

GEOGRAPHY

The Department offers both a Bachelor of Arts and a Bachelor of Science in Geography. We also offer concentrations in Geographic Information Systems and Travel & Tourism, Physical Geography (BS only), and a Minor in Geography. The geography program at UNO prepares students for careers in urban and environmental planning, geographic information systems, cartography, remote sensing, and other areas of geographic research.

Other Information

All coursework taken for the Geography major or minor must be completed with a grade of "C-" or better.

Double-counting rules between Geography and Environmental Science-Geography and Planning:

Students pursuing both majors may not count the same 3000-4000 level Geography courses towards both programs, with the exception of GEOG 3530 and 4050.

The **Environmental Science-Geography and Planning** major with Geography minor may not use the same 3000/4000 level course for both programs.

Double-counting rules between Geography and Geology:

Only one course at the upper level may be counted as credit for both the Geography major and Geology minor, or Geology major and Geography minor. All other upper-level courses can only count in either the major or minor.

Geography may also be studied through the College of Public Affairs and Community Service in the Division of Continuing Studies. Students interested in this degree program must meet with an adviser in the Division of Continuing Studies. The concentration consists of a minimum of 30 credit hours in geography, details of which are found here (<https://www.unomaha.edu/college-of-public-affairs-and-community-service/division-of-continuing-studies/academics/areas-of-concentration/geography.php>).

Option for Degree Completion Fast Track Program

The Department of Geography/Geology has developed a Fast Track program for highly qualified and motivated students providing the opportunity to complete a bachelor's degree and a master's degree in an accelerated time frame. With Fast Track, students may count up to 9 graduate hours toward the completion of their undergraduate program as well as the graduate degree program.

Program Specifics:

- This program is available for undergraduate students pursuing a BA/BS in Geography desiring to pursue an MS in Geography.
- Students must have completed no less than 60 undergraduate hours.
- Students must have a minimum undergraduate GPA of 3.0.
- Students must have a graduate faculty member in the department of Geography/Geology provide a short letter of support for their application to Fast Track as a faculty sponsor/mentor.
- Students must complete the Fast Track Approval form and obtain all signatures and submit to the Office of Graduate Studies prior to first enrollment in a graduate course.
- Students will work with their undergraduate advisor to register for the graduate courses
- A minimum cumulative GPA of 3.0 for graduate coursework is required to remain in good standing.
- Students remain undergraduates until they meet all the requirements for the undergraduate degree and are eligible for all rights and privileges granted undergraduate status including financial aid.

- Near the end of the undergraduate program, formal application to the graduate program is required. The application fee will be waived, the applicant will need to contact the Office of Graduate Studies for a fee waiver code.
 - Admission to Fast Track does NOT guarantee admission to the graduate program.
 - The admit term must be after the completion term of the undergraduate degree.

Student Groups

University of Nebraska Omaha Geography Club (<https://www.unomaha.edu/college-of-arts-and-sciences/geography/student-opportunities/student-organizations.php>)

Contact

Rex G. Cammack, Chair: Department of Geography/Geology

260 DSC
402.554.2662

Website (<https://www.unomaha.edu/college-of-arts-and-sciences/geography/>) Degrees Offered

- Geography, Bachelor of Arts (<http://catalog.unomaha.edu/undergraduate/college-arts-sciences/geography/geography-ba/>)
- Geography, Bachelor of Science (<http://catalog.unomaha.edu/undergraduate/college-arts-sciences/geography/geography-bs/>)

Writing in the Discipline

All students are required to take a writing in the discipline course within their major. For the geography major, students may choose from the following: ENGL 3050 or ENGL 3980.

Minors Offered

Available on campus and online.

- Geography Minor (<http://catalog.unomaha.edu/undergraduate/college-arts-sciences/geography/geography-minor/>)

Geographers are on the front line, tackling some of the most urgent issues facing our world, such as climate change, rapid urbanization, and the spread of infectious diseases. Want to make a difference in our world? – become a geographer!

