The Department of Geology and Geography offers a balance of teaching, research, and service to the region served by the University, and beyond. Areas of focus among geology faculty include igneous and metamorphic petrology, paleontology, sedimentology, structural geology, hydrogeology, coastal geology, environmental geology, geoscience education, and natural history of the Coastal Plain. Geography faculty interests include climatology, geomorphology, geospatial analysis, economic geography, health geography, cultural geography, ecohydrology, hazards, and biogeography. Both programs emphasize the application of Geographic Information Science.

**GEOG 5090G Selected Topics**
1-9 Credit Hours. 0-9 Lecture Hours. 0-9 Lab Hours.
Offered with or without a lab on an experimental basis. Graduate students will complete an individual term project or special report.
**Cross Listing(s):** GEOG 5090, GEOG 5090S.

**GEOG 5091G Applied GIS**
4 Credit Hours. 0 Lecture Hours. 8 Lab Hours.
Applications of advanced GIS design and modeling to a specific topical and/or geographic area. Topics and studies will be varied over time. Graduate students can expect more comprehensive and rigorous course assessments (e.g. class discussion, exams, and/or term papers/projects).
**Cross Listing(s):** GEOG 5091.

**GEOG 5130G Geography of North America**
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
Systematic regional treatment of Canada and the United States including the physical, cultural, and economic aspects of various subregions. Special attention will be paid to comparative themes such as resource development, trade, and migration. Graduate students will complete an individual term project or special report.
**Cross Listing(s):** GEOG 5130.

**GEOG 5230G Urban Geography**
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
An analysis of site, situation, base, principal functions, distribution, supporting areas and internal structure of urban settlements. Graduate students will complete an individual term project or special report.
**Prerequisite(s):** GEOG 1101 or GEOG 1130.
**Cross Listing(s):** GEOG 5230, GEOG 5230S.

**GEOG 5231G Economic Geography**
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
Study of the distribution, production and utilization of the world's basic commodities. Graduate students can expect more comprehensive and rigorous course assessments (e.g. class discussion, exams, and/or term papers/projects).
**Cross Listing(s):** GEOG 5231.

**GEOG 5330G Population Geography**
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
This course explores issues and themes related to the patterns, processes, and consequences of the spatial distribution of the world's population. The course is organized around the fundamental components of population change, fertility, mortality, and migration. Current events related to population change and distribution in multiple geographical contexts will constitute a primary focus of the course. Graduate students will be required to complete more detailed, sophisticated assignments and complete longer, more in depth term papers.
**Prerequisite(s):** GEOG 1101 or GEOG 1130.
**Cross Listing(s):** GEOG 5330.

**GEOG 5430G Political Geography**
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
This course will cover the geography of political behavior from the local to the global scale by examining the relationship of geography and politics. Students will investigate the rapidly changing geopolitics of the era in which they live, with special emphasis on international relations, sovereignty, war, and terrorism. Additionally, the course will focus on redistricting, the Electoral College, and other geographic elements of our American democratic system. Graduate students will learn how to undertake an independent, supervised research project in the field of political geography.
**Prerequisite(s):** GEOG 1101 or GEOG 1130.
**Cross Listing(s):** GEOG 5430.

**GEOG 5435G Nature and Society**
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
This course will examine factors that affect humans' perspectives on resources and analyze the availability, scarcity, and valuing of natural resources, in addition to conflicts over their use. Graduate students can expect more comprehensive and rigorous course assessments (e.g. class discussion, exams, and/or term papers/projects).
**Cross Listing(s):** GEOG 5435.

**GEOG 5441G Remote Sensing**
4 Credit Hours. 2 Lecture Hours. 4 Lab Hours.
This course is designed to introduce the principles and applications of remote sensing and imagery, including electromagnetic energy, the interaction between energy and earth's surface, remotely sensed data, and the major sensor systems. Graduate students can expect more comprehensive and rigorous course assessments (e.g. class discussion, exams, and/or term papers/projects).
**Cross Listing(s):** GEOG 5441.

