

# COURSES FOR GEOGRAPHY

## Geography Courses

### **GY101 Atmospheric Proc & Patterns**

*N*

Hours 4

Three hours lecture and one two-hour laboratory period. Earth-space relations, latitude and longitude, seasons, time, weather, climate, and vegetation. Particular attention is given to the causes of weather and climate and why they tend to be different from place to place.

Natural Science

### **GY102 Earth Surface Processes**

*N*

Hours 4

Three hours lecture and one two-hour laboratory period. Study of earth-surface processes, with consideration of human interaction with the physical environment. Subjects include landforms, water resources, soils, and mapping the physical environment.

Natural Science

### **GY105 World Regional Geography**

*SB*

Hours 3

Introduction to geography through a survey of the world's major geographic regions. Examines their physical and cultural features, economies, and populations.

Social and Behavioral Sciences

### **GY110 People, Places, and Environment**

*SB*

Hours 3

Introduction to geography as a science for learning the fundamentals of human behavior and decision making. Examines how human events, natural resources, economies, development, and urbanization impact the way humankind lives, organizes its space, and makes decisions for the future.

Social and Behavioral Sciences

### **GY202 The Water Planet**

*N*

Hours 4

This course is about water on earth, and the content will integrate scientific elements from the disciplines of atmospheric science, geography, geology, hydrology, oceanography, and water resources. The course is organized based on the large-scale elements of the hydrologic cycle and the smaller-scale elements of the water balance concept, especially as they affect water resources.

Natural Science

### **GY204 Map & Air Photo Interpretation**

Hours 4

Three hours lecture and one two-hour laboratory period. Fundamentals of map reading and interpretation.

### **GY207 Field Studies in Water and Climate**

*N*

Hours 4

Water is one of the most abundant, yet most precious, natural resources on Earth. Its movement and properties are determined by processes occurring within and across many geosystems, including rivers, lakes, glaciers, groundwater, and climate systems. This course explores how different components of Earth's water system operate and the processes linking the components together. We will also explore how people modify and utilize Earth's water systems. Our course will be based in Innsbruck, Austria, a geographic location with a variety of water systems, including glaciers, which have very strong ties to Earth's climate system. We will take fieldtrips to local glaciers and rivers to examine how water systems operate in the "real world" and learn techniques used to measure and understand how these systems change over space and time. We will also take fieldtrips to Prague, Czech Republic and Munich, Germany to better understand how humans modify water systems, through processes such as river regulation. GY 207 is designated a natural science (NS) course.

Natural Science

### **GY265 Water, Energy, and Food**

Hours 3

The primary objective of this course is to introduce students to the essential characteristics and basic processes of inquiry and analysis in the area of the water-energy-food (WEF) nexus. Specifically, the WEF nexus will be considered in relation and its application to human concerns, such as emerging supply and demand issues and their impacts of social and economic systems, ecological health, and human well-being. This course will encourage the development of critical thinking skills and requires students to analyze, synthesize, and evaluate knowledge about core WEF concepts.

### **GY267 Political Ecology**

Hours 3

Political ecology is a multidisciplinary approach to studying the environment through interrogating how power shapes and intersects with human-environment relationships. As a field of inquiry and practice, political ecology has greatly expanded over the past several decades to not just understand the political foundations of environmental problems or challenges, but also the co-production of environments with close attention to matters of justice, power, and inequality. Political ecology contends that through critical analysis and interdisciplinary methodologies, we can come to better understand the roots of socio-environmental problems in order to work for political change and social good.

### **GY302 Climatology**

Hours 3

Introduce the fundamentals of the earth-atmosphere system as they comprise the climate of Earth, drive spatial and temporal climate variability, and impact life.

Prerequisite(s): GY 101

**GY310 Geography of America's Public Lands**

Hours 3

This course is devoted to the topic of the management of the public domain of the United States. It will examine how the public domain came to be, how it has been disposed through the centuries by homesteading, and how remaining public lands are managed by different government agencies for mining, grazing, tourism, defense, or water storage and energy production. The focus will be on western states but public holdings in eastern states, oceans, and the electromagnetic spectrum will be covered.

**GY317 Natural Hazards**

W

Hours 3

Examination of the causes, consequences, and spatial distribution of climatic, geomorphic, and human-induced natural hazards. Writing proficiency is required for a passing grade in this course. A student who does not write with the skill normally required of an upper-division student will not earn a passing grade, no matter how well the student performs in other areas of the course.

Prerequisite(s): GY 101 or GY 102

Writing

**GY330 Computr Mapping Graphics**

C

Hours 4

Three hours lecture and one two-hour laboratory period. Introduction to computer graphics and their application in both the natural and social sciences, with special emphasis on mapping. Computing proficiency is required for a passing grade in this course.

Prerequisite(s): GY 204

Computer Science

**GY339 Natural Resource Envirnm Plang**

Hours 3

Analyzes human interactions with the physical environment and ways of dealing with them. Integrates environmental science, social science, and planning, and includes environmental impact assessment.

**GY341 Geography Of Us And Canada**

Hours 3

Study of the physical and human geography of the United States and Canada.

**GY344 Geography Of Africa**

Hours 3

Study of the physical and human geography of Africa.

**GY345 Geography of Latin America**

Hours 3

This course is designed to provide a regional survey of Latin America's environments and peoples from a geographic perspective. The course presents the physical landscape as well as the changing environment in Latin America. The course then explores the major historical, cultural, and economical aspects of the region. The course will have an emphasis in processes that shape the major contemporary issues, such as development, urbanization, and environmental change.

