GEOGRAPHY (GEOG)

GEOG 10160  INTRODUCTION TO GEOGRAPHY (KSS)  3 Credit Hours
A broad introduction to the study of geographic patterns on Earth. This 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
Attributes: Kent Core Social Sciences, Transfer Module Social Sciences

GEOG 16001  SOIL AND HORTICULTURAL MANAGEMENT  3 Credit Hours
To provide students with an understanding of the relationship of soil, nutrients and fertilizers, and to understand how to properly plant trees, shrubs and flowers. Offered at Salem campus only.
Prerequisite: None.
Schedule Type: Lecture
Contact Hours: 3 lecture
Grade Mode: Standard Letter
Attributes: Kent Core Social Sciences, Transfer Module Social Sciences

GEOG 17063  WORLD GEOGRAPHY (DIVG) (KSS)  3 Credit Hours
An overview of the differences and similarities within and between regions of the world, studying the impacts of spatial processes as they operate at regional, global, and local scales. The 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 U.S. and Canada. The class 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)Explores emerging topics in geography not covered in other existing courses. Variable content course.
Prerequisite: None.
Schedule Type: Lecture
Contact Hours: 1-3 lecture
Grade Mode: Standard Letter
Attributes: Diversity Global

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
This 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 lab 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

GEOG 22040  INTRODUCTION TO GLOBAL TOURISM (DIVG)  3 Credit Hours
(Cross-listed with RPTM 26060) Introduction to travel and tourism around the world, including tourism technologies, 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
Human Geography is an introduction to the spatial patterns and processes of human activity on Earth. This course examines how humans understand and interact with the world. It considers 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

GEOG 29160  MAPPING OUR WORLD  3 Credit Hours
This course is a first step for students to understand the importance of maps. Exposure to case studies and various mapping techniques will allow students to learn both the fundamentals of cartography, what are spatial data, and how we 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. Methods of weather prediction and man's modification of weather are highlighted.
Prerequisite: None.
Schedule Type: Lecture
Contact Hours: 3 lecture
Grade Mode: Standard Letter

GEOG 31064  PRINCIPLES OF CLIMATOLOGY  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 our cultural, social and political history and experiences. In this 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  CAMPUS AND COMMUNITY GARDENS (ELR)  3 Credit Hours
This course gives students a working knowledge in, and ability to understand and analyze, the intersections of food production, access, and consumption. It enables students to apply a critical geographic lens to compare the traditional food production system with alternatives at various scales, from local to global. It focuses on urban community gardening as one such alternative and empowers students to personally interact with the Stark campus' Flash's Food Garden as a case study in planning and preparing such a garden. It accomplishes these tasks by combining 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. Our interest goes beyond space to place: the recognition that these patterns are socially produced and as such, change over time. The approach of this course is to 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
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: None.
Schedule Type: Lecture
Contact Hours: 3 lecture
Grade Mode: Standard Letter

GEOG 37040  GEOGRAPHY OF AFRICA (DIVG)  3 Credit Hours
This course deals with the complex geographical and cultural elements in Africa. It demonstrates how the interaction of these elements has affected Africa's linkages to other continents especially North America. Furthermore it, discusses 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. This 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 it has undergone significant change and experienced many struggles. Its attempts to integrate have led to significant debates about just what it means to be “European”. This class will cover Europe using a systematic approach. In addition to the physical, political, religious, linguistic, social, and economic environments within Europe, we’ll explore the issues that tie Europeans to each other and to the outside world. We’ll sum many of these aspects up 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 U.S.
Prerequisite: None.
Schedule Type: Lecture
Contact Hours: 3 lecture
Grade Mode: Standard Letter

GEOG 37074 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 37076 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. In this course, a thematic approach is taken 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 37084 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 11009 or MATH 11010 or MATH 10041.
Schedule Type: Lecture
Contact Hours: 3 lecture
Grade Mode: Standard Letter

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.
Prerequisite: None.
Schedule Type: Lecture
Contact Hours: 3 lecture
Grade Mode: Standard Letter

GEOG 39002 VARIABLE TITLE WORKSHOP IN GEOGRAPHY 1-6 Credit Hours
(Repeatable for credit)S/u graded.
Prerequisite: Permission.
Schedule Type: Workshop
Contact Hours: 1-6 other
Grade Mode: Satisfactory/Unsatisfactory

