12 Credits.

Grading Basis: Letter Grade

Repeatable. Max Credits: 12.

Additional Information: Global Education Study Abroad.