

Geography and Atmospheric Science

Geography as an academic discipline studies the spatial dimensions of, and links between, culture, society, and environmental processes. The study of Atmospheric Science involves weather and climate and how those affect human activity and life on earth. At the University of Kansas, our department's programs work to understand human activity and the physical world.

Why study geography?

Because people, places, and environments interact and evolve in a changing world. From conservation to soil science to the power of geographic information science data and more, the study of geography at the University of Kansas prepares future leaders. The study of geography encompasses landscape and physical features of the planet and human activity, the environment and resources, migration, and more. Our program (<http://geog.ku.edu/degrees/>) has a unique cross-disciplinary nature with pathway options and diverse faculty (<http://geog.ku.edu/faculty/>) who are passionate about teaching and research. Our students are engaged through internships, undergraduate and graduate research, departmental organizations, and events. Alumni work in a variety of fields including academia, business, conservation, environmental regulation, GIS, regional planning, resource management, soil science, urban planning, and more. A variety of scholarship opportunities are offered through both the University of Kansas and the Department of Geography and Atmospheric Science for qualified undergraduate and graduate students.

Why study atmospheric science?

The study of atmospheric processes enables us to understand human interactions with the environment and generate solutions that make a real difference in people's lives. The atmospheric science program at the University of Kansas is the only one of its kind in the state, following national meteorological guidelines set by both the American Meteorological Society (AMS) and the National Weather Service (NWS). Our program provides students with a solid foundation, but also options. Our students are engaged through research, internships, and several student organizations including the KU Chapter of the American Meteorological Society (AMS), which sponsors an annual Douglas County Severe Weather Symposium, in addition to monthly events. We recently partnered with the National Weather Service to provide opportunities for students to explore work in a variety of NWS regional offices through the Student Career On-Site Training (SCOut) program.

Facilities

The Department of Geography and Atmospheric Science is housed in Lindley Hall on the KU Lawrence campus, which includes multiple laboratories, computer labs, and a weather station. Additionally, the KU Field Station just north of Lawrence provides students an outdoor lab for field work, research projects and more. The station, established in 1947, is part of the National Ecological Observatory Network (NEON), a National Science Foundation initiative. Classes are held in both Lindley Hall and the new Earth, Energy, and Environment Center.

Geography labs include multiple computer labs and those for Soils and Geomorphology, Palynology, and Pedology. Additional campus resources include the map collections of the Spencer Research Library and University Map Library. The University of Kansas

Undergraduate Research Center is another great resource. The center aids undergraduates interested in doing research, offers funding opportunities, and provides step-by-step workshops which provide students the skills necessary to explore, investigate, and excel.

Atmospheric Science labs include a Meteorology and Climate Hub (MACH) with state-of-the-art AWIPS II software used by the National Weather Service and computer lab and collaborative space dedicated to students doing research. Students also get hands-on experience, from forecasting and providing reports to university radio (KJHK 90.7 FM) and television (KUJH-TV) to research project opportunities through our department and the University of Kansas Undergraduate Research Center.

Undergraduate Programs

Geography

Geography integrates information from a variety of sources to study the nature of culture areas, the emergence of physical and human landscapes, and problems of interaction between people and the environment. Mapping and other techniques for gathering and displaying spatial information are integral parts of the field. We offer BA, BGS, and BS undergraduate degrees in Geography as well as a minor with an emphasis in General Geography or Geographical Information Science (GIS). We also offer an undergraduate GIS Geographical Information Science Certificate.

Geography Pathways include:

Geopolitics and Political Geography, Geospatial Analytics/Geoinformatics, Climate and People, Soils and Ecohydrology, Urban/Economic Geography, and People, Migration, and Globalization.

Atmospheric Science

The atmospheric science program offers undergraduates a fundamental knowledge of the atmosphere and the weather it generates. Interactions between weather phenomena and human decisions and activities give the subject important applications. Several pathways lead to a Bachelor of Science degree, with concentration options in General Meteorology, Air Pollution Meteorology, Hydrometeorology, and News Media Forecasting. A Minor in Atmospheric Science is also available.

Students from other disciplines such as biology, math, psychology, environmental studies, and other subjects, have chosen to have a double major, adding Atmospheric Science to enhance their education, skills, and career options.

Courses for Nonmajors

All geography courses below the 500 level are open to nonmajors, as are several above that level.

Graduate Programs

Geography

The graduate curriculum emphasizes broad geographic training while encouraging in-depth commitment to specialized concentrations. Students also are encouraged to take course work outside the department that complements their degree programs. Programs are tailored by the student and advisor to conform to the student's interests and needs, as well as to fulfill the general degree requirements.

The central thrust of the department and the chief capabilities and interests of the faculty fall within these research-teaching areas:

1. Human geography including cultural geography, place, regional development, economic geography, health, diaspora, border conflicts, and environmental policy;
2. Geoinformatics including cartography, geographic information systems (GIS), and remote sensing;
3. Physical geography including geomorphology, soils, ecohydrology, and biogeography;
4. Regional geography including Africa, East Asia, Russia, Latin America, and the United States; and
5. Climatology.

Atmospheric Science

The purpose of the program is to expand the student's knowledge of fundamental atmospheric processes and how the atmosphere interacts with other parts of the environment. Students become familiar with quantitative research methods and how these various approaches can be used to address different problems in atmospheric science. Students gain an in-depth ability to learn specific skills and apply them toward thesis work. These skills consist of, for example, statistical analysis techniques, numerical modeling, or work with atmospheric instrumentation. The breadth of the program and the diverse research topics explored by the faculty are able to accommodate students with a variety of interests.

Graduate Non-Degree Seeking Students

Students who are interested in enrolling in graduate level coursework in the Department of Geography and Atmospheric Science without formal admission to a graduate program at KU are encouraged to apply for graduate non-degree seeking status. See the department's Admission webpage (<https://geog.ku.edu/admission/>) for further details.

Courses

ATMO 105. Introductory Meteorology. 5 Credits. LFE GE3N SWT NPS

A lecture and laboratory course introducing students to the atmosphere, weather and climate phenomena, and their controlling physical processes. Topics covered include: the structure of the atmosphere, energy and energy budgets, climate and climate change, air pollution, clouds and precipitation, pressure and wind systems, severe weather, and weather forecasting.

ATMO 106. Introductory Meteorology, Honors. 5 Credits. LFE GE3N NPS

Honors version of ATMO 105. A lecture and laboratory course introducing students to the atmosphere, weather and climate phenomena, and their controlling physical processes. Topics covered include: the structure of the atmosphere, energy and energy budgets, climate and climate change, air pollution, clouds and precipitation, pressure and wind systems, severe weather, and weather forecasting. Prerequisite: Membership in University Honors Program or by permission of instructor.