**GY346 Geography of Europe**

Hours 3

This course is designed to provide a regional survey of Europe in terms of economic activities and the physcial environment. Special emaphasis is on the historical development of European landscapes.

**GY363 Geomorphology**

Hours 3

Study of physical, chemical and biological processes operating at the Earth's surface and landforms, and the landscapes such processes develop.

Prerequisite(s): GY 102 or GEO 101

**GY365 Industrial Develop & Location**

Hours 3

Systematic study of the principles and processes underlying the development, location, and spatial organization of economic activities from both a national and international perspective. Writing proficiency is required for a passing grade in this course. A student who does not write with the skill normally required of an upper-division student will not earn a passing grade, no matter how well the student performs in other areas of the course.

Prerequisite(s): GY 110

**GY370 Special Topics**

Hours 3

*No description available*

**GY375 Sports Geography**

Hours 3

Sports are an important part of society and contribute billions of dollars to the global economy. This course examines the geographic dimensions of sports, primarily in North America, with some reflections on Europe for contrast. The geography of sports can be analyzed through the use of concepts found in a variety of human geography subdisciplines, including cultural, historical, economic, population, urban, and political geography. The course covers a variety of topics and helps students develop a holistic view of sports with regards to spatial interactions. Geography courses explain why things are where they are on the surface of the Earth. In other words, students develop a spatial perspective in thinking about their surroundings.

**GY377 Cultural Geography**

Hours 3

Study of the way in which culture influences elements of both physical and human landscapes with emphasis on how cultures are spread over space and how cultures make sense of space.

Prerequisite(s): GY 105 or GY 110

**GY385 Watershed Management Plan Development**

Hours 3

This course is designed to be primarily an experiential course and will address development and implementation of a Watershed Management Plan. The North River Watershed Management Plan will be used as a working model and students will review theory before carrying out experiential learning in the field.

**GY404 Physical Geography Seast Us**

Hours 3

A study of the physical landscapes in the southeastern United States. Emphasis is on the geological setting, geomorphic features, climate, soils, and vegetation, and the interrelationships of these conditions that shape the landscape in this region.

Prerequisite(s): GY 101 and GY 102; or GEO 101

**GY405 Dir Res Physical Geog**

Hours 1-3

Hands-on, problem solving in the field of physical geography.

**GY406 Dir Res Human Geography**

Hours 1-3

Hands-on, problem solving in the field of human geography.

**GY409 Forest History and Restoration**

Hours 4

This course covers the theories, tools and techniques used in historical ecology with a focus on the establishment of reference conditions for habitat conservation and restoration efforts.

Prerequisite(s): GY 101 or GY 102

**GY410 The Geography of National Parks**

Hours 3

This course is devoted to the changing geography of the national park system and protected areas, with an emphasis on their design, planning, and operations.

Prerequisite(s): GY 110

**GY412 Hydroclimatology**

Hours 3

To provide a basic understanding of the waters of Earth, especially with relation to the effects of precipitation and evaporation upon the occurrence and character of water in streams, lakes and on or below the land surface.

Prerequisite(s): GY 101 and GY 302

**GY413 Applied Climatology**

Hours 3

Applied Climatology is a graduate/senior level course designed to expand upon fundamental concepts learned in GY 101. Within this broad field, a specific focus in GY 413 concentrates upon climate and human health/behavior, and human modification of climate. The course contains a mixture of lecture, lab, and field assignments.

Prerequisite(s): GY 101

**GY414 Climate Change and Health**

Hours 3

This course is an introduction to the effect of global climate change on health. The course will be taught from a geographical perspective and will introduce students to the physical science of climate change and the impact it has on health through discussion of extreme weather events, altered ecological systems, and threats to human security and welfare. Discussion will build on the core concepts of climate change science to provide students with a solid foundation to further examine a variety of topics from acute impacts such as heat waves and other weather extremes to chronic conditions such as shifting disease vector habitats, degraded air quality, and food security. Direct correlations between health impacts and climate change will be emphasized throughout as will discussion of mitigation and adaptation strategies.

Prerequisite(s): GY 101

**GY415 The Geography of Extinctions and Endangered Species**

Hours 3

This course examines the individuals, institutions, research, controversies, and policies that have developed around wildlife extinction, ecological problems associated with extinction, and endangered species. The course also examines the stories of several lost or vanishing species. This course, which has been developed out of the instructor's current research projects, uses lectures, readings, student-led discussions, writing assignments, and one exam to explore how humans have contributed to, while at the same time grappling with, the issue of wildlife conservation and extinction.

**GY416 Introduction to Geostatistics Using R**

Hours 3

This course is an introduction to geostatistical data analysis using R. The course will be taught from the perspective of geographical and climate data analysis but serves as a broad introduction to the high-level programming language, R, as well as applied spatial data analysis. Students will load and manipulate data of different types, perform a variety of statistical analyses, generate graphical output, and create productive workflows using R alone. The primary outcome will be to facilitate students' use of R to analyze data of their own choosing on a final project. Students will present these methods to the class for others to critique, analyze and learn from. Code sharing and re-use is highly emphasized, as is collaboration. The course is designed as a 1-hour lecture plus 2-hour lab each week.

**GY417 Extreme Weather and Society**

W

Hours 3

EW&S is an integrated physical and social science seminar class consisting of readings, discussion, and lectures on perception, understanding, and communication of severe weather hazards. Writing proficiency is required for a passing grade in this course. A student who does not write with the skill normally required of an upper-division student will not earn a passing grade, no matter how well the student performs in other areas of the course.

