GEOG - Geography

GEOGRAPHY Courses

GEOG 100S, Human Geography. 3 Credits.
This course provides a basic topical introduction to human and cultural geography. It focuses on the diversity of human societies, their distribution, characteristics, and cultural impact on the landscape. Topics include the geography of population, migration, language, religion, economic development, urbanization, resources, and the political landscape.

GEOG 101S, Environmental Geography. 3 Credits.
A geographical study of the diverse characteristics of the Earth's physical landscape, spatial distribution of environmental characteristics, the impacts of these on human populations and human populations' impact on the natural environment. Topics include climate and climate change, mass movements and natural hazards, biogeography and environmental problems such as desertification and deforestation, and the use and abuse of water resources.

GEOG 102T, Digital Earth: Geospatial Technology and Society. 3 Credits.
This course provides an overview and exploration of: 1) the digital representation of the Earth and 2) geospatial science and technology. The course investigates geospatial technological innovations affecting the environment, resources, and society, including satellite global positioning systems, geographic information systems, and earth observations. Students develop hands-on skills as well as critical-thinking skills concerning the role of increasingly ubiquitous geospatial technology and their influences on social, economic, and human-environment interactions.

GEOG 126S, Honors: Cultural Geography. 3 Credits.
Open only to students in the Honors College. A special honors section of GEOG 100S.

GEOG 250, World Regional Geography. 3 Credits.
A study of the physical and cultural characteristics of the major geographical regions of the world. The course focuses upon significant problems within each of the world's major regions and examines the relevance of the geographical background to these problems.

GEOG 295, Topics in Geography. 3 Credits.
A study of selective topics in Geography.

GEOG 296, Topics in Geography. 3 Credits.
A study of selective topics in Geography.

GEOG 300, Maps and Geographic Information. 3 Credits.
An investigation of different representations of the Earth: physical and cognitive maps, atlases, spatial databases, aerial photographs, and remote sensing imagery, with an emphasis on the use of geographic tools for communicating and analyzing information. Prerequisites: GEOG 100S or GEOG 101S.

GEOG 305, World Resources. 3 Credits.
A geographical analysis of the distribution and accessibility of the world's resources including population, agricultural land, biodiversity, water, renewable and nonrenewable materials, and energy sources. Prerequisites: GEOG 100S or GEOG 101S, or permission of the instructor.

GEOG 306T, Hazards: Natural and Technological. 3 Credits.
An exploration of human perceptions of and responses to extreme geophysical and technological hazards, including nuclear bombs and accidents, hurricanes, tornadoes, earthquakes, and volcanoes. Prerequisites: junior standing and six credits in the social sciences or permission of the instructor.

GEOG 308, Research Design. 3 Credits.
Covers the design and implementation of quantitative and qualitative methods of inquiry in social sciences. Prerequisites: GEOG 100S or GEOG 101S.

GEOG 310, Geography of the City. 3 Credits.
An analysis of the structure, growth, and development of cities. Topics include the use of urban land, location of public services, structure of the urban economy, social problems of urban populations, and decay and revitalization. Prerequisites: Completion of General Education human behavior requirement.

GEOG 320, Political Geography. 3 Credits.
A study of the relationship between geographical and political factors; the nation state and its subdivisions; interaction among states; and the political geography of everyday life. Prerequisites: Completion of General Education human behavior requirement.

GEOG 321, World Economic Geography. 3 Credits.
An analysis of differences in spatial patterns on the economic landscape at national and international levels, and the processes which cause such differences. Introduces basic concepts, theories, and models in economic geography at the global scale. Prerequisites: GEOG 100S or GEOG 101S, or permission of the instructor.

GEOG 325, Ethnic Minorities. 3 Credits.
A study of ethnic minorities worldwide with emphasis on geographical dimensions of ethnic identity and relationships between ethnicity and territory, regionalism, politics, and cultural expression. Prerequisites: Sophomore standing or permission of the instructor.

GEOG 330, Field Methods. 3 Credits.
A review of selected techniques for generating data in a field situation. Lectures deal with the description and evaluation of techniques such as sampling methods, observation, interviewing, questionnaires, human relations skills and ethical considerations. The project component involves the definition of field problems and the application of appropriate techniques. Prerequisites: Sophomore standing or permission of the instructor.