ATMO 220. Unusual Weather. 3 Credits. GE3N NLEC

An introductory lecture course which surveys the general principles and techniques of atmospheric science and illustrates their application through discussions of natural but unusual weather phenomena such as blizzards, hurricanes, tornados, and chinooks, of the effects of air pollution on weather, and of intentional human alteration of the atmosphere.

ATMO 321. Climate and Climate Change. 3 Credits.

This course is designed to introduce students to the nature of the Earth's physical climate. It introduces the basic scientific concepts underlying our understanding of our climate system. Particular emphasis is placed on energy and water balances and their roles in evaluating climate change. The course also evaluates the impact of climate on living organisms and the human environment. Finally, past climates are discussed and potential future climate change and its impact on humans is evaluated. (Same as GEOG 321.) Prerequisite: ATMO 105 or GEOG 104.

ATMO 499. Honors Course in Atmospheric Science. 2-3 Credits. AE61 CAP

Open to students with nine hours of upper level credit in Atmospheric Science, an average of at least 3.5 in all Atmospheric Science courses, and an overall average of at least 3.25. Includes the preparation of an honors paper and its defense before a committee of a least two regular faculty members.

ATMO 505. Weather Forecasting. 3 Credits.

A first course in synoptic meteorology designed to introduce students to weather analysis and forecasting through the application of hydrodynamic and thermodynamic principles to operational analysis and forecasting. Topics include analysis and interpretation of surface and upper-air observations and data from satellites, radars, and wind profilers; chart and sounding analysis; and three-dimensional, conceptual models of weather systems. The course includes student-led weather briefings and analysis exercises. Prerequisite: ATMO 105 and MATH 125 or MATH 115.

ATMO 521. Microclimatology. 3 Credits.

A study of climatic environment near the earth-atmosphere interface. Consideration of rural climates in relation to agriculture and urban climates as influenced by air pollution and other factors. Emphasis is on physical processes in the lower atmosphere, distribution of atmospheric variables, the surface energy budget and water balance. (Same as GEOG 521.) Prerequisite: ATMO 105 and MATH 125.

ATMO 525. Air Pollution Meteorology. 3 Credits.

A study of background levels and concentrated sources of atmospheric pollution together with considerations of pollution buildup in urban areas as related to particular weather conditions. Inadvertent weather modifications and effects of atmospheric pollution on particular weather events and general climate will be discussed. Prerequisite: ATMO 105, MATH 125, EECS 138 and CHEM 130.

ATMO 605. Operational Forecasting. 2 Credits.

Students enhance their forecasting expertise by preparing forecasts for presentation to the public through a variety of media. Classroom activities include weekly map discussions and analysis of current weather situations. Forecasting topics such as forecast verification, aviation forecast products, severe weather, flash floods and watches and warnings are examined. Credit for ATMO 605, ATMO 606, and ATMO 607 is limited to a total of eight hours, six of which may be counted toward a degree in atmospheric science. Prerequisite: ATMO 505 and ATMO 640.

ATMO 606. Forecasting Practicum - Private Industry. 2 Credits. AE61 CAP

Practical experience in private industry working with current and/or archived meteorological data. Possibilities include the preparation of forecasts for TV stations and meteorological consulting firms, and working with environmental consulting firms to assess air pollution hazards. May be repeated two times for credit. Credit for ATMO 605, ATMO 606, and ATMO 607 is limited to a total of eight hours, six of which may be counted toward a degree in atmospheric science. Prerequisite: Instructor permission.

ATMO 607. Forecasting Intern - National Weather Service. 2 Credits. AE61 CAP

Practical experience working in a National Weather Service forecasting center in analyzing weather data and preparing weather forecasts. May be repeated two times for credit. Credit for ATMO 605, ATMO 606, and ATMO 607 is limited to a total of eight hours, six of which may be counted toward a degree in atmospheric science. Prerequisite: Instructor permission.

ATMO 608. Operational Forecasting. 3 Credits.

Students enhance their forecasting expertise by preparing forecasts for presentation to the public through a variety of media. Classroom activities include weekly map discussions and analysis of current weather situations. Forecasting topics such as forecast verification, aviation forecast products, severe weather, flash floods and watches and warnings are examined. Credit for ATMO 605, ATMO 606, and ATMO 607 is limited to a total of eight hours, six of which may be counted toward a degree in atmospheric science. Prerequisite: ATMO 505 and ATMO 640.

ATMO 615. Tropical Meteorology. 3 Credits.

This course presents an undergraduate survey of tropical meteorology with an emphasis on clouds and convection ranging from fair-weather cumulus to hurricanes. Specific topics include the general circulation (climatology, air-sea interactions, Hadley and Walker circulation), convective processes in the tropics (diurnal cycles, mesoscale convective systems, convectively coupled waves), and tropical variability (El Niño, Madden-Julian oscillation, monsoons, climate change). The genesis, thermodynamics, dynamics, and other topics related to tropical cyclones and hurricanes are also discussed. This course is offered at the 600 and 700 level with additional assignments at the 700 level. Not open to students with credit in ATMO 715. Prerequisite: ATMO 640 and/or instructor permission.

ATMO 630. Synoptic Meteorology. 3 Credits.

Interpretation, development, and analysis of synoptic charts. Prerequisite: ATMO 505 and ATMO 640.

ATMO 634. Physical Climatology. 3 Credits.

Atmospheric processes are described and discussed in relation to the climate of the earth's surface. Such topics as the greenhouse effect, ozone depletion, and the effect of solar irradiance on climatic change will be included. The physical processes and relationships between various climatic features will be studied. Prerequisite: ATMO 505 and DSCI 301 or MATH 526.

ATMO 640. Dynamic Meteorology. 3 Credits.

This course introduces the student to the fundamentals of fluid dynamics necessary for understanding large scale atmospheric motions. Fundamental physical laws of conservation of mass, momentum and energy are examined and applied to atmospheric flows. Rotation in the atmosphere is examined quantitatively in terms of both circulation and vorticity. Prerequisite: MATH 127 and PHSX 214 or PHSX 212 and PHSX 236.

ATMO 642. Remote Sensing. 3 Credits. AE61 CAP

This course is designed to prepare students to effectively use remotely sensed data in operational or research settings for further work in this field. Topics include radiation and radiation transfer applied to active and remote sensing; radiative properties of space, sun, earth and atmosphere; instrument design considerations and operational characteristics; inversion methods for temperature or concentration profiling; surface temperature measurement; cloud top height determination; rain rate and wind velocity measurement; severe weather detection; satellite photograph interpretation. Prerequisite: ATMO 680, MATH 581.

