

# DEPARTMENT OF GEOGRAPHY

## College of Arts and Sciences

Department of Geography  
413 McGilvrey Hall  
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## Undergraduate Programs

- Environmental Studies - B.A.
- Geography - B.A.

## Minors

- Climate Change
- Environmental Studies
- Geographic Information Science
- Geography
- Urban Studies

## Graduate Programs

- Geographic Information Science - M.GISc
- Geography - M.S.
- Geography - Ph.D.

## Certificates

### Graduate Certificates

- Environmental Geographic Information Science
- Geographic Information Science

## Department of Geography Faculty

- Amey, Katherine S. (2009), Associate Professor, Ph.D., Kent State University, 2011
- Bhungalia, Lisa (2017), Assistant Professor, Ph.D., Syracuse University, 2013
- Kaplan, David H. (1995), Professor, Ph.D., University of Wisconsin-Madison, 1991
- Lee, Jay (1991), Professor, Ph.D., University of Western Ontario, 1989
- Lee, Cameron C. (2008), Assistant Professor, Ph.D., Kent State University, 2014
- Mapes, Jennifer E. (2012), Assistant Professor, Ph.D., University of Southern California, 2009
- Munro-Stasiuk, Mandy J. (1999), Professor, Ph.D., University of Alberta, 1999
- Parylak, Rebecca P. (2008), Professor, Ph.D., Texas State University, San Marcos, 2010
- Post, Christopher (2008), Professor, Ph.D., University of Kansas, 2006
- Scholl, Andrew E. (2013), Assistant Professor, Ph.D., Penn State University, 2008
- Sheridan, Scott C. (2000), Professor, Ph.D., University of Delaware, 2000
- Smiley, Sarah L. (2010), Professor, Ph.D., University Of Kansas, 2007

- Tyner, James A. (1997), Professor, Ph.D., University of Southern California, 1995
- Ward, Aimee L. (2020), Assistant Professor, Ph.D., University of Otago, 2018
- Widner, Emariana S. (2009), Professor, Ph.D., Texas State University, 2009
- Yin, He (2019), Assistant Professor

## Environmental Studies (ENVS)

### ENVS 22070 NATURE AND SOCIETY (KSS) 3 Credit Hours

Environmental studies takes an interdisciplinary approach to studying the environment, with insights from natural sciences, social sciences and the humanities. This course introduces the discipline and explores theoretical approaches to understanding how humans interact with and perceive their environment. It applies these approaches to some of the world's greatest environmental challenges: climate change, the loss of biodiversity, urban sustainability, food and resource insecurity, and the degradation of the physical environment.

**Prerequisite:** None.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**Attributes:** Kent Core Social Sciences, TAG Social and Behavioral Sciences

### ENVS 30000 ENVIRONMENTAL PROTECTION REGULATIONS AND ASSESSMENT 3 Credit Hours

(Cross-listed with PLST 30000) The Federal and State environmental regulations including the National Environmental Policy Act, the Clean Air Act, the Clean Water Act, Solid and Hazardous Waste regulations (RCRA) and the Superfund Legislation require the utilization of trained environmental professionals to conduct Environmental Site Assessments (ESAs). The focus of this course is to introduce students to the methods and approaches for conducting environmental research and study of industrial sites with respect to environmental policies and regulations. The enforcement of regulations utilize environmental professionals who serve in governmental agencies, work in private environmental companies that provide assessments and consultations for industries, and who are employed by industries that seek qualified employees to conduct assessments, and provide professional guidance for industrial regulatory compliance.

**Prerequisite:** Junior standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

### ENVS 30105 CAREER PATHWAYS IN ENVIRONMENTAL STUDIES 1 Credit Hour

Orients students toward various career pathways in environmental studies.

**Prerequisite:** ENVS 22070; and Environmental Studies major; and junior standing.

**Schedule Type:** Lecture

**Contact Hours:** 1 lecture

**Grade Mode:** Satisfactory/Unsatisfactory

**ENVS 32091 ENVIRONMENTAL STUDIES AND SUSTAINABILITY 2 Credit Hours**

Various aspects of environmental studies are explored. Topics vary.

**Prerequisite:** ENVS 22070; and Environmental Studies major; and junior standing.

**Schedule Type:** Seminar

**Contact Hours:** 2 other

**Grade Mode:** Standard Letter

**ENVS 42099 INTEGRATIVE SENIOR PROJECT (ELR) (WIC) 2 Credit Hours**

This is the capstone course for the Environmental Studies major. All students in this course learn about methods of investigation and presentation in the area of environmental studies. The course culminates in a major research project developed and written by each student.

**Prerequisite:** ENVS 22070 and ENVS 32091; and Environmental Studies major.

**Schedule Type:** Project or Capstone

**Contact Hours:** 2 other

**Grade Mode:** Standard Letter

**Attributes:** Experiential Learning Requirement, Writing Intensive Course

**ENVS 46092 INTERNSHIP IN ENVIRONMENTAL STUDIES (ELR) 3-6 Credit Hours**

(Repeatable for credit) (Slashed with ENVS 56092) Work experience in local, regional and national agencies or companies designed to utilize and develop academic and professional skills.

**Prerequisite:** Sophomore standing; and special approval.

**Schedule Type:** Practical Experience

**Contact Hours:** 9-18 other

**Grade Mode:** Standard Letter

**Attributes:** Experiential Learning Requirement

**ENVS 49195 SPECIAL TOPICS IN ENVIRONMENTAL STUDIES 1-3 Credit Hours**

(Slashed with ENVS 49195) Special topics in Environmental Studies.

**Prerequisite:** None.

**Schedule Type:** Lecture

**Contact Hours:** 3-9 lecture

**Grade Mode:** Standard Letter

**ENVS 56092 INTERNSHIP IN ENVIRONMENTAL STUDIES 3-6 Credit Hours**

(Slashed with ENVS 46092)(Repeatable for credit) Work experience in local, regional and national agencies or companies designed to utilize and develop academic and professional skills.

**Prerequisite:** Graduate standing; and special approval.

**Schedule Type:** Practical Experience

**Contact Hours:** 9-18 other

**Grade Mode:** Standard Letter

**ENVS 59195 SPECIAL TOPICS IN ENVIRONMENTAL STUDIES 1-3 Credit Hours**

(Slashed with ENVS 49195) Special topics in Environmental Studies.

**Prerequisite:** Graduate standing.

**Schedule Type:** Lecture

**Contact Hours:** 3-9 lecture

**Grade Mode:** Standard Letter

## Geography (GEOG)

**GEOG 10160 INTRODUCTION TO GEOGRAPHY 3 Credit Hours**

A broad introduction to the study of geographic patterns on Earth.

Course describes and explains spatial patterns of human activity and environmental processes, as well as the interaction between these two realms. Topics include weather, climate, landforms, human-environment interactions, population, culture, economy and politics.

**Prerequisite:** None.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 16001 SOIL AND HORTICULTURAL MANAGEMENT 3 Credit Hours**

Course provides students with an understanding of the relationship of soil, nutrients and fertilizers. Students understand how to properly plant trees, shrubs and flowers.

**Prerequisite:** None.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 17063 WORLD GEOGRAPHY (DIVG) (KSS) 3 Credit Hours**

An overview of the differences and similarities within and between regions of the world. Students study the impacts of spatial processes as they operate at regional, global and local scales. Course emphasizes the effects of globalization on culture, economies, geopolitical relationships, population and the environment.

**Prerequisite:** None.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**Attributes:** Diversity Global, Kent Core Social Sciences, TAG Social and Behavioral Sciences, Transfer Module Social Sciences

**GEOG 17064 GEOGRAPHY OF THE UNITED STATES AND CANADA (DIVD) (KSS) 3 Credit Hours**

An overview of the differences and similarities within and between regions of the United States and Canada. Course focuses on social, economic, settlement and environmental patterns and processes.

**Prerequisite:** None.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**Attributes:** Diversity Domestic, Kent Core Social Sciences, Transfer Module Social Sciences

**GEOG 20195 SPECIAL TOPICS IN GEOGRAPHY 1-3 Credit Hours**

(Repeatable for credit) Course explores emerging topics in geography not covered in other existing courses. Topics vary per course offering.

**Prerequisite:** None.

**Schedule Type:** Lecture

**Contact Hours:** 1-3 lecture

**Grade Mode:** Standard Letter

**GEOG 21062 PHYSICAL GEOGRAPHY (KBS) 3 Credit Hours**

Introduction to the study of the spatial characteristics of the Earth's physical environment, including how humans interact with it. Topics include weather and climate, vegetation, soils, ecosystems, landforms and land-formation processes, human impacts on Earth systems and human societal adaptations to the physical environment.

**Prerequisite:** None.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**Attributes:** Kent Core Basic Sciences, TAG Social and Behavioral Sciences, Transfer Module Natural Sciences

**GEOG 21063 PHYSICAL GEOGRAPHY LABORATORY (KBS) (KLAB) 1 Credit Hour**

Course offers practical experience examining physical geographic processes, including the study and manipulation of map projections, Earth-sun relationships and experiments relating to the atmosphere, biosphere, lithosphere and hydrosphere. This laboratory course is taught in conjunction with the lecture and is designed to expand and reinforce concepts discussed in lecture through hands-on activities.

**Corequisite:** GEOG 21062.

**Schedule Type:** Laboratory

**Contact Hours:** 2 lab

**Grade Mode:** Standard Letter

**Attributes:** Kent Core Basic Sciences, Kent Core Basic Sciences Lab, Transfer Module Natural Sciences, TAG Natural Science Lab

**GEOG 22040 INTRODUCTION TO GLOBAL TOURISM (DIVG) 3 Credit Hours**

(Cross-listed with RPTM 26060) Introduction to travel and tourism around the world. Students study tourism technologies and cultural and natural environments as attractions, benefits of travel, travel ethics and sustainable development.

**Prerequisite:** None.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**Attributes:** Diversity Global

**GEOG 22061 HUMAN GEOGRAPHY (DIVG) (KSS) 3 Credit Hours**

Introduction to the spatial patterns and processes of human activity on Earth. Course examines how humans understand and interact with the world. Students consider how cities are structured; economic and cultural differences; the interaction between politics and identity; and the environmental consequences of human activities.

**Prerequisite:** None.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**Attributes:** Diversity Global, Kent Core Social Sciences, TAG Social and Behavioral Sciences, Transfer Module Social Sciences

**GEOG 29160 MAPPING OUR WORLD 3 Credit Hours**

Course is a first step for students to understand the importance of maps. Students are exposed to case studies and various mapping techniques that allow them to learn both the fundamentals of cartography and spatial data, and how people solve real-life problems using maps.

**Prerequisite:** None.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**Attributes:** TAG Social and Behavioral Sciences

**GEOG 31062 FUNDAMENTALS OF METEOROLOGY 3 Credit Hours**

Analysis of weather elements emphasizing energy exchanges and controls and atmospheric circulation. Course highlights the methods of weather prediction and people's modification of weather.