Prerequisite(s): GY 101

Writing

**GY420 Remote Sensing I**

C

Hours 4

Three hours lecture and one two-hour laboratory period. Introduction to the basic principles of electromagnetic radiation, interaction between energy and earth features, remote sensing instruments, and information extraction from remotely sensed data. Computing proficiency is required for a passing grade in this course.

Prerequisite(s): GY 204

Computer Science

**GY424 Cartography Practicum**

Hours 3-9

Individual work experience in cartography, supervised by faculty and staff of The University of Alabama. A maximum of 3 hours of internship or practicum credit can be applied to the geography major. Credit for GY 424 cannot be applied to the geography minor.

**GY425 Cartography Internship**

Hours 3-9

Individual work experience on a cartographic project, supervised by the staff of an off-campus agency. A maximum of 3 hours of internship or practicum credit can be applied to the geography major. Credit for GY 425 cannot be applied to the geography minor.

**GY429 Fundamentals of Geographic Information Systems**

Hours 3

This course is a hands-on, practical Geographic Information Systems (GIS) introduction for non-majors in Geography or GIS Certificate.

**GY430 Intro Geographic Info Systems**

C

Hours 1,3

Three hours lecture and one hour laboratory period. Introduces the basic concepts of GIS, including definition and components of GIS, spatial data structures, data sources, data input, manipulation and analysis, applications of GIS, and managing GIS. Computing proficiency is required for a passing grade in this course.

Prerequisite(s): GY 204

Computer Science

**GY433 Gis Practicum**

Hours 3-9

Individual work experience in GIS, supervised by the faculty and staff of The University of Alabama. A maximum of 3 hours of internship or practicum credit can be applied to the geography major. Credit for GY 433 cannot be applied to the geography minor.

**GY434 Gis Internship**

Hours 3-9

Individual work experience in GIS, supervised by the staff of an off-campus agency. A maximum of 3 hours of internship or practicum credit can be applied to the geography major. Credit for GY 434 cannot be applied to the geography minor.

**GY435 Remote Sensing II**

Hours 4

Three hours lecture and one two-hour laboratory period. Analysis and extraction of thematic information from nonphotographic remotely sensed data for geographic information systems. Topics include image processing, image enhancement, and image classification. Computing proficiency is required for a passing grade in this course.

Prerequisite(s): GY 420

**GY436 Adv Geographic Info Syst**

C

Hours 4

Three hours lecture and one two-hour laboratory period. Evaluation of case studies, spatial model development, and database design for geographic information systems. Computing proficiency is required for a passing grade in this course.

Prerequisite(s): GY 430

Computer Science

**GY437 GIS for Transportation**

Hours 4

The application of Geographic Information Systems to transportation has resulted in a sub-field known as GIS-T. This course will provide a hands-on introduction to GIS-T.

Prerequisite(s): GY 204

**GY439 GIS Programming**

Hours 4

This course focuses on the extension of geographic information systems (GIS) through programming as well as on the development of stand-alone algorithms for spatial analysis and numerical modeling.

Prerequisite(s): GY 429 or GY 430

**GY440 Commun Facil Planning**

Hours 3

Principles, processes, and analysis of public facility location planning, with emphasis on the spatial search process, impact analysis, and public facility location models. Writing proficiency is required for a passing grade in this course. A student who does not write with the skill normally required of an upper-division student will not earn a passing grade, no matter how well the student performs in other areas of the course.

**GY441 Land Use Regulations**

Hours 3

Theory and use of zoning, eminent domain, taxing and police powers, enabling acts, charters, official maps, codes, nuisance ordinances, and environmental impact statements in community planning.

**GY443 Location Science**

Hours 3

This course presents the theory and practice of Location Science – the study of the optimal or near optimal spatial location and allocation of facilities, routes, personnel, or other assets. A variety of optimal procedures for location problems is presented, including minimum spanning tree, shortest path, maximal flow, and transportation problem algorithms. The Simplex method as applied to location problems is outlined and demonstrated. Heuristic approaches to location problems including greedy heuristics and Tabu search heuristics are reviewed.

**GY444 Field Studies In Africa**

Hours 6

Three-week intensive field study in Ghana. Explores geographical perspectives on Africa's level of development and the responses of the African peoples to their circumstances.

**GY445 Agriculture: Environment and Development**

Hours 3

This course examines the geographical elements of how people use the biophysical environment to grow domesticated plants (crops). Agriculture is understood in this course as the transformation of biophysical or "natural" environments into "cultural" environments. It is assessed in regard to both the plants cultivated, and the soil, slope, moisture, and temperature conditions that exist and then are modified or created by farmers. Ecological and systematic approaches are taken in order to understand how different agricultural strategies insure continual long-term productivity and stability. Microeconomics is an important and recurring theme.

Prerequisite(s): GY 105 or GY 110 or instructor permission

**GY449 Field Studies in Europe: Ireland**

Hours 6

Ireland with its long history of occupation, colonization, invasion, emigration and immigration, together with its diverse geology, geomorphology, culture, history and heritage is an ideal location to study the intricacies of human-earth relationships in a dynamic modern setting. Located on the western most edge of Europe, and a member of the European Union, Ireland welcomes over 11 million visitors each year and during the last decades has evolved into a forward-thinking center of globalism and multiculturalism. This course is designed to immerse each student in all things Irish, past and present, and through readings, field visits, excursions and exposure to the Irish people and culture develop an understanding of the complexity, interdisciplinarity and global interconnections that exist in Ireland and throughout our global community. This is a unique opportunity for students to experience the real Ireland.