GEOG 40191 SEMINAR IN GEOGRAPHY (ELR) (WIC) 3 Credit Hours
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 supervised.
Prerequisite: Permission.
Schedule Type: Practicum or Internship
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) (Cross-listed with GEOG 50195 and GEOG 70195)
Prerequisite: Special approval.
Schedule Type: Lecture
Contact Hours: 1-3 lecture
Grade Mode: Standard Letter

GEOG 40292  FIELD EXPERIENCE IN GEOGRAPHY (ELR)  1-6 Credit Hours
(Repeatable for credit) (Cross-listed with GEOG 50292 and GEOG 70292)
Examination of geographic landscapes in the field.
Prerequisite: Special approval.
Schedule Type: Field Experience
Contact Hours: 12-72 other
Grade Mode: Satisfactory/Unsatisfactory
Attributes: Experiential Learning Requirement

GEOG 40392  PRACTICUM IN EMERGING GEOGRAPHIC TRENDS (ELR)  1-6 Credit Hours
(Repeatable for credit) Examination of newly emerging geographic topics and techniques.
Prerequisite: Special approval.
Schedule Type: Practicum or Internship
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 6 times for credit) Examination of geographic landscapes in the field.
Prerequisite: None.
Schedule Type: Field 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) Individual undergraduate investigation or research on specific geographical problems.
Prerequisite: Permission.
Schedule Type: Individual Investigation
Contact Hours: 1-3 other
Grade Mode: Standard Letter-IP

GEOG 41051  NATURAL DISASTERS AND SOCIETY  3 Credit Hours
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. Taught through the analysis of numerous case studies of natural disasters.
Prerequisite: None.
Schedule Type: Lecture
Contact Hours: 3 lecture
Grade Mode: Standard Letter

GEOG 41052  GLACIERS AND GLACIATION  3 Credit Hours
(Cross-listed with GEOL 44052) (Slashed with GEOG 51052, GEOG 71052, GEOL 54052, GEOL 74052) 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: GEOG 21062 or GEOL 11040.
Schedule Type: Lecture
Contact Hours: 3 lecture
Grade Mode: Standard Letter

GEOG 41065  APPLIED CLIMATOLOGY  3 Credit Hours
Aimed at providing a full appreciation for the range of applicability of climate data to real-world problems. There are three overarching goals of the course: To provide a broad overview of what weather and climate information is out there and how we synthesize weather and climate information for use in applied work; to enable a thorough appreciation for the breadth of disciplines in which applied climatology plays a role; and to provide real-world experience of working through an applied climatological problem, via the final project.
Prerequisite: GEOG 31062 or 31064.
Schedule Type: Lecture
Contact Hours: 3 lecture
Grade Mode: Standard Letter

GEOG 41066  GLOBAL CLIMATE CHANGE  3 Credit Hours
(Cross-listed with GEOG 51066 and GEOG 71066) Examination of the evidence and causes of climate change and how these data are assessed. Past, present and future impacts of climate change and variability are discussed along with policy implications.
Prerequisite: None.
Schedule Type: Lecture
Contact Hours: 3 lecture
Grade Mode: Standard Letter

GEOG 41073  CONSERVATION OF NATURAL RESOURCES  3 Credit Hours
(Cross-listed 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.
GEOG 41074  RESOURCE GEOGRAPHY   3 Credit Hours
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 41082  GEOGRAPHY OF SOILS   3 Credit Hours
An edaphological approach to soils including morphology, formation,
classification, geographical distribution and utilization. Field work
required.
Prerequisite: GEOG 21062 or GEOL 11040.
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 of 10 times) (Cross-listed with GEOG 51195
and GEOG 71195) Special topics in environmental geography.
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 + GEOG 71800): This course examines
environmental belief systems and explores various perceptions of
the Earth's environment and its opportunities, constraints, and risks.
The goals of this course are to develop a framework which will allow
students to explore both their own relationship to the environment and
to understand the sociocultural constructs which have informed their
personal environmental beliefs and to 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)(Slashed with SRM 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  MEDICAL GEOGRAPHY   3 Credit Hours
(Cross-listed with GEOG 52052 and GEOG 72052) This course explores
the interconnection between geography and health. Past and present
epidemics, global health risks and their variation, the link between
disasters and disease, and the factors leading to health disparities will all
be considered from a spatial perspective.
Prerequisite: None.
Schedule Type: Lecture
Contact Hours: 3 lecture
Grade Mode: Standard Letter