GEOG 350, Geography of the United States and Canada. 3 Credits.
The human and physical geography of the United States and Canada with special emphasis on the distribution of population and natural resources, migration patterns, location of major economic activities, and the variety of regional identities within the U.S. and Canada. Prerequisites: Junior standing and six credits in human behavior, or permission of the instructor.

GEOG 355, Topics in Regional Geography. 3 Credits.
A study of selected regions or selected problems within a particular region of the world. Prerequisites: Junior standing or permission of the instructor.

GEOG 367, Cooperative Education. 1-3 Credits.
Student participation for credit based on the academic relevance of the work experience, criteria and evaluative procedures as formally determined by the department and Career Development Services prior to the semester in which the work experience is to take place. Prerequisites: Approval by the department and Career Development Services.

GEOG 368, Internship in Geography. 1-12 Credits.
Individualized practical experience in the area of applied geography. The credits will be commensurate with the level of the student's involvement. Prerequisites: Twelve hours in geography.

GEOG 370, Introduction to Emergency Management. 3 Credits.
Disasters in the U.S and abroad are examined to study the evolution of emergency practices. Factors contributing to the hazardousness of place and community vulnerability are explored. Emergency phases are practiced through interactive simulations. Prerequisites: GEOG 100S or GEOG 101S, or permission of the instructor.

GEOG 395, Topics in Geography. 1-4 Credits.
A study of selected topics designed for nonmajors, or for elective credit within a major. These courses will appear in the course schedule and will be more fully described in information distributed to all academic advisors. Prerequisites: Junior standing or permission of the instructor.

GEOG 396, Topics in Geography. 1-4 Credits.
A study of selected topics designed for nonmajors, or for elective credit within a major. These courses will appear in the course schedule and will be more fully described in information distributed to all academic advisors. Prerequisites: Junior standing or permission of the instructor.
GEOG 398. Tutorial Work in Geography, 1-3 Credits.
Independent study under the direction of an instructor. Prerequisites: Permission of the instructor.

GEOG 400W/500. Seminar in Geography. 3 Credits.
Advanced study of a specialized topic in geography. The choice of the topic may vary according to the availability of faculty expertise and student interest. This is a writing intensive course. This course may be repeated once provided it is a different topic and with permission of the instructor. Prerequisites: A grade of C or better in ENGL 211C or ENGL 221C or ENGL 231C; GEOG 100S or GEOG 101S, or permission of the instructor.

GEOG 401/501. Global Environmental Policy. 3 Credits.
This course analyzes the causes, severity, potential consequences, and proposed solutions regarding global ecological issues with special attention to the scientific debate and the political and policy process. It examines environmental policies of national governments, regional/international organizations, and global conferences. Prerequisites: GEOG 100S or GEOG 101S or GEOG 102T or POLS 100S or POLS 101S or POLS 102S.

GEOG 402/502. Geographic Information Systems. 3 Credits.
A study of the conceptual basis of GIS as a tool for manipulating spatial information. The course focuses on how geographic information can be input and organized within the framework of a GIS. Students will work on a computer-based GIS to gain a greater understanding of spatial database structures and analytical operations. Prerequisites: Junior standing or permission of instructor.

GEOG 404/504. Digital Techniques for Remote Sensing. 3 Credits.
Study of the theory and application of remote sensing, emphasizing environmental applications and aerial and satellite imagery. Covers the fundamentals of multispectral digital image processing, including sensors pre-processing, enhancement, classification, accuracy assessment, and GIS data integration. Prerequisites: Junior standing or permission of instructor.

GEOG 405/505. Seminar in International Resource Management. 3 Credits.
Discussion of the ecological and management principles underlying international resource management and the goal of attaining a sustainable, ecologically balanced world. Prerequisites: GEOG 100S or GEOG 101S; GEOG 305 recommended.

GEOG 408/508. Cartography. 3 Credits.
Computer-assisted methods and techniques employed in the design, construction, and use of maps and other graphics as tools for data analysis and communication. Prerequisites: GEOG 300 or GEOG 402.

GEOG 410/510. Seminar in Urban Geography. 3 Credits.
Discussion of specific urban and metropolitan problems based on outside readings and individually selected research topics. Prerequisites: GEOG 100S or GEOG 101S, or permission of the instructor.

GEOG 411/511. Urban and Regional Planning. 3 Credits.
A study of planning concepts and powers used to guide contemporary metropolitan growth and development. Emphasis is on the application of social science principles and methods to the planning process. Prerequisites: GEOG 100S or GEOG 101S, or permission of the instructor.