**GY450 Conservation Field Studies in Belize**

Hours 6

Study Belize's diverse rainforests, coral reefs, and visit Mayan ruins for a glimpse into a past civilization. Belize is unique in that it still contains relatively undisturbed rainforests and the longest barrier reef in the Western Hemisphere. However, while Belize has emerged as an international leader regarding conservation efforts, threats from climate change, poverty, and development still exist. The purpose of this course is 1) examine current conservation efforts to safeguard this biodiversity; 2) familiarize students with the most important aspects of tropical lowland terrestrial and marine ecosystems; 3) understand the role of local culture in sustainable conservation; 4) gain an understanding of the fundamental importance of biodiversity; and 5) expose students to new and unique cultures and environments. The course is designed for students who are interested in conservation issues, biogeography, marine sciences, ornithology and birding, archaeology, and outdoor adventures.

Prerequisite(s): GY 102

**GY451 Global Environmental Change**

Hours 3

Global Environmental Change focuses on the major issues of global change, including anthropogenic climate change, land use and land cover change, biodiversity issues, environmental pollution, potential global change-related impacts on human health, and relevant social policies. The class will follow a quasi-seminar format where individual presentations and group discussion will comprise a large portion of the in-class activity. Each week students will do research on and/or read assigned articles and additional articles of your own selection on relevant subjects. I will provide a summary of the weekly topic and as a class we will discuss issues raised in the research and readings.

Prerequisite(s): GY 101 or GY 102

**GY452 Environ Decision Making**

Hours 3

Review of the history of natural resources in the U.S. and current environmental topics, followed by discussion of techniques to facilitate environmental decision making and management.

**GY453 Environment & Society**

W

Hours 3

Exploration of the linkages between the biophysical environment and human social systems. Public policy implications are viewed from a social science perspective. Writing proficiency is required for a passing grade in this course. A student who does not write with the skill normally required of an upper-division student will not earn a passing grade, no matter how well the student performs in other areas of the course.

Prerequisite(s): GY 110

Writing

**GY454 Costa Rica Field Studies: Tropical Ecology, Conservation, and Development**

Hours 4

This program will provide students with a broad interdisciplinary experience encompassing tropical ecology, conservation and development (TECD) in a highly experiential learning context.

**GY456 Planning Internship**

Hours 3-9

Individual work experience in planning, supervised by the staff of an off-campus agency. A maximum of 3 hours of internship or practicum credit can be applied to the geography major. Credit for GY 456 cannot be applied to the geography minor.

**GY457 Environmental Entrepreneurship**

Hours 3

Interested in starting a nonprofit? Working with or leading one? In this course students will create their own nonprofit organization from conception to incorporation. Build on an existing idea or start a new organization around students' goals and passion. Learn what it takes to run an organization by building one from the ground up, including business planning, legal structures, board development, and incorporation process. Classes will be structured around brief lectures, reading quizzes, class discussions, maker space project development, and presentations.

**GY458 Urban Planning And Analysis**

Hours 3

A study of contemporary urban landscapes, political and economic power structures, and resultant conflicts. Includes an in-depth analysis of the role of externalities, the urban planner, urban policymaking, and analytical methods in the planning and administration of urban landscapes. Writing proficiency is required for a passing grade in this course. A student who does not write with the skill normally required of an upper-division student will not earn a passing grade, no matter how well the student performs in other areas of the course.

**GY462 Land Use Science**

Hours 4

This course explores the interactions between land use, land cover, and social and environmental processes at multiple scales. The emphasis is on understanding how the natural landscape influences human activities, how humans modify the natural landscape to meet our needs, and how those modifications create a co-evolution between landscapes and human use. Understanding how land uses are, or should be, allocated to achieve multiple goals, including food and fiber production, space for human settlement, provision of ecosystem services, and access to renewable energy sources, requires consideration of these multiple objectives and of the various factors driving land-use decisions at multiple scales.

Prerequisite(s): GY 105 or GY 110

**GY464 Seminar in Contemporary Conservation Politics**

Hours 3

In this reading intensive and discussion based course, students will engage with a variety of contemporary texts that grapple with pertinent questions about the meaning of conservation in our contemporary moment, one which many have labelled the Anthropocene. The seminar will introduce students to key theoretical concepts related to the Anthropocene and its Anthro-adjacent terms (the Capitalocene, the Plantationocene, etc.), with particular focus on how new ways of understanding human transformation on the planet inform and push us to re-evaluate human relationships with nonhuman species. Students will pay special attention in this course—through a variety of ethnographic, empirical, and more theoretical texts—to reconfigurations and rearticulations of human-wildlife relationships and conservation politics, inclusive of both plant and animal life and human efforts to govern nature on a rapidly changing planet. As we face the rapid and ongoing acceleration of planetary species extinction and anthropogenic climate change, new ways of articulating environmental discourses and nature-society relations are necessary, which students will discuss and debate from a number of vantage points where the ecological meets the social (and thus, political).

**GY466 Transport Geography**

Hours 3

Examines the location and function of the multimodal North American transportation system, the urban transportation planning process and methodologies. Assesses the political and environmental contexts of transport systems, including impacts of continued reliance on the automobile.

Prerequisite(s): GY 105 or GY 110, or instructor permission

**GY470 Special Topics**

Hours 3

*No description available***GY472 Soil Science**

Hours 4

Three hours lecture and required field and lab work. Introduction to the study of soils, including soil formation, classification, and the interpretation of soils to reconstruct environmental histories.

**GY473 Public Policy Development in Water Resources**

Hours 3

This course will evaluate the current approaches to policy theory and examine systematically the broader implications of the substantive aspects of public policy development in the water resources spectrum. In analysis of public policy development in water resources, the student will look at both policy process and policy substance. Attention will be given to the questions of how and why water policy differs across states, and how one might evaluate policy performance cross-nationally.