GEOG 42053  GEOGRAPHIES OF MEMORY AND HERITAGE   3 Credit Hours
(Cross-listed with GEOG 52053 and GEOG 72053) 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. To this end the course focuses 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
(Cross-listed with GEOG 52064 and GEOG 72064) This class 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 will engage with foundational
historical narratives, evidence, and methods for understanding these
graphic pasts. The class is taught through a combination of lectures
and discussions of readings and in-class activities.
Prerequisite: GEOG 17064.
Schedule Type: Lecture
Contact Hours: 3 lecture
Grade Mode: Standard Letter

GEOG 42195  SPECIAL TOPICS IN SOCIAL GEOGRAPHY   1-3 Credit Hours
(Repeatable for a maximum of 10 times) (Cross-listed with GEOG 52195
and 72195) Special topics in social geography.
Prerequisite: None.
Schedule Type: Lecture
Contact Hours: 1-3 lecture
Grade Mode: Standard Letter

GEOG 42200  SEMINAR IN ETHNIC, LIFESTYLE AND NATIONAL
COMMUNITIES   3 Credit Hours
(Slashed with GEOG 52200 and GEOG 72200) 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 42410  GEOGRAPHY OF THE GLOBAL ECONOMY (WIC)   3 Credit Hours
Geographic analysis of the increasing interconnectedness of economic
activity. The social, technological and political changes associated with
globalization are also discussed.
Prerequisite: GEOG 34070 or ECON 22061.
Schedule Type: Lecture
Contact Hours: 3 lecture
Grade Mode: Standard Letter
Attributes: Writing Intensive Course
GEOG 44070  SPATIAL ANALYSIS AND LOCATION THEORY  3 Credit Hours
(Cross-listed 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
(Cross-listed with GEOG 55085 and GEOG 75085) Transportation may be the single most important force shaping our 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 46070  URBAN AND REGIONAL PLANNING  3 Credit Hours
(Cross-listed 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. It 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, this course offers participants 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) (Cross-listed with GEOG 56092) Pre-professional work experience in local, regional and environmental planning agencies and in business designed to utilize and develop academic skills.
Prerequisite: Controlled registration admission competitive based on student’s skills and interests and on number of positions available.
Schedule Type: Practicum or Internship
Contact Hours: 3-6 other
Grade Mode: Standard Letter
Attributes: Experiential Learning Requirement

GEOG 49070  GEOGRAPHIC INFORMATION SCIENCE  4 Credit Hours
(Cross-listed 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

GEOG 49072  GEOGRAPHIC INFORMATION SCIENCE AND HEALTH  3 Credit Hours
(Cross-listed 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. This course examines 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 49075  GEOGRAPHIC INFORMATION SCIENCE AND APPLICATIONS FOR SOCIAL PROBLEMS  3 Credit Hours
(Cross-listed with GEOG 59075 and GEOG 79075) This course provides a survey of Geographic Information Systems (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, it focuses on teaching students about 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
(Cross-listed 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
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**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 Systems (GIS) has become standard practice in research on hazards and in their management by government agencies at all levels. Exposes students 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**
Provides both an overview of GIS data structures, analytical functions and usage, and modeling approaches. Students will 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. GIS experience recommended.

**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) 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 49163 CARTOGRAPHY AND GEOVISUALIZATION LABORATORY 1 Credit Hour**
(Slashed with GEOG 59163 and GEOG 79163) Practical experience in the techniques of data acquisition and processing for dynamic, multimedia, and online map production and geovisualizations.

**Prerequisite:** GEOG 49070.

**Corequisite:** GEOG 49162.

**Schedule Type:** Laboratory

**Contact Hours:** 2 lab

**Grade Mode:** Standard Letter

**GEOG 49195 SPECIAL TOPICS IN GEOGRAPHIC INFORMATION SCIENCE 1-3 Credit Hours**
(Repeatable for a maximum of 10 times) (Cross-listed with GEOG 59195 and GEOG 79195) Special topics in geographic information sciences.

**Prerequisite:** None.

**Schedule Type:** Lecture

**Contact Hours:** 1-3 lecture

**Grade Mode:** Standard Letter

**GEOG 49230 REMOTE SENSING 3 Credit Hours**
(Slashed with GEOL 42030)(Slashed with GEOG 59230, GEOG 79230, GEOL 52030, GEOL 72030) 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) (Cross-listed with GEOG 40195 and GEOG 70195) Topics vary according to research interest of person teaching the course.

**Prerequisite:** Graduate standing.

**Schedule Type:** Lecture

**Contact Hours:** 1-3 lecture

**Grade Mode:** Standard Letter

**GEOG 50292 FIELD EXPERIENCE IN GEOGRAPHY 1-6 Credit Hours**
(Repeatable for credit) (Cross-listed with GEOG 40292 and GEOG 70292) Examination of geographic landscapes in the field.