**Prerequisite:** None.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 31064 CLIMATE AND THE ENVIRONMENT 3 Credit Hours**

A study of the physical processes causing the distribution of world climates. Focus on local and urban climates, climatic change and societal impacts of climate.

**Prerequisite:** GEOG 31062.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 31070 POPULATION AND THE ENVIRONMENT 3 Credit Hours**

Course examines the interrelations of population growth, resource depletion and the environment from a geographic perspective, including the principal themes of space and place.

**Prerequisite:** None.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 31080 GEOGRAPHY OF WINE 3 Credit Hours**

Examines the physical environment of viticulture, including climate, soil and farm practices; the cultural tradition of wine making, consumption and trade; and regional production styles.

**Prerequisite:** None.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 31088 ENVIRONMENTAL GEOGRAPHY THROUGH FILM 3 Credit Hours**

Cinema combines the art of storytelling and creation of landscape in such a way as to capture artifacts of the culture from which films emerge and as such, document in some way cultural, social and political history and experiences. In the course, films are used to examine environmental issues and processes in their social and cultural context.

**Prerequisite:** None.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 32023 FOOD AND PLACE (ELR) 3 Credit Hours**

Course gives students a working knowledge in, and ability to understand and analyze, the intersections of food production, access and consumption. Course enables students to apply a critical geographic lens to compare the traditional food production system with alternatives at various scales, from local to global. Students focus on urban community gardening as one such alternative and personally interact with the Stark Campus' Flash's Food Garden as a case study in planning and preparing such a garden. Course combines lectures, discussions of scholarly publications, field trips, guest lectures and the hands-on experiential learning.

**Prerequisite:** None.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**Attributes:** Experiential Learning Requirement

**GEOG 32080 POLITICS AND PLACE (DIVG) 3 Credit Hours**

Spatial aspects of political behavior as manifested in boundary changes, the sizes of states, interstate relations and spatial organization.

**Prerequisite:** None.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**Attributes:** Diversity Global

**GEOG 34070 ECONOMIC GEOGRAPHY 3 Credit Hours**

Examines economic patterns at global, national, regional and local scales. Focus of course goes beyond space to place, with the recognition that these patterns are socially produced and, as such, change over time. Students examine economic models and theories from a spatial perspective, but with a strong focus on real-life outcomes, debates and challenges.

**Prerequisite:** None.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 35065 GEOGRAPHY OF TRANSPORTATION AND SPATIAL INTERACTION 3 Credit Hours**

Course examines spatial interaction; the study of flows, networks and integrated systems at different spatial scales; transport and economic development; and models and methods of analysis.

**Prerequisite:** None.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 36065 CITIES AND URBANIZATION (DIVG) 3 Credit Hours**

Course examines what is a city, how it has evolved over time under changing economic conditions, what is its internal structure and how this has been influenced by transportation developments. Special attention is paid to the causes and consequences of social diversity within the city and how cities differ throughout the world.

**Prerequisite:** None.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**Attributes:** Diversity Global

**GEOG 37010 GEOGRAPHY OF OHIO 3 Credit Hours**

Study of Ohio as a distinctive region, its environment and the varied characteristics of its population, its historical geographic development and contemporary patterns and problems.

**Prerequisite:** Junior standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 37040 GEOGRAPHY OF AFRICA (DIVG) 3 Credit Hours**

Course covers the complex geographical and cultural elements in Africa and demonstrates how the interaction of these elements has affected Africa's linkages to other continents, especially North America. Students discuss how this diversity has affected Africa's economic development and political evolution.

**Prerequisite:** None.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**Attributes:** Diversity Global

**GEOG 37045 GEOGRAPHY OF THE MIDDLE EAST 3 Credit Hours**

The Middle East is a world region where the interactions between human and physical geographies have shaped its history, culture, economies and population patterns. The course uses a thematic approach to understand these interactions and how they shape the modern Middle East and its relationship with the wider world.

**Prerequisite:** None.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 37050 GEOGRAPHY OF RUSSIA AND THE COMMONWEALTH OF INDEPENDENT STATES (DIVG) 3 Credit Hours**

Study of the physical, economical, political and cultural geography of Russia, Ukraine, Central Asia and other components of the former Soviet Union.

**Prerequisite:** None.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**Attributes:** Diversity Global

**GEOG 37066 GEOGRAPHY OF EUROPE (DIVG) 3 Credit Hours**

Europe is unique in terms of its historical cultural influence around the world, but over recent decades, Europe has undergone significant change and experienced many struggles. The attempts to integrate have led to significant debates about just what it means to be "European." This course covers Europe using a systematic approach. Students study the physical, political, religious, linguistic, social and economic environments within Europe. In addition, students explore the issues that tie Europeans to each other and to the outside world. Students sum up many of these aspects with case studies of nations or regions that typify the issues that face Europe today.

**Prerequisite:** None.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**Attributes:** Diversity Global

**GEOG 37070 GEOGRAPHY OF EAST AND SOUTHEAST ASIA (DIVG) 3 Credit Hours**

Analysis of the physical and cultural geography of East and Southeast Asia, extending from Japan and China to Burma and Indonesia.

**Prerequisite:** None.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**Attributes:** Diversity Global

**GEOG 37072 GEOGRAPHY OF CHINA 3 Credit Hours**

Provides an overview of China's physical environment, natural and human resources, social, economic and cultural characteristics, and its roles in today's global environment. Offers a comprehensive view of China's historical development and contemporary trends of growth and how it impacts the United States.

**Prerequisite:** None.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 37084 GEOGRAPHY OF SOUTH AMERICA (DIVG) 3 Credit Hours**

Overview of region and survey of each country emphasizes systematic similarities and differences in physical environment, culture, economic development, population, land use, politics and history.

**Prerequisite:** None.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**Attributes:** Diversity Global

**GEOG 37085 GEOGRAPHY OF LATIN AMERICA AND THE CARIBBEAN (DIVG) 3 Credit Hours**

Latin America and the Caribbean is a traditional geographic region that has been uniquely shaped through multiple physical and cultural factors. Course takes a thematic approach to understanding the interplay of these factors and how they shape modern Latin America-Caribbean identity; the diversity of the environment and culture within the region; and how the region relates to the rest of the world.

**Prerequisite:** None.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**Attributes:** Diversity Global

**GEOG 37095 SPECIAL TOPICS IN REGIONAL GEOGRAPHY 3 Credit Hours**

(Repeatable for a maximum of 3 times) Special topics course in a specific region of the world. Topics vary per course offering.

**Prerequisite:** None.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 39002 STATISTICAL METHODS IN GEOGRAPHY 3 Credit Hours**

Explores probability theory, spatial statistics, estimation procedures, hypothesis testing, spatial sampling, methods of areal association and regression analysis. Geographic applications are emphasized.

**Prerequisite:** MATH 10041 or MATH 11009 or MATH 11010.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 40093 VARIABLE TITLE WORKSHOP IN GEOGRAPHY 1-6 Credit Hours**

(Repeatable for credit) Workshop topics vary per course offering.

**Prerequisite:** Special approval.

**Schedule Type:** Workshop

**Contact Hours:** 1-6 other

**Grade Mode:** Satisfactory/Unsatisfactory

**GEOG 40191 SEMINAR IN GEOGRAPHY (ELR) (WIC) 3 Credit Hours**

(Repeatable for credit) Advanced study of the historical development of geography and of contemporary issues in the field. Emphasis on methods of geographic investigation and presentation of results.

**Prerequisite:** Geography major; and junior standing.

**Schedule Type:** Seminar

**Contact Hours:** 3 other

**Grade Mode:** Standard Letter

**Attributes:** Experiential Learning Requirement, Writing Intensive Course

**GEOG 40192 PRACTICUM IN GEOGRAPHY (ELR) 1-3 Credit Hours**  
(Repeatable for credit) Practical experience in using or teaching geographic techniques and/or problem-solving. Faculty supervise the practicum.

**Prerequisite:** Special approval.

**Schedule Type:** Practical Experience

**Contact Hours:** 1-3 other

**Grade Mode:** Satisfactory/Unsatisfactory-IP

**Attributes:** Experiential Learning Requirement

**GEOG 40195 SPECIAL TOPICS IN GEOGRAPHY 1-3 Credit Hours**

(Repeatable for credit)(Slashed with GEOG 50195 and GEOG 70195)

Topics vary according to research interest of the instructor.

**Prerequisite:** Special approval.

**Schedule Type:** Lecture

**Contact Hours:** 1-3 lecture

**Grade Mode:** Standard Letter

**GEOG 40285 FIELD EXPERIENCE IN GEOGRAPHY 3 Credit Hours**

(Slashed with GEOG 50285 and GEOG 70285) This course introduces students to field methods used in human and physical geography.

Students spend most of the class hours outside investigating important local resources like the Cuyahoga Valley National Park, where they are introduced to geographic approaches to real world problems. Specific field methods may include: landscape interpretation; atmospheric monitoring; hydrologic sampling; terrestrial habitat analyses; human and nature interactions; food desert investigation; urban green space ratios; and traffic data collection.

**Prerequisite:** None.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 40392 PRACTICUM IN EMERGING GEOGRAPHIC TRENDS (ELR) 1-6 Credit Hours**

(Repeatable for credit) Students undertake a practicum to examine newly emerging geographic topics and techniques.

**Prerequisite:** Special approval.

**Schedule Type:** Practical Experience

**Contact Hours:** 1-6 other

**Grade Mode:** Satisfactory/Unsatisfactory

**Attributes:** Experiential Learning Requirement

**GEOG 40492 STUDY AWAY IN GEOGRAPHY (ELR) 1-3 Credit Hours**

(Repeatable for credit) (Slashed with GEOG 50492 and GEOG 70492)

Examination of geographic landscapes in the field.

**Prerequisite:** None.

**Schedule Type:** Practical Experience

**Contact Hours:** 3-9 other

**Grade Mode:** Standard Letter

**Attributes:** Experiential Learning Requirement

**GEOG 40996 INDIVIDUAL INVESTIGATION IN GEOGRAPHY 1-3 Credit Hours**

(Repeatable for credit) Students undertake an investigation or research on specific geographical problems.

**Prerequisite:** Special approval.

**Schedule Type:** Individual Investigation

**Contact Hours:** 1-3 other

**Grade Mode:** Standard Letter-IP



**GEOG 41051 NATURAL DISASTERS AND SOCIETY 3 Credit Hours**

(Slashed with GEOG 51051 and GEOG 71051) This course is a study of natural disasters, the physical processes responsible for hazards, and their effects on the physical and social environment. It focuses on the science of natural hazards and how we can use our knowledge of these natural events and processes to reduce the occurrence or mitigate the effects of natural disasters. Natural disasters include earthquakes, volcanoes, tsunamis, landslides, thunderstorms and tornadoes, heatwaves and droughts, floods, coastal hazards, and wildfires. This course is taught through lecture and analysis of numerous case studies of global natural disasters.