**GY477 Water Resources Management, Law, and Policy**

Hours 3

The Water Resources Management, Law, and Policy course will provide students with a survey of water resources development, control, law, policy and management with particular emphasis on public policy considerations including: the acquisition and exercise of water rights—appropriative and riparian; groundwater management; water districts and user organizations; environmental considerations; Federal/State relations including interstate allocation; and the Alabama Water Resources Act. The course will also address international water law—the multinational treaties, laws, cases, practices and politics governing Earth's transboundary freshwater resources (watercourses including rivers, streams, lakes, and groundwater aquifers) shared by two or more countries.

Prerequisite(s): GY 101 and GY 102; or GEO 101

**GY481 Water Diplomacy**

Hours 3

The course will focus on the linkages between water resources policy and conflict or cooperation with primary interest on interstate (transboundary) and intrastate water issues. The conceptual framework of the course is centered on water scarcity, water conflict, hydropolicy, hydrohegemony, water security, and dispute resolution. The role of disparate stakeholders and the problem of scale will be considered. The policy, norms and laws for mediating water conflict at different jurisdictional levels, including adversarial legalism (lawsuits) are examined.

**GY483 Environment Science Internship**

Hours 3-9

Individual work experience in environmental science, supervised by the staff of an off-campus agency. A maximum of 3 hours of internship or practicum credit can be applied to the geography major. Credit for GY 483 cannot be applied to the geography minor.

**GY485 River Hydrology**

Hours 3

Rivers are dynamic natural systems that are of great importance to ecosystems and society. This course examines river hydrology processes from a physical geography perspective. A major theme of the course will be impacts of human actions on river systems.

Prerequisite(s): GY 101 or GY 102

**GY486 Watershed Dynamics**

W

Hours 3

An examination of the physical operation of watersheds focusing on surface water hydrology, erosion, and sedimentation. Writing proficiency is required for a passing grade in this course. A student who does not write with the skill normally required of an upper-division student will not earn a passing grade, no matter how well the student performs in other areas of the course.

Prerequisite(s): GY 102

Writing

**GY488 Digital Terrain and Watershed Analysis**

Hours 4

This course covers concepts, numerical algorithms, and techniques for digital terrain and watershed analysis. It combines lectures with a substantial practical lab component. The lectures covers spatial representation of topography, topographical data acquisition techniques (Photogrammetric Stereo, InSAR, LiDAR, GPS, cartography), terrain visualization, terrain parameter derivation, extraction of critical terrain features, landform recognition and classification, watershed analysis, cut-and-fill and volumetric analysis, drainage network extraction, watershed delineation, and distributed watershed models. The practical component, involving 8 lab assignments and one individual mini-project, will give students hands-on experience in using proprietary GIS software packages, ArcGIS, EPA BASINS 4.0 and HSPF 12.0 to handle topographic and image data for terrain and watershed analysis.

Prerequisite(s): GY 430

**GY489 Forest Ecology Veg Analy**

W

Hours 4

Three hours lecture and required field work. Study of the nature of forest communities and the interrelationship of organisms that compose them. Writing proficiency is required for a passing grade in this course. A student who does not write with the skill normally required of an upper-division student will not earn a passing grade, no matter how well the student performs in other areas of the course.

Writing

**GY490 Geography Internship**

Hours 3-9

Work experience in an agency involved in geographical analysis. A maximum of 3 hours of internship or practicum credit can be applied to the geography major. Credit for GY 490 cannot be applied to the geography minor.

**GY491 Fluvial Geomorphology**

W

Hours 3

This course provides an in-depth investigation of the processes that determine the form and evolution of rivers and streams. Questions addressed by this course include the following. What processes determine the form and evolution of rivers and streams? How can we infer process from form and vice versa? How do river form and process vary spatially and temporally? What principles of fluvial geomorphology are needed for river restoration and management? The course will combine lectures, discussions, field data collection, and modeling activities. Writing proficiency is required for a passing grade in this course. A student who does not write with the skill normally required of an upper-division student will not earn a passing grade, no matter how well the student performs in other areas of the course.

Prerequisite(s): GY/GEO 363 Geomorphology

Writing

**GY492 Eastern Forest Communities and Silvics**

Hours 4

This field course is focused on the biotic and abiotic elements that create distinct forest communities throughout the eastern US, with a particular emphasis on woody plant assemblages including the silvics of dominant and indicator species in different community types. Applications to forest management are stressed.

Prerequisite(s): GY 101 or GY 102 or BSC 114

**GY494 Forest Measurement & Methods**

Hours 4

This course is designed to provide students with a theoretical foundation and practical experiences in measuring, inventorying, and describing trees, stands, and forests.

Prerequisite(s): GY 101 or GY 102 or BSC 114 or BSC 116

**GY496 Forest Ecosystem Management: Silviculture**

W

Hours 4

In this course silviculture is treated as applied forest ecology. The goal of this course is to provide students with a knowledge of silviculture and its ecological basis so they can design manipulations in forest ecosystems to achieve a range of management objectives. The course requires field trips to tour different sites and visit with forest scientists and managers. In this course students learn about tree growth and stand development and use this information to develop silvicultural prescriptions to meet a diverse range of management goals. We will explore how silvicultural treatments can influence stand structure and composition and how these changes influence timber quantity and quality, forest health, biodiversity, soil, and wildlife habitat among other features. We will also focus on how silviculture is influenced by broader social, economic, and ecological issues. Writing proficiency is required for a passing grade in this course. A student who does not write with the skill normally required of an upper-division student will not earn a passing grade, no matter how well the student performs in other areas of the course.