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

**Schedule Type:** Field Experience

**Contact Hours:** 12-72 other

**Grade Mode:** Satisfactory/Unsatisfactory
GEOG 50392  PRACTICUM IN EMERGING GEOGRAPHIC TRENDS  1-6 Credit Hours
(Repeatable for credit) Examination of newly emerging geographic topics and techniques.
Prerequisite: Graduate standing; and special approval.
Schedule Type: Practicum or Internship
Contact Hours: 1-6 other
Grade Mode: Satisfactory/Unsatisfactory

GEOG 50492  STUDY AWAY IN GEOGRAPHY  1-3 Credit Hours
(Repeatable 6 times for credit) Examination of geographic landscapes in the field.
Prerequisite: None.
Schedule Type: Field Experience
Contact Hours: 3-9 other
Grade Mode: Standard Letter

GEOG 51051  NATURAL DISASTERS AND SOCIETY  3 Credit Hours
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. Taught 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 51052  GLACIERS AND GLACIATION  3 Credit Hours
(Cross-listed with GEOL 54052)(Slashed with GEOG 41052, GEOG 71052, GEOL 44052, GEOL 74052) 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: Graduate standing.
Schedule Type: Lecture
Contact Hours: 3 lecture
Grade Mode: Standard Letter

GEOG 51055  APPLIED CLIMATOLOGY  3 Credit Hours
Aimed at providing a full appreciation for the range of applicability of climate data to real-world problems. There are three overarching goals of the course: To provide a broad overview of what weather and climate information is out there and how we synthesize weather and climate information for use in applied work; to enable a thorough appreciation for the breadth of disciplines in which applied climatology plays a role; and to provide real-world experience of working through an applied climatological problem, via the final project.
Prerequisite: Graduate standing.
Schedule Type: Lecture
Contact Hours: 3 lecture
Grade Mode: Standard Letter

GEOG 51066  GLOBAL CLIMATE CHANGE  3 Credit Hours
(Cross-listed with GEOG 41066 and GEOG 71066) Examination of the evidence and causes of climate change and how these data are assessed. Past, present and future impacts of climate change and variability are discussed along with 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
(Cross-listed 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
Cultural attitudes, conceptual approaches and techniques in resource geography analysis of selected resource issues at various areal scales.
Prerequisite: Graduate standing.
Schedule Type: Lecture
Contact Hours: 3 lecture
Grade Mode: Standard Letter

GEOG 51075  SPECIAL TOPICS IN ENVIRONMENTAL GEOGRAPHY  1-3 Credit Hours
(Repeatable for a maximum of 10 times) (Cross-listed with GEOG 41195 and GEOG 71195) Special topics in environmental geography.
Prerequisite: Graduate standing.
Schedule Type: Lecture
Contact Hours: 1-3 lecture
Grade Mode: Standard Letter

GEOG 51195  SPECIAL TOPICS IN ENVIRONMENTAL GEOGRAPHY  1-3 Credit Hours
(Repeatable for a maximum of 10 times) (Cross-listed with GEOG 41195 and GEOG 71195) Special topics in environmental geography.
Prerequisite: Graduate standing.
Schedule Type: Lecture
Contact Hours: 3 lecture
Grade Mode: Standard Letter

GEOG 51199  GLOBAL ENVIRONMENTAL ISSUES  3 Credit Hours
(Slashed with GEOG 41199 and GEOG 71199) This course examines environmental belief systems and explores various perceptions of the Earth's environment and its opportunities, constraints, and risks. The goals of this course are to develop a framework which will allow students to explore both their own relationship to the environment and to understand the sociocultural constructs which have informed their personal environmental beliefs and to 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  MEDICAL GEOGRAPHY  3 Credit Hours
(Cross-listed with GEOG 42052 and GEOG 72052) This course explores the interconnection between geography and health. Past and present epidemics, global health risks and their variation, the link between disasters and disease, and the factors leading to health disparities will all be considered from a spatial perspective.
Prerequisite: Graduate standing.
Schedule Type: Lecture
Contact Hours: 3 lecture
Grade Mode: Standard Letter
GEOG 52053 GEOGRAPHIES OF MEMORY AND HERITAGE  3 Credit Hours
(Cross-listed with GEOG 42053 and GEOG 72053) 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. To this end the course focuses 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
(Cross-listed with GEOG 42064 and GEOG 72064) This class 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 will engage with foundational historical narratives, evidence, and methods for understanding these geographic pasts. The class is taught through 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 of 10 times) (Cross-listed with GEOG 42195 and GEOG 72195) Special topics in social geography.
Prerequisite: Graduate standing.
Schedule Type: Lecture
Contact Hours: 1-3 lecture
Grade Mode: Standard Letter