**Prerequisite:** Junior standing or above.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 41065 APPLIED CLIMATOLOGY 3 Credit Hours**

(Slashed with GEOG 51065 and GEOG 71065) Course aims to provide a full appreciation for the range of applicability of climate data to real-world problems. There are three overarching goals of the course: (1) To provide a broad overview of what weather and climate information is out there and how people synthesize weather and climate information for use in applied work; (2) to enable a thorough appreciation for the breadth of disciplines in which applied climatology plays a role; and (3) to provide real-world experience of working through an applied climatological problem, via a final project.

**Prerequisite:** GEOG 31062 or GEOG 31064.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 41066 GLOBAL CLIMATE CHANGE 3 Credit Hours**

(Slashed with GEOG 51066 and GEOG 71066) Examination of the evidence and causes of climate change and how these data are assessed. Students discuss past, present and future impacts of climate change and variability, in addition to policy implications.

**Prerequisite:** None.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 41073 CONSERVATION OF NATURAL RESOURCES 3 Credit Hours**

(Slashed with GEOG 51073 and GEOG 71073) Evaluation of past and current problems associated with the management of natural resources and the environments associated with their utilization.

**Prerequisite:** None.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 41074 RESOURCE GEOGRAPHY 3 Credit Hours**

(Slashed with GEOG 51074 and GEOG 71074) Culture-technology and distance in relation to resource adequacy and management concepts for societal decisions about common property and situations with external economies.

**Prerequisite:** Junior standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 41077 WATER AND SOCIETY 3 Credit Hours**

(Slashed with GEOG 51077 and GEOG 71077) This course examines the relationships between water and the world's population with an emphasis on the developing world (Africa, Asia, Middle East, and Latin America). Students will analyze how water impacts humans and how humans impact water. The course begins by introducing the hydro-social cycle and network theories to provide a foundation and framework to understand the four primary course themes: water policy and governance (including privatization, public-private partnerships, and the various United Nations' global water initiatives), water as power (including social power and how governments politicize water), flooding and droughts (including vulnerabilities, adaptations, and mitigations), and inequalities (including on gender, quality, access, and affordability). The course concludes by revisiting these themes and applying ideas of water justice and sustainability. The course is primarily discussion based with limited lectures to ensure students understand key concepts.

**Prerequisite:** Junior standing or above.

**Schedule Type:** Seminar

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 41082 GEOGRAPHY OF SOILS 3 Credit Hours**

(Slashed with GEOG 51082 and GEOG 71082) An edaphological approach to soils, including morphology, formation, classification, geographical distribution and utilization. Students will be required to undertake field work.

**Prerequisite:** ESCI 11040 or GEOG 21062.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 41195 SPECIAL TOPICS IN ENVIRONMENTAL GEOGRAPHY 1-3 Credit Hours**

(Repeatable for a maximum 10 times)(Slashed with GEOG 51195 and GEOG 71195) Topics vary per course offering.

**Prerequisite:** None.

**Schedule Type:** Lecture

**Contact Hours:** 1-3 lecture

**Grade Mode:** Standard Letter

**GEOG 41800 GLOBAL ENVIRONMENTAL ISSUES 3 Credit Hours**

(Slashed with GEOG 51800 and GEOG 71800) Course examines environmental belief systems and explores various perceptions of the Earth's environment and its opportunities, constraints and risks. The goals of the course is twofold: (1) develop a framework to allow students to explore both their own relationship to the environment and to understand the sociocultural constructs that have informed their personal environmental beliefs; and (2) apply this knowledge to critically assess various stakeholder perspectives of specific environmental issues.

**Prerequisite:** None.

**Schedule Type:** Seminar

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 42040 TOURISM DEVELOPMENT AND RECREATIONAL TRAVEL 3 Credit Hours**

(Cross-listed with RPTM 46000, HTM 56000) Investigation of travel and tourism development using an interdisciplinary social science approach.

**Prerequisite:** RPTM 36060.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 42052 HEALTH GEOGRAPHY 3 Credit Hours**

(Slashed with GEOG 52052 and GEOG 72052) This course examines health/medical geography, a subdiscipline of both public health and geography, that focuses on geographic aspects of health and disease. The field deals with human-environment interactions and their influence on human health. This course offers historical context to geography and health and covers three major approaches to health/medical geographic scholarship: ecological approaches, which systematically analyzes relationships between people and their environments; social approaches, including political economy and socio-behavioral approaches; and spatial approaches.

**Prerequisite:** None.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 42053 GEOGRAPHIES OF MEMORY AND HERITAGE 3 Credit Hours**

(Slashed with GEOG 52053 and GEOG 72053) Course gives students a working knowledge in, and ability to understand and analyze, the intersection of memory and landscape as a tangible re-presentation of the human past, oftentimes used as a tangible expression of cultural or political power. Students focus on memorialization, preservation and tourism concepts and themes.

**Prerequisite:** Junior standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 42064 SETTLING THE NORTH AMERICAN ENVIRONMENT 3 Credit Hours**

(Slashed with GEOG 52064 and GEOG 72064) Course surveys the environmental changes of the North American continent brought about by Indigenous, European Colonial and American land use practices, from pre-Columbian times to present. Students engage with foundational historical narratives, evidence and methods for understanding these geographic pasts. Course is a combination of lectures and discussions of readings and in-class activities.

**Prerequisite:** Junior standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 42070 SEMINAR IN ETHNIC, LIFESTYLE AND NATIONAL COMMUNITIES 3 Credit Hours**

(Slashed with GEOG 52070 and GEOG 72070) Covers the geographies of ethnic identity and nationalism, national identity and territory, borderlands and diasporas, national separatism and the variety of ways in which cultural difference asserts itself.

**Prerequisite:** Junior standing; and special approval.

**Schedule Type:** Seminar

**Contact Hours:** 3 other

**Grade Mode:** Standard Letter

**GEOG 42195 SPECIAL TOPICS IN SOCIAL GEOGRAPHY 1-3 Credit Hours**

(Repeatable for maximum 10 times)(Slashed with GEOG 52195 and 72195) Topics vary per course offering.

**Prerequisite:** None.

**Schedule Type:** Lecture

**Contact Hours:** 1-3 lecture

**Grade Mode:** Standard Letter

**GEOG 43189 WICKED PROBLEMS: TACKLING GLOBAL ISSUES IN THE 21ST CENTURY (ELR) 3 Credit Hours**

(Cross-listed with ESCI 43189 and POL 43189) This course provides an overview and analysis of the United Nations Sustainable Development Goals (SDG), as well as strategies that can be used for tackling them. The SDGs address the most serious problems faced by humankind today. These include poverty, hunger, inequality, climate change, economic development and environmental sustainability. A key characteristic of the SDGs is that they are known as "wicked problems." Wicked problems are complex issues that resist conventional approaches to problem solving, and for which existing solutions often create unintended consequences that only make the original problem worse. Emphasis is placed on problems of collective action, evidence-based public policies and interdisciplinary approaches to addressing global issues. Registration in Florence semester abroad required.

**Prerequisite:** None.

**Schedule Type:** International Experience, Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**Attributes:** Experiential Learning Requirement

**GEOG 44010 GEOGRAPHIES OF GLOBAL DEVELOPMENT 3 Credit Hours**

(Slashed with GEOG 54010 and GEOG 74010) This course examines the political economy of development. More narrowly, we examine the historical geography of agricultural transformations and capitalist development. We draw from case studies from different regions to interpret differential patterns of development and political-economic change. Emphasis is placed on the creation, structure, and operation of the capitalist agro-food system and its impact on small-scale farmers and landless rural workers.

**Prerequisite:** Junior standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 44070 SPATIAL ANALYSIS AND LOCATION THEORY 3 Credit Hours**

(Slashed with GEOG 54070 and GEOG 74070) Classical theories for location of economic activities and contemporary approach of spatial analysis, spatial organization of economic systems behavioral models in economic geography spatial allocation problems.

**Prerequisite:** None.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 45085 URBAN TRANSPORTATION 3 Credit Hours**

(Slashed with GEOG 55085 and GEOG 75085) Transportation may be the single most important force shaping cities. Historically, cities have depended on their access to ports, canals, railroads and highways. Today, transportation networks, the use of public transportation, provisions for bicycles and pedestrians and transportation architecture continue to define how a city looks, feels and acts.

**Prerequisite:** None.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 46060 FOOD SECURITY AND SUSTAINABILITY 3 Credit Hours**  
(Slashed with GEOG 56060 and GEOG 76060) This course explores the concept of food security from the standpoint of agrarian change, food regimes, agroecology, and development. In the process, we examine the various frameworks that have grounded academic and popular understandings of famine and food security, including Malthusian, environmental determinism, Food Availability Decline (FAD), entitlements, and historical materialism.

**Prerequisite:** Junior standing.

**Schedule Type:** Seminar

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 46070 URBAN AND REGIONAL PLANNING 3 Credit Hours**

(Slashed with GEOG 56070 and GEOG 76070) Examines how cities develop and what “people” – through government, quasi-public institutions and private interests – can do to modify urban growth, the distribution of people and places and urban design.

**Prerequisite:** None.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 46080 URBAN SUSTAINABILITY 3 Credit Hours**

(Slashed with GEOG 56080 and GEOG 76080) Provides an introduction to interdisciplinary perspectives on urban sustainability, focusing on environmental challenges caused by urbanization and the innovative ways urban dwellers seek to address those challenges. Course provides background on relevant disciplinary perspectives and their application to environmental challenge domains.

**Prerequisite:** None.

**Schedule Type:** Lecture, Seminar

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 46081 SEMINAR IN URBAN GEOGRAPHY 3 Credit Hours**

(Slashed with GEOG 56081 and GEOG 76081) Through class discussions and readings, students gain a better understanding of the various issues, projects and paradigms that make up the field of urban geography.

**Prerequisite:** Junior standing; and special approval.

**Schedule Type:** Seminar

**Contact Hours:** 3 other

**Grade Mode:** Standard Letter

**GEOG 46092 INTERNSHIP IN GEOGRAPHY AND PLANNING (ELR)  
3-6 Credit Hours**

(Repeatable for credit) Pre-professional work experience in local, regional and environmental planning agencies and in business designed to utilize and develop academic skills. Registration into the course is competitive based on student’s skills and interests and on number of positions available.

**Prerequisite:** Special approval.

**Schedule Type:** Practical Experience

**Contact Hours:** 3-6 other

**Grade Mode:** Standard Letter

**Attributes:** Experiential Learning Requirement

**GEOG 49070 GEOGRAPHIC INFORMATION SCIENCE 4 Credit Hours**

(Slashed with GEOG 59070 and GEOG 79070) Introduction to theories and methods for geographic data processing, including data capture and input data storage and management and data analysis and displays. Emphasis is on laboratory exercises using GIS software packages for real-world applications.

