GEOGRAPHY (GEO)

GEO 103 Introduction to Earth Science 3
Survey of basic concepts and processes integrating the nature of the earth's three primary physical systems: the solid earth and continents; the ocean basins and the oceans; and the atmosphere's weather.
GE Core: GNS
LEC: GPS
Notes: Students cannot receive credit for both GEO 103 and GEO 106/GEO 106L.

GEO 104 World Regional Geography 3
Geographical criteria that define the major cultural and functional world regions. Emphasis on regional methods of geographical study, with applications to current world events and situations.
GE Core: GSB
GE Marker: GL

GEO 105 Introduction to Human Geography 3
Introduction to geographical characteristics of population, political systems, settlement patterns, and cultural mosaics.
GE Core: GSB
GE Marker: GN

GEO 106 Geosystems Science 3
The earth's atmosphere, hydrological, and tectonic systems. Includes applications to natural resources management and environmental planning.
GE Core: GNS
LEC: GPS
Corequisites: GEO 106L.
Notes: Students cannot receive credit for both GEO 103 and GEO 106/GEO 106L.

GEO 106L Geosystems Science Laboratory 1
Laboratory exercises to accompany GEO 106, which must be taken concurrently. Topics include atmospheric data analysis, topographic map interpretation, and hydrological measurements.
GE Core: GNS
LEC: GPS
Corequisites: GEO 106.
Notes: Students cannot receive credit for both GEO 103 and GEO 106/GEO 106L.

GEO 111 Physical Geology 3
Survey of tectonic and erosional processes, mountain building, rivers, glaciers, deserts, and coastal landform development.
GE Core: GNS
LEC: GPS
Corequisites: GEO 111L.

GEO 111L Physical Geology Laboratory 1
Laboratory demonstrations and map interpretation exercises to accompany GEO 111, which must be taken concurrently.
GE Core: GNS
LEC: GPS
Corequisites: GEO 111.

GEO 121 Introduction to Geographic Information Science 3
Introduction to the fundamental concepts of geographical information science (geographic data acquisition, representation, analysis, and interpretation). Technologies reviewed include topographic mapping, global positioning systems, aerial photography, and satellite remote sensing.
GE Core: GNS
LEC: GPS

GEO 205 Environmental Change: Its Nature and Impact 3
Environmental changes related to human use of land, water, soils, minerals, and natural amenities. Planning for sustained use or preservation of land-based natural resources.

GEO 301 Urban Geography: Global Patterns 3
Urbanization processes and the development of mega-cities and urban hierarchies emphasizing the differences between cities from across the world.
GE Core: GSB
GE Marker: GL

GEO 302 Urban Geography: Land Use 3
Internal structure of cities, including the role of transportation systems, socio-economic development, and the physical environment. Emphasis on differences within cities.

GEO 304 Introduction to Transportation Analysis 3
Transportation systems as they affect human behavior and urban patterns, primarily within a North American context.

GEO 305 Environmental Hazards Assessment 3
Nature and geographical distribution of short-lived environmental hazards including earthquakes, hurricanes, floods, volcanic eruptions, and landslides. Factors contributing to increased hazard potential. Alternative human responses to short-lived hazards.
Prerequisites: GEO 103 or equivalent.

GEO 306 World Economic Geography 3
Characteristics and location of the world's resources, theory of industrial location, world patterns of industry.
GE Core: GSB
GE Marker: GL

GEO 311 Weather and Climate 3
Introduction to the nature, origin, processes, and dynamics of the atmosphere. Consideration also of human modification of the atmosphere and of climatic change.
GE Core: GNS
LEC: GPS
Prerequisites: GEO 103 or equivalent.
Corequisites: GEO 311L.

GEO 311L Climatology Laboratory 1
Laboratory work to accompany GEO 311.
GE Core: GNS
LEC: GPS
Corequisites: GEO 311.

GEO 314 Physical Geography: Landscape Processes 3
Examination of the processes responsible for the development of the earth's varied terrain characteristics. Analysis of environmental problems involving human impact on landscape and river systems.
GE Core: GNS
LEC: GPS
Prerequisites: GEO 103 or equivalent.
Corequisites: GEO 314L.
GEO 314L Physical Geography Laboratory 1
Laboratory demonstrations and map interpretation exercises to accompany GEO 314, which must be taken concurrently.
GE Core: GNS
LEC: GPS
Corequisites: GEO 314.

GEO 315 The Geography of World Affairs 3
Contemporary problems and issues of and between nations of the world as they have evolved in their geographical settings.
GE Marker: GN

GEO 322 Research Methods in Geography 3
Use of the scientific method, data collection, spatial analysis, and technical writing. Development of fundamental research and quantitative skills in geography.

