GEOG 2271
Introduction to the Arctic Environment

T TH 9:30 - 10:45, GUGG 205

Professor Mark Serreze
mark.serreze@colorado.edu

The Arctic plays a key role in the global climate system and is a region in the midst of rapid change, encompassing the land, ocean and the atmosphere. In this course you will learn about the highly varied climates and landscapes that characterize the Arctic, the Arctic Ocean and its floating sea ice cover, the Greenland ice sheet, Arctic tundra, snow and permafrost. The course will also emphasize the dramatic changes that are taking place in the Arctic, including rapid warming and a shrinking sea ice cover, and what these changes mean for the rest of the planet.
In an ever-urbanizing world, having an understanding of the systems that support, maintain, and optimize human conditions will be critical in responding to a changing climate. Through the lens of Resilience, this course looks at the nexus represented by urban settlements: where the demand for productive energy, water, and food systems all come together in support of human endeavors.

This course will utilize lecture, discussion, and exercises to explore both the nature of urban systems, and the primary drivers affecting their look and operation in the future. Students will learn from the Instructor and Guest Professionals, to identify and analyze the forms and functions of different systems, factors leading to their optimization, and trends affecting how they’ll look and operate in the future.
GEOG 3422
Political Ecology

M,W 3:00 - 4:15, GUGG 205

Professor Mara Goldman
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‘The environment’ figures dominantly in our daily lives and academic pursuits—from concerns over climate change and biodiversity loss, to energy policy and agricultural development. Yet we rarely stop to consider how environmental concerns are tied to specific contexts, histories, and power struggles. In this class we do just that, through the lens of political ecology, a growing sub-discipline, which aims to understand the links between people, the environment, and global political economic processes.

A political ecology approach highlights the power dynamics involved in knowing, managing, and making claims on the environment, (including those related to gender, class, indignity, development and conservation planning). In this class we will discuss the creation of political ecology as a sub-field, and explore its value for understanding a diversity of topics including wildlife management in East Africa, stream restoration and urban gardens in the US, and development in West Africa. You will leave the class with a more complete view of environmental debates and the guiding principles that make political ecology a strong and growing sub-field.
GEOG 3511
Introduction to Hydrology

MWF 11:00 - 11:50 HLMS 193
Lab: TH 9:00 - 10:50, GUGG 6

Professor John Pitlick
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This course is about learning both the principles of hydrology as well as the techniques which can be used to solve hydrologic problems. In practice, hydrologists have to quantify rates at which water is exchanged between the atmosphere, land surface, and the oceans. This often involves processing data and solving sets of equations. It is fairly easy to lose sight of the conceptual part of the problem once you focus on techniques.

Thus, one of our other goals is to give you a balanced view of hydrology---one that includes a description of the physical processes as well as a coherent presentation of the theories and techniques which are used in practice.
This course describes the basic components of the climate system: the atmosphere, ocean, cryosphere, and lithosphere. We will investigate the basic physical processes that determine climate and the link between the components of the climate system. Emphasis is placed on the hydrologic cycle and its role in climate, climate stability, and global change. The theme throughout this course will be an examination of the importance of climate as one of the major forcing functions in environmental change. Both human-induced and natural climate variability will be covered.
GEOG 3742-001

Power, Place, Culture: Biopolitics, War & The State of Exception

T,TH 5:00 - 6:15, HUMN 135
Professor Najeeb Jan
najeeb.jan@colorado.edu

Geography in its broadest sense is concerned with understanding the world and our place within it. But this “world” is not simply given; it is fashioned. This course is fundamentally concerned with understanding the process of ‘world-formation’ via a meditation on several abstract and yet essential concepts: Power, Place/Space and Culture/Subjectivity. We spend the bulk of the semester developing the conceptual skills to think through these key terms. We then deploy these new ways of (postmodern) critical thinking towards a concerted meditation on the very concrete problems of violence, war, militarism and exceptionalism. In particular we will explore the concept of biopolitics (biopower) which is concerned principally with the government of life; the relationship between life and power in the modern world. A key emphasis of this seminar in critical geography will also be on the question of what it means to think critically. The primary conceptual grammars with which we shall pry open the crisis of the modern human condition, and through which we shall attempt to disclose something of our future possibilities, are linked to a rethinking of the concept of power. What is power and what dominant forms has power taken in the modern world? Critical geographic thinking is concerned not only with how we inhabit place, but also with investigating, and bringing to light, the very presuppositions that silently undergird our ways of knowing and acting in the world.
GEOG 3742-880

Power, Place, Culture

T,TH 2:00 - 3:15, LIBR M300D (honors and 3.3 GPA)

Dr. Abby Hickcox
abby.hickcox@colorado.edu

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GEOG 3812
Mexico, Central America, and the Caribbean

M,W 3:00 - 4:15, HLMS 241

Professor Fernando Riosmena
fernando.riosmena@colorado.edu

Do you want to delve into how globalization, foreign influence, and domestic political, social, and economic affairs have changed places in the region and whether they have propelled development, population change, and mobility within and out of it?

