

GEOGRAPHY (GEOG)

Courses

GEOG 1001 (4) Our Changing Planet: Climate and Vegetation

Understanding our fragile planet and the life it harbors requires understanding how the distribution of the sun's energy at the surface, the atmosphere and its circulation, and the distribution of ocean and lands shape patterns of temperature, precipitation and vegetation across the globe. Along with providing a foundation for understanding planet Earth, this course addresses the growing impacts of human systems on climate change and environmental quality.

Additional Information: GT Pathways: GT-SC1 - Natural Physical Sci:Lec Crse w/ Req Lab

Arts Sci Core Curr: Natural Science Sequence

Arts Sci Core Curr: Natural Science Lab

Arts Sci Gen Ed: Distribution-Natural Sci Lab

Arts Sci Gen Ed: Distribution-Natural Sciences

Departmental Category: Physical Geography

MAPS Course: Natural Science Lab or Lab/Lec

MAPS Course: Natural Science

GEOG 1011 (4) Our Changing Planet: Landscapes and Water

In many ways, the Earth is defined by its abundance of water and vigorous hydrologic cycle. This course introduces how floodplains and their associated river systems, river deltas, erosional features such as the Grand Canyon, depositional features such as Cape Cod and Long Island, as well as mountain and even desert landscapes reflect the great power of water in shaping our planet and impacting life on Earth.

Additional Information: GT Pathways: GT-SC1 - Natural Physical Sci:Lec Crse w/ Req Lab

Arts Sci Core Curr: Natural Science Sequence

Arts Sci Core Curr: Natural Science Lab

Arts Sci Gen Ed: Distribution-Natural Sci Lab

Arts Sci Gen Ed: Distribution-Natural Sciences

Departmental Category: Physical Geography

MAPS Course: Natural Science Lab or Lab/Lec

MAPS Course: Natural Science

GEOG 1962 (3) Geographies of Global Change

Familiarizes students with a geographic understanding of conflicts around the globe and of economic, political and cultural globalization. Analyzes the relationship between global forces, regions and local interests in contemporary territorial and geopolitical tensions and conflicts, emphasizing issues such as nationalism, migration, labor and natural resources. Formerly GEOG 2002.

Additional Information: Arts Sci Gen Ed: Distribution-Social Sciences

Arts Sci Gen Ed: Diversity-Global Perspective

Departmental Category: Asia Content

MAPS Course: Geography

GEOG 1972 (3) Sustainable Futures, Environment and Society

Deepen your understanding of key global environmental issues, such as climate change, biodiversity loss, pollution, overconsumption, and environmental health hazards. We will discuss topics including conservation, water use, ethics, and environmental justice, and think about the relationship between politics, economy, culture and nature with case studies from around the globe.

Additional Information: Arts Sci Gen Ed: Diversity-Global Perspective

Arts Sci Gen Ed: Distribution-Social Sciences

Departmental Category: Environment-Society Geography

MAPS Course: Geography

GEOG 1982 (3) Global Geographies: Societies, Places, Connections

Introduces a comparative framework for recognizing and understanding the diversity of the world's societies and cultures. Units explore both local scale issues such as economic growth, inequality, political conflict, ethnic and racial dynamics, and climate change impacts, as well as broader scale trends associated with globalization, international development, migration, and the historical legacies of colonialism and imperialism.

Additional Information: Arts Sci Gen Ed: Distribution-Social Sciences

Departmental Category: Asia Content

MAPS Course: Geography

GEOG 1992 (3) Human Geographies

Examines social, political, economic, and cultural processes creating the geographical worlds in which we live, and how these spatial relationships shape our everyday lives. Studies urban growth, geopolitics, agricultural development and change, economic growth and decline, population dynamics, and migration exploring both how these processes work at global scale as well as shape geographies of particular places.

Additional Information: Arts Sci Gen Ed: Distribution-Social Sciences

MAPS Course: Geography

GEOG 2001 (1-4) Topics in Physical Geography

Examines various topics in physical geography that are not typically covered in the curriculum for lower division students; offered intermittently depending on student demand and availability of instructors.

Additional Information: Arts Sci Gen Ed: Distribution-Natural Sciences

GEOG 2053 (3) Mapping Our World

Maps, geospatial data and technology play an important role in our understanding of the world and our geospatial literacy. Learn about the evolution of maps, the map as an art form, the map as a form of communication, and the ways maps influence our view of the world. Engage in critical thinking about maps and spatial data, and their use in society. In hands-on exercises students learn how to critically read and evaluate maps for expanding their spatial awareness of the world around them.

Additional Information: Arts Sci Gen Ed: Distribution-Natural Sciences

Arts Sci Gen Ed: Distribution-Social Sciences

Departmental Category: Techniques (Skills)

GEOG 2092 (3) Advanced Introduction to Human Geography

Provides a rigorous introduction to key analytical concepts of human geography - place, space, scale, regions, nature, landscapes and territory - while giving an overview of topics addressed in subfields including economic geography, political geography, cultural geography and development geography. Specific topics may vary slightly from semester to semester but will likely include borders and migration, maps, tourism, climate change and the Anthropocene, geopolitical conflict, development, urbanization, nationalism, gender, race, inequality and identity.

Grading Basis: Letter Grade

Additional Information: Arts Sci Gen Ed: Distribution-Social Sciences

MAPS Course: Geography

GEOG 2212 (3) Location, Location, Location: Introduction to Affordable Housing and Urban Development Geographies

This course examines the geographies of housing affordability and urban development in the United States. Students will engage with course readings and assignments toward an understanding of spatial marginalization through housing exclusion. The contemporary affordable housing crisis will be discussed through the lens of politics, economic, and societal marginalization associated with race, gender, class, ability/disability, geographic location, and the ways in which places are shaped by housing policies at different scales.

Additional Information: Arts Sci Gen Ed: Distribution-Social Sciences

GEOG 2271 (3) Introduction to the Arctic Environment

Rising temperatures, shrinking sea ice and melting glaciers are only the most visible indications of a rapidly changing Arctic. This course addresses the climate of the Arctic and the changes being observed at a non-mathematical level. It is intended to provide students with a basic understanding of the Arctic physical and biological environment as well as the impacts of Arctic change on human and environmental systems.

Additional Information: Arts Sci Gen Ed: Distribution-Natural Sciences
Departmental Category: Physical Geography

GEOG 2321 (3) Geography of Skiing and Snowboarding

Skiing and snowboarding (hereafter, skiing) are sports that lie at the convergence of diverse Earth science disciplines. Skiing is about the unique interaction between mountains, climate, the physics of glissading, technological innovation, and human expression. This course studies skiing through the lens of geographic inquiry, introducing students to the science of geography, by investigating the physical processes that govern mountain weather, snow properties, and the dynamics by which humans glissade over snow.

Additional Information: Arts Sci Gen Ed: Distribution-Natural Sciences

GEOG 2421 (3-4) Visualizing Climate Change and Extreme Weather Events

Climate change is one of the most important and contentious issues impacting every aspect of our society. So what is climate change and who will it impact? This course will address the environmental and societal consequences and more. You will graph, map, and view satellite data to provide evidence of climate change around the world. In these efforts, you will be introduced to basic graphing, GIS, and remote sensing skills.

Additional Information: Arts Sci Gen Ed: Distribution-Natural Sci Lab
Arts Sci Gen Ed: Distribution-Natural Sciences

GEOG 2692 (3) Foundations in Public Health

Get a comprehensive overview of public health as well as an in-depth introduction to specific public health-related topics. Beginning with a historical overview, students will explore major public health concepts such as the basic principles of epidemiology, the biomedical basis of disease, social and behavioral determinants of health, and systems thinking. Learn about the concepts of measuring and evaluating the health of populations, principles of communicable and non-communicable diseases, environmental and occupational health, the economics of health, and the role of public health workers in society.

Equivalent - Duplicate Degree Credit Not Granted: IPHY 2692 and PBHL 2692

Additional Information: Arts Sci Gen Ed: Distribution-Social Sciences

GEOG 2852 (3) Contemporary Southeast Asia: Environmental Politics

Examines globally pressing questions of environmental sustainability, regional inequality and development in the dynamic and heterogeneous landscapes of contemporary Southeast Asia. Focuses on interactions between histories of uneven development and contemporary debates over energy and infrastructure, food security, governance and access to land, forest and water-based resources.

Equivalent - Duplicate Degree Credit Not Granted: ASIA 2852

Additional Information: Arts Sci Gen Ed: Diversity-Global Perspective
Arts Sci Gen Ed: Distribution-Social Sciences
Departmental Category: Environment-Society Geography

GEOG 3022 (3) Climate Politics and Policy

Engages students in exploring the realm of contemporary and historical climate policy at three major levels of government: international, national and local/regional. Through course lectures, discussions, readings and activities, students will become conversant with the actors, mechanisms and concerns involved in climate policy and politics and develop their own sense of how to judge the success of climate policies. Fulfills intermediate social science requirement in Environmental Studies Major.