**Prerequisite:** None.

**Schedule Type:** Combined Lecture and Lab

**Contact Hours:** 3 lecture, 2 lab

**Grade Mode:** Standard Letter

**Attributes:** TAG Social and Behavioral Sciences

**GEOG 49072 GEOGRAPHIC INFORMATION SCIENCE AND HEALTH 3  
Credit Hours**

(Slashed with GEOG 59072 and GEOG 79072) Geographic theory and methods serve as the connection among disparate disciplines focused on how and why “health” varies between regions, cities and neighborhoods. Students examine how geospatial technologies, especially GIS, have become an important health analysis tool.

**Prerequisite:** None.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 49073 ENVIRONMENTAL DATA ANALYSIS IN R 3 Credit Hours**

(Slashed with GEOG 59073 and GEOG 79073) The course aims to teach students basic concepts, skills, and tools for working with data in R. R is an open-source (free) programming language for statistical computing and graphics that statisticians widely use, scientists, data miners, and geographers. The number of R users grows exponentially each year, contributing to a massive online community and countless free tutorials. This is a hands-on course designed for students with no programming experience. However, this course does not teach statistics: understanding of basic statistics and common statistical tests is assumed and prior coursework in statistics is encouraged. With the knowledge gained in this course, students will be ready to undertake their own data analysis in R and increase their efficiency through reproducible workflows.

**Prerequisite:** BSCI 40224 or GEOG 39002 or MATH 10041.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 49075 GEOGRAPHIC INFORMATION SCIENCE: APPLICATIONS  
FOR SOCIAL PROBLEMS 3 Credit Hours**

(Slashed with GEOG 59075 and GEOG 79075) Course provides a survey of geographic information system (GIS) and related mapping applications that are used to understand and solve a variety of social problems (e.g., crime, poor health and educational outcomes, exposure to environmental hazards). Through case studies, students learn spatial data acquisition, basic spatial analysis and forms of map-based visual communication to stakeholders and the general public.

**Prerequisite:** GEOG 49070.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter



**GEOG 49076 SPATIAL PROGRAMMING 3 Credit Hours**

(Slashed with GEOG 59076 and GEOG 79076) Examination of the design, development and use of geographic information technologies with computer programming to model, process and visualize geographic phenomena.

**Prerequisite:** GEOG 49070.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 49078 GEOGRAPHIC INFORMATION SCIENCE AND ENVIRONMENTAL HAZARDS 3 Credit Hours**

(Slashed with GEOG 59078 and GEOG 79078) The study and management of natural hazards are inherently reliant on both physical and human processes and spatial patterns. Given the many variables involved and the variety of scales at which they operate, use of geographic information system (GIS) has become standard practice in research on hazards and in their management by government agencies at all levels. Students are exposed to a wide array of spatial data that is used in these activities, as well as standard mapping and spatial analysis procedures and forms of data dissemination.

**Prerequisite:** GEOG 49070.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 49080 ADVANCED GEOGRAPHIC INFORMATION SCIENCE 3 Credit Hours**

(Slashed with GEOG 59080 and GEOG 79080) Provides both an overview of geographic information science (GIS) data structures, analytical functions and usage and modeling approaches. Students learn how to manage GIS data in different formats or projections; select GIS analytical tools for solving different problems; and model changes of geographical phenomena as represented by GIS data.

**Prerequisite:** GEOG 49070.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 49085 WEB AND MOBILE GEOGRAPHIC INFORMATION SCIENCE 3 Credit Hours**

(Slashed with GEOG 59085 and GEOG 79085) Explores how web and mobile phones present opportunities and challenges to the field of geographic information science (GIS). This includes the examination of the use, design and development of cyberinfrastructure-enabled GIS emphasizing web- and mobile-based interfaces and technologies. Students are recommended to have GIS experience to enroll in the course.

**Prerequisite:** None.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 49098 RESEARCH IN GEOGRAPHIC INFORMATION TECHNOLOGY (ELR) 1-3 Credit Hours**

(Repeatable for credit) Students undertake individual research on a topic in geographic information technology.

**Prerequisite:** Special approval.

**Schedule Type:** Research

**Contact Hours:** 1-3 other

**Grade Mode:** Standard Letter-IP

**Attributes:** Experiential Learning Requirement

**GEOG 49162 CARTOGRAPHY 3 Credit Hours**

(Slashed with GEOG 49162 and GEOG 79162) Introduces map design principles including base maps, typography, generalization, symbols, color scheme, and classification. Builds on students' experiences with GIS to focus on applying map design principles using geospatial and graphic design software to produce effective print and static web maps.

**Prerequisite:** GEOG 49070.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 49195 SPECIAL TOPICS IN GEOGRAPHIC INFORMATION SCIENCE 1-3 Credit Hours**

(Repeatable for maximum 10 times)(Slashed with GEOG 59195 and GEOG 79195) Topics vary per course offering.

**Prerequisite:** None.

**Schedule Type:** Lecture

**Contact Hours:** 1-3 lecture

**Grade Mode:** Standard Letter

**GEOG 49198 RESEARCH IN CARTOGRAPHY AND GEOGRAPHIC INFORMATION SYSTEMS (ELR) 1-3 Credit Hours**

(Repeatable for credit) Students undertake individual research on a topic in cartography or geographic information science (GIS) under the direction of a faculty member.

**Prerequisite:** Special approval.

**Schedule Type:** Research

**Contact Hours:** 1-3 other

**Grade Mode:** Standard Letter

**Attributes:** Experiential Learning Requirement

**GEOG 49230 REMOTE SENSING 3 Credit Hours**

(Cross-listed with ESCI 42030)(Slashed with ESCI 52030, ESCI 72030, GEOG 59230, GEOG 79230) Computer analysis of multispectral satellite datasets. Applications in terrestrial earth science are emphasized.

**Prerequisite:** None.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 50093 VARIABLE TITLE WORKSHOP IN GEOGRAPHY 1-5 Credit Hours**

(Repeatable for credit) Variable title workshop in geography.

**Prerequisite:** Graduate standing.

**Schedule Type:** Workshop

**Contact Hours:** 1-5 other

**Grade Mode:** Satisfactory/Unsatisfactory-IP

**GEOG 50195 SPECIAL TOPICS IN GEOGRAPHY 1-3 Credit Hours**

(Repeatable for credit)(Slashed with GEOG 40195 and GEOG 70195) Topics vary according to research interest of the instructor.

**Prerequisite:** Graduate standing.

**Schedule Type:** Lecture

**Contact Hours:** 1-3 lecture

**Grade Mode:** Standard Letter

**GEOG 50285 FIELD EXPERIENCE IN GEOGRAPHY 3 Credit Hours**  
(Slashed with GEOG 40285 and GEOG 70285) This course introduces students to field methods used in human and physical geography. Students spend most of the class hours outside investigating important local resources like the Cuyahoga Valley National Park, where they are introduced to geographic approaches to real world problems. Specific field methods may include: landscape interpretation; atmospheric monitoring; hydrologic sampling; terrestrial habitat analyses; human and nature interactions; food desert investigation; urban green space ratios; and traffic data collection.  
**Prerequisite:** Graduate standing.  
**Schedule Type:** Lecture  
**Contact Hours:** 3 lecture  
**Grade Mode:** Standard Letter

**GEOG 50392 PRACTICUM IN EMERGING GEOGRAPHIC TRENDS 1-6 Credit Hours**  
(Repeatable for credit) Students undertake a practicum examining newly emerging geographic topics and techniques.  
**Prerequisite:** Graduate standing; and special approval.  
**Schedule Type:** Practical Experience  
**Contact Hours:** 1-6 other  
**Grade Mode:** Satisfactory/Unsatisfactory

**GEOG 50492 STUDY AWAY IN GEOGRAPHY 1-3 Credit Hours**  
(Repeatable for maximum 6 attempts)(Slashed with GEOG 40492 and GEOG 70492) Examination of geographic landscapes in the field.  
**Prerequisite:** Graduate standing.  
**Schedule Type:** Field Experience  
**Contact Hours:** 3-9 other  
**Grade Mode:** Standard Letter

**GEOG 51051 NATURAL DISASTERS AND SOCIETY 3 Credit Hours**  
(Slashed with GEOG 41051 and GEOG 71051) Study of natural disasters; the physical causes of the hazards associated with the disasters; their effects on humans and societies; spatial and temporal distributions; and strategies to reduce the occurrences of disasters. Natural disasters include hurricanes, tornadoes, floods, landslides, heat waves, wildfire, blizzards, earthquakes, tsunami and volcanoes. Mitigation for disasters and responses to disasters are studied across economically developing nations and developed nations. Students learn through the analysis of numerous case studies of natural disasters.  
**Prerequisite:** Graduate standing.  
**Schedule Type:** Lecture  
**Contact Hours:** 3 lecture  
**Grade Mode:** Standard Letter

**GEOG 51065 APPLIED CLIMATOLOGY 3 Credit Hours**  
(Slashed with GEOG 41065 and GEOG 71065) Course aims to provide a full appreciation for the range of applicability of climate data to real-world problems. There are three overarching goals of the course: (1) To provide a broad overview of what weather and climate information is out there and how people synthesize weather and climate information for use in applied work; (2) to enable a thorough appreciation for the breadth of disciplines in which applied climatology plays a role; and (3) to provide real-world experience of working through an applied climatological problem, via a final project.  
**Prerequisite:** Graduate standing.  
**Schedule Type:** Lecture  
**Contact Hours:** 3 lecture  
**Grade Mode:** Standard Letter

**GEOG 51066 GLOBAL CLIMATE CHANGE 3 Credit Hours**  
(Slashed with GEOG 41066 and GEOG 71066) Examination of the evidence and causes of climate change and how these data are assessed. Students discuss past, present and future impacts of climate change and variability, in addition to policy implications.  
**Prerequisite:** Graduate standing.  
**Schedule Type:** Lecture  
**Contact Hours:** 3 lecture  
**Grade Mode:** Standard Letter

**GEOG 51073 CONSERVATION OF OUR NATURAL RESOURCES 3 Credit Hours**  
(Slashed with GEOG 41073 and GEOG 71073) Evaluation of past and current problems associated with the management of natural resources and the environments associated with their utilization.  
**Prerequisite:** Graduate standing.  
**Schedule Type:** Lecture  
**Contact Hours:** 3 lecture  
**Grade Mode:** Standard Letter

**GEOG 51074 RESOURCE GEOGRAPHY 3 Credit Hours**  
(Slashed with GEOG 41074 and GEOG 71074) Culture-technology and distance in relation to resource adequacy and management concepts for societal decisions about common property and situations with external economies.  
**Prerequisite:** Graduate standing.  
**Schedule Type:** Lecture  
**Contact Hours:** 3 lecture  
**Grade Mode:** Standard Letter

**GEOG 51077 WATER AND SOCIETY 3 Credit Hours**  
(Slashed with GEOG 41077 and GEOG 71077) This course examines the relationships between water and the world's population with an emphasis on the developing world (Africa, Asia, Middle East, and Latin America). Students will analyze how water impacts humans and how humans impact water. The course begins by introducing the hydro-social cycle and network theories to provide a foundation and framework to understand the four primary course themes: water policy and governance (including privatization, public-private partnerships, and the various United Nations' global water initiatives), water as power (including social power and how governments politicize water), flooding and droughts (including vulnerabilities, adaptations, and mitigations), and inequalities (including on gender, quality, access, and affordability). The course concludes by revisiting these themes and applying ideas of water justice and sustainability. The course is primarily discussion-based with limited lectures to ensure students understand key concepts.  
**Prerequisite:** Graduate standing.  
**Schedule Type:** Seminar  
**Contact Hours:** 3 lecture  
**Grade Mode:** Standard Letter

**GEOG 51082 GEOGRAPHY OF SOILS 3 Credit Hours**  
(Slashed with GEOG 41082 and GEOG 71082) An edaphological approach to soils, including morphology, formation, classification, geographical distribution and utilization. Students will be required to undertake field work.  
**Prerequisite:** Graduate standing.  
**Schedule Type:** Lecture  
**Contact Hours:** 3 lecture  
**Grade Mode:** Standard Letter

**GEOG 51195 SPECIAL TOPICS IN ENVIRONMENTAL GEOGRAPHY****1-3 Credit Hours**

(Repeatable for a maximum 10 times)(Slashed with GEOG 41195 and GEOG 71195) Topics vary per course offering.