Prerequisite(s): GY 489 or GY 409 or GY 492 or GY 494 or instructor permission

Writing

**GY500 Research Traditions Meth In Gy**

Hours 3

An investigation of the historical development of geography, including its changing philosophies and prominent contributors. Students are also introduced to various approaches for conducting research in geography and must develop a written research proposal in an area of their interest.

**GY504 Physical Geo of SE US**

Hours 3

A study of the physical landscapes in the southeastern United States. Emphasis is on the geological setting, geomorphic features, climate, soils, and vegetation, and the interrelationships of these conditions that shape the landscape in this region.

**GY505 Dir Research Physical Geograph**

Hours 1-3

*No description available*

**GY506 Dir Research Human Geography**

Hours 1-3

*No description available*

**GY509 Forest History and Restoration**

Hours 4

Investigation of the theories, tools, and techniques used in historical ecology with a focus on the establishment of reference conditions for habitat restoration and management decisions.

**GY510 Geography of National Parks**

Hours 3

This course is devoted to the changing geography of the national park system and related protected areas throughout the world, with an emphasis on their design, planning, and operations.

**GY512 Hydroclimatology**

Hours 3

To provide a basic understanding of the waters of Earth, especially with relation to the effects of precipitation and evaporation upon the occurrence and character of water in streams, lakes and on or below the land surface.

**GY513 Applied Climatology**

Hours 3

Applied Climatology is a graduate/senior level course designed to expand upon fundamental concepts learned in GY 101 and also GY 402 (Climatology). Within this broad field, a specific focus in GY 513 concentrates upon climate and human health/behavior, and human modification of climate. The course contains a mixture of lecture, lab, and field assignments.

Prerequisite(s): GY 101 GY 402

**GY514 Climate Change and Health**

Hours 3

This course is an introduction to the effect of global climate change on health. The course will be taught from a geographical perspective and will introduce students to the physical science of climate change and the impact it has on health through discussion of extreme weather events, altered ecological systems, and threats to human security and welfare. Discussion will build on the core concepts of climate change science to provide students with a solid foundation to further examine a variety of topics from acute impacts such as heat waves and other weather extremes to chronic conditions such as shifting disease vector habitats, degraded air quality, and food security. Direct correlations between health impacts and climate change will be emphasized throughout as will discussion of mitigation and adaptation strategies.

**GY516 Introduction to Geostatistics Using R**

Hours 3

This course is an introduction to geostatistical data analysis using R. The course will be taught from the perspective of geographical and climate data analysis but serves as a broad introduction to the high-level programming language, R, as well as applied spatial data analysis. Students will load and manipulate data of different types, perform a variety of statistical analyses, generate graphical output, and create productive workflows using R alone. The primary outcome will be to facilitate students' use of R to analyze data of their own choosing on a final project. Students will present these methods to the class for others to critique, analyze and learn from. Code sharing and re-use is highly emphasized, as is collaboration. The course is designed as a 1-hour lecture plus 2-hour lab each week.

**GY517 Extreme Weather and Society**

Hours 3

EW&S is an integrated physical and social science (W) seminar class consisting of readings, discussion, and lectures on perception, understanding, and communication of severe weather hazards.

**GY520 Remote Sensing I**

Hours 4

Focuses on basic principles behind remote sensing physics, techniques, and technology and introduces new sensor systems and digital image processing. Major topics include electromagnetic radiation principles, airborne remote sensing, microwave remote sensing, satellite remote sensing, and digital image processing.

**GY523 Quantitative Methods**

Hours 3

This course introduces several quantitative methods used by geographers to analyze and interpret geographic data and solve geographic problems. Topics include: Data formatting and organization, descriptive statistics, sampling, hypothesis formulation and testing, and parametric and non-parametric statistical procedures through factor analysis.



**GY529 Fundamentals of GIS**

Hours 3

This course is a hands-on, practical Geographic Information Systems (GIS) introduction. GIS is a computer-based system used for gathering, analyzing, and displaying geographic information. GIS enables users to integrate multiple spatial data sources, perform complex geographic analysis and present the results in digital and paper map. This technology has a wide range of applications for research, businesses and governments. Tailored toward first-time users, this course will focus on learning how to use the ArcGIS software package to import, generate, display and analyze spatial data.

**GY530 Intro Geographic Info Systems**

Hours 4

Introduces the basic concepts of GIS, including definition and components of GIS, spatial data structures, data sources, data input, manipulation and analysis, applications of GIS, and managing GIS.

**GY532 Spec Research In Geog**

Hours 2-4

*No description available*

**GY534 GIS Internship**

Hours 3-6

Individual work experience in GIS supervised by the staff of an off-campus agency.

**GY535 Remote Sensing II**

Hours 4

Focuses on the quantitative analysis of non-photographic remote sensor data, providing students with hands-on experience using a digital image processing software package. Topics include preprocessing, image enhancement, classification, digital change detection, and remote sensing and GIS.

**GY536 Adv Geographic Info Syst**

Hours 4

Focuses on the analytical use of spatial information as well as GIS applications. Topics include spatial aspects of geographic information, attribute data structure, error and uncertainty, spatial analysis theories, GIS modeling, and GIS design.

**GY537 GIS for Transportation**

Hours 4

The application of Geographic Information Systems to transportation has resulted in a sub-field known as GIS-T. This course will provide a hands-on introduction to GIS-T.

**GY539 GIS Programming**

Hours 4

This course focuses on the extension of geographic information systems (GIS) through programming as well as on the development of stand-alone algorithms for spatial analysis and numerical modeling.