Equivalent - Duplicate Degree Credit Not Granted: ENVS 3022

Recommended: Prerequisite ENVS 1000 or GEOG 1972.

Additional Information: Arts Sci Gen Ed: Distribution-Social Sciences
Departmental Category: Environment-Society Geography

GEOG 3023 (4) Statistics and Geographic Data

Learn how to use computational and statistical tools to solve problems in the geographic domain and apply introductory statistical concepts to real world problems through lab exercises. Using spatial data you will be trained in powerful specialized descriptive and predictive analysis technique. You will explore how to manipulate and visualize data and make inference using state-of-the art statistics software, applied to various social and Earth Science problems.

Equivalent - Duplicate Degree Credit Not Granted: GEOL 3023

Additional Information: Arts Sci Gen Ed: Distribution-Natural Sciences
Arts Sci Gen Ed: Quantitative Reasoning Math
Departmental Category: Techniques (Skills)

GEOG 3053 (4) Geographic Information Science: Mapping

Introduction to Geographic Information Systems (GIS) and the fundamentals of cartographic design. Learn about the science and art of map design in a GIS environment! Students will learn how to build a spatial database, implement best practice for processing various types of environmental and social spatial data and apply basic visual analytics to understand spatial patterns.

Requisites: Restricted to students with 27-180 credits (Sophomores, Juniors or Seniors).

Recommended: Prerequisite basic familiarity with computers and an introductory course in statistics (may be taken concurrently).

Additional Information: Arts Sci Gen Ed: Distribution-Natural Sciences
Arts Sci Gen Ed: Distribution-Social Sciences
Departmental Category: Techniques (Skills)

GEOG 3251 (3) Mountain Geosystems

Surveys mountain environments and their human use with illustrations from temperate and tropical mountain areas.

Additional Information: Arts Sci Gen Ed: Distribution-Natural Sciences
Arts Sci Gen Ed: Distribution-Social Sciences
Departmental Category: Physical Geography

GEOG 3301 (3) Analysis of Climate and Weather Observations

Discusses instruments, techniques and statistical methods used in atmospheric observations. Covers issues of data accuracy and analysis of weather maps. Provides application to temperature and precipitation records, weather forecasting and climate change trends. Uses computers to access data sets and process data.

Equivalent - Duplicate Degree Credit Not Granted: ATOC 3300

Requisites: Requires prerequisite courses of APPM 1340 and 1345 or APPM 1350 or ECON 1088 or MATH 1081 or MATH 1300 or MATH 1310 and ATOC 1050 and ATOC 1060 or GEOG 3601 or ATOC 3600 or ENVS 3600 or GEOG 1011 (all minimum grade D-).

Recommended: Prerequisites ATOC 1050 or ATOC 1060 or ATOC 3600 or GEOG 3601 or ENVS 3600 or GEOG 1001 and one semester calculus.

Additional Information: Arts Sci Core Curr: Natural Science Non-Sequence
Arts Sci Gen Ed: Distribution-Natural Sciences
Departmental Category: Physical Geography

GEOG 3351 (3) Biogeography

Surveys and analyzes plant and animal distributions on a world scale from ecological and historical perspectives. Emphasizes human impact on species.

Requisites: Requires prerequisite course of GEOG 1001 (minimum grade D-).

Additional Information: Arts Sci Gen Ed: Distribution-Natural Sciences
Departmental Category: Physical Geography

GEOG 3402 (3) Natural Hazards

Explores the impacts of extreme geophysical events on human society. Emphasizes adaptations to extreme events and ways of reducing vulnerability and damage.

Additional Information: Arts Sci Gen Ed: Distribution-Social Sciences
Departmental Category: Environment-Society Geography

GEOG 3412 (3) Conservation Practice and Resource Management

Studies policy and management of natural resources. Emphasizes practical approaches to the conservation and management of soil, land, water and air resources.

Additional Information: Arts Sci Gen Ed: Distribution-Social Sciences
Departmental Category: Environment-Society Geography

GEOG 3422 (3) Political Ecology

Political ecology is an influential approach to understanding society-environment relationships. Learn about issues including different philosophies of nature and wilderness, the politics of conservation, causes of environmental degradation, environmental conflict and indigenous ecological knowledge and understand their importance in our society.

Recommended: Prerequisite GEOG 1972.

Additional Information: Arts Sci Gen Ed: Distribution-Social Sciences
Departmental Category: Environment-Society Geography

GEOG 3511 (4) The Water Cycle

The pathway a raindrop or snowflake takes from the atmosphere to the stream determines water quality and quantity society relies on. This course examines the water cycle and its relationship with climate, vegetation, and soil. Learn how to work with quantitative analysis tools used by water managers during labs.

Requisites: Requires a prerequisite course of GEOG 1011 or GEOL 1010 or GEOL 1012 (minimum grade D-).

Additional Information: Arts Sci Core Curr: Natural Science Non-Sequence
Arts Sci Gen Ed: Distribution-Natural Sci Lab
Arts Sci Gen Ed: Distribution-Natural Sciences
Departmental Category: Physical Geography

GEOG 3601 (3) Principles of Climate

Describes the basic components of the climate system: the atmosphere, ocean, cryosphere and lithosphere. Investigates the basic physical processes that determine climate and link the components of the climate system. Covers the hydrological cycle and its role in climate, climate stability and global change.

Equivalent - Duplicate Degree Credit Not Granted: ATOC 3600 and ENVS 3600

Requisites: Restricted to Geography (GEOG) or Environmental Studies (ENVS) majors or Atmospheric Oceanic Sciences (ATOC) minors only.

Recommended: Prerequisites one semester of calculus and ATOC 1060 or ATOC 3300 or GEOG 3301 or GEOG 1001.

Additional Information: Arts Sci Core Curr: Natural Science Non-Sequence
Arts Sci Gen Ed: Distribution-Natural Sciences
Departmental Category: Physical Geography

GEOG 3612 (3) Reimagining Cities: Spaces of Power, Privilege, and Possibility

Introduces geography of American cities, highlighting urban development as a contested, socially and spatially uneven process; emphasizes the intersection of urban space with categories of difference such as race and class.

Additional Information: Arts Sci Gen Ed: Distribution-Social Sciences
Arts Sci Gen Ed: Diversity-U.S. Perspective

GEOG 3622 (3) Cities of the Global South

Examines the geographies, processes, structural forces and everyday forms of urban life that are at the core of rapid urban transformation in the global South. Through using interdisciplinary scholarship, empirical case studies and key theoretical work, the course covers themes such as migration and urbanization, informality and governance, infrastructures of everyday life and urban environmental politics.

Equivalent - Duplicate Degree Credit Not Granted: IAFS 3670

GEOG 3662 (3) Economic Geography

Presents theories of the spatial organization of economic production, consumption and exchange systems. Geographical dynamics of industrialization, urbanization and economic growth. Examination of property, labor and social conflict, with a focus on political economy.

Additional Information: Arts Sci Gen Ed: Distribution-Social Sciences

GEOG 3672 (3) Who Runs the World? Sex, Power, and Gender in Geography

This course will examine how gender and sexuality is constructed locally, nationally, and globally, drawing on conversations about feminist pasts, presents, and futures. We will focus on how gender intersects with race, class, sexuality, ability, religion, ethnicity, and geopolitical location to structure the lived experiences of women across the globe. We will apply critical geographic perspectives to gender inequality, exploring the overlaps and differences in women's and LGBTQ+ struggles as they are shaped by ongoing socio-cultural, political, and economic conditions globally.

Equivalent - Duplicate Degree Credit Not Granted: WGST 3672

Recommended: Prerequisite GEOG 1962 or GEOG 1972 or GEOG 1982 or GEOG 1992 or GEOG 2092 or WGST 2000 or WGST 2600.

Additional Information: Arts Sci Core Curr: Human Diversity
Arts Sci Gen Ed: Diversity-Global Perspective
Arts Sci Gen Ed: Distribution-Social Sciences
Departmental Category: Human Geography

GEOG 3682 (3) International Development: Economics, Power, and Place

Learn about global economic and political inequalities through international development programs. Understand why some countries are in conditions of cyclical poverty while others experience massive economic growth and wealth. We will examine different approaches to economic development and critically consider existing and future planning.

Requisites: Restricted to students with 27-180 credits (Sophomores, Juniors or Seniors) only.

Recommended: Prerequisite GEOG 1962 or GEOG 1972 or GEOG 1982 or GEOG 1992 or GEOG 2092.