Geography is the study of the earth as the home to humans, from the environment and landscape to the ways in which humans depend on, adapt to, and modify our world. It mixes the physical sciences (landforms, climate, biology), with the social sciences (population, land use, culture, economic development), using cutting-edge spatial technologies (geographic information systems, global positioning systems, remote sensing). We are interested not only in where things are, but why they are there, and "why should we care?" To study geography means honing both observational and analytical skills. With these skills, our graduates work in a wide range of fields, including:

- urban planning
- environmental management (for state and federal agencies)
- cartography and spatial analysis (for state and federal agencies as well as private companies)
- geospatial data science (for community development, marketing, and infrastructure planning)
- emergency planning and preparedness
- climatology and meteorology

- education
- natural resource management(groundwater, rivers, soil and air)
- environmental conservation and preservation (local state and national park rangers, historical preservation, and environmental education)

GEOG 1000 WORLD REGIONAL GEOGRAPHY (3 credits)

An introductory course designed to study the world and its macro-regions using a combination of physical and human geography. (Offered Fall, Spring)

Distribution: Social Science General Education course and Global Diversity General Education course

GEOG 1020 INTRODUCTION TO HUMAN GEOGRAPHY (3 credits)

An introductory course which studies the geography of human activity through a topic by topic coverage of cultural traits and complexes that characterize different societies in the world. Major cultural topics of focus are the geography of population, agricultural systems, settlement, language, religion, political patterns, and man's ways of occupying urban and industrial space, among others.

Distribution: Social Science General Education course and Global Diversity General Education course

GEOG 1030 OUR DYNAMIC PLANET: INTRODUCTION TO PHYSICAL GEOGRAPHY (4 credits)

This course is designed to acquaint the student with those processes active in shaping the surface of the earth and their relationship to one another. Includes the study of the atmosphere, river systems and hydrology, glaciers, climate, plate tectonics and landforms. Includes weekly laboratory sessions. (Offered Fall, Spring)

Distribution: Natural/Physical Sci General Education lecture&lab

GEOG 1050 HUMAN-ENVIRONMENT GEOGRAPHY (4 credits)

Learn about how sustainability and quality of life depend on human interactions with environmental phenomena such as Climate, Drought, Energy, Water, and Biodiversity. These interactions influence patterns of Urbanization, Technology, Consumption, and Agriculture that can improve or degrade quality of life and sustainability. Lecture emphasizes concepts for understanding and explaining human-environment interaction. Labs focus on fundamentals of physical earth science and how these offer possibilities for sustainable development.

Distribution: Natural/Physical Sci General Education lecture&lab

GEOG 1090 INTRODUCTION TO GEOSPATIAL SCIENCES (4 credits)

An introductory lecture/lab that has students learn and apply the principles of geospatial science within the frameworks of Geographic Information Science (GISc), Remote Sensing, Aerial Photography, Photogrammetry, Global Positioning Systems and Cartography/Visualization. The course focuses on the underlying scientific basis that is shared across all of these frameworks. Students will produce both maps and spatial analysis by the end of the course using all of the above frameworks.

Prerequisite(s): Not open to non-degree graduate students.

Distribution: Natural/Physical Sci General Education lecture&lab

GEOG 2620 AERIAL PHOTOGRAPHIC INTERPRETATION (3 credits)

A practical application of various types of air photographs to the interpretation and analysis of both physical and cultural landscapes. Provides a fundamental tool for those interested in geography, geology, ecology and the environment. Recommended: Three hours in geography or geology.

GEOG 3000 TRAVEL STUDY IN GEOGRAPHY (3 credits)

The course examines the development of travel as a human endeavor and the process of planning a trip to a foreign country. A major objective of the course is the use and evaluation of Internet travel resources. This is accomplished by searching for relevant sources and assembling this material for presentation to others through the Internet.

Prerequisite(s): An introductory course in geography is highly recommended along with a basic knowledge of online tools available through the Internet.

GEOG 3020 HEALTH & MEDICAL GEOGRAPHY (3 credits)

What are the relationships between place and health? Why are there health disparities between populations in different parts of the country, and the world? The field of health and medical geography offers methods and perspectives to help us understand these timely and pressing questions. In this class, we will examine the links between societies, geographies, and health and disease, and what the implications are for our interconnected world.