This course offers insights into the human geography of Latin America with special focus on changes in the political economy and population of Mexico, Central America, and the Spanish-speaking Caribbean nations.
Global environmental change is one of the most pressing international issues of this century. There is a need to monitor the earth’s vital signs from atmospheric ozone to sea level change.

Satellite data sets are critical for monitoring regional and global changes, determine natural variability of Earth systems and addressing fundamental global change issues. The course is designed to introduce students to the techniques of remote sensing measurements of environmental parameters from aircraft and satellite platforms. The course is based on the application of simple physical principles of electromagnetic radiation. Different sensing systems such as electro-optical systems, passive microwave systems, ranging systems, and scattering techniques will be discussed with applications for the atmosphere, cryosphere, lithosphere, and biosphere.
GEOG 4100/5100
Special Topics in Geography: Earth System Analytics

W 3:00 - 5:50, SEEC S125

Dr. Leah Wasser
leah.wasser@colorado.edu

Learn data intensive science approaches to understanding the earth

This advanced, multidisciplinary course will address major questions in Earth science and teach students to use the analytical tools necessary to undertake exploration of “big scientific data”. If you are a graduate and undergraduate (junior/senior) student in the natural/social science disciplines with an interest in learning about computationally intensive science, this course is for you.

Example Course Science Topics (Topics subject to change):
- Climate & Disturbance (Fire / Drought / Permafrost): How changing climate impacts natural disturbance systems.
- Land Processes (Erosion): Identify how rapid and slow landscape evolution impacts our lives.
- Vegetation: Determine what is driving Colorado forest dieback.
- Climate & Society: Social media and web as a powerful means to understand climate impacts.
- Data Integration: understand issues associated with integration data from various sources (scale, resolution, format).

We will work together to build the following skills:
- Scientific programming: Use the R / R-studio environment to access, process & visualize scientific data.
- Find / access scientific data: Programmatic (API) access of data (NASA, USGS, etc.) via API’s.
- Communication/Collaboration: Refine cross-discipline collaborative writing and project development skills.
- High Performance Computing (HPC): Implement large scale data processing tasks on powerful remote servers.
- Efficient data approaches: Process data more quickly via using multiple “cores”.

End of the semester Course Project: Students will choose a science question of interest to explore throughout the semester. They will apply skills learned in the course, to produce and present a final project.
GEOG 4110/5100

Advanced Remote Sensing

Lecture: T,TH 11:00 - 12:15
Lab: T 2:00-3:50

Professor Waleed Abdalati
waleed.abdalati@colorado.edu

The context, perspective, and scale provided by remote sensing observations have made them an invaluable source of data for understanding the Earth System. In the prerequisite introductory course, Remote Sensing of the Environment (GEOG/GEOL 4093/5093), students learned some of the basic physical principals underlying remote sensing and were introduced to some of the key remote sensing capabilities and how they work. This class is designed to build on that foundation by delving deeper into the physics of remote sensing and examining image analysis techniques for extracting the maximum amount of information from remotely sensed imagery.

This course will enable in-depth examination of environmental issues and parameters that are generally local in nature, but global in significance.
GEOG 4303 / 5303
GIS Programming for Spatial Analysis

Prerequisites:
- GEOG 4103/5103 or comparable is required.
- Working experience with ArcGIS 10x.
- Additional coursework such as GEOG 4203/5203 would be helpful.
- Programming experience is not a prerequisite.

Lecture: M 4:00 - 6:50, GUGG 2
Labs: T 12:30 - 3:20, GUGG 6
W 4:00 - 6:50, GUGG 6

Professor Stefan Leyk
stefan.leyk@colorado.edu

Do you want to enter the job market as a competitive GIS modeler with programming skills? This course will help you get there. It 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. We will cover different concepts, principles and techniques of programming that help you to solve a variety of spatial problems in physical and human Geography. You will learn how to work with Python for Geoprocessing in ArcGIS as well as for spatial programming in gridded data using numpy, scipy and other open source libraries. Furthermore, you will understand the basic ideas of object-oriented and procedural programming. You will develop skills to explore, handle, manipulate, and model spatial data as well as methods development. Lectures will include numerous demonstrations and hands-on examples as well as algorithmic exercises. In labs you will work on solving typical programming and implementation problems that you will encounter in the real world. During the last weeks of the term students will work in small groups on a proposed project to deepen their programming knowledge, improve their GIS proficiency and train their presentation and communication skills.
This course is a quantitative investigation of the physical, chemical, and biological processes that determine the hydrology and hydrochemistry of headwater catchments (watersheds). A watershed is a natural unit of land from which the surface, subsurface and groundwater runoff drain to a common outlet. In this course, the emphasis is on the movement and storage of water, nutrients, and solutes on and in the context of the watershed. This course provides a process-level understanding of watershed biogeochemistry such that students will be able to understand the consequences of our planned and inadvertent human activities on water flow and quality at the catchment scale.