Additional Information: Arts Sci Gen Ed: Diversity-Global Perspective
Arts Sci Gen Ed: Distribution-Social Sciences
Departmental Category: Human Geography
Departmental Category: Asia Content

GEOG 3692 (4) Introduction to Global Public Health

Introduces global health by putting its contemporary definition, determinants, development and direction as a field into a broad global context. The course is divided into four core topics: 1) the burden and distribution of disease and mortality; 2) the determinants of global health disparities; 3) the development of global health policies; and 4) the outcomes of global health interventions. Required for the Public Health Certificate.

Additional Information: Arts Sci Gen Ed: Diversity-Global Perspective
Arts Sci Gen Ed: Distribution-Social Sciences
Departmental Category: Human Geography

GEOG 3742 (3) Place, Power, and Contemporary Culture

Examines the relationship between places, power, and the dynamics of culture. Explores how the globalization of economics, politics, and culture shapes cultural change. Looks at how place-based cultural politics both assist and resist processes of globalization.

Recommended: Prerequisite GEOG 1962 or GEOG 1982 or GEOG 1992 or GEOG 2092.

Additional Information: Arts Sci Core Curr: Contemporary Societies
Arts Sci Gen Ed: Distribution-Arts Humanities
Arts Sci Gen Ed: Diversity-Global Perspective
Arts Sci Gen Ed: Distribution-Social Sciences
Arts Sci Gen Ed: Diversity-U.S. Perspective
Departmental Category: Human Geography

GEOG 3782 (3) Environmentalism, Race, and Justice

Examines spatial inequalities in environmental problems and their relationships to environmentalism and racism. Examines the implications for human health, well-being, and sense of place. Identifies factors that contribute to environmental inequalities, with particular attention to environmentalism and racism. Explores efforts to reduce environmental inequality, including by social movements, researchers, students, journalists, political leaders, and government agencies. Introduces students to research methods for documenting and analyzing environmental inequality. Focuses geographically on the United States. Formerly offered as a special topics course.

Recommended: Prerequisite GEOG 1972.

Additional Information: Arts Sci Gen Ed: Distribution-Social Sciences

GEOG 3812 (3) Mexico, Central America, and the Caribbean

Introduces the geography of Latin America, focusing on the lands and peoples of Mexico, Central America, and the Caribbean. Examines regional and national culture, history, environment, and population, as well as ongoing environmental and socioeconomic changes.

Recommended: Prerequisite GEOG 1962 or GEOG 1972 or GEOG 1982 or GEOG 1992 or GEOG 2092.

Additional Information: Arts Sci Gen Ed: Diversity-Global Perspective
Arts Sci Gen Ed: Distribution-Social Sciences
Departmental Category: Human Geography

GEOG 3822 (3) China's Diverse Geographies: Environment, Society, Politics

Get to know one of the world's most diverse countries, its physical and historical geography, urbanization and regional development, agriculture, population, energy, and the environment. Learn more about China and how to situate its development in a broader Asian and global context.

Recommended: Prerequisite GEOG 1962 or GEOG 1972 or GEOG 1982 or GEOG 1992 or GEOG 2092.

Additional Information: Arts Sci Core Curr: Human Diversity
Arts Sci Gen Ed: Diversity-Global Perspective
Arts Sci Gen Ed: Distribution-Social Sciences
Departmental Category: Human Geography
Departmental Category: Asia Content

GEOG 3832 (3) India and Its Neighbors: Societies, Economies, and Geopolitics

Experience the diverse societies and cultures of India, Nepal, Afghanistan, Pakistan, Bangladesh, Sri Lanka, Bhutan, and the Maldives. Learn about the different belief systems, cultural practices, and environments in this region and how international relations and politics in this region influence global trade/economics, politics, conflict, and security.

Recommended: Prerequisites GEOG 1962 or GEOG 1972 or GEOG 1982 or GEOG 1992 or GEOG 2092.

Additional Information: Arts Sci Gen Ed: Distribution-Social Sciences
Departmental Category: Human Geography
Departmental Category: Asia Content

GEOG 3840 (1-6) Undergraduate Independent Study

Provides an independent study opportunity, by special arrangement with faculty, for students presenting strong geography preparation. Instructor consent required.

Repeatable: Repeatable for up to 8.00 total credit hours. Allows multiple enrollment in term.

Requisites: Restricted to Geography (GEOG) majors only.

GEOG 3842 (3) Human Geography of Czechia: Political, Economic and Social Transitions

Excursions in Prague will begin with an understanding of Czech history through various imprints on the landscape, such as city planning, design, architecture and culture. This will be followed by a discussion of Prague in the 20th century and the various political, economic and social transitions. These transitions will be explored through field based study in and outside of Prague.

Additional Information: Arts Sci Gen Ed: Distribution-Social Sciences

GEOG 3862 (3) Global Africa: Environment, Development, and Culture

What comes to mind when you think about Africa as a place and its connectedness to the rest of the world? Learn about the cultures, politics, economies, and ecologies of very specific places across the continent – from urban Nigeria to rural villages in Tanzania. Understand historic and present day flows of people, wealth, ideas, and more, to and from Africa to the rest of the world, from the slave trade, colonialism and wildlife conservation, to food, music and sports.

Recommended: Prerequisite GEOG 1962 or GEOG 1972 or GEOG 1982 or GEOG 1992 or GEOG 2092.

Additional Information: Arts Sci Gen Ed: Diversity-Global Perspective
Arts Sci Gen Ed: Distribution-Social Sciences
Departmental Category: Human Geography

GEOG 3882 (3) Geography of the Former Soviet Union

Examines the contemporary social, political, population, cultural, ethnic and resource geography of the former Soviet Union. Relations between Russia and neighboring countries are also considered. Historical and physical geography are introduced as background to understanding post-Soviet developments and challenges.

Additional Information: Arts Sci Gen Ed: Distribution-Social Sciences

GEOG 3930 (3) Internship

Provides an academically supervised opportunity for advanced geography or environmental studies majors to work in public and private organizations on projects related to the student's career goals and to relate classroom theory to practice. Instructor consent required.

Repeatable: Repeatable for up to 6.00 total credit hours. Allows multiple enrollment in term.

Requisites: Restricted to Geography (GEOG) or Environmental Studies (ENVS) majors only.

GEOG 4001 (1-4) Topics in Physical Geography

Examines various topics in physical geography that are not typically covered in the curriculum. Offered intermittently depending on student demand and availability of instructors.

Repeatable: Repeatable for up to 12.00 total credit hours. Allows multiple enrollment in term.

Additional Information: Arts Sci Gen Ed: Distribution-Natural Sciences

GEOG 4002 (1-4) Topics in Human and Environment/Society Geography

Examines various topics in human and environment / society geography that are not typically covered in the curriculum. Offered intermittently depending on student demand and availability of instructors.

Repeatable: Repeatable for up to 12.00 total credit hours. Allows multiple enrollment in term.

Additional Information: Arts Sci Gen Ed: Distribution-Social Sciences

GEOG 4003 (1-4) Topics in Geographic Skills

Examines various topics in geographical skills and techniques that are not typically covered in the curriculum. Offered intermittently depending on student demand and availability of instructors.

Repeatable: Repeatable for up to 12.00 total credit hours. Allows multiple enrollment in term.

Additional Information: Arts Sci Gen Ed: Distribution-Natural Sciences

GEOG 4023 (4) Advanced Quantitative Methods for Spatial Data

Reviews fundamental statistical and quantitative modeling techniques and introduces more advanced statistical techniques widely used in geography today. Emphasizes geographic examples and spatial problems teaching hands-on skills in statistical programming. Topics covered include generalized linear models, spatial autocorrelation, spatial regression methods, and working with complex datasets.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 5023

Requisites: Requires prerequisite course of GEOG 3023 (minimum grade D-).

Additional Information: Arts Sci Gen Ed: Distribution-Social Sciences
Departmental Category: Methods

GEOG 4043 (4) Advanced Geovisualization and Web Mapping

Advanced technical course in web-based cartography and geovisualization stressing the important role digital cartography plays in cyberspace and society. Focuses on principles of effective cartographic design in multimedia and hypertext environments. Labs are organized around hands-on active learning projects demonstrating skills in geovisualization and cartographic practice.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 5043

Requisites: Requires prerequisite course of GEOG 3053 (minimum grade C-).

Additional Information: Arts Sci Gen Ed: Distribution-Natural Sciences
Arts Sci Gen Ed: Distribution-Social Sciences
Departmental Category: Methods

GEOG 4093 (4) Remote Sensing of the Environment

Covers acquisition and interpretation of environmental data by remote sensing. Discusses theory and sensors as well as manual and computerized interpretation methods. Stresses infrared and microwave portions of the spectrum.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 5093 and GEOL 4093 and GEOL 5093

Requisites: Requires prerequisite course of APPM 1340 1345 or APPM 1350 or ECON 1088 or 3818 or MATH 1081 or 1300 or 1310 or 2510 or ANTH 4000 or BCOR 1020 or GEOG 3023 or GEOL 3023 or PSCI 2075 or PSYC 2111 or SOCY 2061 or 4061 or STAT 4000 (minimum grade D-).