**Prerequisite:** Graduate standing.

**Schedule Type:** Lecture

**Contact Hours:** 1-3 lecture

**Grade Mode:** Standard Letter

**GEOG 51800 GLOBAL ENVIRONMENTAL ISSUES 3 Credit Hours**

(Slashed with GEOG 41800 and GEOG 71800) Course examines environmental belief systems and explores various perceptions of the Earth's environment and its opportunities, constraints and risks. The goals of the course is twofold: (1) develop a framework to allow students to explore both their own relationship to the environment and to understand the sociocultural constructs that have informed their personal environmental beliefs; and (2) apply this knowledge to critically assess various stakeholder perspectives of specific environmental issues.

**Prerequisite:** Graduate standing.

**Schedule Type:** Seminar

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 52052 HEALTH GEOGRAPHY 3 Credit Hours**

(Slashed with GEOG 42052 and GEOG 72052) This course examines health/medical geography, a subdiscipline of both public health and geography, that focuses on geographic aspects of health and disease. The field deals with human-environment interactions and their influence on human health. This course offers historical context to geography and health and covers three major approaches to health/medical geographic scholarship: ecological approaches, which systematically analyzes relationships between people and their environments; social approaches, including political economy and socio-behavioral approaches; and spatial approaches.

**Prerequisite:** Graduate standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 52053 GEOGRAPHIES OF MEMORY AND HERITAGE 3 Credit Hours**

(Slashed with GEOG 42053 and GEOG 72053) Course gives students a working knowledge in, and ability to understand and analyze, the intersection of memory and landscape as a tangible re-presentation of the human past, oftentimes used as a tangible expression of cultural or political power. Students focus on memorialization, preservation and tourism concepts and themes.

**Prerequisite:** Graduate standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 52064 SETTLING THE NORTH AMERICAN ENVIRONMENT 3 Credit Hours**

(Slashed with GEOG 42064 and GEOG 72064) Course surveys the environmental changes of the North American continent brought about by Indigenous, European Colonial and American land use practices, from pre-Columbian times to present. Students engage with foundational historical narratives, evidence and methods for understanding these geographic pasts. Course is a combination of lectures and discussions of readings and in-class activities.

**Prerequisite:** Graduate standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 52070 SEMINAR IN ETHNIC, LIFESTYLE AND NATIONAL COMMUNITIES 3 Credit Hours**

(Slashed with GEOG 42070 and GEOG 72070) Covers the geographies of ethnic identity and nationalism, national identity and territory, borderlands and diasporas, national separatism and the variety of ways in which cultural difference asserts itself.

**Prerequisite:** Graduate standing.

**Schedule Type:** Seminar

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 52195 SPECIAL TOPICS IN SOCIAL GEOGRAPHY 1-3 Credit Hours**

(Repeatable for a maximum 10 times)(Slashed with GEOG 42195 and GEOG 72195) Topics vary per course offering.

**Prerequisite:** Graduate standing.

**Schedule Type:** Lecture

**Contact Hours:** 1-3 lecture

**Grade Mode:** Standard Letter

**GEOG 54010 GEOGRAPHIES OF GLOBAL DEVELOPMENT 3 Credit Hours**

(Slashed with GEOG 44010 and GEOG 74010) This course examines the political economy of development. More narrowly, we examine the historical geography of agricultural transformations and capitalist development. We draw from case studies from different regions to interpret differential patterns of development and political-economic change. Emphasis is placed on the creation, structure, and operation of the capitalist agro-food system and its impact on small-scale farmers and landless rural workers.

**Prerequisite:** Graduate standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 54070 SPATIAL ANALYSIS AND LOCATION THEORY 3 Credit Hours**

(Slashed with GEOG 44070 and GEOG 74070) Classical theories for location of economic activities and contemporary approach of spatial analysis, spatial organization of economic systems behavioral models in economic geography and spatial allocation problems.

**Prerequisite:** Graduate standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 55085 URBAN TRANSPORTATION 3 Credit Hours**

(Slashed with GEOG 45085 and GEOG 75085) Transportation may be the single most important force shaping cities. Historically, cities have depended on their access to ports, canals, railroads and highways. Today, transportation networks, the use of public transportation, provisions for bicycles and pedestrians and transportation architecture continue to define how a city looks, feels and acts.

**Prerequisite:** Graduate standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 56060 FOOD SECURITY AND SUSTAINABILITY 3 Credit Hours**

(Slashed with GEOG 46060 and GEOG 76060) This course explores the concept of food security from the standpoint of agrarian change, food regimes, agroecology, and development. In the process, we examine the various frameworks that have grounded academic and popular understandings of famine and food security, including Malthusian, environmental determinism, Food Availability Decline (FAD), entitlements, and historical materialism.

**Prerequisite:** Graduate standing.

**Schedule Type:** Seminar

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 56070 URBAN AND REGIONAL PLANNING 3 Credit Hours**

(Slashed with GEOG 46070 and GEOG 76070) Examines how cities develop and what “people” – through government, quasi-public institutions and private interests – can do to modify urban growth, the distribution of people and places and urban design.

**Prerequisite:** Graduate standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 56080 URBAN SUSTAINABILITY 3 Credit Hours**

(Slashed with GEOG 46080 and GEOG 76080) Provides an introduction to interdisciplinary perspectives on urban sustainability, focusing on environmental challenges caused by urbanization and the innovative ways urban dwellers seek to address those challenges. Course provides background on relevant disciplinary perspectives and their application to environmental challenge domains.

**Prerequisite:** Graduate standing.

**Schedule Type:** Lecture, Seminar

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 56081 SEMINAR IN URBAN GEOGRAPHY 3 Credit Hours**

(Slashed with GEOG 46081 and GEOG 76081) Through class discussions and readings, students gain a better understanding of the various issues, projects and paradigms that make up the field of urban geography.

**Prerequisite:** Graduate standing.

**Schedule Type:** Seminar

**Contact Hours:** 3 other

**Grade Mode:** Standard Letter

**GEOG 56092 INTERNSHIP IN GEOGRAPHY AND PLANNING 3-6 Credit Hours**

(Repeatable for credit) Pre-professional work experience in local, regional and environmental planning agencies and private business designed to utilize and develop academic skills.

**Prerequisite:** Graduate standing; and special approval.

**Schedule Type:** Practical Experience

**Contact Hours:** 3-6 other

**Grade Mode:** Standard Letter

**GEOG 59070 GEOGRAPHIC INFORMATION SCIENCE 4 Credit Hours**

(Slashed with GEOG 49070 and GEOG 79070) Introduction to theories and methods for geographic data processing, including data capture and input, data storage and management and data analysis and displays. Emphasis is on laboratory exercises using GIS software packages for real-world applications.

**Prerequisite:** Graduate standing.

**Schedule Type:** Combined Lecture and Lab

**Contact Hours:** 3 lecture, 2 lab

**Grade Mode:** Standard Letter

**GEOG 59071 FUNDAMENTALS OF GEOGRAPHIC INFORMATION SCIENCE I 3 Credit Hours**

Introduction to fundamental concepts and methods for geographic data analysis, including data capture and input, data storage and management, and data analysis and display. Emphasis is on applications of GIS software to real world issues.

**Prerequisite:** Graduate standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 59072 GEOGRAPHIC INFORMATION SCIENCE AND HEALTH 3 Credit Hours**

(Slashed with GEOG 49072 and GEOG 79072) Geographic theory and methods serve as the connection among disparate disciplines focused on how and why “health” varies between regions, cities and neighborhoods. Students examine how geospatial technologies, especially GIS, have become an important health analysis tool.

**Prerequisite:** Graduate standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 59073 ENVIRONMENTAL DATA ANALYSIS IN R 3 Credit Hours**

(Slashed with GEOG 49073 and GEOG 79073) The course aims to teach students basic concepts, skills, and tools for working with data in R. R is an open-source (free!) programming language for statistical computing and graphics that statisticians widely use, scientists, data miners, and geographers. The number of R users grows exponentially each year, contributing to a massive online community and countless free tutorials. This is a hands-on course designed for students with no programming experience. However, this course does not teach statistics: understanding of basic statistics and common statistical tests is assumed and prior coursework in statistics is encouraged. With the knowledge gained in this course, students will be ready to undertake their own data analysis in R and increase their efficiency through reproducible workflows.

**Prerequisite:** Graduate standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 59075 GEOGRAPHIC INFORMATION SCIENCE: APPLICATIONS FOR SOCIAL PROBLEMS 3 Credit Hours**

(Slashed with GEOG 49075 and GEOG 79075) Course provides a survey of geographic information system (GIS) and related mapping applications that are used to understand and solve a variety of social problems (e.g., crime, poor health and educational outcomes, exposure to environmental hazards). Through case studies, students learn spatial data acquisition, basic spatial analysis and forms of map-based visual communication to stakeholders and the general public.

**Prerequisite:** GEOG 49070 or GEOG 59070 or GEOG 59071; and graduate standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 59076 SPATIAL PROGRAMMING 3 Credit Hours**

(Slashed with GEOG 49076 and GEOG 79076) Examination of the design, development and use of geographic information technologies with computer programming to model, process and visualize geographic phenomena.