This course builds on and complements existing courses in Geography, particularly ‘Introduction to Hydrology’. Topics include: hydrography separation, isotopic and geochemical hydrologic tracers, water quality, pollution, geochemistry, nutrient cycling, field experiments, and simulation modeling. These processes will be applied to a range of geographic regions, emphasizing headwater catchments in montane environments.
GEOG 4501/5501
Water Resources and Management of the Western U.S.

MWF 1:00 - 1:50, GUGG 205

Dr. Paul Lander, LEED AP
Paul.W.Lander@colorado.edu

This course is an overview of the human dimensions of water: the law, policy, economics, management, and valuation of water in the western United States.

The West has a completely different legal structure than the East for the administration of water, and a culture that has developed different methods of management and organization around the role of water in our daily lives. We regularly feature working professionals to broaden the range of discussion as we look at the effects of water use, climate change, population, and agriculture on this fascinating, and important, resource.
GEOG 4712
Political Geography
MWF 12:00 - 12:50, MCOL E186

Instructor: Meredith DeBoom
meredith.deboom@colorado.edu

This course focuses on the international and cross-national perspectives of political geography. It deals with political, economic and social aspects of international relations from a geographical perspective and examines the post Cold War and post 9-11 world. As such, the course has an integrative character and requires basic knowledge about international affairs. Frequent reading of a substantive newspaper or magazine, such as The New York Times, The Guardian, Christian Science Monitor, the Economist or the BBC News webpage (news.bbc.co.uk) would help significantly to acquire (or develop) knowledge of global locations and current events.

The course is designed for the upper-division level. It surveys some important aspects of the discipline of political geography but does not engage in a systematic survey of regional issues and conflicts. Instead, case studies of contemporary developments, including the role of nationalism in global South states, the geopolitics of rising powers like China and India, and the causes of environmental and natural resource conflicts in sub-Saharan Africa and South Asia, are used to illustrate key concepts from the lectures and readings.
GEOG 4722/5722
Field Methods in Human Geography
T 3:30 - 6:20, GUGG 201E

Professor Jennifer Fluri
jennifer.fluri@colorado.edu

In this course we will discuss various qualitative methodologies and methods for research in human geography. The readings will provide various techniques and tools for collecting qualitative data. We will discuss the connection between theory and methods and how to critically analyze qualitative research.

This course includes a practical engagement with data collection in order to help students develop a nuanced understanding of various methods. Research ethics will be discussed including the role and importance of ethics for research with populations in various locations in and outside the United States. This will include developing strategies for critical self-reflection at all stages of the research process.
GEOG 4742
Topics in Environment & Society: Geographies of Food and Agriculture
T,TH 3:30 - 4:45, ENVD 120

Instructor: Kaitlin Fertaly
kaitlin.fertaly@colorado.edu

Audrey Richards, the great British anthropologist, once pointed out that the need to eat is the most basic and important of all human drives. We need food more frequently and more urgently than we need sex. The central place of food in our lives has made food one of the major foci of human existence. How we grow, process, distribute, and consume our food often defines us as a society. In our society, the food system has become the target of enormous critique in the last ten years, and also enormous innovation. How does what we eat define us? What does it mean to eat food made in factories and advertised on television, or to seek out "fresh," local or organic food? How do we use food to define ourselves as men and women, as Americans or punks, or Chinese, as children or adults? What does it mean to eat too much, or too little, and how does it define us as social beings? These are the key questions we'll be asking in this course. This course approaches food from two perspectives. The first is the political economy of food. We will look at food as a commodity, and study where it comes from, how it connects members of different societies and social groups as it travels along the commodity chain, and how it creates social and geopolitical inequalities. We will also study food as culture, including the symbolic meanings of different foods in various world cultures, the role of food in defining gender, national identity, and social class. We'll look at food, memory and place, the relationship between food spaces and gender/race, and the role of food in transnational culture.
GEOG 4762
Political Islam

M, W 3:00 - 4:15 HLMS 141

Professor Najeeb Jan
najeeb.jan@colorado.edu

“Political Islam” dominates national and global news with popular revolutions, dictatorships, terrorism, jihad, suicide bombings and beheadings, perpetually in the headlines. The “Muslim World” has become synonymous with war, conflict, crisis and violence. As such “Islam,” particularly after 9-11, has become the definitive ‘Other’ of America, driving both the logics of the National Security State and the broader public imaginary of the enemy.

Therefore a nuanced, methodologically reflexive and critical understanding of this phenomenon is not only topical but also of vital importance for understanding key dynamics of power in the contemporary world.

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