**GY541 Land Use Regulations**

Hours 3

The course explores the legal standards by which land is regulated and controlled in the U.S. It is designed for students who wish to become actively involved or exposed to land management and the planning profession.

**GY543 Location Science**

Hours 3

This course presents the theory and practice of Location Science – the study of the optimal or near optimal spatial location and allocation of facilities, routes, personnel, or other assets. A variety of optimal procedures for location problems is presented, including minimum spanning tree, shortest path, maximal flow, and transportation problem algorithms. The Simplex method as applied to location problems is outlined and demonstrated. Heuristic approaches to location problems including greedy heuristics and Tabu search heuristics are reviewed. The peer-reviewed literature in location science is explored.

**GY545 Agriculture: Environment and Development**

Hours 3

This course examines the geographical elements of how people use the biophysical environment to grow domesticated plants (crops). Agriculture is understood in this course as the transformation of biophysical or "natural" environments into "cultural" environments. It is assessed in regard to both the plants cultivated, and the soil, slope, moisture, and temperature conditions that exist and then are modified or created by farmers. Ecological and systematic approaches are taken in order to understand how different agricultural strategies insure continual long-term productivity and stability. Microeconomics is an important and recurring theme.

**GY551 Global Environmental Change**

Hours 3

Global Environmental Change focuses on the major issues of global change, including anthropogenic climate change, land use and land cover change, biodiversity issues, environmental pollution, potential global change-related impacts on human health, and relevant social policies. The class will follow a quasi-seminar format where individual presentations and group discussion will comprise a large portion of the in-class activity. Each week students will do research on and/or read assigned articles and additional articles of your own selection on relevant subjects. Instructor will provide a summary of the weekly topic and as a class, students will discuss issues raised in the research and readings.

**GY552 Environ Decision Making**

Hours 3

Designed to help students develop both the tools and the personal philosophy necessary to analyze and manage scarce resources. A review of current environmental topics is followed by a survey of different paradigms and techniques that contribute to environmental decision making.

**GY553 Environment & Society**

Hours 3

Explores the linkages between the biophysical environmental and human social systems. Public-policy implications are viewed from a social science perspective.

**GY558 Urban Analysis Planning**

Hours 3

A thorough examination of the literature in economics, political science, and sociology that is relevant to the geographical study of contemporary urban structure, power, and conflict.

**GY562 Land Use Science**

Hours 4

This course explores the interactions between land use, land cover, and social and environmental processes at multiple scales. The emphasis is on understanding how the natural landscape influences human activities, how humans modify the natural landscape to meet our needs, and how those modifications create a co-evolution between landscapes and human use. Understanding how land uses are, or should be, allocated to achieve multiple goals, including food and fiber production, space for human settlement, provision of ecosystem services, and access to renewable energy sources, requires consideration of these multiple objectives and of the various factors driving land-use decisions at multiple scales.

**GY566 Transport Geography**

Hours 3

Examines location and function of the multimodal North American transportation system, the urban transport planning process, and the political and environmental contexts of transport systems, including impacts of continued reliance on the automobile.

**GY570 Special Studies Geog**

Hours 3

*No description available*

**GY572 Soil Science**

Hours 4

Introduction to the scientific study of soils. Covers soil physical properties, morphology, development, classification, environmental functions and uses, and resource degradation.

**GY573 Public Policy Development in Water Resources Seminar**

Hours 3

This course will evaluate the current approaches to policy theory and examine systematically the broader implications of the substantive aspects of public policy development in the water resources spectrum. In analysis of public policy development in water resources, the student will look at both policy process and policy substance. Attention will be given to the questions of how and why water policy differs across states, and how one might evaluate policy performance cross-nationally.

**GY574 Cartography Practicum**

Hours 3-6

Individual work experience in cartography supervised by the faculty and staff of the University.

**GY576 Gis Practicum**

Hours 3-6

Individual work experience in GIS supervised by the faculty and staff of the University.

**GY577 Water Resources Management, Law, and Policy**

Hours 3

The Water Resources Management, Law, and Policy course will provide students with a survey of water resources development, control, law, policy and management with particular emphasis on public policy considerations including: the acquisition and exercise of water rights –appropriative and riparian; groundwater management; water districts and user organizations; environmental considerations; Federal/State relations including interstate allocation; and the Alabama Water Resources Act. The course will also address international water law—the multinational treaties, laws, cases, practices and politics governing Earth’s transboundary freshwater resources (watercourses including rivers, streams, lakes, and groundwater aquifers) shared by two or more countries.

**GY579 Planning Internship**

Hours 3-6

Individual work experience in planning supervised by the staff of an off-campus planning agency.

**GY581 Water Diplomacy**

Hours 3

The course will focus on the linkages between water resources policy and conflict or cooperation with primary interest on interstate (transboundary) and intrastate water issues. The conceptual framework of the course is centered on water scarcity, water conflict, hydropolicy, hydrohegemony, water security, and dispute resolution. The role of disparate stakeholders and the problem of scale will be considered. The policy, norms and laws for mediating water conflict at different jurisdictional levels, including adversarial legalism (lawsuits) are examined.

**GY585 River Hydrology**

Hours 3

Rivers are dynamic natural systems that are of great importance to ecosystems and society. This course examines river hydrology processes from a physical geography perspective. A major theme of the course will be impacts of human actions on river systems.

Prerequisite(s): instructor permission

**GY586 Watershed Dynamics**

Hours 3

An examination of the physical operation of drainage basins (watersheds), focusing on surface water hydrology, erosion, and sedimentation.