ATMO 650. Advanced Synoptic Meteorology. 3 Credits.

Analysis and interpretation of synoptic weather charts including treatment of numerical weather forecasting. Prerequisite: ATMO 630 and ATMO 660.

ATMO 660. Advanced Dynamic Meteorology. 3 Credits.

Advanced study of the atmosphere including treatment of the vorticity equation. Prerequisite: ATMO 640 and MATH 220 or MATH 320.

ATMO 680. Physical Meteorology. 3 Credits.

This course is designed to enhance the student's understanding of atmospheric processes through the study of these processes at molecular through micro scales. Topics include the properties and behavior of gases; transfer processes; phase change; solar and earth radiation; cloud drop, ice crystal and precipitation formation; atmospheric electricity; stratospheric chemistry. Prerequisite: MATH 127; PHSX 214, or PHSX 212 and PHSX 236.

ATMO 690. Special Problems in Meteorology. 1-3 Credits.

Prerequisite: Nine hours in meteorology.

ATMO 697. Seminar for Seniors. 1 Credits. AE61 CAP

Current research in atmospheric science will be discussed. May be repeated for a total of two credit hours. Prerequisite: Senior level in atmospheric science.

ATMO 699. Undergraduate Research. 2 Credits. AE61 CAP

Work on a research project under the supervision of a faculty member. Prerequisite: Nine credit hours in atmospheric science. May be taken up to three times for credit.

ATMO 710. Atmospheric Dynamics. 3 Credits.

Presentation of contemporary approaches to the study of atmospheric dynamics. May include methodologies that provide insight into global, synoptic, mesoscale or microscale motions. Prerequisite: ATMO 660 or equivalent.

ATMO 715. Tropical Meteorology. 3 Credits.

This course presents a survey of tropical meteorology at the graduate level with an emphasis on clouds and convection ranging from fair-weather cumulus to hurricanes. Specific topics include the general circulation (climatology, air-sea interactions, Hadley and Walker circulation), convective processes in the tropics (diurnal cycles, mesoscale convective systems, convectively coupled waves), and tropical variability (El Niño, Madden-Julian oscillation, monsoons, climate change). The genesis, thermodynamics, dynamics, and other topics related to tropical cyclones and hurricanes are also discussed. This course is offered at the 600 and 700 level with additional assignments at the 700 level. Not open to students with credit in ATMO 615. Prerequisite: Instructor consent.

ATMO 720. Atmospheric Modeling. 3 Credits.

Illustration and application of contemporary approaches to mathematical and statistical description of atmospheric phenomena. Prerequisite: Consent of instructor.

ATMO 725. Clouds, Climate and Precipitation. 3 Credits.

This course includes seminar-style lectures and discussions bridging cloud physics, physical climatology, and climate dynamics with a central theme regarding how clouds and precipitation interact with the Earth's climate system. Specific topics include aerosol-cloud interactions, large-scale convective organization in the tropics, mid-latitudes, and polar regions, diabatic feedbacks on the general circulation, natural climate variability, and cloud effects in global climate models. How cloud systems have changed in recent decades, in addition to future model scenarios, are also discussed.

ATMO 731. Advanced Topics in Atmospheric Science: _____. 1-3 Credits.

Advanced investigation of special topics in atmospheric science. May include topics in dynamic, physical or synoptic meteorology or climatology as well as related topics in earth and physical sciences. May be repeated if topic differs.

ATMO 898. Readings in Atmospheric Science. 1-4 Credits.
Independent readings of special problems in Atmospheric Science.

ATMO 899. Master's Thesis. 1-10 Credits.
Thesis credit. Graded on a satisfactory progress/limited progress/no progress basis.

ATMO 998. Research in Atmospheric Science. 1-5 Credits.
Individual investigation of special problems in Atmospheric Science.

ATMO 999. Doctoral Dissertation. 1-10 Credits.
Enrollment course for writing doctoral dissertation in Atmospheric Science. Graded on a satisfactory progress/limited progress/no progress basis.

Courses

GEOG 100. World Regional Geography. 3 Credits. AE42 SWT SBS

An introductory survey of the environmental setting, historically formative periods, and present-day issues that distinguish the major culture areas of the world.

GEOG 102. People, Place, and Society. 3 Credits. GE3S SBS
An examination of the relationships between humans and their environments. The course introduces students to basic concepts in human geography relating to economic activities, landscapes, languages, migrations, nations, regions, and religions. Serves as the basis for further course work in cultural, economic, political, population, and urban geography.

GEOG 103. People, Place, and Society, Honors. 3 Credits. GE3S SBS

An introduction to how human societies organize space and modify the world about them. Resultant patterns on the landscape are interpreted through principles of space perception, cultural ecology, diffusion, land use, and location theory. Comparisons are made between urban and rural areas and between subsistence and commercial societies. Open to students who have been accepted into the College Honors Program.

GEOG 104. Introduction to Physical Geography. 3 Credits. GE3N NLEC

The components of the physical environment are discussed in order to familiarize the student with their distributions and dynamic nature. Major topics include the atmosphere, landforms, soils, and vegetation together with their interrelationships and their relevance to human activity. This course and GEOG 105 together satisfy the laboratory science requirement. Both courses are required for geography majors.

GEOG 105. Introductory Laboratory in Physical Geography. 2 Credits. LFE NLAB

A laboratory course designed to complement GEOG 104 in satisfying the laboratory science requirement. It is required for geography majors. Laboratory exercises include a wide variety of analyses using data on the atmosphere, hydrosphere, biosphere, and lithosphere. Prerequisite: GEOG 104, which may be taken concurrently.

GEOG 111. Mapping Our Changing World. 4 Credits. LFE GE3N NPS

This course is an introduction to geospatial technologies. It focuses on the conceptual and technical aspects of mapping technologies that transform information about locations, people, objects, environments, events, and phenomena to digital representations of the world and as end-products of

geospatial analysis. Topics covered include surveying, aerial photography and photogrammetry, satellite remote sensing, global positioning systems (GPS), geographic information systems (GIS), and thematic mapping. Students will learn how to acquire and develop geospatial data as the sources for mapping, the skills of analyzing and interpreting spatial information, and how geovisualization can be used in addressing real-world problems. This course includes an embedded laboratory.

GEOG 140. Global Environment I: The Discovery of Environmental Change. 3 Credits. GE3N SWT NLEC

This interdisciplinary course and laboratory sections survey the foundations of environmental understanding and the process of scientific discovery from perspectives that combine the principles and methodologies of the humanities, physical, life and social sciences. Key topics include the history of environmental systems and life on earth, the discovery of biotic evolution, ecological change, and climate change. Laboratory sections apply the principles and methodologies of the humanities, physical, life and social sciences to earth systems and the development of environmental understanding using historical and present-day examples. (Same as EVRN 140.)