GEOG 412/512. Cities of the World. 3 Credits.
An examination of cities of the world's major cultural realms with an emphasis on the urban landscape as it varies between developed and developing countries. Prerequisites: Junior standing or permission of the instructor.

GEOG 417/517. GIS for Planning and Public Policy. 3 Credits.
Geographic Information Systems (GIS) and science are an essential tool for urban planners and policy makers who have special interests in places and who need this kind of knowledge for decision making. The purpose of this course is to teach students the foundations of GIS and how it is applied in urban planning and other related disciplines. The course combines lectures, discussion of readings, and hands-on exercises in the computer lab. Prerequisites: GEOG 402 or permission of the instructor.

GEOG 418. Quantitative Methods. 3 Credits.
A survey of and practicum in the basic techniques of quantitative research, including the logic of empirical research, the identification of data sources, and the use of appropriate statistical techniques. Prerequisites: GEOG 100S or GEOG 101S, GEOG 308 with a grade of C- or better. Pre- or corequisite: STAT 130M with a grade of C- or better.

GEOG 419/519. Spatial Analysis of Coastal Environments. 3 Credits.
The course integrates remotely sensed and field techniques for scientific investigation and practical management of coastal environmental systems. Spatial modeling of coastal processes and management tools using Geographic Information System (GIS). Prerequisites: GEOG 404 or permission of the instructor.

GEOG 420/520. Marine Geography. 3 Credits.
An analysis of human-sea relationships with particular emphasis on resource management and political organization from global, regional, and national perspectives. Prerequisites: Junior standing and six credits in human behavior, or permission of the instructor.

GEOG 422W/522. Coastal Geography. 3 Credits.
An examination of the physical and human geography of the coastal zone. Considers problems of managing coastal resources with an emphasis on North America. Lectures focus on coastal patterns, processes, and problems at the global, national, and local scales. Students investigate a section of the local coastline and write a report on the physical and human geography on the basis of field study, library, and internet research. This is a writing intensive course. Prerequisites: GEOG 100S or GEOG 101S, a grade of C or better in ENGL 211C or ENGL 221C or ENGL 231C, or permission of the instructor.

GEOG 424/524. Weather, Climate and Society. 3 Credits.
Weather and climate play a pivotal role in nearly every aspect of life. How does temperature relate to health outcomes? What impact does El Niño have on Peruvian farmers? How is the issue of climate change reflected in national security policy? Why? Topics also include the energy balance equation, remote sensing techniques, and climatological data acquisition and analysis. Beyond an understanding of the complex processes that dictate the flow of the atmosphere, the course analyzes the socioeconomic, political, and cultural perspectives of climate and weather. The course also provides a framework for stewardship and responsibility to the future. Prerequisites: GEOG 100S, GEOG 101S, or permission of the instructor.

GEOG 425/525. Internet Geographic Information Systems. 3 Credits.
Theoretical and practical exploration of methods, standards, and policies related to the development and utilization of geographic information systems on the Internet. Students will create and utilize distributed geospatial data and analytical systems using the WWW and the Internet to address geographical problems. Prerequisites: GEOG 402.

GEOG 432/532. Advanced GIS. 3 Credits.
The study of a series of advanced topics in the field of geographic information systems/science. Focus is placed on the development of projects/models and a survey of several advanced techniques. Students will work on a computer based GIS to implement topics from lectures. Prerequisites: GEOG 402.

GEOG 446/546. Geography, Gender, and Sexuality. 3 Credits.
This course examines gender identity and sexuality in all of their diverse forms through a lens of human geography, such as metaphors of space and place, the cultural landscape, and 'mapping territory.' Topics explored include global gender identities; 'queer space,' locating gender and sexuality within the arts and tourism; the gendered citizen and the nation; and political economies gender and sexuality. Prerequisites: Junior standing, GEOG 100S or GEOG 101S, a grade of C or better in ENGL 211C, ENGL 221C, or ENGL 231C, or permission of the instructor.

GEOG 451/551. Europe. 3 Credits.
A geographical analysis of the interrelationships among physical, cultural, economic, and political factors in Europe. Prerequisites: Junior standing and GEOG 100S or GEOG 101S, or permission of the instructor.
GEOG 452/552. Africa. 3 Credits.
A geographical analysis of the interrelationships among physical, cultural, economic, and political factors in Africa. Prerequisites: Junior standing and GEOG 100S or GEOG 101S, or permission of the instructor.