Prerequisite(s): GEOG 1000 or GEOG 1020, junior standing, or permission of the instructor.

GEOG 3030 GEOGRAPHY OF AFRICA (3 credits)

This course is about the human geography of Africa. It offers an overview of the geography, economics, politics, history, oral and written literature, art, anthropology and sociology of the African continent, with particular focus on sub-Saharan Africa. The course attempts to dispel myths and stereotypes about the African continent and facilitates an understanding of the dynamics that shaped and continue to shape African systems and people. Students taking Geography of Africa will engage in a comprehensive and systematic survey of the environments, natural resources, populations, their cultures, and histories of the geographic regions of Africa and their development. (Cross-listed with BLST 3030).

Prerequisite(s): Junior or instructor permission

GEOG 3050 GEOGRAPHY IN FILM (3 credits)

Our views of the world are largely shaped by images that we see through popular media. This course examines contemporary films from around the world and how they depict places, the environment, and the lives of people. Critical and constructive examination of film will enable students to understand how images produce powerful ideological messages and how they shape the representation of entire cultures and people.

Prerequisite(s): Junior standing. Introductory courses in regional, human, physical geography are highly recommended.

GEOG 3070 GEOGRAPHY OF LATIN AMERICA (3 credits)

This course surveys the physical and human environments of Latin America. Emphasis is placed upon cultural factors in the use of land and Latin American development. (Cross-listed with LLS 3070).

Prerequisite(s): Junior

GEOG 3080 EAST & SOUTHEAST ASIA (3 credits)

An introduction to the physical and human landscape of East, and Southeast Asia, encompassing countries from Japan to Myanmar. Emphasis is placed upon the sequence of occupancy of the land, agrarian traditional economies and contemporary development. Dominated by China, the region represents a major area for economic development.

Prerequisite(s): Junior

GEOG 3130 ECONOMIC GEOGRAPHY (3 credits)

An introduction to the basic concepts and approaches in contemporary economic geography, stressing the importance of the spatial perspective for an understanding of how economic processes work at global, national, regional, and local scales. (Offered Fall) (Cross-listed with ECON 3130)

Prerequisite(s): Majoring in Geography. Non-Geography majors: MATH 1310 or MATH 1220, ECON 2200 and ECON 2220, each with a "C" (2.0) or better.

GEOG 3230 GEOGRAPHY OF EUROPE (3 credits)

This course is a comprehensive examination of contemporary Europe from a geographical perspective. The course covers physical, cultural, political, urban, population and economic geography of Europe as well as the recent political and economic transformations in both Western and Eastern Europe.

Prerequisite(s): GEOG 1000, GEOG 1020, GEOG 1030 or GEOG 1050, and junior.

GEOG 3240 GEOGRAPHY OF RUSSIA AND ITS NEIGHBORS (3 credits)

A comprehensive examination of Russia and the former Soviet republics from a geographical perspective. The course is organized topically to cover physical, historical, political, urban, population, economic and environmental geography. Special attention is given to geographical and environmental effects of the collapse of the former Soviet Union and the post-Communist transformation.

Prerequisite(s): GEOG 1000 or GEOG 1020 or GEOG 3130 and junior, or permission of instructor

GEOG 3330 UNITED STATES & CANADA (3 credits)

GEOG 3330: UNITED STATES & CANADA involves the analysis of the natural environment, historical development, economic systems, cultural patterns, and political structures of the Canada geographic region. The course provides a regional geographic perspective on these two countries by examining the expression of culture on the landscape. The course is designed for students wishing to gain regional geographical knowledge, while expanding their understanding of the interconnections among people and place within the United States and Canada.

Prerequisite(s): Junior

GEOG 3440 NEBRASKA NATURAL RESOURCES MANAGEMENT (3 credits)

Method and actual application of managing natural resources in Nebraska, with emphasis on individual stewardship. The course will focus on the most current political, physical and economic developments in resources management.

Prerequisite(s): Junior standing or permission of the instructor.

GEOG 3510 METEOROLOGY (3 credits)

A course designed to acquaint the student with the atmospheric environment. The course deals with atmospheric processes, their relationship and variation in both time and space, and their effect on the overall environment of the earth.