GEOG 54010 GEOGRAPHY OF THE GLOBAL ECONOMY  3 Credit Hours
(Cross-listed with GEOG 44010 and GEOG 74010) Geographic analysis of the increasing interconnectedness of economic activity. The social, technological and political changes associated with globalization are also discussed.
Prerequisite: Graduate standing.
Schedule Type: Lecture
Contact Hours: 3 lecture
Grade Mode: Standard Letter

GEOG 54070 SPATIAL ANALYSIS AND LOCATION THEORY  3 Credit Hours
(Cross-listed 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
(Cross-listed with GEOG 45085 and GEOG 75085) Transportation may be the single most important force shaping our 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 56070 URBAN AND REGIONAL PLANNING  3 Credit Hours
(Cross-listed 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
(Cross-listed 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. It 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, this course offers participants 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) (Cross-listed with GEOG 46092) Preprofessional 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: Practicum or Internship
Contact Hours: 3-6 other
Grade Mode: Standard Letter
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
<th>Grade Mode</th>
<th>Contact Hours</th>
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<tbody>
<tr>
<td>GEOG 59070</td>
<td>GEOGRAPHIC INFORMATION SCIENCE</td>
<td>4</td>
<td>Standard Letter</td>
<td>3 lecture, 2 lab</td>
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<td></td>
<td>(Cross-listed 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.</td>
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<td><strong>Prerequisite:</strong> Graduate standing.</td>
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<td><strong>Schedule Type:</strong> Combined Lecture and Lab</td>
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<td>GEOG 59071</td>
<td>FUNDAMENTALS OF GEOGRAPHIC INFORMATION SCIENCE I</td>
<td>3</td>
<td>Standard Letter</td>
<td>3 lecture</td>
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<td></td>
<td>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.</td>
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<td><strong>Prerequisite:</strong> Graduate standing.</td>
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<td><strong>Schedule Type:</strong> Lecture</td>
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<td><strong>Contact Hours:</strong> 3 lecture</td>
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<tr>
<td>GEOG 59072</td>
<td>GEOGRAPHIC INFORMATION SCIENCE AND HEALTH</td>
<td>3</td>
<td>Standard Letter</td>
<td>3 lecture</td>
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<td>Geographic theory and methods serve as the connection among disparate disciplines focused on how and why “health” varies between regions, cities, and neighborhoods. Examines how geospatial technologies, especially GIS, have become an important health analysis tool.</td>
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<td><strong>Prerequisite:</strong> Graduate standing.</td>
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<td>GEOG 59075</td>
<td>GEOGRAPHIC INFORMATION SCIENCE:APPLICATIONS FOR SOCIAL PROBLEMS</td>
<td>3</td>
<td>Standard Letter</td>
<td>3 lecture</td>
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<td>(Slashed with GEOG 49075 and GEOG 79075) This course provides a survey of Geographic Information Systems (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, it focuses on teaching students about spatial data acquisition, basic spatial analysis, and forms of map-based visual communication to stakeholders and the general public.</td>
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<td><strong>Prerequisite:</strong> GEOG 49070 or GEOG 59070; and graduate standing.</td>
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<td><strong>Schedule Type:</strong> Lecture</td>
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<td>GEOG 59076</td>
<td>SPATIAL PROGRAMMING</td>
<td>3</td>
<td>Standard Letter</td>
<td>3 lecture</td>
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<td>(Cross-listed 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.</td>
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<td><strong>Prerequisite:</strong> GEOG 59070; and graduate standing.</td>
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<td><strong>Schedule Type:</strong> Lecture</td>
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<td><strong>Contact Hours:</strong> 3 lecture</td>
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<td>GEOG 59078</td>
<td>GEOGRAPHIC INFORMATION SCIENCE AND ENVIRONMENTAL HAZARDS</td>
<td>3</td>
<td>Standard Letter</td>
<td>3 lecture</td>
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<td>(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 Systems (GIS) has become standard practice in research on hazards and in their management by government agencies at all levels. Exposes students 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.</td>
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<td><strong>Prerequisite:</strong> GEOG 49070 or 59070; and graduate standing.</td>
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<td><strong>Schedule Type:</strong> Lecture</td>
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<td>GEOG 59080</td>
<td>ADVANCED GEOGRAPHIC INFORMATION SCIENCE</td>
<td>3</td>
<td>Standard Letter</td>
<td>3 lecture</td>
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<td>(Cross-listed with GEOG 49080 and GEOG 79080) Provides both an overview of GIS data structures, analytical functions and usage, and modeling approaches. Students will 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.</td>
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<td><strong>Prerequisite:</strong> GEOG 49070 or GEOG 59070; and graduate standing.</td>
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<td><strong>Schedule Type:</strong> Lecture</td>
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<td>GEOG 59081</td>
<td>FUNDAMENTALS OF GEOGRAPHIC INFORMATION SCIENCE II</td>
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<td>Standard Letter</td>
<td>3 lecture</td>
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<td>Advanced theories and techniques for handling and analyzing geographic data, analytical functions and modelling approaches. Topics covered include: 2D and 3D 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.</td>
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<td><strong>Prerequisite:</strong> GEOG 59071; and graduate standing.</td>
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<td><strong>Schedule Type:</strong> Lecture</td>
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<td><strong>Contact Hours:</strong> 3 lecture</td>
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<tr>
<td>GEOG 59085</td>
<td>WEB AND MOBILE GEOGRAPHIC INFORMATION SCIENCE</td>
<td>3</td>
<td>Standard Letter</td>
<td>3 lecture</td>
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<td>(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. GIS experience recommended.</td>
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<td><strong>Prerequisite:</strong> Graduate standing.</td>
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<td><strong>Contact Hours:</strong> 3 lecture</td>
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GEOG 59162 CARTOGRAPHY AND GEOVISUALIZATION  3 Credit Hours
(Slashed with GEOG 49162 and GEOG 79162) Study of the design and production of dynamic, interactive, multimedia web-based mapping. Data acquisition and processing, symbolism, composition, text and color utilization.
Prerequisite: GEOG 49070 or GEOG 59070; and graduate standing.
Corequisite: GEOG 59163.
Schedule Type: Lecture
Contact Hours: 3 lecture
Grade Mode: Standard Letter