GEOG 453/553. Asia. 3 Credits.
A geographical analysis of the interrelationships among physical, cultural, economic, and political factors in Asia excluding the Middle East and the former USSR. Prerequisites: Junior standing and GEOG 100S or GEOG 101S, or permission of the instructor.

GEOG 454W/554. Latin America. 3 Credits.
A geographical analysis of the interrelationships among physical, cultural, economic, and political factors in Latin America. This is a writing intensive course. Prerequisites: Junior standing, GEOG 100S or GEOG 101S, a grade of C or better in ENGL 211C or ENGL 221C or ENGL 231C, or permission of the instructor.

GEOG 455/555. The Middle East. 3 Credits.
A geographical analysis of the interrelationships among physical, cultural, economic, and political factors in the Middle East. Prerequisites: Junior standing and GEOG 100S or GEOG 101S, or permission of the instructor.

GEOG 458/558. Geography of Virginia. 3 Credits.
An analysis of Virginia’s population, resources, and regional landscapes as they have been influenced by physical, cultural, historical, and economic factors. Prerequisites: GEOG 100S or GEOG 101S.

GEOG 460/560. Medical Geography. 3 Credits.
The course covers a range of topics in medical and health geography, including spatial behaviors of infectious disease and health care access. The focus of the course is on the geographical patterns of health and disease from the population rather than individual scale. In addition to seminar style lectures and discussions, the course enables students to further investigate by learning how to conduct medical/health geography research. Prerequisites: Successful completion of the University’s lower-division General Education requirement in Human Behavior, or permission of the instructor.

GEOG 462/562. Advanced Spatial Analysis. 3 Credits.
This course introduces the essential theoretical concepts and analytical tools for analyzing spatial process, spatial autocorrelation, spatial patterns, techniques for spatial interpolation, network connectivity, big data, and landscape patterns. The course culminates with students carrying out their own spatial analysis projects. This course assumes that students understand the basic concepts in GIS with some experience in software operation of ArcGIS. Prerequisite: GEOG 402 or permission of the instructor.

GEOG 463/563. GIS Programming. 3 Credits.
This course develops students’ GIS programming skills. Focus is placed on Python programming in ArcGIS and JavaScript in Web GIS development. Prerequisites: GEOG 402.

GEOG 464/564. Advanced Environmental Geography Seminar. 3 Credits.
The objective of the course is to provide students with a deeper understanding of the current concepts and debates in environmental geography. By exploring the ethical and philosophical foundations of the field, the course considers the environment’s opportunities and constraints. While topics may include climate change, agricultural security, and renewable energy, the course will be driven by student-led discussions and participation. Critically thinking about complex phenomenon, the seminar will include various weekly readings, discussions, and writing assignments. Prerequisites: GEOG 100S or GEOG 101S or permission of the instructor.

GEOG 473/573. Geographic Information Systems for Emergency Management. 3 Credits.
Students will demonstrate advanced skills and techniques using spatial data to prevent, mitigate, respond to, and recover from intentional, natural, and accidental homeland security threats and emergencies. This course demonstrates the importance of rapidly disseminating spatial information towards the prevention and response of various organizations to homeland security events. This course will provide students with the tools and experience required to collect, prepare and manage spatial data and enable students to be prepared to map and analyze the data to quickly and effectively create a coordinated response to real homeland security events. Prerequisites: GEOG 100S, GEOG 101S, or permission of the instructor.

GEOG 475/575. Urban Resiliency. 3 Credits.
This course examines the multifaceted interface of built and natural environments and their impacts on land use management at spatial and temporal scales. It evaluates the impact of population pressure on sustainability through a survey of urban areas and analyzes urban planning and management capacities to maintain resilience despite environmental and technological hazards. Prerequisites: GEOG 100S or GEOG 101S or permission of the instructor.

GEOG 480W. Senior Seminar in International Studies. 3 Credits.
Interdisciplinary research and the preparation of a senior thesis in international studies. This is a writing intensive course. Prerequisites: A grade of C or better in ENGL 211C or ENGL 221C or ENGL 231C, senior standing in the BAIS degree program or permission of the instructor.