**Prerequisite:** GEOG 59070; and graduate standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 59078 GEOGRAPHIC INFORMATION SCIENCE AND ENVIRONMENTAL HAZARDS 3 Credit Hours**

(Slashed with GEOG 49078 and GEOG 79078) The study and management of natural hazards are inherently reliant on both physical and human processes and spatial patterns. Given the many variables involved and the variety of scales at which they operate, use of geographic information system (GIS) has become standard practice in research on hazards and in their management by government agencies at all levels. Students are exposed to a wide array of spatial data that is used in these activities, as well as standard mapping and spatial analysis procedures and forms of data dissemination.

**Prerequisite:** GEOG 49070 or GEOG 59070 or GEOG 59071; and graduate standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 59080 ADVANCED GEOGRAPHIC INFORMATION SCIENCE 3 Credit Hours**

(Slashed with GEOG 49080 and GEOG 79080) Provides both an overview of geographic information science (GIS) data structures, analytical functions and usage and modeling approaches. Students learn how to manage GIS data in different formats or projections; select GIS analytical tools for solving different problems; and model changes of geographical phenomena as represented by GIS data.

**Prerequisite:** GEOG 59070; and graduate standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 59081 FUNDAMENTALS OF GEOGRAPHIC INFORMATION SCIENCE II 3 Credit Hours**

Advanced theories and techniques for handling and analyzing geographic data, analytical functions and modelling approaches. Topics covered include: two- and three-dimension processing of geographic information, detection of geographic patterns through spatial analysis and spatial statistics, network analysis, modeling of geographic processes and an overview of GIS programming tools.

**Prerequisite:** GEOG 59071; and graduate standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 59085 WEB AND MOBILE GEOGRAPHIC INFORMATION SCIENCE 3 Credit Hours**

(Slashed with GEOG 49085 and GEOG 79085) Explores how web and mobile phones present opportunities and challenges to the field of geographic information science (GIS). This includes the examination of the use, design and development of cyberinfrastructure-enabled GIS emphasizing web- and mobile-based interfaces and technologies. Students are recommended to have GIS experience to enroll in the course.

**Prerequisite:** Graduate standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 59162 CARTOGRAPHY 3 Credit Hours**

(Slashed with GEOG 49162 and GEOG 79162) Introduces map design principles including base maps, typography, generalization, symbols, color scheme, and classification. Builds on students' experiences with GIS to focus on applying map design principles using geospatial and graphic design software to produce effective print and static web maps.

**Prerequisite:** GEOG 49070 or GEOG 59070; and graduate standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 59195 SPECIAL TOPICS IN GEOGRAPHIC INFORMATION SCIENCE 1-3 Credit Hours**

(Repeatable for maximum 10 times)(Slashed with GEOG 49195 and GEOG 79195).Topics vary per course offering.

**Prerequisite:** Graduate standing.

**Schedule Type:** Lecture

**Contact Hours:** 1-3 lecture

**Grade Mode:** Standard Letter

**GEOG 59230 REMOTE SENSING 3 Credit Hours**

(Cross-listed with ESCI 52030)(Slashed with ESCI 42030, ESCI 72030, GEOG 49230, GEOG 79230) Computer analysis of multispectral satellite datasets. Applications in terrestrial earth science are emphasized.

**Prerequisite:** Graduate standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 60191 SEMINAR IN TOPICAL GEOGRAPHY 3 Credit Hours**

(Repeatable for credit)(Slashed with GEOG 70191) Seminar in one of the major topical fields in geography. Topics vary per course offering.

**Prerequisite:** Graduate standing.

**Schedule Type:** Seminar

**Contact Hours:** 3 other

**Grade Mode:** Standard Letter



**GEOG 60199 THESIS I 2-6 Credit Hours**

Thesis students must register for a total of 6 hours, 2 to 6 hours in single semester distributed over several semesters if desired.

**Prerequisite:** Graduate standing.

**Schedule Type:** Masters Thesis

**Contact Hours:** 2-6 other

**Grade Mode:** Satisfactory/Unsatisfactory-IP

**GEOG 60299 THESIS II 2 Credit Hours**

Thesis students must continue registration each semester until all degree requirements are met.

**Prerequisite:** GEOG 60199; and graduate standing.

**Schedule Type:** Masters Thesis

**Contact Hours:** 2 other

**Grade Mode:** Satisfactory/Unsatisfactory-IP

**GEOG 60800 SEMINAR IN THE DEVELOPMENT OF GEOGRAPHIC THOUGHT 3 Credit Hours**

(Slashed with GEOG 70800) Development of geographic knowledge and concepts with emphasis on recent development. Critical analysis of writings of representative geographers and scientists in related fields.

**Prerequisite:** Graduate standing.

**Schedule Type:** Seminar

**Contact Hours:** 3 other

**Grade Mode:** Standard Letter

**GEOG 60900 QUALITATIVE RESEARCH METHODS IN GEOGRAPHY 3 Credit Hours**

(Slashed with GEOG 70900) Introduces qualitative methods and research applications, along with methodological considerations of these approaches. Students consider the epistemology of qualitative research and learn the mechanics of conducting this research in the field. In class, these methods are put into practice and the results are put into writing.

**Prerequisite:** Graduate standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 60996 RESEARCH IN GEOGRAPHY 1-3 Credit Hours**

(Repeatable for credit) Students undertake individual research problems in geography.

**Prerequisite:** Graduate standing; and special approval.

**Schedule Type:** Research

**Contact Hours:** 1-3 other

**Grade Mode:** Standard Letter-IP

**GEOG 60998 RESEARCH I 1-15 Credit Hours**

(Repeatable for credit) Research or individual investigation for master's level graduate students. Credits earned may be applied toward meeting degree requirements if the department approves.

**Prerequisite:** Graduate standing.

**Schedule Type:** Research

**Contact Hours:** 1-15 other

**Grade Mode:** Standard Letter

**GEOG 61998 RESEARCH II 1-15 Credit Hours**

(Repeatable for credit) Research or individual investigation for master's level graduate students. Credits earned may be applied toward meeting degree requirements if the department approves.

**Prerequisite:** Graduate standing.

**Schedule Type:** Research

**Contact Hours:** 1-15 other

**Grade Mode:** Satisfactory/Unsatisfactory

**GEOG 62062 BEHAVIORAL GEOGRAPHY 3 Credit Hours**

(Slashed with GEOG 72062) Course focuses on spatial perception, cognition and behavior. Students discuss the collection and processing of spatial information, behavior in space, location of space and interaction in space.

**Prerequisite:** Graduate standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 67091 SEMINAR IN REGIONAL GEOGRAPHY 3 Credit Hours**

(Repeatable for credit)(Slashed with GEOG 77091) Variable content seminar on one of the major regions of world.

**Prerequisite:** Graduate standing.

**Schedule Type:** Seminar

**Contact Hours:** 3 other

**Grade Mode:** Standard Letter

**GEOG 69004 QUANTITATIVE METHODS IN GEOGRAPHY 3 Credit Hours**

(Slashed with GEOG 79004) Explores the methods and applications of some of the most common statistics found in geographic work. It explores probability theory, spatial statistics, estimation procedures, hypothesis testing, spatial sampling, methods of areal association, correlation and regression analysis, and principal components analysis.

Theory and execution of these methods are equally emphasized, and applications to geographic problems are examined within each theme.

**Prerequisite:** Graduate standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 69007 SPATIOTEMPORAL ANALYTICS 3 Credit Hours**

Course equips students with essential spatiotemporal thinking and technical skills in mapping, analyzing, visualizing, communicating and simulating the spatiotemporal data. The software ArcGIS and free packages in R and Netlogo are used in the instruction.

**Prerequisite:** GEOG 49070 or GEOG 59070 or GEOG 59071; and graduate standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 69073 GEOGRAPHIC INFORMATION SCIENCE: GLOBAL HEALTH 3 Credit Hours**

Emerging and re-emerging diseases in non-developed countries pose one of the greatest health challenges of current times. Geospatial approaches often provide one of the only information sources in data poor and challenging environments. The course exposes students to these health issues and disease environments through varied case studies, while simultaneously highlighting the geospatial methods and approaches used to understand and combat disease.

**Prerequisite:** Graduate standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 69074 GEOGRAPHIC INFORMATION SCIENCE: SPATIAL ANALYSIS FOR HEALTH GEOGRAPHY 3 Credit Hours**

Spatial analysis is used to verify patterns and associations in health data maps. These results can then be used to further hone the scientific question, or help design an intervention strategy. Course introduces students to spatial analytical approaches used by health researchers and practitioners in the exploratory investigation of health data. Students are exposed to new mobile technologies that can be used to enrich more traditional spatial data sources.

**Prerequisite:** GEOG 49070 or GEOG 59070 or GEOG 59071; and graduate standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 69079 ENVIRONMENTAL GEOGRAPHIC INFORMATION SCIENCE 3 Credit Hours**

GPS and environmental spatial data are commonly used in a variety of management and assessment plans in fields related to environmental science to achieve effective decision making and environmental resource management. Course focuses on techniques used to process, manage, visualize and analyze environmental data using GIS. Students learn how to collect and process GPS and online sources of geospatial data and how to employ techniques such as suitability modeling, measuring distributions and calculating landscape metrics.

**Prerequisite:** GEOG 49070 or GEOG 59070 or GEOG 59071; and graduate standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 69082 CYBERGIS 3 Credit Hours**

(Slashed with GEOG 79082) Explores cyberinfrastructure-enabled geographic information systems (i.e. cyberGIS) and related technologies including a broad introduction to the use, design, and development of cyberinfrastructure, spatial data infrastructures, geographic information services, and web-enabled mapping technologies. Situates CyberGIS in the broader context of geographic information science focusing on the how synthesizing computational thinking and spatial thinking influence methodological approaches.

**Prerequisite:** GEOG 49070 or GEOG 59070 or GEOG 59071; and graduate standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 69083 GEODATABASES 3 Credit Hours**

Course explores the essential concepts and skills needed to efficiently create a geodatabase, add data to it and realistically model the real-world spatial relationships inherent to the data. Students learn about geodatabase features that help ensure data integrity over time and about storing and managing geographic data.

**Prerequisite:** GEOG 49070 or GEOG 59070 or GEOG 59071; and graduate standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 69164 CARTOGRAPHIC DESIGN 3 Credit Hours**

Introduces students to the principles of map design and the art of map construction. Students will become familiar with the cartographic process, especially as they apply basic mapping concepts such as scale, projections, typography, generalization, symbols, color scheme, and classification to the design and production of thematic maps. Students will also learn how to describe and manipulate spatial data and how to select an appropriate map type for a given task and data set. This course builds on students' experiences with GIS to focus on the design needed to disseminate information beyond users of the software and produce effective print and web maps. Class exercises will provide hands-on experience in using GIS and graphic software packages. Principles and experiences learned in class will equip students with the fundamental skills necessary to effectively communicate graphic information through maps.