Additional Information: Arts Sci Gen Ed: Distribution-Natural Sci Lab
Arts Sci Gen Ed: Distribution-Natural Sciences
Departmental Category: Methods

GEOG 4103 (4) Geographic Information Science: Spatial Analytics

Explores advanced topics in geospatial databases, spatial analytics and geoprocessing in a Geographic Information System (GIS). Emphasizes how geographic concepts are linked to methodological frameworks for recording, transforming, storing/retrieving, analyzing, and processing geographic data as well as various forms of uncertainty. Exercises demonstrate the application of GIS-based methods to real world scenarios in interdisciplinary settings.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 5103

Requisites: Requires prereq of (GEOG 3053 or GEOG 4603) and ANTH 4000 or APPM 4570 or BCOR 1020 or ECON 3818 or GEOG 3023 or GEOL 3023 or MATH 2510 or PSCI 2075 or PSYC 2111 or SOCY 2061 or SOCY 4061 (all min C-). Restrictd to students with 57-180 credits (Jun/ Sr).

Additional Information: Arts Sci Gen Ed: Distribution-Natural Sci Lab
Arts Sci Gen Ed: Distribution-Natural Sciences
Departmental Category: GIScience

GEOG 4173 (3) Research Seminar

Examines the nature of research and develops pregraduate skills for geographic research, emphasizing problem definition, methods, sources, data interpretation, and writing. Recommended for students pursuing honors.

Requisites: Restricted to students with 87-180 credits (Senior, Fifth Year Senior) Geography (GEOG) or Environmental Studies (ENVS) majors only.

Additional Information: Arts Sci Gen Ed: Distribution-Natural Sciences
Departmental Category: Methods

GEOG 4201 (3) Biometeorology

Learn about the interactions between atmospheric processes and living organisms (plants, animals, and humans) through a meteorology/ biology lens. Topics include carbon and water cycling through vegetation, the energy and water balances in the system, and human temperature regulation to better understand how organisms adapt to a changing environment using a practical, problem-solving approach.

Equivalent - Duplicate Degree Credit Not Granted: ENVS 4201

Requisites: Prereq of GEOG 1001 any of (APPM 1340 1345) or APPM 1350 or ECON 1088 or 3818 or MATH 1081 or 1300 or 1310 or 2510 or ANTH 4000 or BCOR 1020 or GEOG 3023 or GEOL 3023 or PSCI 2075 or PSYC 2111 or SOCY 2061 or 4061 or STAT 4000 (min grade D-).

Additional Information: Arts Sci Gen Ed: Distribution-Natural Sciences
Departmental Category: Physical Geography

GEOG 4203 (4) Geographic Information Science: Spatial Modeling

Focuses on the use and development of advanced models for human and environmental applications in a geospatial environment integrating raster and vector data models. Covers terrain and hydrologic modeling, geostatistical modeling, dasymetric modeling, as well as multi-criteria modeling. Group projects critically design, implement and test spatial models to develop independent skillsets in a chosen problem setting.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 5203

Requisites: Requires prerequisite course of GEOG 4103 (minimum grade C-).

Recommended: Requisite working knowledge of GIS software.

Additional Information: Arts Sci Gen Ed: Distribution-Natural Sci Lab
Arts Sci Gen Ed: Distribution-Natural Sciences
Departmental Category: GIScience

GEOG 4241 (4) Earth Surface Processes

Earth's surface is constantly reshaped by water, ice, wind, and life.

This class investigates the earth's landscapes and the processes that modify them, both gradually by slow weathering and erosion, and abruptly through the action of floods, landslides, and other geologic events.

We cover surface processes in hillslope, glacial, riverine, desert, and coastal environments. Upon completion of the course, students will have mastered knowledge about diverse surface processes and landforms and applied core geomorphic principles to a variety of landscapes. Students will also learn that understanding surface processes is important for managing natural hazards (e.g., landslides and floods). This course will draw from many disciplines, including geology, geography, physics, chemistry, and biology. The laboratory portion of the course will include quantitative problem solving and field trips to collect and analyze geomorphic data.

Equivalent - Duplicate Degree Credit Not Granted: GEOL 4241

Requisites: Requires prerequisite courses of GEOG 1011 and (GEOL 1010 or GEOL 1020 or GEOL 1030 or GEOL 1040 or GEOL 1060) and APPM 1340 and APPM 1345 and (APPM 1350 or ECON 1088 or MATH 1081 or 1300 or 1310) (min grade D-).

Additional Information: Arts Sci Core Curr: Natural Science Non-Sequence
Arts Sci Gen Ed: Distribution-Natural Sci Lab
Arts Sci Gen Ed: Distribution-Natural Sciences
Departmental Category: Physical Geography

GEOG 4251 (3-4) River Systems and Landforms

Rivers integrate the landscape, carrying water, sediment, and organic matter. Rivers also shape the landscape, eroding and depositing material. This course covers the physical (geomorphic) processes in river systems and the landforms that they create. Topics covered include drainage basin processes, river hydraulics, sediment transport, channel forms and patterns, interactions between ecological and geomorphic processes in rivers, and river restoration and management. The course will combine lectures, discussions, in-class activities, and field trips.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 5251

Requisites: Requires prerequisite courses of GEOG 1011 and GEOG 3511 (minimum grade D-).

Recommended: Prerequisite GEOG 3023.

Additional Information: Arts Sci Gen Ed: Distribution-Natural Sci Lab
Arts Sci Gen Ed: Distribution-Natural Sciences
Departmental Category: Physical Geography

GEOG 4261 (3) Glaciers and Permafrost

Surveys the major terrestrial components of the cryosphere, including permafrost, glaciers and ice sheets. Emphasizes physical processes involving ice, including thermal behavior, ice deformation and mass balance, but also considers biogeochemical processes and landforms associated with ice. The climate context, including human interactions and recent climate history, will be considered. Taught in a combination lecture-seminar format.

Requisites: Requires prerequisite course of GEOG 1011 or GEOL 1010 (minimum grade D-).

Recommended: Prerequisite GEOG 4241.

Additional Information: Arts Sci Gen Ed: Distribution-Natural Sciences
Departmental Category: Physical Geography

GEOG 4271 (3) The Arctic Climate System

Understanding the climate of the Arctic requires a synthetic, system oriented approach. The course focuses on the intimate linkages between the atmosphere, ocean and land that give the Arctic region its unique character, link the Arctic to the larger global climate system, and promote understanding the rapid changes occurring in the Arctic.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 5271

Requisites: Requires prerequisite course of GEOG 1001 or ATOC 1050 or ATOC 1060 (minimum grade D-).

Recommended: Prerequisites GEOG 3511 or GEOG 3601 or ATOC 3600 or ENVS 3600 and statistics.

Additional Information: Arts Sci Gen Ed: Distribution-Natural Sciences
Departmental Category: Physical Geography

GEOG 4292 (3) Migration, Immigrant Adaptation, and Development

Examines historical and current patterns of migration with an emphasis in international movement. Looks at leading migration theories related to both origin- and destination-based explanations while critically looking at the role of development as a potential cause and consequence of population movement. Finally, covers some aspects of immigrants' social and economic adaptation to their host society.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 5292

Recommended: Prerequisite GEOG 1962 or GEOG 1972 or GEOG 1982 or GEOG 1992 or GEOG 2092.

Additional Information: Arts Sci Gen Ed: Diversity-Global Perspective
Arts Sci Gen Ed: Distribution-Social Sciences
Arts Sci Gen Ed: Diversity-U.S. Perspective
Departmental Category: Human Geography

GEOG 4303 (4) Geographic Information Science: Spatial Programming

Focuses on the extension of geographic information systems (GIS) through programming as well as on the development of algorithms for spatial analysis and information extraction in vector and raster data using open source tools. Covers concepts, principles and techniques of programming and solving spatial problems in natural and social science settings. Group projects will foster skillsets in implementing solutions to complex spatial problems.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 5303

Requisites: Requires prerequisite course of GEOG 4103 (minimum grade C-).

Recommended: Prerequisite GEOG 4203.

Additional Information: Arts Sci Gen Ed: Distribution-Natural Sci Lab
Arts Sci Gen Ed: Distribution-Natural Sciences
Departmental Category: GIScience

GEOG 4311 (3) Watershed Biogeochemistry

Emphasizes terrestrial-aquatic linkages in headwater catchments, focusing on hydrologic pathways, isotopic and geochemical tracers, nutrient cycling, water quality, experimental manipulations, and modeling.

Requisites: Requires prerequisite courses of GEOG 1011 and GEOG 3511 (minimum grade D-).

Recommended: Requisite parametric statistics.