Distribution: Natural/Physical Sci General Education lecture

GEOG 3514 INTRODUCTION TO METEOROLOGY LABORATORY (1 credit)

This lab is designed to give students practice with atmospheric processes using scientific principles techniques, procedures and data associated with meteorology. Offered on-line only.

Prerequisite(s): Concurrent or previous enrollment in GEOG 3510

Distribution: Natural/Physical Sci General Education lab course

GEOG 3530 CARTOGRAPHY AND DATA VISUALIZATION (4 credits)

An introduction to the concepts and techniques of map construction and visual data communication. Topics include map scale, map projections, thematic cartography, history of cartography, computer mapping, and global positioning systems. Particular attention is given to designing both paper and Internet distributed maps. This course is offered in both the Fall and Spring semesters. (Cross-listed with GEOG 8535).

Prerequisite(s): GEOG 1000 or GEOG 1020 and GEOG 1030 or GEOG 1050, a statistics course, and a programming course.

GEOG 3540 CARTOGRAPHY & GIS LAB (2 credits)

An introduction to the methods and techniques of map construction using both graphic design and geographic information system software. Topics include map design for both general reference and thematic maps. Particular attention is given to the processing, compilation, data classification, and symbolization of various types of spatial data. This course is the lab component of GEOG 3530.

Prerequisite(s): Concurrent registration in GEOG 3530.

GEOG 4010 CONSERVATION OF NATURAL RESOURCES (3 credits)

This course provides a diverse overview of the principles and contemporary issues related to ecology and management of wildlife, fisheries, forests, soil, rangeland, minerals, and water. It includes the philosophical, economic and social aspects of resource management. Current local, regional, and global issues are examined. (Cross-listed with GEOG 8016).

Prerequisite(s): Three hours of geography.

GEOG 4020 SPATIAL ANALYSIS IN GEOGRAPHY (3 credits)

An introduction to spatial analysis with a focus on spatial statistics. Emphasis will be placed on the nature of geographic data, spatial data handling, modeling logic, sampling theory, and design. Both descriptive and spatial statistics methods are covered. Students will receive hands-on experience working with statistical data sets, software, and scientific visualization of research results. (Cross-listed with GEOG 8026).

Prerequisite(s): STAT 1530 or equivalent

GEOG 4030 COMPUTER MAPPING AND VISUALIZATION (3 credits)

Computer techniques in the mapping and visualization of spatial data. Various forms of spatial data manipulation and computer graphic output techniques are examined. Particular attention is given to the creation of maps for the internet and the incorporation of interaction and animation in their display. (Cross-listed with GEOG 8036).

Prerequisite(s): GEOG 1090 or permission of instructor. Background in programming, particularly JavaScript, highly recommended.

GEOG 4040 GEOARCHAEOLOGY (3 credits)

An introduction to geoarchaeology: the application of methods and techniques of geography, geology and other earth sciences to solve archaeological problems and reconstruct past environments. (Cross-listed with GEOG 8046, GEOL 4040).

Prerequisite(s): Major in geology or geography; or major in anthropology, philosophy or religion with GEOG 1030, GEOG 1060 or GEOG 1070; or GEOL 1170 or GEOL 1010; or permission

GEOG 4050 GEOGRAPHIC INFORMATION SYSTEMS I (4 credits)

An introduction to the concepts and principles of geographic information systems (GIS). Emphasis will be placed on geographic data inputs, manipulation, analysis, and output functions. Exercises introduce students to GIS software and applications. Usually offered Fall, Spring, Summer. (Cross-listed with GEOG 8056).

Prerequisite(s): GEOG 3530 or 6 credit hours of GEOG course.

GEOG 4100 BIOGEOGRAPHY (3 credits)

This course is intended as an introduction to biogeography, the study of the distribution and evolution of organisms across space and through time. Usually offered every year. (Cross-listed with BIOL 4100, GEOL 4100, BIOL 8106, GEOG 8106, GEOL 8106).

Prerequisite(s): BIOL 1450 and BIOL 1750 or GEOL 3100 or BIOL 3100, junior-senior.