**Prerequisite:** GEOG 49070 or GEOG 59070 or GEOG 59071; and graduate standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 69231 ENVIRONMENTAL REMOTE SENSING 3 Credit Hours**

Introduction to the basic principles of environmental remote sensing, including the electromagnetic spectrum, spectral properties of Earth objects, aerial photograph analysis and interpretation and satellite image analysis and interpretation. Special focus will be on environmental applications, especially as they pertain to understanding vegetation, water, and land use mapping and impacts.

**Prerequisite:** Graduate standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 69392 PRACTICUM IN GEOGRAPHIC INFORMATION SCIENCE 6 Credit Hours**

Culminating experience for students in the MGISc program. It will be taken in place of two Carousel/Specialist courses on the schedule for the student's final semester. It is designed to provide practical experience in the application of MGISc course content in real-world professional settings. Students will select a professional project in consultation with their employer and program faculty and then will design, implement, and report on their activities in a culminating professional paper.

**Prerequisite:** GEOG 59070 or GEOG 59071 and GEOG 59080 or GEOG 59081 and GEOG 69164; and two additional graduate-level GEOG courses; and graduate standing; and special approval.

**Schedule Type:** Practical Experience

**Contact Hours:** 18 other

**Grade Mode:** Standard Letter-IP

**GEOG 69701 RESEARCH AND PRESENTATION OF GEOGRAPHIC DATA 3 Credit Hours**

Critical discussion of techniques of geographic research and preparation and presentation of research papers.

**Prerequisite:** Graduate standing.

**Schedule Type:** Seminar

**Contact Hours:** 3 other

**Grade Mode:** Standard Letter

**GEOG 70093 VARIABLE TITLE WORKSHOP IN GEOGRAPHY 1-5 Credit Hours**

(Repeatable for credit) Variable title workshop in geography.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Workshop

**Contact Hours:** 1-5 other

**Grade Mode:** Satisfactory/Unsatisfactory-IP

**GEOG 70191 SEMINAR IN TOPICAL GEOGRAPHY 3 Credit Hours**

(Repeatable for credit)(Slashed with GEOG 60191) Seminar in one of the major topical fields in geography. Topics vary per course offering.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Seminar

**Contact Hours:** 3 other

**Grade Mode:** Standard Letter

**GEOG 70195 SPECIAL TOPICS IN GEOGRAPHY 1-3 Credit Hours**

(Repeatable for credit)(Slashed with GEOG 40195 and GEOG 50195)

Topics vary according to research interest of the instructor.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Lecture

**Contact Hours:** 1-3 lecture

**Grade Mode:** Standard Letter

**GEOG 70285 FIELD EXPERIENCE IN GEOGRAPHY 3 Credit Hours**

(Slashed with GEOG 40285 and GEOG 50285) This course introduces students to field methods used in human and physical geography.

Students spend most of the class hours outside investigating important local resources like the Cuyahoga Valley National Park, where they are introduced to geographic approaches to real world problems. Specific field methods may include: landscape interpretation; atmospheric monitoring; hydrologic sampling; terrestrial habitat analyses; human and nature interactions; food desert investigation; urban green space ratios; and traffic data collection.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 70392 PRACTICUM IN EMERGING GEOGRAPHIC TRENDS 1-6 Credit Hours**

(Repeatable for credit) Students undertake a practicum in examining newly emerging geographic topics and techniques.

**Prerequisite:** Doctoral standing; and special approval.

**Schedule Type:** Practical Experience

**Contact Hours:** 1-6 other

**Grade Mode:** Satisfactory/Unsatisfactory

**GEOG 70492 STUDY AWAY IN GEOGRAPHY 1-3 Credit Hours**

(Repeatable for maximum 6 attempts)(Slashed with GEOG 40492 and GEOG 50492) Examination of geographic landscapes in the field.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Field Experience

**Contact Hours:** 3-9 other

**Grade Mode:** Standard Letter

**GEOG 70800 SEMINAR IN THE DEVELOPMENT OF GEOGRAPHIC THOUGHT 3 Credit Hours**

(Slashed with GEOG 60800) Development of geographic knowledge and concepts with emphasis on recent development. Critical analysis of writings of representative geographers and scientists in related fields.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Seminar

**Contact Hours:** 3 other

**Grade Mode:** Standard Letter

**GEOG 70900 QUALITATIVE RESEARCH METHODS IN GEOGRAPHY 3 Credit Hours**

(Slashed with GEOG 60900) Introduces qualitative methods and research applications, along with methodological considerations of these approaches. Students consider the epistemology of qualitative research and learn the mechanics of conducting this research in the field. In class, these methods are put into practice and the results are put into writing.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 71051 NATURAL DISASTERS AND SOCIETY 3 Credit Hours**

(Slashed with GEOG 41051 and GEOG 51051) Study of natural disasters; the physical causes of the hazards associated with the disasters; their effects on humans and societies; spatial and temporal distributions; and strategies to reduce the occurrences of disasters. Natural disasters include hurricanes, tornadoes, floods, landslides, heat waves, wildfire, blizzards, earthquakes, tsunami and volcanoes. Mitigation for disasters and responses to disasters are studied across economically developing nations and developed nations. Students learn through the analysis of numerous case studies of natural disasters.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 71052 GLACIERS AND GLACIATION 3 Credit Hours**

Examination of how glacial ice masses change the shape of the earth's surface, how they are integral to climate and sea level change, and how they pose high risk hazards.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 71065 APPLIED CLIMATOLOGY 3 Credit Hours**

(Slashed with GEOG 41065 and GEOG 51065) Course aims to provide a full appreciation for the range of applicability of climate data to real-world problems. There are three overarching goals of the course: (1) To provide a broad overview of what weather and climate information is out there and how people synthesize weather and climate information for use in applied work; (2) to enable a thorough appreciation for the breadth of disciplines in which applied climatology plays a role; and (3) to provide real-world experience of working through an applied climatological problem, via a final project.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 71066 GLOBAL CLIMATE CHANGE 3 Credit Hours**

(Slashed with GEOG 41066 and GEOG 51066) Examination of the evidence and causes of climate change and how these data are assessed. Students discuss past, present and future impacts of climate change and variability, in addition to policy implications.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 71073 CONSERVATION OF OUR NATURAL RESOURCES 3 Credit Hours**

(Slashed with GEOG 41073 and GEOG 51073) Evaluation of past and current problems associated with the management of natural resources and the environments associated with their utilization.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 71074 RESOURCE GEOGRAPHY 3 Credit Hours**

(Slashed with GEOG 41074 and GEOG 51074) Culture-technology and distance in relation to resource adequacy and management concepts for societal decisions about common property and situations with external economies.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 71077 WATER AND SOCIETY 3 Credit Hours**

(Slashed with GEOG 41077 and GEOG 51077) This course examines the relationships between water and the world's population with an emphasis on the developing world (Africa, Asia, Middle East, and Latin America). Students will analyze how water impacts humans and how humans impact water. The course begins by introducing the hydro-social cycle and network theories to provide a foundation and framework to understand the four primary course themes: water policy and governance (including privatization, public-private partnerships, and the various United Nations' global water initiatives), water as power (including social power and how governments politicize water), flooding and droughts (including vulnerabilities, adaptations, and mitigations), and inequalities (including on gender, quality, access, and affordability). The course concludes by revisiting these themes and applying ideas of water justice and sustainability. The course is primarily discussion-based with limited lectures to ensure students understand key concepts.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Seminar

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 71082 GEOGRAPHY OF SOILS 3 Credit Hours**

(Slashed with GEOG 41082 and GEOG 51082) An edaphological approach to soils, including morphology, formation, classification, geographical distribution and utilization. Students will be required to undertake field work.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 71195 SPECIAL TOPICS IN ENVIRONMENTAL GEOGRAPHY 1-3 Credit Hours**

(Repeatable for a maximum 10 times)(Slashed with GEOG 41195 and GEOG 51195) Topics vary per course offering.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Lecture

**Contact Hours:** 1-3 lecture

**Grade Mode:** Standard Letter

**GEOG 71800 GLOBAL ENVIRONMENTAL ISSUES 3 Credit Hours**

(Slashed with GEOG 41800 and GEOG 51800) Course examines environmental belief systems and explores various perceptions of the Earth's environment and its opportunities, constraints and risks. The goals of the course is twofold: (1) develop a framework to allow students to explore both their own relationship to the environment and to understand the sociocultural constructs that have informed their personal environmental beliefs; and (2) apply this knowledge to critically assess various stakeholder perspectives of specific environmental issues.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Seminar

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 72052 HEALTH GEOGRAPHY 3 Credit Hours**

(Slashed with GEOG 42052 and GEOG 52052) This course examines health/medical geography, a subdiscipline of both public health and geography, that focuses on geographic aspects of health and disease. The field deals with human-environment interactions and their influence on human health. This course offers historical context to geography and health and covers three major approaches to health/medical geographic scholarship: ecological approaches, which systematically analyzes relationships between people and their environments; social approaches, including political economy and socio-behavioral approaches; and spatial approaches.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 72053 GEOGRAPHIES OF MEMORY AND HERITAGE 3 Credit Hours**

(Slashed with GEOG 42053 and GEOG 52053) Course gives students a working knowledge in, and ability to understand and analyze, the intersection of memory and landscape as a tangible re-presentation of the human past, oftentimes used as a tangible expression of cultural or political power. Students focus on memorialization, preservation and tourism concepts and themes.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 72062 BEHAVIORAL GEOGRAPHY 3 Credit Hours**

(Slashed with GEOG 62062) Course focuses on spatial perception, cognition and behavior. Students discuss the collection and processing of spatial information, behavior in space, location of space and interaction in space.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter



**GEOG 72064 SETTling THE NORTH AMERICAN ENVIRONMENT 3 Credit Hours**

(Slashed with GEOG 42064 and GEOG 52064) Course surveys the environmental changes of the North American continent brought about by Indigenous, European Colonial and American land use practices, from pre-Columbian times to present. Students engage with foundational historical narratives, evidence and methods for understanding these geographic pasts. Course is a combination of lectures and discussions of readings and in-class activities.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 72070 SEMINAR IN ETHNIC, LIFESTYLE AND NATIONAL COMMUNITIES 3 Credit Hours**

(Slashed with GEOG 42070 and GEOG 52070) Covers the geographies of ethnic identity and nationalism, national identity and territory, borderlands and diasporas, national separatism and the variety of ways in which cultural difference asserts itself.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Seminar

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 72195 SPECIAL TOPICS IN SOCIAL GEOGRAPHY 1-3 Credit Hours**

(Repeatable for maximum of 10 times)(Slashed with GEOG 42195 and GEOG 52195) Topics vary per course offering.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Lecture