**GY588 Digital Terrain and Watershed Analysis**

Hours 4

This course covers concepts, numerical algorithms, and techniques for digital terrain and watershed analysis. It combines lectures with a substantial practical lab component. The lectures covers spatial representation of topography, topographical data acquisition techniques (Photogrammetric Stereo, InSAR, LiDAR, GPS, cartography), terrain visualization, terrain parameter derivation, extraction of critical terrain features, landform recognition and classification, watershed analysis, cut-and-fill and volumetric analysis, drainage network extraction, watershed delineation, and distributed watershed models. The practical component, involving 8 lab assignments and one individual mini-project, will give students hands-on experience in using proprietary GIS software packages, ArcGIS, EPA BASINS 4.0 and HSPF 12.0 to handle topographic and image data for terrain and watershed analysis.

Prerequisite(s): GY 430 or equivalent or GY 530

**GY589 Forest Eco Veg Analysis**

Hours 4

A study of the relationship of trees to the environment, and the interrelationship of organisms that compose the forest community.

**GY590 Internship**

Hours 3

Individual work experience with agency involved in geographical research, analysis, and reporting.

**GY591 Fluvial Geomorphology**

Hours 3

This course provides an in-depth investigation of the processes that form rivers and their evolution.

**GY596 Forest Ecosystem Management: Silviculture**

Hours 4

In this course silviculture is treated as applied forest ecology. The goal of this course is to provide students with a knowledge of silviculture and its ecological basis so they can design manipulations in forest ecosystems to achieve a range of management objectives. The course requires field trips to tour different sites and visit with forest scientists and managers. In this course students learn about tree growth and stand development and use this information to develop silvicultural prescriptions to meet a diverse range of management goals. We will explore how silvicultural treatments can influence stand structure and composition and how these changes influence timber quantity and quality, forest health, biodiversity, soil, and wildlife habitat among other features. We will also focus on how silviculture is influenced by broader social, economic, and ecological issues.

Prerequisite(s): GY489 or GY409 or GY492 or GY494 or instructor permission

**GY598 Non-Thesis Research**

Hours 1-3

*No description available***GY599 Thesis Research**

Hours 1-12

This independent research course partially fulfills required master's-level research thesis hours toward the master's degree in Geography. The course is conducted under the guidance of the thesis advisor. Material covered will be of an advanced nature aimed at providing master's students with an understanding of the latest research and current developments within the field. Discussion and advisor guidance will be directed towards readings of research articles and development of research methodology, with the aim of producing an original research contribution that represents a novel development in the field, or a novel perspective on a pre-existing topic in the field.

**GY602 Seminar in Climatology**

Hours 3

This course is a doctoral level research intensive seminar in the geographic sub-field of climatology. The course will be taught by faculty with varied expertise within climatology and will, therefore, be dynamic in its topical focus from semester to semester. Content will broadly fall within hydro-climatology, synoptic climatology, climatological extremes, bio-climatology, and historical or paleo-climatology. The material covered will be of an advanced nature aimed at providing doctoral students with an understanding of the latest research and current developments within the field. Discussion will be directed towards readings of research articles and development of research methodology with the aim of producing an original research product that could be submitted in a scholarly journal for publication.

**GY610 Seminar in Forest Science and Management**

Hours 3

This is a reading and discussion intensive graduate seminar course. Each week you will be expected to come to class prepared to critically discuss the readings and other assignments. We will cover a diversity of topics in forest science and management and some additional reading may be necessary for you to be fully prepared to engage in class discussion. Our seminar time will be devoted to discussion of topics selected by individual students and the instructor. Students are encouraged to select a topic related to their research, but this is not a requirement. Throughout the semester we will also discuss the philosophy of science, the rubrics of scientific evaluation, the publication process, and other topics to aid in your training as a research scientist.

**GY615 Seminar Human-Environmental Interactions**

Hours 3

This is a reading and discussion intensive graduate seminar course. Each week, students will be expected to come to class prepared to critically discuss the readings and other assignments. A diversity of topics will be covered in human-environmental interactions in geography and some additional reading may be necessary for students to be fully prepared to engage in class discussion. Seminar time will be devoted to discussion of topics selected by individual students and the instructor. Throughout the semester there will be discussion of the philosophy of science, the rubrics of scientific evaluation, the publication process, and other topics to aid in student training as a research scientist.

**GY630 Seminar in Geographic Information Science**

Hours 3

Geographic Information Sciences (GISci) include a range of spatial technologies, including Geographic Information Systems, remote sensing, computer modeling, GPS, and cartography. This seminar will examine contemporary issues in GISci through readings and group discussion.

**GY663 Seminar in Geomorphology**

Hours 3

Geomorphology is the study of earth surface processes and landforms, including quantitative analyses of how and why landscapes change over space and time. In this seminar students will examine how and why geomorphic systems function and change in response to climatic and tectonic forcing and human activities through readings and group discussions.

**GY699 Dissertation Research in Geography**

Hours 1-12

This independent research course partially fulfills required doctoral level research dissertation hours toward the Ph.D. in Geography. A total of 24 dissertation hours are required. The course is conducted under the guidance of the Ph.D. advisor. The student repeats hours in this course at least until the dissertation requirements have been satisfactorily completed. Material covered will be of an advanced nature aimed at providing doctoral students with an understanding of the latest research and current developments within the field. Discussion and advisor guidance will be directed towards readings of research articles and development of research methodology with the aim of producing an original scientific contribution that represents a novel development in the field or a novel twist on a pre-existing topic in the field.

Prerequisite(s): You must be a PhD student in Geography that has defended a dissertation proposal and successfully completed requirements for Ph.D. candidacy.