GEOG 142. Global Environment II: The Ecology of Human Civilization. 3 Credits. GE3S

This interdisciplinary course and its laboratory sections survey the history of humanity's relationship with the natural world over the long term from perspectives that combine the principles and methodologies of the humanities, physical, life and social sciences. Key topics include the evolution of Homo sapiens and cultural systems; the development of hunter, gatherer, fisher, agricultural, and pastoral lifeways; the ecology of colonialism and industrial civilization, and the emergence of ideological and ethical perspectives on the relationship between nature and culture. Laboratory sections apply the principles and methodologies of the humanities, physical, life and social sciences to the humanity's engagement with the global environment using historical and present-day examples. (Same as EVRN 142.)

GEOG 144. Global Environment I: Discovery of Environmental Change, Honors. 3 Credits. LFE GE3N NLEC

This interdisciplinary course surveys the foundations of environmental understanding and the process of scientific discovery from perspectives that combine the principles and methodologies of the humanities, physical, life and social sciences. Key topics include the history of environmental systems and life on earth, the discovery of biotic evolution, ecological change, and climate change. Laboratory sections apply the principles and methodologies of the humanities, physical, life and social sciences to earth systems and the development of environmental understanding using historical and present-day examples. (Same as EVRN 144.) Open only to students admitted to the University Honors Program or by permission of instructor.

GEOG 145. Global Environment II: The Ecology of Human Civilization, Honors. 3 Credits. GE3S

This interdisciplinary course and its laboratory sections survey the history of humanity's relationship with the natural world over the long term from perspectives that combine the principles and methodologies of the humanities, physical, life and social sciences. Key topics will include the evolution of Homo sapiens and cultural systems; the development of hunter, gatherer, fisher, agricultural, and pastoral lifeways; the ecology of colonialism and industrial civilization, and the emergence of ideological and ethical perspectives on the relationship between nature and culture. Laboratory sections apply the principles and methodologies of the humanities, physical, life and social sciences to the humanity's engagement with the global environment using historical and present-day

examples. (Same as EVRN 145.) Open only to students admitted to the University Honors Program or by permission of instructor.

GEOG 148. Scientific Principles of Environmental Studies. 3 Credits. GE3N SWT NLEC

This course provides the scientific knowledge necessary to understand the changing relationships between humans and the natural environment, with an emphasis on the assessment of current environmental problems and critical evaluation of potential solutions. Major topics include fundamental scientific concepts and principles, interactions among the biological and physical components of the environment, implications of a growing human population, water resources, the atmosphere, climate, and energy sources. (Same as EVRN 148.)

GEOG 150. Environment, Culture and Society. 3 Credits. GE3S SBS

An introduction to geographic approaches to the study of the environment, emphasizing societal and cultural factors that influence human interaction with the biosphere, hydrosphere, lithosphere, and atmosphere. The course involves analysis of a broad range of contemporary environmental issues from the local to global scales.

GEOG 160. Environmental Solutions. 1 Credits. LFE SWT NLAB

These labs are designed to explore the physical, social, and cultural dimensions of environmental systems. Students will engage in hands-on activities and field experiences about a range of current and historical environmental issues affecting both the United States and other parts of the world. This course will broaden your understanding of important foundational concepts and skills including basic scientific principles and processes that govern the functioning of environmental systems, ways to apply this understanding to case studies and field experiences, and how to use these perspectives to eventually make informed, just decisions about climate change, the future flourishing of humans and non-humans. This course is offered at the 100 and 300 level with additional assignments at the 300 level. Not open to students with credit in EVRN 360/361. (Same as EVRN 160.) Prerequisite: This course requires previous or concurrent enrollment in EVRN 140/144 (or cross-listed and transfer equivalents).

GEOG 201. Culture and Health. 3 Credits. AE42 GLBC

This course offers a holistic, interdisciplinary approach to understandings of health, well-being, and disease within and across cultures. It draws upon the subfields of anthropology, as well as the humanities, natural sciences, and social sciences. This course should be of special interest to premedical students and majors in the allied health professions. (Same as AAAS 203 and GIST 210.)

GEOG 202. Culture and Health, Honors. 3 Credits. AE42 GLBC

Honors version of AAAS 203, GEOG 201 and GIST 210. This course offers a holistic, interdisciplinary approach to understandings of health, well-being, and disease within and across cultures. It draws upon the subfields of anthropology, as well as the humanities, natural sciences, and social sciences. This course should be of special interest to premedical students and majors in the allied health professions. (Same as AAAS 204 and GIST 211.)

GEOG 205. Disaster, Disease, and Mapping. 3 Credits.

Disaster, Disease, and Mapping investigates the intricate interactions between both the physical and human causalities of infectious disease transmission by examining multiple pathogens, their reservoirs, and their transmission modes. Maps are used to critically ascertain the spatial distribution of disasters and how human and physical actions, promote or reduce, disease transmission. We will study actions affecting transmission including physical factors such as environmental degradation, natural hazards, and climate change as well as social/human factors of

globalization, inequity of access to healthcare, and regional and global responses.

GEOG 300. Geographic Adventures in Climate Change. 3 Credits. GE11 GLBC

This course considers how climate change is altering particular things such as coffee and chocolate production, the electricity grid and nuclear energy, wild salmon and sharks, rare earth minerals and ice shelves, and many other aspects of life on earth. This course looks at how environmental processes and human systems interact at different spatial scales. This geographic framework is applied to a range of topics to assess climate change impacts as well as approaches to longstanding and emerging problems. Students will identify human systems (cultural, political, economic, justice, technology, etc.) and physical systems (biosphere, atmosphere, lithosphere, cryosphere, ecosystems, etc.). They will assess how human and environmental systems interact and the various spatial scales of these interactions. Students will analyze how climate change is interacting with these systems, their interactions, and spatial implications. Students will demonstrate critical thinking to create possible responses to specific contexts where human-environment interactions are altered by climate change and evaluate the impact of those responses. Student learning outcomes emphasize the demonstration of geographic systems thinking and critical analysis towards solution options. (Same as EVRN 300.)

GEOG 303. Happiness in East Asia. 3 Credits.