Additional Information: Arts Sci Gen Ed: Distribution-Natural Sciences
Departmental Category: Physical Geography

GEOG 4321 (3-4) Snow Hydrology

Offers a multidisciplinary and quantitative analysis of physico-chemical processes that operate in seasonally snow-covered areas, from the micro- to global-scale: snow accumulation, metamorphism, ablation, chemical properties, biological aspects, electromagnetic properties, remote sensing, GIS and quantitative methods.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 5321

Requisites: Requires prerequisite course of APPM 1340 1345 or APPM 1350 or ECON 1088 or 3818 or MATH 1081 or 1300 or 1310 or 2510 or ANTH 4000 or BCOR 1020 or GEOG 3023 or GEOL 3023 or PSCI 2075 or PSYC 2111 or SOCY 2061 or 4061 or STAT 4000 (minimum grade D-).

Additional Information: Arts Sci Gen Ed: Distribution-Natural Sci Lab
Arts Sci Gen Ed: Distribution-Natural Sciences
Departmental Category: Physical Geography

GEOG 4331 (3-4) Mountain Climatology

Surveys and analyzes climatic characteristics of mountain environments worldwide.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 5331

Requisites: Requires prerequisite course of GEOG 1001 or ATOC 1050 or ATOC 1060 (minimum grade D-).

Additional Information: Arts Sci Gen Ed: Distribution-Natural Sciences
Departmental Category: Physical Geography

GEOG 4371 (3) Forest Geography: Principles and Dynamics

Surveys principles of forest geography and ecology. Includes both individual tree responses to environmental factors and species interactions within communities. Emphasizes forest dynamics and their relation to management problems.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 5371

Requisites: Requires prerequisite course of GEOG 1001 (minimum grade D-).

Additional Information: Arts Sci Gen Ed: Distribution-Natural Sciences
Departmental Category: Physical Geography

GEOG 4401 (3) Soils Geography

Discusses chemical and physical properties of soils, soil development, distributions and management relevant to understanding plant-soil relationships in natural and human-altered landscapes.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 5401

Requisites: Requires prerequisite course of GEOG 1011 (minimum grade D-).

Recommended: Prerequisite inorganic chemistry.

Additional Information: Arts Sci Gen Ed: Distribution-Natural Sciences
Departmental Category: Physical Geography

GEOG 4403 (3) Geographic Information Science: Space Time Analytics

Focuses on understanding processes (human, natural, social or physical) through data driven analysis of patterns in spatio-temporal data. Covers a wide range of topics relevant to space time data, including pattern analysis, modeling and visualization as well as time geography and various contemporary issues in space time analytics. Utilizes a hands-on, flipped classroom approach with in-class development of technical skills.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 5403

Requisites: Requires a prerequisite course of GEOG 3023 or GEOG 4023 (minimum grade C-).

Additional Information: Arts Sci Gen Ed: Distribution-Natural Sciences
Departmental Category: GIScience

GEOG 4430 (3) Seminar: Conservation Trends

Provides environmental studies or geography majors with an undergraduate format for interdisciplinary discussion and research into current and future directions of conservation.

Repeatable: Repeatable for up to 6.00 total credit hours.

Requisites: Restricted to students with 57-180 credits (Juniors or Seniors).

Additional Information: Arts Sci Gen Ed: Distribution-Social Sciences
Departmental Category: Environment-Society Geography

GEOG 4463 (3) Earth Analytics Data Science Bootcamp

Learn key skills to automate data processing and visualization workflows that support both repeatable analysis and collaborative project approaches using scientific programming, version control and project management tools. Covers working with heterogeneous, large spatio-temporal data derived from space, airborne and ground based sensors and other sources. Gain applied experience through group projects that address real world problems.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 5463

Requisites: Restricted to students with 57-180 credits (Juniors or Seniors).

Grading Basis: Letter Grade

Additional Information: Arts Sci Gen Ed: Distribution-Natural Sciences
Departmental Category: Methods

GEOG 4501 (3) Water Issues in the American West

Water scarcity is a perpetual issue facing communities in the western United States. This course critically evaluates water use, emphasizing problems associated with geographic maldistribution, appropriations, irrigation, industry, pollution and regional development. Interprets and analyzes hydroclimatic data, surface and groundwater.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 5501

Additional Information: Arts Sci Gen Ed: Distribution-Social Sciences
Departmental Category: Environment-Society Geography

GEOG 4503 (3) Geographic Information Science: Project Management

Managing a geospatial project encompasses problem identification, project design, analysis and supporting team dynamics. The class mixes lectures and class exercises with student-selected projects and works through all stages of a project from articulating an initial idea to project planning and scoping, building a work plan, timeline and budget, executing the work plan and evaluating a project's progress.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 5503

Requisites: Requires prerequisite course of GEOG 3053 or GEOG 4103 (minimum grade C-).

Additional Information: Arts Sci Gen Ed: Distribution-Natural Sciences
Departmental Category: GIScience

GEOG 4563 (3) Earth Analytics

Introduce students to major unanswered questions in Earth science and to the analytical tools, including data management, analysis and visualization, necessary to explore 'big data' from a suite of sensors. Aligns with Earth Lab, a new initiative of the University's Grand Challenge (<http://www.colorado.edu/grandchallenges/>) to use our expertise in space-based observation to address our world's most pressing problems. Comparable programming course work may be substituted for GEOG 4463 with instructor approval.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 5563

Requisites: Requires prerequisite course of GEOG 4463 (minimum grade C-).

Grading Basis: Letter Grade

Additional Information: Arts Sci Gen Ed: Distribution-Natural Sciences
Departmental Category: Methods

GEOG 4603 (3) GIS in the Social and Natural Sciences

Introduces Geographic Information Systems and their underlying principles through interactive lectures and lab exercises. Students get basic skills for working in a GIS environment and learn how to handle and manage geospatial data, create maps and conduct geospatial analysis focusing on project tasks typically encountered in the social and natural sciences.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 5603

Additional Information: Arts Sci Gen Ed: Distribution-Natural Sciences
Departmental Category: GIScience

GEOG 4622 (3) City Life

Analyzes social, behavioral, political and demographic factors that influence development and maintenance of communities in contemporary urban environments, with primary emphasis on U.S. cities.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 5622

Recommended: Prerequisite GEOG 1962 or GEOG 1972 or GEOG 1982 or GEOG 1992.

Additional Information: Arts Sci Gen Ed: Distribution-Social Sciences

GEOG 4632 (3) Development Geography

Provides an overview of development policy and practice, surveying foundational works in Development Studies as well as critical interventions. Required for Graduate Certificate in Development Studies.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 5632

Requisites: Requires prerequisite course of GEOG 1962 or GEOG 1972 or GEOG 1982 or GEOG 1992 (minimum grade D-).

Recommended: Prerequisite GEOG 1962 or GEOG 1972 or GEOG 1982 or GEOG 1992 or GEOG 2092 (minimum grade D-).

Additional Information: Arts Sci Gen Ed: Distribution-Social Sciences
Departmental Category: Human Geography

GEOG 4692 (3) Climate Change and Health

Climate change is one of the great societal challenges of our times and it not only threatens the physical environment but also threatens human health. The course will explore the ways that climate change is affecting public health now and is projected to affect health in the future. We will also explore the public health implications, positive and negative, of efforts to respond to climate change through mitigation and adaptation. Formerly offered as a special topics course.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 5692

GEOG 4712 (3) Political Geography

Systematic study of relations between geography and politics, especially as background for better understanding of international affairs. Includes topics such as frontiers and boundaries, power analysis, geopolitics, international political economy, and strategic concepts.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 5712

Requisites: Restricted to students with 27-180 credits (Sophomores, Juniors or Seniors) only.

Recommended: Prerequisite GEOG 1962 or GEOG 1972 or GEOG 1982 or GEOG 1992 or GEOG 2092 or IAFS 1000 or PSCI 2012 or PSCI 2223.

Additional Information: Arts Sci Gen Ed: Distribution-Social Sciences
Departmental Category: Human Geography

GEOG 4722 (3) Field Methods in Human Geography

Examines research methods associated with field work in human geography. Prepares students for fieldwork by focusing on geographic and interdisciplinary field work techniques; interpretation of field data; discussion of the politics, ethics and gender, race, class and cross-cultural issues related to field work.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 5722

Additional Information: Arts Sci Gen Ed: Distribution-Social Sciences
Departmental Category: Methods

GEOG 4732 (3) Population Geography

Emphasizes spatial aspects of population characteristics including fertility, mortality, migration, distribution and composition. Includes both theoretical and empirical considerations, in addition to field work and computer simulations.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 5732

Requisites: Restricted to students with 27-180 credits (Sophomores, Juniors or Seniors) only.

Recommended: Prerequisite GEOG 1962 or GEOG 1972 or GEOG 1982 or GEOG 1992 or GEOG 2092.