GEOG 481. Geographic Inquiry and Professional Development. 3 Credits.
This course is designed to allow students to synthesize Geography concepts, theories, and knowledge and apply them to: 1) understand their positionality within the paradigms of the discipline, 2) explore future career paths, discover job possibilities, and graduate school opportunities in Geography, and 3) prepare materials (such as resumes and e-portfolios) to be used to apply for such positions. Prerequisites: GEOG 100S or GEOG 101S OR GEOG 102T.

GEOG 490/590. Applied Cartography/GIS. 1-3 Credits.
Practical experience in applying the principles of cartography and geographical information systems to the design and construction of maps and other graphics. Prerequisites:Junior standing or permission of the instructor.

GEOG 495/595. Topics in Geography. 1-4 Credits.
The advanced study of selected topics which, due to their specialized nature, may not be offered regularly. These courses will appear in the course schedule, and will be more fully described in information distributed to all academic advisors. Prerequisites: Appropriate survey course or permission of the instructor.

GEOG 496/596. Topics in Geography. 1-4 Credits.
The advanced study of selected topics which, due to their specialized nature, may not be offered regularly. These courses will appear in the course schedule, and will be more fully described in information distributed to all academic advisors. Prerequisites: Appropriate survey course or permission of the instructor.

GEOG 497/597. Independent Research in Geography. 1-3 Credits.
Independent reading and study on a topic to be selected under the direction of the instructor. Conferences and papers as appropriate. Prerequisites: Senior standing and approval of the director of geography.

GEOG 498/598. Tutorial Work in Geography. 1-3 Credits.
Independent study under the direction of an instructor. Prerequisites: Permission of instructor.

GEOG 499. Senior Thesis. 3 Credits.
Completion of a research paper supervised by a faculty member from the Geography program. Research topic to be selected in concert with the faculty supervisor and a final written report required. Prerequisites: GEOG 308 and senior standing in Geography.
GEOG 500. Seminar in Geography. 3 Credits.
Advanced study of a specialized topic in geography. The choice of the topic may vary according to the availability of faculty expertise and student interest.

GEOG 501. Global Environmental Policy. 3 Credits.
This course analyzes the causes, severity, potential consequences, and proposed solutions regarding global ecological issues with special attention to the scientific debate and the political and policy process. It examines environmental policies of national governments, regional/international organizations and global conferences. Prerequisites: GEOG 100S or GEOG 101S or GEOG 102T or POLS 101S or POLS 102S.

GEOG 502. Geographic Information Systems. 3 Credits.
A study of the conceptual basis of GIS as a tool for manipulating spatial information. The course focuses on how geographic information can be input and organized within the framework of a GIS. Students will work on a computer-based GIS to gain a greater understanding of spatial database structures and analytical operations.

GEOG 504. Digital Techniques for Remote Sensing. 3 Credits.
Study of the theory and application of remote sensing, emphasizing environmental applications and aerial and satellite imagery. Covers the fundamentals of multispectral digital image processing, including sensors pre-processing, enhancement, classification, accuracy assessment, and GIS data integration.

GEOG 505. Seminar in International Resource Management. 3 Credits.
Discussion of the ecological and management principles underlying international resource management and the goal of attaining a sustainable, ecologically balanced world.

GEOG 508. Cartography. 3 Credits.
Computer-assisted methods and techniques employed in the design, construction, and use of maps and other graphics as tools for data analysis and communication.

GEOG 510. Seminar in Urban Geography. 3 Credits.
Discussion of specific urban and metropolitan problems based on outside readings and individually selected research topics.

GEOG 511. Urban and Regional Planning. 3 Credits.
A study of planning concepts and powers used to guide contemporary metropolitan growth and development. Emphasis is on the application of social science principles and methods to the planning process.

GEOG 512. Cities of the World. 3 Credits.
An examination of cities of the world's major cultural realms with an emphasis on the urban landscape as it varies between developed and developing countries.

GEOG 517. GIS for Planning and Public Policy. 3 Credits.
Geographic Information Systems (GIS) and science are an essential tool for urban planners and policy makers who have special interests in places and who need this kind of knowledge for decision making. The purpose of this course is to teach students the foundations of GIS and how it is applied in urban planning and other related disciplines. The course combines lectures, discussion of readings, and hands-on exercises in the computer lab. Prerequisites: GEOG 402 or GEOG 502 or permission of the instructor.

GEOG 519. Spatial Analysis of Coastal Environments. 3 Credits.
The course integrates remotely sensed and field techniques for scientific investigation and practical management of coastal environmental systems. Spatial modeling of coastal processes and management tools using Geographic Information System (GIS). Prerequisites: GEOG 504.