This course explores culture-specific ways that people in East Asia promote their well-being and happiness and alleviate their emotional and psychological distress, as individuals and as societies. It draws upon East Asian philosophical and religious traditions and contemporary practices, policies, and industries. Students will learn historical, cultural, and spatial (both social and physical) factors that shape people's experiences of trust, well-being, and comfort, as well as theoretical and methodological tools for a deeper understanding of people's lives through the lens of happiness within and across cultures. This course offers a multi-disciplinary approach to happiness, drawing primarily upon anthropology, sociology, and human geography. Knowledge of Korean, Japanese, or Chinese language is not required. This course is offered at the 300 and 500 level with additional assignments at the 500 level. Not open to students with credit in EALC 503. (Same as EALC 303 and GIST 302.) Prerequisite: Junior level standing required (5th semester or above) or consent of the instructor.

GEOG 304. Environmental Conservation. 3 Credits. GE3N NLEC

A survey of current methods of describing and modeling the function, structure, and productivity of natural and anthropogenically modified earth resource systems, along with a discussion of contemporary views of what constitutes a natural landscape. Fundamental natural science principles about the interplay among lithospheric, atmospheric, hydrospheric, and biospheric components of earth systems are emphasized. Uses of natural resources, including fossil fuels, minerals, and water, are described with attention to the earth's total energy budget. Human activities that affect preservation, conservation, and multiple uses of earth regions receive attention. Systems under stress through population and other contemporary forces serve as examples. (Same as EVRN 304.)

GEOG 311. Introductory Cartography and Geovisualization. 4 Credits. LFE

This course is an introduction to cartography and focuses on computer-based map making skills. It begins with the history of cartography, cognitive maps, and the use of maps in the past and modern times. Topics covered in this course emphasize spatial data handling, principles of cartography and symbolization, map elements and design, and mapping techniques such as choropleth, proportional symbol and dot

maps. Students will learn to adopt appropriate spatial data and mapping techniques to create accurate and creative digital maps reflecting given phenomena.

GEOG 316. Methods of Analyzing Geographical Data. 4 Credits. LFE

Introduces the benefits and limitations of using quantitative methods to analyze geographical problems. Covers traditional descriptive (e.g., measures of central tendency) and inferential statistics (e.g., hypothesis testing) but also inherently geographical approaches such as shape and point pattern analysis, and spatial autocorrelation. Laboratory emphasizes using the computer to explore and analyze geographical problems.

GEOG 321. Climate and Climate Change. 3 Credits.

This course is designed to introduce students to the nature of the Earth's physical climate. It introduces the basic scientific concepts underlying our understanding of our climate system. Particular emphasis is placed on energy and water balances and their roles in evaluating climate change. The course also evaluates the impact of climate on living organisms and the human environment. Finally, past climates are discussed and potential future climate change and its impact on humans is evaluated. (Same as ATMO 321.) Prerequisite: ATMO 105 or GEOG 104.

GEOG 332. Glaciers and Landscape. 3 Credits.

Elements from glaciology, geology, and climatology are merged to examine the interactions between glaciers and their natural environments, including the processes involved in glacier formation, the relationship between glaciers and climate, the mechanisms of glacier flow, and interpretation of the Earth's glacial record. Emphasis is placed on an interdisciplinary approach to study environmental change and paleoclimate reconstruction. Prerequisite: GEOG 104 or GEOL 101, or consent of instructor.

GEOG 336. Introduction to Environmental Hydrology and Water Resources. 3 Credits.

Water is vital to life on earth. In this course we cover components of the water or "hydrologic" cycle, how management has altered them, and how they are predicted to change with the changing climate. We discuss the evolution of water policy, its implications for managements and the economic impact of human perturbation on water. We study the physical processes that govern the water cycle, learn how they are measured, and estimate hydrologic fluxes. (Same as EVRN 363.) Prerequisite: GEOG 104 or GEOL 101.

GEOG 339. Topics in Physical Geography: _____. 1-3 Credits.

An investigation of special topics in Physical Geography. May include coursework under headings of soils, vegetation, climate, or geomorphology. May be repeated if topic differs.

GEOG 351. Africa's Human Geographies. 3 Credits. GE3S SBS

An introduction to historical, cultural, social, political, and economic issues in Africa from a geographic perspective. The course begins with the historical geography of humanity in Africa, from ancient times through to the present. Other topics include cultural dynamics, demography, health, rural development, urbanization, gender issues, and political geography. Case studies from Eastern and Southern Africa will be used to illustrate major themes. (Same as AAAS 351.)

GEOG 354. Globalization: A Geographic Approach. 3 Credits.

This course is designed to provide a broad overview of some major facets of the historical, economic, political, cultural, and geographical dimensions of contemporary globalization, the process by which individual regions and nations have become progressively linked to, and structured by, the world-system of states and markets, and the cultural contradictions associated with this process. (Same as GIST 354.)

GEOG 358. Introduction to Geographic Information Systems. 4 Credits. LFE GE3N NPS

An introduction to computer-based analysis of spatial data. Covers basic principles of collecting, storing, analyzing, and displaying spatial data. Emphasis is on problem-solving activities using common spatial analytical techniques (e.g., map overlay). The student will gain extensive hands-on experience with state-of-the-art GIS software. This course includes an embedded laboratory.

GEOG 360. Computer Programming for Mapping and Spatial Analysis. 3 Credits.

This course teaches basic computer programming concepts and skills for mapping and spatial analysis using various scripting languages. The goal is to enable students to write computer programs, develop mapping applications, and perform spatial data analysis. This course will lay the foundation for computerized problem solving skills that can be applied in later courses. This course assumes no previous programming experience.

GEOG 370. Introduction to Cultural Geography. 3 Credits. GE3S SBS

Charts some of the major lines of research in cultural geography, including critical theory, political economy, poststructuralist thought, feminism, and global consumption. Through fieldwork, diverse research methods are applied to issues such as community development, cultural patterns on the landscape and global impacts on local economies. Prerequisite: GEOG 100, GEOG 102 or GEOG 103; or consent of instructor.

GEOG 371. Environmental Geopolitics. 3 Credits.

This course examines how human relationships with the biophysical world are politicized. Examines key contributions to debates surrounding environmental security, resource conflicts, and related issues, as well as geopolitical assumptions on which these debates build. (Same as EVRN 371 and GIST 371.)

GEOG 372. Environmental Policy. 3 Credits.

An historical and analytical study of the formulation, implementation, and consequences of environmental policy in the United States. Attention is directed at relevant interest groups, issues specific to both rural and urban populations, relationships between national policies and international organizations concerned with environmental problems. Prerequisite: GEOG 148 or EVRN 148; and either EVRN 103 or HIST 103, EVRN 347 or HIST 347, or GEOG 150.

GEOG 373. Borders, Politics, and Territory. 3 Credits.