Additional Information: Arts Sci Gen Ed: Diversity-Global Perspective
Arts Sci Gen Ed: Distribution-Social Sciences
Departmental Category: Human Geography

GEOG 4742 (3) Topics in Environment and Society

Studies peoples and their environments, including human modification of nature and cultural interpretation and construction of rural and urban landscapes.

Repeatable: Repeatable for up to 6.00 total credit hours. Allows multiple enrollment in term.

Requisites: Restricted to students with 27-180 credits (Sophomores, Juniors or Seniors) only.

Recommended: Prerequisite GEOG 1962 or GEOG 1972 or 1982 or GEOG 1992 or GEOG 2092.

Additional Information: Arts Sci Gen Ed: Distribution-Social Sciences
Departmental Category: Environment-Society Geography

GEOG 4762 (3) Geographies of Political Islam

Explores the postcolonial landscape of political Islam through the lens of political and cultural geography. Develops a critical anti-essentialist framework for understanding the political crisis of the Muslim world in relation to broader questions of empire, nationalism, democracy, revolution, security, terrorism, globalization and modernity. Focuses on the post-1979 period, several key Muslim nation-states (Saudi-Arabia, Egypt, Iran, Turkey, Pakistan) and movements (Taliban, ISIS).

Recommended: Prerequisite GEOG 1982 or GEOG 1992 or GEOG 2092 or GEOG 3742.

Additional Information: Arts Sci Gen Ed: Distribution-Social Sciences
Departmental Category: Human Geography

GEOG 4772 (3) Food and Power

Analyzes people's relationships with food through lenses of power, justice, and sustainability. Topics covered include the political economy of global food systems, agroecology, agricultural technologies, alternative food movements, migration and labor politics, and influence of gender, race, class, and culture on food consumption. Draws on case studies from across the United States and around the globe.

Recommended: Prerequisites GEOG 1972 or GEOG 1982 or GEOG 2092.

GEOG 4812 (3) Political Ecology & Latin America

Presents theoretical approaches to the links between environment and development in Latin America and focuses on analytical discussion of contemporary (and controversial) issues in sustainable development in Latin America. Examines social, ecological, economic, and political forces influencing the use of natural resources.

Recommended: Prerequisite GEOG 1962 or GEOG 1982 or GEOG 1992 or GEOG 2092 or GEOG 3682 or GEOG 3422 or GEOG 3812 or ANTH 3110 or PSCI 3032.

Additional Information: Arts Sci Gen Ed: Diversity-Global Perspective
Arts Sci Gen Ed: Distribution-Social Sciences
Departmental Category: Environment-Society Geography

GEOG 4822 (3) Environment and Development in China

Examines key environmental problems in relation to China's rapid modernization and development.

Recommended: Prerequisite GEOG 1962 or GEOG 1982 or GEOG 1992 or GEOG 2092 or HIST 1618.

Additional Information: Arts Sci Gen Ed: Distribution-Social Sciences
Departmental Category: Environment-Society Geography
Departmental Category: Asia Content

GEOG 4832 (3) Geography of Tibet

Rigorously examines contemporary Tibetan society, culture and nature from a geographical perspective. Uses readings on contemporary Tibet as an entry point into scholarly research about nationalism, representation, diaspora, landscape and place, sustainable development, natural resource management, identity and environmentalism.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 5832

Recommended: Prerequisite GEOG 3822 or other classes on China.

Additional Information: Arts Sci Gen Ed: Distribution-Social Sciences
Departmental Category: Asia Content

GEOG 4842 (3) Global Frontiers in Southeast Asia

Uses the theme of the global frontier to examine and compare three key moments in the modern history of Southeast Asia: the colonial encounter, the rise of the modern territorial state, and the age of contemporary globalization. Examines case studies from earlier eras to analyze emerging global frontiers at the junction of state territoriality and transnational economic expansion.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 5842 and ASIA 4842

Additional Information: Arts Sci Gen Ed: Distribution-Arts Humanities
Arts Sci Gen Ed: Distribution-Social Sciences

GEOG 4852 (3) Health and Medical Geography

Examines geographical patterns of health and disease with an emphasis on global health issues. Focuses on three major approaches to medical geographic research: ecological approaches, which systematically analyze relationships between people and their environments; social approaches, including political economy and socio-behavioral approaches; and spatial approaches, which employ maps and spatial analysis to identify patterns of health and disease. Elective course for Public Health Certificate.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 5852

Requisites: Restricted to students with 57-180 credits (Juniors or Seniors).

Recommended: Prerequisites GEOG 1001 or GEOG 1011 and GEOG 1962 or GEOG 1972 or GEOG 1992 or GEOG 2092.

Additional Information: Arts Sci Gen Ed: Distribution-Social Sciences
Departmental Category: Human Geography

GEOG 4892 (3) Geography of Western Europe

Provides a regional survey of cultural, political, economic, social, and physical geography of Western Europe, emphasizing the distinctive character and problems of each major area and the relationship of the region to the world.

Recommended: Prerequisite GEOG 1962 or GEOG 1972 or GEOG 1982 or GEOG 1992 or GEOG 2092.

Additional Information: Arts Sci Gen Ed: Distribution-Social Sciences
Departmental Category: Human Geography

GEOG 4990 (3) Senior Thesis

Offers thesis research under faculty supervision. Instructor consent required.

Repeatable: Repeatable for up to 6.00 total credit hours.

Requisites: Restricted to students with 57-180 credits (Junior or Senior) Geography (GEOG) majors only.

GEOG 5003 (4) Elements of Geographic Information Systems

Discusses incorporating GIS methods into graduate thesis or dissertation research. Reviews basic mapping concepts (scale and projections), acquiring different types of spatial data (raster and vector), building an error-free database, making simple queries, overlays, charts, and maps. Intended for students who want to learn GIS but lack background skills in computing or cartography.

Requisites: Restricted to graduate students only.

Recommended: Prerequisite some experience with Mac or Windows.

Additional Information: Departmental Category: GIScience

GEOG 5023 (4) Advanced Quantitative Methods for Spatial Data

Reviews fundamental statistical and quantitative modeling techniques and introduces more advanced statistical techniques widely used in geography today. Emphasizes geographic examples and spatial problems teaching hands-on skills in statistical programming. Topics covered include generalized linear models, spatial autocorrelation, spatial regression methods, and working with complex datasets.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 4023

Requisites: Restricted to graduate students only.

Additional Information: Departmental Category: Methods

GEOG 5043 (4) Advanced Geovisualization and Web Mapping

Advanced technical course in web-based cartography and geovisualization stressing the important role digital cartography plays in cyberspace and society. Focuses on principles of effective cartographic design in multimedia and hypertext environments. Labs are organized around hands-on active learning projects demonstrating skills in geovisualization and cartographic practice.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 4043

Requisites: Restricted to graduate students only.

Additional Information: Departmental Category: Methods

GEOG 5093 (4) Remote Sensing of the Environment

Covers acquisition and interpretation of environmental data by remote sensing. Discusses theory and sensors as well as manual and computerized interpretation methods. Stresses infrared and microwave portions of the spectrum.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 4093 and GEOL 4093 and GEOL 5093

Requisites: Restricted to graduate students only.

Additional Information: Departmental Category: Methods

GEOG 5100 (1-4) Special Topics: Geography

Covers various topics outside of the normal curriculum; offered intermittently depending on student demand and availability of faculty.

Repeatable: Repeatable for up to 9.00 total credit hours. Allows multiple enrollment in term.

Requisites: Restricted to graduate students only.

GEOG 5103 (4) Geographic Information Science: Spatial Analytics

Explores advanced topics in geospatial databases, spatial analytics and geoprocessing in a Geographic Information System (GIS). Emphasizes how geographic concepts are linked to methodological frameworks for recording, transforming, storing/retrieving, analyzing, and processing geographic data as well as various forms of uncertainty. Exercises demonstrate the application of GIS-based methods to real world scenarios in interdisciplinary settings.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 4103

Requisites: Restricted to graduate students only.

Additional Information: Departmental Category: GIScience

GEOG 5113 (3) Seminar: Geographic Information Systems

Focuses on the current research topics in geographical information systems and selected areas of application. Includes major journal articles related to each topic. Students complete and present a seminar paper.

Requisites: Restricted to graduate students only.

Recommended: Prerequisite GEOG 4103 or GEOG 5103 or instructor consent required.

Additional Information: Departmental Category: GIScience

GEOG 5152 (3) History and Theory of Geography

History of ideas and institutions that have shaped contemporary geographic inquiry. Examines the evolving relations among human geography, physical geography, environment-society relations, and geographic information processing. Designed to situate graduate student research within major subfields and intellectual currents of geography.

Requisites: Restricted to Geography (GEOG) graduate students only.