GEOG 4120 URBAN GEOGRAPHY (3 credits)

This course is designed to serve as an introduction to the complex and dynamic urban system, including the physical, economic, political, cultural, social, and environmental forces that shape the form and function of cities, as well as how individuals and groups experience urban life. We make ample use of geographic information systems (GIS) to analyze cities and better understand crucial urban concepts such as urban growth and development, patterns of urban form, segregation and neighborhood change, economic specialization and agglomeration, urban sprawl, and environmental justice. (Offered Fall) (Cross-listed with GEOG 8126).

GEOG 4130 POLITICAL GEOGRAPHY (3 credits)

An introduction to the basic concepts and approaches in contemporary political geography at the global, national and local scales. Core topics to be examined include geopolitics, imperialism, war and peace, global ecopolitics, states, nationalism and electoral geography. (Offered Fall) (Cross-listed with GEOG 8136).

Prerequisite(s): An introductory level human geography course: GEOG 1020 or GEOG 1000, Junior

GEOG 4150 GEOGRAPHY, GENDER AND ENTREPRENEURSHIP (3 credits)

An advanced seminar focused on links among geography, gender and work, emphasizing leadership and entrepreneurship. The course considers theory and method in addition to empirical work. The nature of space, of gender, and of work, are examined. Topics include the gendering of work, the geography of entrepreneurship, gender and leadership. (Cross-listed with WGST 4150, ENTR 4150, ENTR 8156, GEOG 8156 and WGST 8156).

Prerequisite(s): Junior, senior, or graduate standing, or permission of instructor.

GEOG 4160 URBAN SUSTAINABILITY (3 credits)

Using sustainability as a conceptual framework, students in this course will investigate a variety of social, economic, and environmental challenges facing cities of the 21st century. Topics and issues explored include urban growth and expansion, livability, equity & gentrification, energy use & production, urban farming, poverty, automobility & transportation, water security, urban pollution, and the role of cities in climate change. (Cross-listed with GEOG 8166)

Prerequisite(s): Junior

GEOG 4170 ADVANCED CULTURAL GEOGRAPHY (3 credits)

This course examines current theoretical debate and research practice in a select topic in Cultural Geography. Emphasis will be on readings and discussion with students engaging in original research. Specific thematic focus will vary from year to year. This course may be taken multiple times as long as topics differ. (Cross-listed with GEOG 8176).

Prerequisite(s): GEOG 1000 or GEOG 1020, junior standing, or permission of the instructor.

GEOG 4200 WATER QUALITY (3 credits)

This class will apply chemical principles to the aquatic environment to understand how and why water quality varies. Integrated lectures and labs will focus on completing a class-defined, locally-explorable water quality project. Students will also gain basic water sampling and analysis skills. (Cross-listed with GEOG 8206, GEOL 4200).

Prerequisite(s): One of the following: GEOL 2750, GEOL 4540, CHEM 1140, CHEM 1180, or instructor permission.

GEOG 4210 GEOGRAPHIES OF SEXUALITIES (3 credits)

How are geography and sexuality related? What have cities got to do with sexual identities? Can rural spaces foster diverse sexual communities? These and related questions are the focus of this upper-level undergraduate and graduate-level course. Students read scholarly work by and about LGBTQ+ (Lesbian, Gay, Bisexual, Transgender, Queer, and +), and cisgender people, and their lived experiences creating and inhabiting different geographies. Students gain an appreciation for the social construction of diverse sexualized spaces and considers questions about equity and policy through case studies in a variety of countries. Each student also researches a course-relevant topic they choose. (Cross-listed with GEOG 8216, WGST 4210, WGST 8216).

Prerequisite(s): GEOG 1000, GEOG 1020, WGST 2010, or WGST 2020, or junior standing, or permission of the instructor.

GEOG 4230 GREAT PLAINS & NEBRASKA (3 credits)

This course is a comprehensive examination of the Great Plains region from a geographical perspective. It considers both the physical and human geography of the Plains, with particular attention to our home, Nebraska. Topics to be covered include: the Plains' unique ecosystems, its early human inhabitants, its later settlers, its evolving land-use patterns, and current issues. (Cross-listed with GEOG 8236).