GEOG 59163  CARTOGRAPHY AND GEOVISUALIZATION LABORATORY
1 Credit Hour
(Cross-listed with GEOG 49163 and GEOG 79163) Practical experience in the techniques of data acquisition and processing for dynamic, multimedia, and online map production and geovisualizations.
Prerequisite: GEOG 49070 or 59070; and graduate standing.
Corequisite: GEOG 59162.
Schedule Type: Laboratory
Contact Hours: 2 lab
Grade Mode: Standard Letter

GEOG 59195 SPECIAL TOPICS IN GEOGRAPHIC INFORMATION SCIENCE  1-3 Credit Hours
(Repeatable a maximum of 10 times) (Cross-listed with GEOG 49195 and GEOG 79195). Special topics in geographic information sciences.
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 GEOL 52030)(Slashed with GEOG 49230, GEOG 79230, GEOL 42030, GEOL 72030) 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) (Cross-listed with GEOG 70191) Seminar in one of the major topical fields in geography offered by title in given semester.
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
(Cross-listed 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: Research
Contact Hours: 1-3 other
Grade Mode: Standard Letter

GEOG 60996  RESEARCH IN GEOGRAPHY  1-3 Credit Hours
(Repeatable for credit) Individual research problems in geography.
Prerequisite: Graduate standing; and special approval.
Schedule Type: Research
Contact Hours: 1-15 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
Focuses on spatial perception, cognition and behavior. How we collect and process spatial information, behavior in space, locate space and interact 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
(Cross-listed with GEOG 77091) Seminar on one of the major regions of world offered by title in given semester.
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
Equips students with essential spatiotemporal thinking and technical skills in mapping, analyzing, visualizing, communicating, and simulating the spatiotemporal data. ArcGIS and free packages in R and Netlogo will be used in the instruction.
Prerequisite: GEOG 59070; 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. This course will expose 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. This course will introduce spatial analytical approaches used by health researchers and practitioners in the exploratory investigation of health data. Students will also be exposed to new mobile technologies that can be used to enrich more traditional spatial data sources.
Prerequisite: GEOG 59070 or GEOG 59072; 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. This course will focus on techniques used to process, manage, visualize, and analyze environmental data using GIS. Students will 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 59070; 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: Graduate standing.
Schedule Type: Lecture
Contact Hours: 3 lecture
Grade Mode: Standard Letter