GEOG 5161 (3) Research Design in Geography

The human section reads and discusses contemporary research philosophies and methodologies in human geography. Practices the development of research proposals and presentation of research ideas and results. The physical section reads and discusses contemporary research philosophies and methodologies in physical geography (climatology, geomorphology, biogeography, and soils geography). Practices the development of research proposals and presentation of research ideas.

Requisites: Restricted to Geography (GEOG) graduate students only.

Additional Information: Departmental Category: Physical Geography

GEOG 5203 (4) Geographic Information Science: Spatial Modeling

Focuses on the use and development of advanced models for human and environmental applications in a geospatial environment integrating raster and vector data models. Covers terrain and hydrologic modeling, geostatistical modeling, dasymetric modeling, as well as multi-criteria modeling. Group projects critically design, implement and test spatial models to develop independent skillsets in a chosen problem setting.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 4203

Requisites: Restricted to graduate students only.

Recommended: Prerequisite GEOG 4103 or GEOG 5103 or working knowledge of GIS software or instructor consent required.

Additional Information: Departmental Category: Methods

GEOG 5211 (3) Seminar: Physical Climatology

Involves a research seminar concerned with problems of mass and energy exchange in the Earth-atmosphere system. Selects topics from such areas as air quality, bioclimatology, hydrology, climate change, and the climates of urban, agricultural, and natural environments.

Requisites: Restricted to graduate students only.

Additional Information: Departmental Category: Physical Geography

GEOG 5221 (3) Synoptic and Dynamic Climatology

Examines global climates from the standpoint of synoptic and dynamic climatology.

Requisites: Restricted to graduate students only.

Additional Information: Departmental Category: Physical Geography

GEOG 5241 (1-3) Topics in Physical Geography

Presents recent research topics that vary from year to year. Consult the online Schedule Planner for specific topics.

Repeatable: Repeatable for up to 6.00 total credit hours. Allows multiple enrollment in term.

Requisites: Restricted to graduate students only.

Additional Information: Departmental Category: Physical Geography

GEOG 5251 (3-4) River Systems and Landforms

Rivers integrate the landscape, carrying water, sediment, and organic matter. Rivers also shape the landscape, eroding and depositing material. This course covers the physical (geomorphic) processes in river systems and the landforms that they create. Topics covered include drainage basin processes, river hydraulics, sediment transport, channel forms and patterns, interactions between ecological and geomorphic processes in rivers, and river restoration and management. The course will combine lectures, discussions, in-class activities, and field trips.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 4251

Requisites: Restricted to graduate students only.

Additional Information: Departmental Category: Physical Geography

GEOG 5271 (3) The Arctic Climate System

Understanding the climate of the Arctic requires a synthetic, system oriented approach. The course focuses on the intimate linkages between the atmosphere, ocean and land that give the Arctic region its unique character, link the Arctic to the larger global climate system, and promote understanding the rapid changes occurring in the Arctic.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 4271

Requisites: Restricted to graduate students only.

Additional Information: Departmental Category: Physical Geography

GEOG 5292 (3) Migration, Immigrant Adaptation, and Development

historical and current patterns of migration with an emphasis in international movement. Looks at leading migration theories related to both origin- and destination-based explanations while critically looking at the role of development as a potential cause and consequence of population movement. Finally, covers some aspects of immigrants' social and economic adaptation to their host society.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 4292

Requisites: Restricted to graduate students only.

GEOG 5303 (4) Geographic Information Science: Spatial Programming

Focuses on the extension of geographic information systems (GIS) through programming as well as on the development of algorithms for spatial analysis and information extraction in vector and raster data using open source tools. Covers concepts, principles and techniques of programming and solving spatial problems in natural and social science settings. Group projects will foster skillsets in implementing solutions to complex spatial problems.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 4303

Requisites: Restricted to graduate students only.

Recommended: Prerequisite GEOG 4203/5203.

Additional Information: Departmental Category: GIScience

GEOG 5321 (3-4) Snow Hydrology

Offers a multidisciplinary and quantitative analysis of physico-chemical processes that operate in seasonally snow-covered areas, from the micro- to global-scale: snow accumulation, metamorphism, ablation, chemical properties, biological aspects, electromagnetic properties, remote sensing, GIS and quantitative methods.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 4321

Requisites: Restricted to graduate students only.

Additional Information: Departmental Category: Physical Geography

GEOG 5331 (3-4) Mountain Climatology

Surveys and analyzes climatic characteristics of mountain environments worldwide.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 4331

Requisites: Restricted to graduate students only.

Additional Information: Departmental Category: Physical Geography

GEOG 5371 (3) Forest Geography: Principles and Dynamics

Surveys principles of forest geography and ecology. Includes both individual tree responses to environmental factors and species interactions within communities. Emphasizes forest dynamics and their relation to management problems.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 4371

Requisites: Restricted to graduate students only.

Additional Information: Departmental Category: Physical Geography

GEOG 5391 (3) Seminar: Biogeography

Considers in detail current research themes in biogeography. Includes intensive reading of current research literature and preparation of research papers. Topics vary.

Repeatable: Repeatable for up to 6.00 total credit hours. Allows multiple enrollment in term.

Requisites: Restricted to graduate students only.

Additional Information: Departmental Category: Physical Geography

GEOG 5401 (3) Soils Geography

Discusses chemical and physical properties of soils, soil development, distributions and management relevant to understanding plant-soil relationships in natural and human-altered landscapes.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 4401

Requisites: Restricted to graduate students only.

Additional Information: Departmental Category: Physical Geography

GEOG 5403 (3) Geographic Information Science: Space Time Analytics

Focuses on understanding processes (human, natural, social or physical) through data driven analysis of patterns in spatio-temporal data. Covers a wide range of topics relevant to space time data, including pattern analysis, modeling and visualization as well as time geography and various contemporary issues in space time analytics. Utilizes a hands-on, flipped classroom approach with in-class development of technical skills.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 4403

Requisites: Restricted to graduate students only.

GEOG 5463 (3) Earth Analytics Data Science Bootcamp

Learn key skills to automate data processing and visualization workflows that support both repeatable analysis and collaborative project approaches using scientific programming, version control and project management tools. Covers working with heterogeneous, large spatio-temporal data derived from space, airborne and ground based sensors and other sources. Gain applied experience through group projects that address real world problems.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 4463

Requisites: Restricted to graduate students only.

Grading Basis: Letter Grade

GEOG 5501 (3) Water Issues in the American West

Water scarcity is a perpetual issue facing communities in the western United States. This course critically evaluates water use, emphasizing problems associated with geographic maldistribution, appropriations, irrigation, industry, pollution and regional development. Interprets and analyzes hydroclimatic data, surface and groundwater.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 4501

Requisites: Restricted to graduate students only.

Additional Information: Departmental Category: Environment-Society Geography

GEOG 5503 (3) Geographic Information Science: Project Management

Managing a geospatial project encompasses problem identification, project design, analysis and supporting team dynamics. The class mixes lectures and class exercises with student-selected projects and works through all stages of a project from articulating an initial idea to project planning and scoping, building a work plan, timeline and budget, executing the work plan and evaluating a project's progress.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 4503

Requisites: Requires prerequisite course of GEOG 5103 (minimum grade C-).

GEOG 5563 (3) Earth Analytics

Introduce students to major unanswered questions in Earth science and to the analytical tools, including data management, analysis and visualization, necessary to explore 'big data' from a suite of sensors. Aligns with Earth Lab, a new initiative of the University's Grand Challenge (<http://www.colorado.edu/grandchallenges/>) to use our expertise in space-based observation to address our world's most pressing problem. Comparable programming course work may be substituted for GEOG 5463 with instructor approval.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 4563

Requisites: Requires prerequisite course of GEOG 5463 (min grade B-) Restricted to graduate students only.

Grading Basis: Letter Grade

GEOG 5603 (3) GIS in the Social and Natural Sciences

Introduces Geographic Information Systems and their underlying principles through interactive lectures and lab exercises. Students get basic skills for working in a GIS environment and learn how to handle and manage geospatial data, create maps and conduct geospatial analysis focusing on project tasks typically encountered in the social and natural sciences.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 4603

GEOG 5622 (3) City Life

Analyzes social, behavioral, political and demographic factors that influence development and maintenance of communities in contemporary urban environments, with primary emphasis on U.S. cities.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 4622

Requisites: Restricted to graduate students only.

GEOG 5632 (3) Development Geography

Provides an overview of development policy and practice, surveying foundational works in Development Studies as well as critical interventions. Required for Graduate Certificate in Development Studies.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 4632

Requisites: Restricted to graduate students only.

GEOG 5642 (3) Seminar: Urban Geography

Surveys current research topics in urban geography. Emphasizes definition of possible student thesis topics.

Requisites: Restricted to graduate students only.