This course considers how humans wield power in the geographical form of borders and territories. At the international level this is called geopolitics, while at the national, provincial, and local levels it is political geography. Rare is a day when headlines fail to portray ongoing negotiations for influence over the places and spaces through which people live and the very lines that divide them. This course traces the historical evolution of borders and territory before exploring contemporary practices of bordering and border crossing in relation to trade, migration, maritime, outer space, air space, environment, cyberspace, governance, and human rights. Prerequisite: GEOG 100 or GEOG 102 or equivalent or consent of instructor.

GEOG 374. Vulnerability and Adaptation. 3 Credits.

The course objective is to understand and analyze human adaptation to environmental change by focusing on disasters and climate change. Each semester, the course rotates topics ranging from oil spills, hurricanes, sea-level rise to infectious disease. It provides undergraduate students with research experience and service learning, and offers opportunities for certificates through the Center for Undergraduate Research and the Center for Civic and Service Responsibility at KU. Students learn theories relevant to the case study, work in groups to generate research themes,

conduct literature search and review, learn research methods, and write and present their work.

GEOG 377. Urban Geography. 3 Credits.

This course explores the city from the multiple perspectives of its inhabitants. The cultural viewpoints of place, gender, age, and ethnicity are stressed. Traditional topics such as urban hierarchy, functions of the city, suburbanization, and ongoing changes in core and peripheral areas also receive attention. The distinctive landscapes of individual North American cities are emphasized, but examples also are drawn from throughout the world.

GEOG 395. Environmental Issues of: _____. 3 Credits.

This regional geography course examines contemporary environmental issues of a particular region of the world based on the expertise of the professor. Course emphasis is on the interaction of natural, socio-economic, and cultural factors of development that give rise to environmental problems. Students learn how local, national, and international government and non-governmental stakeholders address environmental problems. Course may be repeated with different professors.

GEOG 396. East Asia. 3 Credits. GE3S SBS

This course is an introduction to the contemporary politics, economy, and culture of Korea, China, and Japan in the context of globalization. In addition to the discussion of individual countries, the course examines the cross-cutting themes such as international relations, cultural exchange, and economic development in the region of East Asia.

GEOG 399. Topics in Regional Studies: _____. 1-3 Credits.

An investigation of special topics in Regional Studies. May include coursework related to a specific country or region. May be repeated if topic differs.

GEOG 451. Ecosystems Stewardship. 3 Credits.

This course sits at the crossroads between the discipline of ecology and the practice of stewardship, specifically the Indigenous Knowledge that is born from these landscapes over millennia in a place. Students will interact with research that establishes scientific foundations as a method to engage environmental problems in the anthropocene. The concept of stewardship is a core tenet of this course, students will engage with many approaches of stewardship, centering primarily on humans as a part of, not apart from, the environment. This course is offered at the 400 and 700 level with additional assignments at the 700 level. Not open to students with credit in EVRN 451 or EVRN 751, GEOG 451 or GEOG 759, BIOL 451 or BIOL 759. (Same as BIOL 451 and EVRN 451.)

GEOG 490. Geographic Internship. 1-6 Credits. AE61 CAP

Supervised practical experience. The student submits a proposal describing the internship prior to enrollment. Upon acceptance, regularly scheduled meetings with the advisor provide assistance, guidance and evaluation of progress in the professional experience. A written summary of the experience or outcomes of the research project are prepared independently by the student, a representative of the host agency, and the advisor. Total credit not to exceed six hours. Prerequisite: Fifteen hours of geography and permission of instructor.

GEOG 498. Special Topics in Geography: _____. 1-5 Credits.

Prerequisite: Fifteen hours of geography.

GEOG 499. Honors Course in Geography. 2-3 Credits. AE61 CAP

Open to students with nine hours of upper level credit in geography, an average of at least 3.5 in all geography courses, and an overall average of at least 3.25. Includes the preparation of an honors paper and its defense before a committee of at least two regular faculty members.

GEOG 500. Senior Capstone in Geography. 3 Credits. AE61 CAP

The capstone project provides students with a broad-based, interdisciplinary educational experience and allows them to integrate and synthesize the knowledge they have gained in their studies. The major goals of this course are to help students synthesize an integrated view of geography, advance steps toward career preparation, and develop networking and professional skills. The course will provide an overview of geography as a unified, coherent discipline with multiple perspectives, emphasize writing and analytical skills, introduce students to a major research project that integrates elements of physical and human geography, cultivate knowledge for future professional development, and introduce students to professional organizations. Students will gain experience applying and/or interviewing for professional positions and be introduced to multiple professional development and career services on campus. Graduate students may take this course by permission only. Prerequisite: Nine hours in Geography and status as a senior major in the department; or permission of instructor.

GEOG 512. Advanced Cartography and Geovisualization. 4 Credits.

This is an advanced computer-based scientific cartography course. It covers mapping techniques such as dasymetric mapping, multivariate mapping, cartogram and flow map, map animation, geovisual analytics, web and interactive mapping, and mapping from remotely sensed imagery. This course focuses on practical and hands-on experience. Students will learn theoretical concepts, principles, and design examples, and produce a cartographic portfolio of well-designed and professional maps. Prerequisite: GEOG 311 or equivalent; or consent of instructor.

GEOG 521. Microclimatology. 3 Credits.

A study of climatic environment near the earth-atmosphere interface. Consideration of rural climates in relation to agriculture and urban climates as influenced by air pollution and other factors. Emphasis is on physical processes in the lower atmosphere, distribution of atmospheric variables, the surface energy budget and water balance. (Same as ATMO 521.) Prerequisite: ATMO 105 and MATH 125.

GEOG 526. Remote Sensing of Environment I. 4 Credits. LFE

Introduction to study of the environment through air photos and satellite imagery, including principles of remote sensing, interactions of electromagnetic energy with the atmosphere and earth's surface, aerial photography, satellite systems, and sensors (electro-optical, thermal, and radar). Emphasis in the latter part of the course is on such applications as global monitoring, land cover mapping, forestry, agriculture, and oceanography. Laboratory emphasizes visual interpretation of aerial photography and satellite imagery and an introduction to digital image processing in the department's NASA Earth Science Remote Sensing Laboratory. Prerequisite: MATH 101 or equivalent. GEOG 358 recommended.

GEOG 528. Spatial Databases. 3 Credits.

This course covers concepts in spatial databases and their relevance in geographic information systems (GIS) and spatial analysis. It introduces the fundamental theories of data management behind Geographic Information Systems and imparts hands-on experience with mainstream spatial database management systems (DBMS), standard query languages and necessary tools to query/transform geospatial data, and perform spatial and network analysis. The course provides more in-depth coverage on database-oriented approaches for GIS geospatial analysis. This course is offered at the 500 and 700 level with additional assignments at the 700 level. Not open to students with credit in GEOG 728. Prerequisite: GEOG 358; or instructor permission.