GEOG 520. Marine Geography. 3 Credits.
An analysis of human-sea relationships with particular emphasis on resource management and political organization from global, regional, and national perspectives.

GEOG 522. Coastal Geography. 3 Credits.
An examination of the physical and human geography of the coastal zone. Considers problems of managing coastal resources with an emphasis on North America. Lectures focus on coastal patterns, processes, and problems at the global, national, and local scales. Students investigate a section of the local coastline and write a report on the physical and human geography on the basis of field study, library, and internet research.

GEOG 524. Weather, Climate, and Society. 3 Credits.
Weather and climate play a pivotal role in nearly every aspect of life. How does temperature relate to health outcomes? What impact does El Niño have on Peruvian farmers? How is the issue of climate change reflected in national security policy? Why? Topics also include the energy balance equation, remote sensing techniques, and climatological data acquisition and analysis. Beyond an understanding of the complex processes that dictate the flow of the atmosphere, the course analyzes the socioeconomic, political, and cultural perspectives of climate and weather. The course also provides a framework for stewardship and responsibility to the future. Prerequisites: GEOG 100S, 101S, or permission of the instructor.

GEOG 525. Internet Geographic Information Systems. 3 Credits.
Theoretical and practical exploration of methods, standards, and policies related to the development and utilization of geographic information systems on the Internet. Students will create and utilize distributed geospatial data and analytical systems using the WWW and the Internet to address geographical problems. Prerequisites: GEOG 502.

GEOG 532. Advanced GIS. 3 Credits.
The study of a series of advanced topics in the field of geographic information systems/science. Focus is placed on the development of projects/models and a survey of several advanced techniques. Students will work on a computer based GIS to implement topics from lectures. Prerequisites: GEOG 502.

GEOG 546. Geography, Gender, and Sexuality. 3 Credits.
This course examines gender identity and sexuality in all of their diverse forms through a lens of human geography, such as metaphors of space and place, the cultural landscape, and 'mapping territory.' Topics explored include global gender identities; 'queer space'; 'locating' gender and sexuality within the arts and tourism; the gendered citizen and the nation; and political economies of gender and sexuality.

GEOG 551. Europe. 3 Credits.
A geographical analysis of the interrelationships among physical, cultural, economic, and political factors in Europe.

GEOG 552. Africa. 3 Credits.
A geographical analysis of the interrelationships among physical, cultural, economic, and political factors in Africa.

GEOG 553. Asia. 3 Credits.
A geographical analysis of the interrelationships among physical, cultural, economic, and political factors in Asia excluding the Middle East and the former USSR.

GEOG 554. Latin America. 3 Credits.
A geographical analysis of the interrelationships among physical, cultural, economic, and political factors in Latin America.

GEOG 555. The Middle East. 3 Credits.
A geographical analysis of the interrelationships among physical, cultural, economic, and political factors in the Middle East.

GEOG 558. Geography of Virginia. 3 Credits.
An analysis of Virginia's population, resources, and regional landscapes as they have been influenced by physical, cultural, historical, and economic factors.

GEOG 560. Medical Geography. 3 Credits.
The course covers a range of topics in medical and health geography, including spatial behaviors of infectious disease and health care access. The focus of the course is on the geographical patterns of health and disease from the population rather than individual scale. In addition to seminar style lectures and discussions, the course enables students to further investigate by learning how to conduct medical/health geography research.
GEOG 562. Advanced Spatial Analysis. 3 Credits.
This course introduces the essential theoretical concepts and analytical tools for analyzing spatial processes, spatial autocorrelation, spatial patterns, techniques for spatial interpolation, network connectivity, big data, and landscape patterns. The course culminates with students carrying out their own spatial analysis projects. This course assumes that students understand the basic concepts in GIS with some experience in software operation of ArcGIS. Prerequisite: GEOG 402 or GEOG 502, or permission of the instructor.

GEOG 563. GIS Programming. 3 Credits.
This course develops students' GIS programming skills. Focus is placed on Python programming in ArcGIS and JavaScript in Web GIS development. Prerequisites: GEOG 402 or GEOG 600.