GEOG 4260 PROCESS GEOMORPHOLOGY (4 credits)

A lecture and laboratory course focused on understanding Earth surface processes and the evolution of landforms across spatial and temporal scales. The course emphasizes applying unifying concepts in geomorphology, quantitative methodology and modern process-oriented geomorphology to interpret landscape evolution. (Cross-listed with GEOG 8266, GEOL 4260).

Prerequisite(s): One of the following: GEOL 1010, GEOL 1170, GEOG 1030, GEOG 1050 or instructor permission.

GEOG 4320 CLIMATOLOGY (3 credits)

A study of climatic processes and their effect on shaping the physical landscape. Emphasis on physical and applied aspects of the field. (Cross-listed with GEOG 8326).

Prerequisite(s): GEOG 1030, GEOG 1050, GEOG 3510, or permission of instructor.

GEOG 4330 SOIL GENESIS, MORPHOLOGY AND CLASSIFICATION (4 credits)

This course is designed to familiarize students with basic soil chemical, physical and biological properties, soil morphological characteristics, soil classification and soil forming processes. The course focuses on relationships between soils and environmental factors and how such factors alter soil forming processes. The lab will focus on developing basic field skills, including soil morphological descriptions and soil mapping, as well as common laboratory methods used to analyze soils. (Cross-listed with GEOL 4330, GEOG 8336).

Prerequisite(s): One of the following: GEOG 1030, GEOG 1050, GEOL 1010, GEOL 1170 or instructor permission.

GEOG 4340 WATER RESOURCES (3 credits)

This course explores the applied principles of hydrology, water systems modeling, river basin development, and water management issues and practices in the United States and other parts of the world. Two local Saturday field trips will be required. (Cross-listed with GEOG 8346).

Prerequisite(s): GEOG 1060 and Junior standing

GEOG 4350 GLOBAL CLIMATE CHANGE (3 credits)

The primary objective of this course is for students to form a scientific, evidence-based, stance on current and future changes to the Earth's climate. To this end, this course will be based on scientific inquiry into the current state of knowledge. Particular emphases are placed on evidence and causes of change, and the associated environmental and social impacts, including: water resources, extreme weather, human health, and others of interest to the class. (Cross-listed with GEOG 8356, ENVN 8356, ENVN 4350).

Prerequisite(s): At least one of the following: GEOG 1030, GEOG 1050, GEOG 3510, GEOG 4320, or permission from instructor

GEOG 4400 EMERGING TOPICS IN GEOGRAPHY (3 credits)

Emerging Topics in Geography focuses on the latest research areas in the field of geography. The specific topic of each course set will be based on the research trends in geography. This course will be offered on demand. (Cross-listed with GEOG 8406).

GEOG 4530 HISTORICAL GEOGRAPHY OF THE UNITED STATES (3 credits)

This course examines the geography, physical and human, real, perceived, or theoretical, of the United States' historical development. It considers the ways history has and has not been affected by geography. It will also cover the field of historical geography, its theories and practices. (Cross-listed with GEOG 8536).

Prerequisite(s): Junior and HIST 1110 and HIST 1120 or GEOG 1020 or GEOG 3330

GEOG 4550 GEOGRAPHY OF ECONOMIC GLOBALIZATION (3 credits)

A study of the geography of economic globalization and the geography of the world economy. The major topics include the historical development of the world economy and globalization from the geographical perspective, trends in geography of global production, trade and investment, the most important factors and actors in the globalization processes and its geographic effects, geography of transnational corporations, case studies of economic geography of selected industries and service activities, effects of globalization on the developed and developing countries. This course also supports the Cultural and Global Analysis concentration in the Master of Arts in Critical and Creative Thinking. (Cross-listed with GEOG 8556, CACT 8116).

Prerequisite(s): An introductory level human geography course: GEOG 1020 or GEOG 1000

GEOG 4600 INDEPENDENT RESEARCH (1-3 credits)

Advanced study in the form of a major paper to give the senior student knowledge of and experience in using government documents, professional, and/or primary materials on a topic. Must be under the supervision of the instructor who is particularly qualified for the topic chosen. (Cross-listed with GEOL 4600).