GEOG 531. Topics in Physical Geography: _____. 1-3 Credits.

An investigation of special topics in physical geography. May include specific course work under the headings of geomorphology, climatology,

soils, vegetation, quaternary, paleoenvironments, hydrology, etc. May be repeated, if topic differs.

GEOG 532. Geoarchaeology. 3 Credits.

Application of the concepts and methods of the geosciences to interpretation of the archeological record. The course will focus primarily on the field aspects of geoarchaeology (e.g., stratigraphy, site formational processes, and landscape reconstruction), and to a lesser extent on the array of laboratory approaches available. (Same as ANTH 517.) Prerequisite: GEOG 104, ANTH 110, or ANTH 310.

GEOG 541. Geomorphology. 4 Credits. LFE

A critical study of land forms in relation to tectonics, climatic environment, and geologic processes. The use of geomorphic methods in the interpretation of Cenozoic history is emphasized. Laboratory exercises in analysis of field observations, maps, and photographs. Required field trip and fee. (Same as GEOL 541.) Prerequisite: GEOL 101 and GEOL 103, GEOG 104 and GEOG 105, or GEOL 103 and GEOL 304.

GEOG 553. Geography of African Development. 3 Credits. GE3S

Acquaints students with the values and social parameters of African agricultural and pastoral practice. Topics include customary land rights, African perspectives on the natural world, gender issues in African agriculture, and the urbanization of African cultures. The course also contrasts African views with those of Western development practitioners and donor agencies. Case studies from different countries are used to highlight the continent's regional differences. (Same as AAAS 553.)

GEOG 556. Geography of the Energy Crisis. 3 Credits.

A discussion and analysis of the basic facts and causes of energy problems on a national and world scale. Examines current production, consumption, efficiency, reserves, conservation, and other energy policy options, including adjustments that will affect consumer use, national politics, and strategic issues. Prerequisite: GEOG 102.

GEOG 558. Spatial Data Analysis. 4 Credits. LFE

A course in geographic information science designed for advanced undergraduate and graduate level students who already have an introductory understanding of GIS. Emphasis will be placed on spatial data analysis methods and their applications to geographical problem-solving. Topics include map algebra, terrain analysis and fundamentals of spatial statistics. Students will apply knowledge gained in lecture and reading to natural resource, urban, and scientific applications using state-of-the-art GIS software. Prerequisite: GEOG 358 or consent of instructor.

GEOG 560. GIS Application Programming. 3 Credits.

This course teaches programming within Geographic Information Systems. Students learn how to customize GIS applications to automate data processing and spatial analysis through programming languages. GIS programming concepts and methods are introduced from the aspects of spatial data management and analysis covering both the vector and raster data models. This course is offered at the 500 and 700 level with additional assignments at the 700 level. Not open to students with credit in GEOG 760. Prerequisite: GEOG 558 and a course in programming languages.

GEOG 570. Geography of American Indians. 3 Credits.

A survey of the culture and history of selected indigenous peoples of the Americas. Emphasis is placed on the environmental setting, the settlement and subsistence patterns, and the impact of European colonization. Discussion includes present-day ethnic and resource issues.

GEOG 571. Topics in Cultural Geography: _____. 1-3 Credits.

An investigation of special topics in cultural geography. May include specific course work under the headings of cultural theory and

methodology, material culture, foodways, religion, and similar topics. May be repeated, if topic differs.

GEOG 577. Human Dimensions of Global Change. 3 Credits.

This class introduces concepts such as coupled human and natural systems, social-ecological resilience, and sustainability science, examines people's responses to major climate, land, water, and coastal change, and discusses case studies. One hour of each seminar will be devoted to individual needs that address topical or methodological issues. Class requirements include presentations, biweekly papers, and a term paper. (Same as GIST 577.) Prerequisite: One of the following: GEOG 100, GEOG 104, GEOG 374, or an Environmental Studies introductory course.

GEOG 583. Migration, Diasporas and Development. 3 Credits.

This course introduces students to key concepts in global migration and its implications on development in migrant sending states particularly those on the African continent. It will explore the various migration patterns from Africa (e.g. migration between North Africa and Europe in the aftermath of the Arab Spring), South-South migration, the 'brain drain' of skilled professionals and its implications for development, and the role of diasporas in development. The course will also assess the integration of migrants in major migrant destination regions. Finally, the course will provide students with an opportunity to critically examine the relationship between migration and development in a particular national context of their choice. (Same as AAAS 583.) Prerequisite: GEOG 102 or consent of instructor.

GEOG 590. Understanding Central Asia. 3 Credits. AE42

An intensive, multidisciplinary survey of Central Asia, focusing on the former Soviet republics-Kazakhstan, Krygyzstan, Tajikistan, Turkmenistan, Uzbekistan-with additional coverage of neighboring regions (the Caucasus and the Caspian basin, Afghanistan, and western China). The course addresses the history of the region (from the Silk Road to Soviet rule), geography, religion, and the building of post-Soviet states and societies. This course is offered at the 500 and 700 level with additional assignments at the 700 level. Not open to students with credit in REES 710. (Same as REES 510.) Prerequisite: One previous interdisciplinary area studies course or the instructor's permission.

GEOG 591. Geography of Latin America. 3 Credits.

A study of the different physical, economic, and cultural settings in Latin America which form the basis for the various forms of livelihood.

GEOG 597. Geography of Brazil. 3 Credits.

Study of geographic factors, physical and cultural, that are basic to understanding the historical development of Portuguese South America and the contemporary and cultural geography of Brazil. Course also includes a survey of Brazil's South American neighbors.

GEOG 601. Indigenous Peoples of the World. 3 Credits.

A survey of the varied responses of global Indigenous peoples as a result of the imposition of external economic and political systems. An overview of diverse, thematic issues such as land rights, economic development, resources and cultural patrimony, languages, knowledge systems, and women's rights from the perspectives of Indigenous societies around the world. Detailed studies of Indigenous peoples seeking recognition and protection under international law are used. (Same as GIST 601 and ISP 601.) Prerequisite: Permission of instructor.

GEOG 658. Topics in Geospatial Technologies: _____. 1-6 Credits. LFE

An investigation of special topics in geoinformatics. May include specific coursework under the headings of methodology, basic research, thematic or regional applications, geographic information systems (GIS), Global Positioning System (GPS), and geostatistics. May be repeated if topic differs. Prerequisite: GEOG 111 or GEOG 358 or consent of instructor.

GEOG 716. Advanced Geostatistics. 3 Credits.