GEOG 5652 (3) Introduction to Social Theory

Surveys theoretical paradigms in the social sciences. Includes canonical works from the history of the social sciences as well as contemporary theorists. Appropriate for beginning to advanced graduate students doing qualitative research.

Requisites: Restricted to graduate students only.

GEOG 5662 (3) Seminar: Topics in Economic Geography

Covers selected topics emphasizing faculty specialties. Topics vary with instructor. Check with department for semester offerings.

Repeatable: Repeatable for up to 3.00 total credit hours.

Requisites: Restricted to graduate students only.

GEOG 5663 (1-3) Earth Analytics Applications

Develop expertise in finding, organizing, managing and processing large, heterogeneous, spatio-temporal data to address a real-world problem. Students will work collaboratively on semi-guided science project.

Students gain critical skills required to understand data structures, utilize APIs, extract insight from data and understand how uncertainty propagates. Culminates with a formal presentation of project results.

Repeatable: Repeatable for up to 3.00 total credit hours.

Requisites: Requires prerequisite course of GEOG 5463 and GEOG 5563 (min grade B-) Restricted to graduate students only.

Grading Basis: Letter Grade

GEOG 5692 (3) Climate Change and Health

Climate change is one of the great societal challenges of our times and it not only threatens the physical environment but also threatens human health. The course will explore the ways that climate change is affecting public health now and is projected to affect health in the future. We will also explore the public health implications, positive and negative, of efforts to respond to climate change through mitigation and adaptation. Formerly offered as a special topics course.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 4692

Requisites: Restricted to graduate students only.

GEOG 5712 (3) Political Geography

Systematic study of relations between geography and politics, especially as background for better understanding of international affairs. Includes topics such as frontiers and boundaries, power analysis, geopolitics, international political economy, and strategic concepts.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 4712

Requisites: Restricted to graduate students only.

GEOG 5722 (3) Field Methods in Human Geography

Examines research methods associated with field work in human geography. Prepares students for fieldwork by focusing on geographic and interdisciplinary field work techniques; interpretation of field data; discussion of the politics, ethics and gender, race, class and cross-cultural issues related to field work.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 4722

Requisites: Restricted to graduate students only.

GEOG 5732 (3) Population Geography

Emphasizes spatial aspects of population characteristics including fertility, mortality, migration, distribution and composition. Includes both theoretical and empirical considerations, in addition to field work and computer simulations.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 4732

Requisites: Restricted to graduate students only.

GEOG 5750 (3) Climate Politics and Science-Policy

Explores, understands and critically analyzes influences and trends in climate politics and science-policy. Course participants will gain an improved understanding of the myriad factors, pressures and processes that are involved in contemporary climate politics undergirding explicit policy proposals. Course participants will more capably identify consequential spaces of decision-making, recognize tractable places for change and fashion constructive strategies for their own research by way of best available evidence from work done in these areas. Overall, our attention to these course themes, concepts and case studies will help us to more capably understand, analyze and engage in the high-stakes 21st century arena of climate politics and science-policy. Previously offered as a special topics course.

Equivalent - Duplicate Degree Credit Not Granted: ENVM 5750, ENVS 5750 and SOCY 5750

Requisites: Restricted to graduate students only.

Grading Basis: Letter Grade

GEOG 5782 (3) Sustainable Development: Critique

Investigates historical and contemporary theories and critiques of development and their implications for geographic theory and method. Focuses on the role of representation in evaluating case studies and examining the potential for a sustainable development.

Requisites: Restricted to graduate students only.

GEOG 5832 (3) Geography of Tibet

Rigorously examines contemporary Tibetan society, culture and nature from a geographical perspective. Uses readings on contemporary Tibet as an entry point into scholarly research about nationalism, representation, diaspora, landscape and place, sustainable development, natural resource management, identity and environmentalism.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 4832

Requisites: Restricted to graduate students only.

Additional Information: Departmental Category: Asia Content

GEOG 5840 (1-3) Graduate Independent Study

Offers independent research for master's students only. Instructor consent required.

Repeatable: Repeatable for up to 6.00 total credit hours. Allows multiple enrollment in term.

Requisites: Restricted to graduate students only.

GEOG 5842 (3) Global Frontiers in Southeast Asia

Uses the theme of the global frontier to examine and compare three key moments in the modern history of Southeast Asia: the colonial encounter, the rise of the modern territorial state, and the age of contemporary globalization. Examines case studies from earlier eras to analyze emerging global frontiers at the junction of state territoriality and transnational economic expansion.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 4842 and ASIA 4842

Requisites: Restricted to graduate students only.

GEOG 5852 (3) Health and Medical Geography

Examines geographical patterns of health and disease with an emphasis on global health issues. Focuses on three major approaches to medical geographic research: ecological approaches, which systematically analyze relationships between people and their environments; social approaches, including political economy and socio-behavioral approaches; and spatial approaches, which employ maps and spatial analysis to identify patterns of health and disease. Elective course for Public Health Certificate.

Equivalent - Duplicate Degree Credit Not Granted: GEOG 4852

Requisites: Restricted to graduate students only.

GEOG 5930 (3) Advanced Internship

Provides an academically supervised opportunity for graduate-level geography majors to work in public and private organizations on advanced projects related to geographic theory and their career goals. Instructor consent required.

Repeatable: Repeatable for up to 6.00 total credit hours. Allows multiple enrollment in term.

Requisites: Restricted to graduate students only.

GEOG 5961 (3) Theories of Climate and Climate Variability

Critically reviews current theories of climatic variability based on analysis of the different physical processes affecting climate.

Requisites: Restricted to graduate students only.

Additional Information: Departmental Category: Physical Geography

GEOG 6180 (1-3) Seminar: Geographic Problems

Applies research methods to selected problems. Topics vary with instructor.

Repeatable: Repeatable for up to 7.00 total credit hours.

Requisites: Restricted to graduate students only.

GEOG 6211 (1-3) Readings in Climatology

Discusses selected topics in current climatological literature. Specific themes vary.

Repeatable: Repeatable for up to 7.00 total credit hours.

Requisites: Restricted to graduate students only.

Additional Information: Departmental Category: Physical Geography

GEOG 6402 (3) Seminar: Political Ecology

Critically examines the politics of human-environment relationships across cultures and societies. Focuses on environmental degradation, change and management from the perspectives including political economy, cultural politics, STS and post structural theory.

Repeatable: Repeatable for up to 6.00 total credit hours.

Requisites: Restricted to graduate students only.

GEOG 6712 (3) Seminar: Political Geography

Considers in detail history and methodology of the field, including an analysis of selected systematic topics such as frontiers and boundaries, international rivers, conflicting claims to territory, and electoral geography.

Repeatable: Repeatable for up to 7.00 total credit hours.

Requisites: Restricted to graduate students only.

GEOG 6732 (3) Formal Population Geography: Analysis and Forecasting

In-depth introduction to formal demography. In addition to learning the basic demographic tools used nowadays in fertility, marriage, mortality, migration and forecasting/projections, it also looks at some potential links between formal and statistical demographic work that would enable the student to apply some of the methods learnt in an econometric or multivariate setting.

Requisites: Restricted to graduate students only.

Recommended: Prerequisite GEOG 5023.

GEOG 6742 (3) Seminar: Cultural Geography

Explores various geographic topics emphasizing the concept of culture. Emergence of several points of view in the development of cultural geography.

Repeatable: Repeatable for up to 7.00 total credit hours.

Requisites: Restricted to graduate students only.

GEOG 6940 (1) Master's Candidate for Degree

Registration intended for students preparing for a thesis defense, final examination, culminating activity, or completion of degree.

Requisites: Restricted to graduate students only.

GEOG 6950 (1-6) Master's Thesis

Instructor consent required.

Repeatable: Repeatable for up to 6.00 total credit hours.

Requisites: Restricted to graduate students only.

GEOG 7118 (3) Foundations of Environmental Justice

Examines environmental justice movements, policies, institutions, objectives, and scholarship. Identifies factors that contribute to environmental inequality, and efforts to reduce it. Formerly offered as a special topics course.

Equivalent - Duplicate Degree Credit Not Granted: COMM 7118, ENVS 7118 and PSCI 7118

Requisites: Restricted to graduate students only.

GEOG 7840 (1-3) Graduate Independent Study

Offers independent research for doctoral students only. Instructor consent required.

Repeatable: Repeatable for up to 6.00 total credit hours. Allows multiple enrollment in term.

Requisites: Restricted to graduate students only.

GEOG 8990 (1-10) Doctoral Dissertation

All doctoral students must register for not fewer than 30 hours of dissertation credit as part of the requirements for the degree. For a detailed discussion of doctoral dissertation credit, refer to the Graduate School section. Instructor consent required.

Repeatable: Repeatable for up to 30.00 total credit hours.

Requisites: Restricted to graduate students only.