GEOG 69083 GEODATABASES  3 Credit Hours
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 will learn about geodatabase features that help ensure data integrity over time and about storing and managing geographic data.
Prerequisite: GEOG 59070; 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 CarouselSpecialist 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 and GEOG 59080 and GEOG 69164; and two additional graduate-level GEOG courses; and graduate standing.
Schedule Type: Practicum or Internship
Contact Hours: 18 other
Grade Mode: Standard Letter

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) (Cross-listed with GEOG 60191) Seminar in one of the major topical fields in geography offered by title in given semester.
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) (Cross-listed with GEOG 40195 and GEOG 50195) Special topics in geography.
Prerequisite: Doctoral standing.
Schedule Type: Lecture
Contact Hours: 1-3 lecture
Grade Mode: Standard Letter

GEOG 70292  FIELD EXPERIENCE IN GEOGRAPHY  1-6 Credit Hours
(Repeatable for credit) Examination of geographic landscapes in the field.
Prerequisite: Doctoral standing; and special approval.
Schedule Type: Field Experience
Contact Hours: 1-6 other
Grade Mode: Satisfactory/Unsatisfactory

GEOG 70392  PRACTICUM IN EMERGING GEOGRAPHIC TRENDS  1-6 Credit Hours
(Repeatable for credit) Examination of newly emerging geographic topics and techniques.
Prerequisite: Doctoral standing; and special approval.
Schedule Type: Practicum or Internship
Contact Hours: 1-6 other
Grade Mode: Satisfactory/Unsatisfactory

GEOG 70492  STUDY AWAY IN GEOGRAPHY  1-3 Credit Hours
(Repeatable 6 times for credit) Examination of geographic landscapes in the field.
Prerequisite: None.
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
(Cross-listed 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
Study of natural disasters, 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, wildfires, blizzards, earthquakes, tsunami and volcanoes. Mitigation for disasters and responses to disasters are studied across economically developing nations and developed nations. Taught 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
(Cross-listed with GEOL 74052)(Slashed with GEOG 41052, GEOG 51052, GEOL 44052, GEOL 54052) 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
Aimed at providing a full appreciation for the range of applicability of climate data to real-world problems. There are three overarching goals of the course: To provide a broad overview of what weather and climate information is out there and how we synthesize weather and climate information for use in applied work; to enable a thorough appreciation for the breadth of disciplines in which applied climatology plays a role; and to provide real-world experience of working through an applied climatological problem, via the final project.
Prerequisite: Doctoral standing.
Schedule Type: Lecture
Contact Hours: 3 lecture
Grade Mode: Standard Letter

GEOG 71066  GLOBAL CLIMATE CHANGE   3 Credit Hours
(Cross-listed with GEOG 41066 and GEOG 51066) Examination of the evidence and causes of climate change and how these data are assessed. Past, present and future impacts of climate change and variability are discussed along with 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
(Cross-listed 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
Cultural attitudes, conceptual approaches and techniques in resource geography; analysis of selected resource issues at various areal scales.
Prerequisite: Doctoral standing.
Schedule Type: Lecture
Contact Hours: 3 lecture
Grade Mode: Standard Letter

GEOG 71082  GEOGRAPHY OF SOILS   3 Credit Hours
(Cross-listed with GEOG 41082 and GEOG 51082) Study and analysis of different soil types in their relation to geographic factors.
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 of 10 times) (Cross-listed with GEOG 41195 and GEOG 51195) Special topics in environmental geography.
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) This course examines environmental belief systems and explores various perceptions of the Earth’s environment and its opportunities, constraints, and risks. The goals of this course are to develop a framework which will allow students to explore both their own relationship to the environment and to understand the sociocultural constructs which have informed their personal environmental beliefs and to 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  MEDICAL GEOGRAPHY   3 Credit Hours
(Cross-listed with GEOG 42052 and GEOG 52052) This course explores the interconnection between geography and health. Past and present epidemics, global health risks and their variation, the link between disasters and disease, and the factors leading to health disparities will all be considered from a spatial perspective.
Prerequisite: Doctoral standing.
Schedule Type: Lecture
Contact Hours: 3 lecture
Grade Mode: Standard Letter

GEOG 72053  GEOGRAPHIES OF MEMORY AND HERITAGE   3 Credit Hours
(Cross-listed with GEOG 42053 and GEOG 52053) 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. To this end the course focuses 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
Focuses on spatial perception, cognition and behavior. How we collect and process spatial information behavior in space, locate space and interact 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
(Cross-listed with GEOG 42064 and GEOG 52064) This class 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 will engage with foundational historical narratives, evidence, and methods for understanding these geographic pasts. The class is taught through 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 72070 SEMINAR IN ETHNIC, LIFESTYLE AND NATIONAL COMMUNITIES 3 Credit Hours
(Slashed with GEOG 42070 and GEOG 42070) 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 a maximum of 10 times) (Cross-listed with GEOG 42195 and GEOG 52195) Special topics in social geography.