GEOG 564. Advanced Environmental Geography Seminar. 3 Credits.
The objective of the course is to provide students with a deeper understanding of the current concepts and debates in environmental geography. By exploring the ethical and philosophical foundations of the field, the course considers the environment's opportunities and constraints. While topics may include climate change, agricultural security, and renewable energy, the course will be driven by student-led discussions and participation. Critically thinking about complex phenomenon, the seminar will include various weekly readings, discussions, and writing assignments.

GEOG 573. Geographic Information Systems for Emergency Management. 3 Credits.
Students will demonstrate advanced skills and techniques using spatial data to prevent, mitigate, respond to, and recover from intentional, natural, and accidental homeland security threats and emergencies. This course demonstrates the importance of rapidly disseminating spatial information towards the prevention and response of various organizations to homeland security events. This course will provide students with the tools and experience required to collect, prepare and manage spatial data and enable students to be prepared to map and analyze the data to quickly and effectively create a coordinated response to real homeland security events.

GEOG 575. Urban Resiliency. 3 Credits.
This course examines the multifaceted interface of built and natural environments and their impacts on land use management at spatial and temporal scales. It evaluates the impact of population pressure on sustainability through a survey of urban areas and analyzes urban planning and management capacities to maintain resilience despite environmental and technological hazards. Prerequisites: GEOG 100S, 101S, or equivalent or permission of the instructor.

GEOG 590. Applied Cartography/GIS. 1-3 Credits.
Practical experience in applying the principles of cartography and geographical information systems to the design and construction of maps and other graphics.

GEOG 595. Topics in Geography. 1-4 Credits.
The advanced study of selected topics which, due to their specialized nature, may not be offered regularly. These courses will appear in the course schedule, and will be more fully described in information distributed to academic advisors.

GEOG 596. Topics in Geography. 1-4 Credits.
The advanced study of selected topics which, due to their specialized nature, may not be offered regularly. These courses will appear in the course schedule, and will be more fully described in information distributed to academic advisors.

GEOG 597. Independent Research in Geography. 1-3 Credits.
Independent reading and study on a topic to be selected under the direction of the instructor, Conferences and papers as appropriate.

GEOG 598. Tutorial Work in Geography. 1-3 Credits.
Independent research under the supervision of a faculty member.

GEOG 600. Geospatial Data Analysis. 3 Credits.
Course focuses on the fundamentals of geospatial data science. Students learn the key data models, structures, sources, and application of spatial analysis using GIS software, R, programming, and Earth observations.

GEOG 601. Spatial Statistics and Modeling. 3 Credits.
This course covers the foundations of spatial statistics and modeling. Emphasis is placed on point, linear and areal patterns, geostatistics, and model development for a variety of problems using multiple software packages.

GEOG 620. Seminar in Political Geography. 3 Credits.
A study of the interrelationships of political and geographic phenomena, and theories of geopolitics; examines in a seminar format the political geography both of specific topics such as the national integration of states, refugees and resources, and of particular regions of the world.

GEOG 625. Ethno-Regionalism. 3 Credits.
An examination of the geopolitics of world ethnic minorities with special reference to selected 'trouble spots' on the world political map.

GEOG 626. Lifespan Communication, Geography, and Food. 3 Credits.
This course examines the intersections of communication, geography, and food from lifespan and global perspectives. Topics to be covered include communication and cooking; dinner table talk; food and folk culture; victual rituals; the portrayal of food in media (e.g., film, television, CMC, print); the role of race, class, and gender in food production/consumption; the commercialization of food; fast food and slow food; globalization vs. the 'locavore' movement; visualization and symbolic communication about food and nutrition; and market and supermarket geographies.

GEOG 650. Seminar in Regional Geography. 1-3 Credits.
Advanced seminar on a particular country or world region.

GEOG 668. Internship. 1-6 Credits.
Individualized practical experience.

GEOG 695. Selected Topics in Geography. 1-3 Credits.
Advanced study of selected topics designed to permit small groups of qualified students to work on subjects of mutual interest.

GEOG 696. Selected Topics in Geography. 1-3 Credits.
Advanced study of selected topics designed to permit small groups of qualified students to work on subjects of mutual interest.

GEOG 697. Independent Research in Geography. 1-3 Credits.
Independent research in geography under the supervision of a faculty member.

GEOG 720. Cultural Geography Seminar. 3 Credits.
This seminar examines the field of cultural geography with: 1) an emphasis on theories and concepts developed over the past twenty years in 'new' cultural geography, and 2) cultural geography's emphasis on issues such as place, power, landscape and identity.