**GEOG 5530G Cultural Geography**
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
An examination of the world's diverse cultural landscapes. Emphasis on the connections between social, political, religious and agricultural patterns and the impact of societies on the natural environment. Graduate students can expect more comprehensive and rigorous course assessments (e.g. class discussion, exams, and/or term papers/projects).
**Cross Listing(s):** GEOG 5530.

**GEOG 5531G Environmental Impact and Remediation**
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
This course will introduce students to the National Environmental Policy Act (NEPA), its Environmental Impact Assessment (EIA) process per the Council on Environmental Quality (CEQ), and review criteria regarding whether a Finding Of No Significant Impact (FONSI) or requirement for an Environmental Impact Statement (EIS) is issued. Students will see how the EIA process can be applied to the workflow of federal projects, from the research phase through planning, remediation, monitoring, evaluation, and improved regulatory enforcement/environmental policy. Graduate students can expect more comprehensive and rigorous course assessments (e.g. class discussion, exams, and/or term papers/projects).
**Cross Listing(s):** GEOG 5531.

**GEOG 5540G Advanced GIS**
4 Credit Hours. 2 Lecture Hours. 4 Lab Hours.
This course covers the advanced spatial analysis and modeling functions of GIS and offers both fundamental theoretical background and extensive hands-on experience in spatial analysis and modeling. Major topics include network analysis, surface modeling, spatial patterns analysis, spatial data visualization, and basics of spatial statistics. Graduate students can expect more comprehensive and rigorous course assessments (e.g. class discussion, exams, and/or term papers/projects).
**Cross Listing(s):** GEOG 5540.
GEOG 5545G Ecohydrology  
4 Credit Hours. 3 Lecture Hours. 4 Lab Hours.  
This course will cover how water interacts to connect the biotic and abiotic components of ecosystems, with a focus on forests. Students will measure hydrologic processes to determine the water budget of an on-campus forest and associate these measurements to ecological processes upon which human society relies (watershed management and sustainable agriculture). This includes training on common and cutting-edge ecohydrological field equipment installation, operation, maintenance, and data analysis techniques. Additionally, students will compare their results to studies around the globe. Graduate students will write an ecohydrology research proposal in a format required by federal funding agencies.  
Cross Listing(s): GEOG 5545.

GEOG 5590G Field Studies-Geography  
6-8 Credit Hours. 6-8 Lecture Hours. 0 Lab Hours.  
An intensive course on a specific region of the world conducted in that region combining lecture, observation and travel. Students usually will bear tuition, travel and living expenses during the course. May be repeated for credit in different regions. Graduate students will complete an individual term project or special report.  
Cross Listing(s): GEOG 5590.

GEOG 5890G Directed Study  
0-4 Credit Hours. 1-4 Lecture Hours. 1-4 Lab Hours.  
Independent study for advanced students. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.  
Prerequisite(s): Approval of Department Chair is required.  
Cross Listing(s): GEOG 5890, GEOG 5890S.

GEOG 7531 Global Climate Change  
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.  
This course investigates the global climate system in the context of current and future changes in this system. In particular the course provides an in depth study of hemispheric and smaller scale changes in the climate system with emphasis on temperature, precipitation, and severe weather.  

GEOG 7535 Cultural and Political Ecology  
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.  
This course examines the subfields of cultural and political ecology through an extensive review and critique of the research literature in areas including: the appropriation of nature, conservation, ecotourism, sustainability, deforestation, and environmental policies. Examples from multiple geographic contexts will be discussed and critiqued.  

GEOG 7541 GIS Applications in Social Science  
4 Credit Hours. 2 Lecture Hours. 4 Lab Hours.  
This course is designed to introduce the concepts, theories, computational methods, and real-world applications of GIS in the social sciences-related fields at the graduate level.  
Prerequisite(s): A minimum grade of "C" in GEOG 7631.

GEOG 7542 Geospatial Techniques and Applications  
4 Credit Hours. 2 Lecture Hours. 4 Lab Hours.  
Geospatial Techniques and Applications aims to broaden students’ advanced knowledge and skills in the use and applications of state-of-the-art geospatial technologies to a range of environmental issues and problems. The course will provide in-depth theoretical background on issues surrounding data acquisition, image processing, and analysis to prepare students for semester-long research projects.  
Prerequisite(s): A minimum grade of "C" in GEOG 5441G.