**Contact Hours:** 1-3 lecture

**Grade Mode:** Standard Letter

**GEOG 74010 GEOGRAPHIES OF GLOBAL DEVELOPMENT 3 Credit Hours**

(Slashed with GEOG 44010 and GEOG 54010) This course examines the political economy of development. More narrowly, we examine the historical geography of agricultural transformations and capitalist development. We draw from case studies from different regions to interpret differential patterns of development and political-economic change. Emphasis is placed on the creation, structure, and operation of the capitalist agro-food system and its impact on small-scale farmers and landless rural workers.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 74070 SPATIAL ANALYSIS AND LOCATION THEORY 3 Credit Hours**

(Slashed with GEOG 44070 and GEOG 54070) Classical theories for location of economic activities and contemporary approach of spatial analysis, spatial organization of economic systems, behavioral models in economic geography and spatial allocation problems.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 75085 URBAN TRANSPORTATION 3 Credit Hours**

(Slashed with GEOG 45085 and GEOG 55085) Transportation may be the single most important force shaping cities. Historically, cities have depended on their access to ports, canals, railroads and highways. Today, transportation networks, the use of public transportation, provisions for bicycles and pedestrians and transportation architecture continue to define how a city looks, feels and acts.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 76060 FOOD SECURITY AND SUSTAINABILITY 3 Credit Hours**

(Slashed with GEOG 46060 and GEOG 56060) This course explores the concept of food security from the standpoint of agrarian change, food regimes, agroecology, and development. In the process, we examine the various frameworks that have grounded academic and popular understandings of famine and food security, including Malthusian, environmental determinism, Food Availability Decline (FAD), entitlements, and historical materialism.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Seminar

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 76070 URBAN AND REGIONAL PLANNING 3 Credit Hours**

(Slashed with GEOG 46070 and GEOG 56070) Examines how cities develop and what "people" – through government, quasi-public institutions and private interests – can do to modify urban growth, the distribution of people and places and urban design.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 76080 URBAN SUSTAINABILITY 3 Credit Hours**

(Slashed with GEOG 46080 and GEOG 56080) Provides an introduction to interdisciplinary perspectives on urban sustainability, focusing on environmental challenges caused by urbanization and the innovative ways urban dwellers seek to address those challenges. Course provides background on relevant disciplinary perspectives and their application to environmental challenge domains.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Lecture, Seminar

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 76081 SEMINAR IN URBAN GEOGRAPHY 3 Credit Hours**

(Slashed with GEOG 46081 and GEOG 56081) Through class discussions and readings, students gain a better understanding of the various issues, projects and paradigms that make up the field of urban geography.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Seminar

**Contact Hours:** 3 other

**Grade Mode:** Standard Letter

**GEOG 77091 SEMINAR IN REGIONAL GEOGRAPHY 3 Credit Hours**

(Repeatable for credit)(Slashed with GEOG 67091) Variable content seminar on one of the major regions of world.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Seminar

**Contact Hours:** 3 other

**Grade Mode:** Standard Letter



**GEOG 79004 QUANTITATIVE METHODS IN GEOGRAPHY 3 Credit Hours**

(Slashed with GEOG 69004) Explores the methods and applications of some of the most common statistics found in geographic work. It explores probability theory, spatial statistics, estimation procedures, hypothesis testing, spatial sampling, methods of areal association, correlation and regression analysis, and principal components analysis. Theory and execution of these methods are equally emphasized, and applications to geographic problems are examined within each theme.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 79070 GEOGRAPHIC INFORMATION SCIENCE 4 Credit Hours**

(Slashed with GEOG 49070 and GEOG 59070) Introduction to theories and methods for geographic data processing, including data capture and input, data storage and management and data analysis and displays. Emphasis is on laboratory exercises using GIS software packages for real-world applications.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Combined Lecture and Lab

**Contact Hours:** 3 lecture, 2 lab

**Grade Mode:** Standard Letter

**GEOG 79072 GEOGRAPHIC INFORMATION SCIENCE AND HEALTH 3 Credit Hours**

(Slashed with GEOG 49072 and GEOG 59072) Geographic theory and methods serve as the connection among disparate disciplines focused on how and why "health" varies between regions, cities and neighborhoods. Students examine how geospatial technologies, especially GIS, have become an important health analysis tool.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 79073 ENVIRONMENTAL DATA ANALYSIS IN R 3 Credit Hours**

(Slashed with GEOG 49073 and GEOG 49073) The course aims to teach students basic concepts, skills, and tools for working with data in R. R is an open-source (free!) programming language for statistical computing and graphics that statisticians widely use, scientists, data miners, and geographers. The number of R users grows exponentially each year, contributing to a massive online community and countless free tutorials. This is a hands-on course designed for students with no programming experience. However, this course does not teach statistics: understanding of basic statistics and common statistical tests is assumed and prior coursework in statistics is encouraged. With the knowledge gained in this course, students will be ready to undertake their own data analysis in R and increase their efficiency through reproducible workflows.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 79075 GEOGRAPHIC INFORMATION SCIENCE: APPLICATIONS FOR SOCIAL PROBLEMS 3 Credit Hours**

(Slashed with GEOG 49075 and GEOG 59075) Course provides a survey of geographic information system (GIS) and related mapping applications that are used to understand and solve a variety of social problems (e.g., crime, poor health and educational outcomes, exposure to environmental hazards). Through case studies, students learn spatial data acquisition, basic spatial analysis and forms of map-based visual communication to stakeholders and the general public.

**Prerequisite:** GEOG 79070; and doctoral standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 79076 SPATIAL PROGRAMMING 3 Credit Hours**

(Slashed with GEOG 49076 and GEOG 59076) Examination of the design, development and use of geographic information technologies with computer programming to model process and visualize geographic phenomena.

**Prerequisite:** GEOG 79070; and doctoral standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 79078 GEOGRAPHIC INFORMATION SCIENCE AND ENVIRONMENTAL HAZARDS 3 Credit Hours**

(Slashed with GEOG 49078 and GEOG 59078) The study and management of natural hazards are inherently reliant on both physical and human processes and spatial patterns. Given the many variables involved and the variety of scales at which they operate, use of geographic information system (GIS) has become standard practice in research on hazards and in their management by government agencies at all levels. Students are exposed to a wide array of spatial data that is used in these activities, as well as standard mapping and spatial analysis procedures and forms of data dissemination.

**Prerequisite:** GEOG 79070; and doctoral standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 79080 ADVANCED GEOGRAPHIC INFORMATION SCIENCE 3 Credit Hours**

(Slashed with GEOG 49080 and GEOG 59080) Provides both an overview of geographic information science (GIS) data structures, analytical functions and usage and modeling approaches. Students learn how to manage GIS data in different formats or projections; select GIS analytical tools for solving different problems; and model changes of geographical phenomena as represented by GIS data.

**Prerequisite:** GEOG 79070; and doctoral standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 79082 CYBERGIS 3 Credit Hours**

(Slashed with GEOG 69082) Explores cyberinfrastructure-enabled geographic information systems (i.e. cyberGIS) and related technologies including a broad introduction to the use, design, and development of cyberinfrastructure, spatial data infrastructures, geographic information services, and web-enabled mapping technologies. Situates cyberGIS in the broader context of geographic information science focusing on the how synthesizing computational thinking and spatial thinking influence methodological approaches.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 79085 WEB AND MOBILE GEOGRAPHIC INFORMATION SCIENCE 3 Credit Hours**

(Slashed with GEOG 49085 and GEOG 59085) Explores how web and mobile phones present opportunities and challenges to the field of geographic information science (GIS). This includes the examination of the use, design and development of cyberinfrastructure-enabled GIS emphasizing web- and mobile-based interfaces and technologies. Students are recommended to have GIS experience to enroll in the course.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 79162 CARTOGRAPHY 3 Credit Hours**

(Slashed with GEOG 49162 and GEOG 59162) Study of the design and production of dynamic, interactive, multimedia web-based mapping. Data acquisition and processing, symbolization, composition, text and color utilization.

**Prerequisite:** GEOG 49070 or GEOG 59070 or GEOG 79070; and doctoral standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 79195 SPECIAL TOPICS IN GEOGRAPHIC INFORMATION SCIENCE 1-3 Credit Hours**

(Repeatable for maximum 10 times)(Slashed with GEOG 49195 and GEOG 59195). Topics vary per course offering.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Lecture

**Contact Hours:** 1-3 lecture

**Grade Mode:** Standard Letter

**GEOG 79230 REMOTE SENSING 3 Credit Hours**

(Cross-listed with ESCI 72030)(Slashed with ESCI 42030, ESCI 52030, GEOG 49230, GEOG 59230) Computer analysis of multispectral satellite datasets. Applications in terrestrial earth science are emphasized.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GEOG 80199 DISSERTATION I 15 Credit Hours**

(Repeatable for credit) Doctoral dissertation, for which registration in at least two semesters is required first of which will be semester in which dissertation work is begun and continuing until the completion of 30 hours.

**Prerequisite:** Doctoral standing; and special approval.

**Schedule Type:** Dissertation

**Contact Hours:** 15 other

**Grade Mode:** Satisfactory/Unsatisfactory-IP

**GEOG 80299 DISSERTATION II 15 Credit Hours**

(Repeatable for credit) Continuing registration required of doctoral students who have completed the initial 30 hours of dissertation and continuing until all degree requirements are met.

**Prerequisite:** GEOG 80199; and doctoral standing.

**Schedule Type:** Dissertation

**Contact Hours:** 15 other

**Grade Mode:** Satisfactory/Unsatisfactory-IP

**GEOG 80998 RESEARCH I 1-15 Credit Hours**

(Repeatable for credit) Research or individual investigation for doctoral students who have not yet passed their candidacy examination. Credits earned may be applied toward degree if department approves.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Research

**Contact Hours:** 1-15 other

**Grade Mode:** Standard Letter

**GEOG 81091 RESEARCH IN PHYSICAL RESOURCES 2,3 Credit Hours**

(Repeatable for credit) Research on basic processes related to formation of physical environment. Investigation of significant variables in resource utilization relevant to regional planning and development.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Research

**Contact Hours:** 2-3 other

**Grade Mode:** Standard Letter-IP

**GEOG 81998 RESEARCH II 1-15 Credit Hours**

(Repeatable for credit) Research or individual investigation for doctoral students who have not yet passed their candidacy examination. Credits earned may be applied toward degree if department approves.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Research

**Contact Hours:** 1-15 other

**Grade Mode:** Satisfactory/Unsatisfactory

**GEOG 89092 GRADUATE FIELD CAMP 5 Credit Hours**

(Repeatable for credit) Field research problems involving individual investigation of specific urban or rural region.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Field Experience

**Contact Hours:** 3 other

**Grade Mode:** Standard Letter

**GEOG 89098 RESEARCH IN CARTOGRAPHY 1-3 Credit Hours**

(Repeatable for credit) Investigations into function of map as medium of scientific expression; problem of map design in relation to human perception of graphically expressed spatial information.

**Prerequisite:** Doctoral standing.

**Schedule Type:** Research

**Contact Hours:** 1-3 other

**Grade Mode:** Standard Letter