An introduction to the practical application of advanced geospatial statistical techniques. Potential topics include: spatial regression, interpolation, clustering, and advanced nonparametric statistics. Knowledge of a statistical package and GIS is assumed. Prerequisite: GEOG 358 or equivalent.

GEOG 719. Development of Geographic Thought. 2-3 Credits.

Critical analysis of the growth of geographic thought from antiquity to the present: emphasis on structure of modern geography. Prerequisite: Twenty hours of geography or consent of instructor.

GEOG 726. Remote Sensing of Environment II. 4 Credits.

An overview of techniques for computer analysis of digital data from earth orbiting satellites for environmental applications. Topics covered include: data formats, image enhancements and analysis, classification, thematic mapping, and environmental change detection. The laboratory exercises provide hands-on experience in computer digital image processing in the department's NASA Earth Science Remote Sensing Laboratory. Prerequisite: Introductory statistics and GEOG 526 or equivalent.

GEOG 728. Spatial Databases. 3 Credits.

This course covers concepts in spatial databases and their relevance in geographic information systems (GIS) and spatial analysis. It introduces the fundamental theories of data management behind Geographic Information Systems and imparts hands-on experience with mainstream spatial database management systems (DBMS), standard query languages and necessary tools to query/transform geospatial data, and perform spatial and network analysis. The course provides more in-depth coverage on database-oriented approaches for GIS geospatial analysis. This course is offered at the 500 and 700 level with additional assignments at the 700 level. Not open to students with credit in GEOG 528. Prerequisite: GEOG 358; or instructor permission.

GEOG 731. Topics in Physical Geography: _____. 1-3 Credits.

An investigation of special topics in physical geography. May include specific course work under the headings of geomorphology, climatology, soils, vegetation, quaternary, paleoenvironments, hydrology, etc. May be repeated.

GEOG 748. Location Modeling. 3 Credits.

This course provides an overview of advanced location analysis and modeling in the context of GIS. It introduces students to principles of location analysis, methods for making strategic location decisions, as well as existing classic location problems. It demonstrates analytical approaches by which location problems can be solved using mathematical programming, GIS and other optimization software. This course is a specialized course with an emphasis on the spatial analysis function of Geographic Information Systems, which covers many concrete applications of GIS geospatial analysis in urban planning, transportation, and service systems planning, ranging from firefighting stations to forestry management to transportation facilities. Prerequisite: GEOG 358; or instructor permission.

GEOG 752. Topics in Urban/Economic Geography: _____. 1-3 Credits.

An investigation of special topics in urban/economic geography. May include specific coursework under the headings of energy, economic development, international trade, environmental perception, housing, transportation, and migration. May be repeated.

GEOG 759. Ecosystems Stewardship. 3 Credits.

This course sits at the crossroads between the discipline of ecology and the practice of stewardship, specifically the Indigenous Knowledge that is born from these landscapes over millennia in a place. Students will interact with research that establishes scientific foundations as a

method to engage environmental problems in the anthropocene. The concept of stewardship is a core tenet of this course, students will engage with many approaches of stewardship, centering primarily on humans as a part of, not apart from, the environment. This course is offered at the 400 and 700 level with additional assignments at the 700 level. Not open to students with credit in EVRN 451 or EVRN 751, GEOG 451 or GEOG 759, BIOL 451 or BIOL 759. (Same as BIOL 759 and EVRN 751.)

GEOG 760. GIS Application Programming. 3 Credits.

This course teaches spatial data analysis using computer programming. Advanced spatial programming concepts and methods are introduced from the aspects of spatial data management and analysis covering both the vector and raster data models. This course is offered at the 500 and 700 level with additional assignments at the 700 level. Not open to students with credit in GEOG 560. Prerequisite: GEOG 558 and a course in programming languages.

GEOG 771. Topics in Cultural Geography: _____. 1-3 Credits.

An investigation of special topics in cultural geography. May include specific course methodology, material culture, foodways, religion, and similar topics. May be repeated.

GEOG 781. Environmental Geopolitics. 3 Credits.

This course examines how human relationships with the biophysical world are politicized. Examines key contributions to debates surrounding environmental security, resource conflicts, and related issues, as well as geopolitical assumptions on which these debates build. This course is a more advanced and rigorous version of the undergraduate version of this course. It is not open to students who have taken or are enrolled in GEOG 371 or EVRN 371, Environmental Geopolitics.

GEOG 791. Latin American Regions: _____. 3 Credits.

A description and analysis of the principal sources of geographic information pertaining to portions or all of Latin America. Prerequisite: GEOG 591 or concurrent auditing of GEOG 591, or consent of instructor.

GEOG 805. Perspectives in Geography. 2 Credits.

This course provides background on the discipline of geography and how it is practiced by the faculty in the department. It provides a foundation of knowledge of geography's role within the human and physical sciences as well as the humanities. Students will gain a critical perspective into the breadth of geography, including the ways in which geographers view the world through the lenses of place, space, and scale and the debates and approaches within the changing landscape of geographic inquiry.

GEOG 806. Proposal Writing and Research Design. 2 Credits.

The course is designed to assist graduate students in developing their research project, including refining research questions, creating a literature review, and defining appropriate methods to aid in successfully answering their questions. Learning outcomes include the production of an individual draft research proposal based upon the student's research design.

GEOG 875. Qualitative Research Methods. 3 Credits.

This course provides background on qualitative research methods used in human geography. Students will gain a critical perspective into relevant issues of qualitative methods with specific regard to ethical concerns related to human subjects research within the social sciences and humanities and the debates and approaches within the changing landscapes of qualitative methods. Students will have the opportunity to practice these techniques and strategies in a group research project. Prerequisite: GEOG 805 or consent of instructor.

GEOG 890. Geographic Internship. 1-6 Credits.

Supervised professional experience. The student submits to the program committee a proposal describing the internship prior to enrollment. Upon acceptance, regularly scheduled meetings with the advisor provide

assistance, guidance and evaluation of progress in the professional experience. A written summary of the experience or outcomes of the research project are prepared independently by the student, a representative of the host agency, and the advisor. Total credit not to exceed six hours. Prerequisite: Twelve hours of graduate level geography courses and consent of program committee.

GEOG 898. Readings in Geography. 1-4 Credits.

GEOG 899. Master's Thesis. 1-10 Credits.

Thesis credit. Graded on a satisfactory progress/limited progress/no progress basis.

GEOG 980. Seminar in Geography: _____. 1-3 Credits.

GEOG 998. Research in Geography. 1-5 Credits.

GEOG 999. Doctoral Dissertation. 1-10 Credits.

Dissertation credit. Graded on a satisfactory progress/limited progress/no progress basis.