GEOG 7543 Frontiers in Geospatial Science  
4 Credit Hours. 2 Lecture Hours. 4 Lab Hours.  
This class introduces students to recent developments in geospatial science and technologies. Students will become familiar with the most recent technological advances in Geographic Information Science.
GEOL 5132G Regional Field Geology  
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.  
A field expedition involving geological investigation of a major geologic region of North America. Students will be expected to make geological observations through such techniques as mapping, measuring sections, collecting scientific samples, or other standard techniques, then to analyze and interpret their observations or measurements. A scientific journal or notebook will be used by each student to record data and observations. A final report will be required. Students usually will bear tuition, travel, and living expenses in the field. Graduate students will complete an individual term project or special report.  
Prerequisite(s): GEOL 1121.  
Cross Listing(s): GEOL 5132.

GEOL 5140G Vertebrate Paleontology  
4 Credit Hours. 4 Lecture Hours. 0 Lab Hours.  
A study of the morphology, classification and geologic significance of vertebrate fossils. Graduate students will complete an individual term project or special report.  
Prerequisite(s): GEOL 1122 or permission of instructor; GEOL 5141 strongly recommended.  
Cross Listing(s): GEOL 5140.

GEOL 5141G Paleontology  
0.4 Credit Hours. 0.3 Lecture Hours. 3 Lab Hours.  
This course provides an overview of the major principles, applications, and methods of paleontology. Topics covered in this course include, but are not limited to: the formation of fossils, fossil identification and classification, evolution and extinction, biostratigraphy, biogeography, paleoecology, and functional morphology. Labs utilize a diverse collection of invertebrate fossils and paleontology software. Graduate students will complete a special report, not required of undergraduates.  
Prerequisite(s): GEOL 1122.  
Cross Listing(s): GEOL 5141.

GEOL 5142G Stratigraphy and Sedimentation  
4 Credit Hours. 4 Lecture Hours. 0 Lab Hours.  
Introduction to the principles and application of stratigraphy and biostratigraphy, and principles of sedimentation. Emphasis is placed on concepts of time, time-rock, rock units, sedimentary facies, guide fossils and fossil range and description of rocks in time and space, their correlation and interpretation. Petrologic interpretation and basic laboratory techniques are also demonstrated. The origin and distribution of sedimentary rocks is examined from initial weathering through erosion and transportation, to environments and mechanisms of deposition. Graduate students will complete an individual term project or special report.  
Prerequisite(s): GEOL 3541.  
Cross Listing(s): GEOL 5142.

GEOL 5231G General Oceanography  
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.  
This course is an integrated approach to the study of oceans with special emphasis on geology, chemistry, and biology of ocean basins. Studies will include the ecological, physical, and geological features of ocean basins, as well as chemical composition of ocean water and oceanic circulation processes. This course cannot be used for upper-level course credit in the Geology BA, Geology BS, or Geology Minor programs.  
Prerequisite(s): GEOL 1110 or GEOL 1121 or GEOL 1121S or GEOL 5230 or GEOL 5230G.  
Cross Listing(s): GEOL 5231.

GEOL 5340G Barrier Island Environmental Geology  
4 Credit Hours. 2 Lecture Hours. 6 Lab Hours.  
This course is an on site, direct observation study of the physical processes that create barrier islands and drive their geologic and environmental evolution. The course will cover principles of coastal geology and barrier island hydrogeology. Students will observe and document the diverse environments of a Georgia barrier island and the effects of coastal erosion and sea level rise on island environments and wildlife habitat. Students will also explore the anthropogenic impacts to these environments and resources, practice field science observation and documentation skills, and develop research and presentation skills through team research projects during an eight to ten day residence on St. Catherines Island. Graduate students can expect more comprehensive and rigorous assessments as well as additional work based on the graduate field of study.  
Prerequisite(s): Permission of instructor.  
Cross Listing(s): GEOL 5340.