Prerequisite(s): Permission of department chair.

GEOG 4610 ENVIRONMENTAL MONITORING AND ASSESSMENT (3 credits)

An interdisciplinary approach to techniques for the design and implementation of environmental inventory and monitoring schemes used to evaluate natural resources. Students work as teams to synthesize information from their backgrounds in geography, geology and ecology to evaluate the impacts of human actions on environmental quality following the framework for environmental assessments provided by the National Environmental Policy Act. Course is organized to accommodate variable needs of students with different backgrounds and career choices. Usually offered every year. (Cross-listed with BIOL 4610, ENVN 4610, GEOL 4610, GEOG 8616, GEOL 8616)

Prerequisite(s): Permission of instructor.

GEOG 4620 GEOGRAPHICAL FIELD STUDIES (3 credits)

Field experience course based on variable topics and themes. Students must attend the multiple day field trip that will require overnight stays. (Cross-listed with GEOG 8626).

Prerequisite(s): Instructor Permission. Not open to non-degree graduate students.

GEOG 4630 ENVIRONMENTAL REMOTE SENSING (4 credits)

An introduction to remote sensing science and technology. Emphasis will be placed on multispectral data, matter/energy interactions, sensor system characteristics, photogrammetry, image interpretation, digital image processing, and environmental applications. Formal laboratory instruction will provide students with problem-solving skills and hands-on experience with remote sensing and GIS software. (Cross-listed with GEOG 8636).

Prerequisite(s): GEOG 1060 or GEOG 1070 or GEOL 1170. Introductory statistics highly recommended.

GEOG 4640 CRITICAL ZONE SCIENCE (4 credits)

This course examines the Critical Zone (CZ), Earth's permeable layer that extends from the top of vegetation to the bottom of groundwater. The CZ is a constantly evolving layer where rock, soil, water, air, and living organisms interact to regulate the landscape and natural habitats; it also determines the availability of life-sustaining resources, including our food production and water quality. CZ science is an interdisciplinary and international endeavor focused on cross-disciplinary science. In this course, we will focus on using data available from the existing National Science Foundation (NSF)-funded CZ Observatories (CZOs) along with readings, discussions and activities to explore interactions within the CZ. (Cross-listed with GEOG 8646, GEOL 4640)

Prerequisite(s): One of the following: GEOL 1170, GEOL 1010, GEOG 1030 or GEOG 1050; one chemistry or physics course recommended; or instructor permission.

GEOG 4660 GEOGRAPHIC INFORMATION SYSTEMS II (4 credits)

An introduction to advanced geographic information systems (GIS) topics. Emphasis will be placed on algorithms and analysis for information extraction. Topics include spatial interpolation, remote sensing GIS integration, software development, spatial analysis, GIS modeling, and future advances in GIS. Formal laboratory instruction will provide students with GIS experience to solve application problems. Usually offered in Fall. (Cross-listed with GEOG 8666).

Prerequisite(s): GEOG 4050 / GEOG 8056

GEOG 4800 INTERNSHIP IN ENVIRONMENTAL REGIONAL PLANNING EARTH SCIENCE (1-6 credits)

Internships with local agencies or corporations enable students to gain knowledge and experience and apply their learning in comprehensive regional or environmental planning or environmental science.

Prerequisite(s): Senior, major or area of concentration in geography or environmental science and permission

GEOG 4820 INTRODUCTION TO ENVIRONMENTAL LAW & REGULATIONS (3 credits)

An introduction to environmental law and regulations intended for students pursuing careers in environmental sciences or related fields. The course emphasizes the origins, implementation, and enforcement of U.S. state and federal laws and regulations. Major federal environmental laws, covering air and water quality, solid and hazardous waste, pollution prevention and remediation, and natural resources will be discussed. Usually offered Fall semesters. (Cross-listed with ENVN 8826, ENVN 4820, BIOL 4820, GEOG 8826, PA 8826).

Prerequisite(s): Junior-senior or permission of the instructor.