Prerequisite: Doctoral standing.
Schedule Type: Lecture
Contact Hours: 1-3 lecture
Grade Mode: Standard Letter

GEOG 74010 GEOGRAPHY OF THE GLOBAL ECONOMY 3 Credit Hours
(Cross-listed with GEOG 44010 and GEOG 54010) Geographic analysis of the increasing interconnectedness of economic activity. The social, technological and political changes associated with globalization are also discussed.

Prerequisite: Doctoral standing.
Schedule Type: Lecture
Contact Hours: 3 lecture
Grade Mode: Standard Letter

GEOG 74070 SPATIAL ANALYSIS AND LOCATION THEORY 3 Credit Hours
(Cross-listed 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
(Cross-listed with GEOG 45085 and GEOG 55085) Transportation may be the single most important force shaping our 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 76070 URBAN AND REGIONAL PLANNING 3 Credit Hours
(Cross-listed 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. It 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, this course offers participants 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 76091 SEMINAR IN REGIONAL GEOGRAPHY 3 Credit Hours
(Repeatable for credit) (Cross-listed with GEOG 67091) Seminar on one of the major regions of world offered by title in given semester.

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  GEOPHYSICAL INFORMATION SCIENCE  4 Credit Hours
(Cross-listed 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
Geographic theory and methods serve as the connection among
disparate disciplines focused on how and why "health" varies between
regions, cities, and neighborhoods. This course examines how geospatial
processes and spatial patterns. Given the many variables involved and
phenomena.
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
(Cross-listed with GEOG 49075 and GEOG 59075) This course provides
a survey of Geographic Information Systems (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, it focuses on teaching
students about spatial data acquisition, basic spatial analysis, and forms
of map-based visual communication to stakeholders and the general
public.
Prerequisite: GEOG 49070 or 59070 or 79070; and doctoral standing.
Schedule Type: Lecture
Contact Hours: 3 lecture
Grade Mode: Standard Letter

GEOG 79076  SPATIAL PROGRAMMING  3 Credit Hours
(Cross-listed 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
Systems (GIS) has become standard practice in research on hazards
and in their management by government agencies at all levels. Exposes
students 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 59070 or 79070; and doctoral standing.
Schedule Type: Lecture
Contact Hours: 3 lecture
Grade Mode: Standard Letter

GEOG 79080  ADVANCED GEOGRAPHIC INFORMATION SCIENCE  3
Credit Hours
(Cross-listed with GEOG 49080 and GEOG 59080) Provides both an
overview of GIS data structures, analytical functions and usage, and
modeling approaches. Students will 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 4/5/79070; 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
graphic 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 synthesizes 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 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. GIS experience
recommended.
Prerequisite: Doctoral standing.
Schedule Type: Lecture
Contact Hours: 3 lecture
Grade Mode: Standard Letter

GEOG 79162  CARTOGRAPHY AND GEOVISUALIZATION  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.
Corequisite: GEOG 79163.
Schedule Type: Lecture
Contact Hours: 3 lecture
Grade Mode: Standard Letter

GEOG 79163  CARTOGRAPHY AND GEOVISUALIZATION LABORATORY
  1 Credit Hour
(Cross-listed with GEOG 49163 and GEOG 59163) Practical experience
in the techniques of data acquisition and processing for dynamic,
mma, and online map production and geovisualizations.
Prerequisite: GEOG 49070 or 59070 or 79070; and doctoral standing.
Corequisite: GEOG 79162.
Schedule Type: Laboratory
Contact Hours: 2 lab
Grade Mode: Standard Letter
GEOG 79195  SPECIAL TOPICS IN GEOGRAPHIC INFORMATION SCIENCE  1-3 Credit Hours
(Repeatable for a maximum of 10 times) (Cross-listed with GEOG 49195 and GEOG 59195). Special topics in geographic information sciences.
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 GEOL 72030)(Slashed with GEOG 49230, GEOG 59230, GEOL 42030, GEOL 52030) 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 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: 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