GEOL 5431G Coastal Geology  
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.  
Coastal Geology will comprise an introduction to a variety of coastal environments and landforms as well as the physical and geological processes that shape them. Coastal hazards and issues related to the ecology and management of the coast will also be discussed. The course will include two required weekend fieldtrips to coastal areas in the southeastern United States. Graduate students will complete an individual term project or a special report.  
Prerequisite(s): GEOL 1122 or permission of instructor; GEOL 5142 strongly recommended.  
Cross Listing(s): GEOL 5431.

GEOL 5440G Structural Geology  
4 Credit Hours. 4 Lecture Hours. 0 Lab Hours.  
A study of geologic structures resulting from rock formation and deformation. Attention will be given to recognition and solution of structural problems. Graduate students will complete an individual term project or special report.  
Prerequisite(s): GEOL 3542 and MATH 1112 or MATH 1113.  
Cross Listing(s): GEOL 5440.

GEOL 5530G Geomorphology  
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.  
A systematic study of landforms and the processes which create and modify them. Graduate students will complete an individual term project or special report.  
Prerequisite(s): GEOL 1122 or GEOG 1111.  
Cross Listing(s): GEOL 5530.
GEOL 5541G Hydrogeology  
4 Credit Hours.  4 Lecture Hours.  0 Lab Hours.  
A survey of hydrogeology that includes the occurrence, distribution, movement and chemistry of subsurface waters. Emphasizes subsurface hydrology (hydrogeology), but will also include related aspects of surface systems. Major topics covered will include: 1) relationships between precipitation, runoff, and infiltration; 2) porosity and permeability of various earth materials; 3) subsurface movement of water through earth materials; 4) basic chemical characteristics of natural waters; and 5) current water resource issues such as supply, quality, contamination, and remediation. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.  
Prerequisite(s): GEOL 3542.  
Cross Listing(s): GEOL 5541.

GEOL 5542G Advanced Hydrogeology  
4 Credit Hours.  3 Lecture Hours.  2 Lab Hours.  
In-depth study of hydrogeologic and geochemical principles with emphasis on quantitative techniques. Various laboratory and field techniques will be covered, including the use of numerical models and aquifer testing. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.  
Prerequisite(s): GEOL 5541.  
Cross Listing(s): GEOL 5542.

GEOL 5740G Sea Turtle Natural History  
4 Credit Hours.  2 Lecture Hours.  6 Lab Hours.  
A field-based course in which students work as sea turtle conservation scientists by monitoring beaches and documenting and recording nesting activity during an 8 to 10 day residence on St. Catherines Island, Georgia. Students will prepare for field work with two days of lectures on the GSU campus as well as a training session on GA DNR nest monitoring protocols, prior to field work on St. Catherines Island. Students will keep a daily field journal and prepare a paper on loggerhead sea turtles, documenting nesting behavior, nesting habitat, hatchling emergences and threats to hatchlings and adults using images acquired during their daily monitoring activity. Graduate students can expect more comprehensive and rigorous assessments as well as additional work based on the graduate field of study. Graduate students will also complete a resource notebook or term project.  
Prerequisite(s): Permission of instructor.  
Cross Listing(s): GEOL 5740.

GEOL 5741G Sea Turtle Conservation  
4 Credit Hours.  3 Lecture Hours.  8 Lab Hours.  
Designed primarily for pre-service and in-service teachers, will introduce students to conservation through the study of Georgia's sea turtles, content and process skills of science through conservation, and the integration of teaching resources and electronic technologies into their classrooms. May meet by distance learning with laboratory content delivered by Internet, distance learning, fax, e-mail, or by self-contained web-based video streaming (SREC). Will average 3 hours of lectures alternate weeks via distance learning and 4-8 credit hours of laboratory on alternate weekends via Internet, e-mail, and hands-on exercises. Permission of instructor required. Graduate students will complete an endangered species teaching unit or paper.  
Cross Listing(s): GEOL 5741.

GEOL 5890G Directed Study  
1-3 Credit Hours.  1-3 Lecture Hours.  0 Lab Hours.  
Well prepared geology majors may be permitted to carry on independent study upon the recommendation of one of the geology/geography faculty. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.  
Prerequisite(s): Permission of instructor required.  
Cross Listing(s): GEOL 5890.