GEO 330 Elements of Hydrology 3
Introduction to the origin, properties, occurrence, circulation of the waters of the earth, including the application of hydrologic techniques for the evaluation of regional water budgets and problems relating to the conservation of water resources.
Prerequisites: GEO 103 or GEO 311 or GEO 314, or permission of instructor.

GEO 331 Sustainable Tourism and Transportation 3
Explores transportation networks utilized by the global tourism sector; their social, economic, and environmental dimensions, associated trends, associated negative impacts and resource usage and opportunities for planning sustainable transportation networks.
Notes: Same as STH 331.

GEO 333 Geography of Europe 3
Examination of human and physical characteristics of the European region. Topics include settlement patterns, landscape evolution, patterns and spatial variation of economic activity, urbanization, and political divisions.
GE Marker: GL

GEO 335 General Geography 3

GEO 338 Regions of Latin America 3
Geographic distinctiveness of Latin American regions, with an emphasis upon the physical foundation, bases of past development, and recent transformation. Major consideration given to Mexico/Central America, Peru/Bolivia, and Brazil.

GEO 340 Geography of East Asia 3
Examines dynamic economic, sociocultural, and political changes in East Asia by using geographical criteria to study physical and human resources influencing rapid modernization within an ancient framework.
GE Marker: GN

GEO 344 Geography of the United States and Canada 3
Study of the human and physical characteristics of the United States and Canada, with emphasis on the former.
GE Core: GSB

GEO 357 Principles of Cartography 3
The science of cartography with an emphasis on the use of maps as descriptive and analytical tools. Laboratory work introduces computer mapping, compilation, design, and symbolization.
Prerequisites: GEO 121.

GEO 358 Geographic Information Systems 3
Provides basic concepts and methods for capturing, storing, querying, analyzing, and displaying geospatial data using Geographic Information Systems (GIS).
Prerequisites: GEO 121 or permission of instructor.

GEO 359 Remote Sensing of Environment 3
Acquisition, analysis, and interpretation of digital and photographic imagery. Emphasis on use of satellite and aircraft imagery for classification and monitoring of the earth’s physical and cultural landscape.
Prerequisites: GEO 121.

GEO 400 ExpCrs: A Field Investigation of Human-Environment Relations in Insular SE Asia 1
Students will investigate Human-Environment Factors in Insular SE Asia.
Prerequisites: Permission of instructor and IPC (IPC will enroll students in this course).

GEO 421 Geographic Information Science 3
Principles and use of geographic information; emphases are on data acquisition and techniques of spatial analysis and display. Requirements include a substantial applied research project.
Prerequisites: GEO 121, GEO 357, GEO 359.

GEO 490 Special Problems in Geography 3
Opportunity for advanced students to undertake independent study of field research of special interest.
Prerequisites: Permission of faculty member with whom student wishes to work and at least 3 s.h. of previous work in geography.

GEO 495 Internship in Geography 3
Practical experience in a professional setting related to the student’s main topic of interest. Includes a research paper linking the topic to the experience.
Prerequisites: Written permission required before registering for the internship.

GEO 502 Entrepreneurial Urban Planning 3
Fundamental concepts and techniques of urban planning as it relates to enhancing overall quality of life with a primary focus on land use patterns, the environment, business and entrepreneurship.
Notes: Same as ENT 502.

GEO 504 Political Geography 3
A systematic overview of relationships among space, place, and politics at multiple geographic scales. Topics include boundaries, geopolitics, nationalism, resource distribution, means of controlling space, and the spatiality of globalization.
Prerequisites: Junior level or permission of instructor.

GEO 510 Biogeography 3
Study of the geographic distribution of organisms and the factors/processes accountable. Emphasis on the increasingly important role humans play in influencing biogeographic processes.
Prerequisites: GEO 311 or GEO 314 or BIO 301 or admission to graduate program in geography, or permission of instructor.

GEO 511 Advanced Weather and Climate-Synoptic Climatology 3
Exploration of atmospheric dynamics and general circulation patterns throughout the world. Emphasis on cyclogenesis, surface-upper atmosphere links, tropospheric waves, vorticity, and forecasting.
Prerequisites: GEO 311 or admission to graduate program in geography, or permission of instructor.
GEO 522 Geography of Livable Cities 3
Advanced study on the processes of urban population and economic growth from the perspective of urban livability. Emphasis on accessing and interpreting data from public or private sources.

GEO 530 Researching Opportunities in Entrepreneurship and Economic Development 3
Students will learn how to conduct research necessary to make informed decisions for an entrepreneurial venture and measure and assess economic development opportunities. No business research experience necessary.
Prerequisites: Junior, senior, or graduate standing.
Notes: Same as ENT 530, LIS 530, MKT 530.

GEO 533 Regional Economic Development 3
Theories of location of economic activity; techniques to assess impact of types of economic activity; policy and institutional issues related to local, state, and global economic development.

GEO 557 Advanced Cartography 3
Advanced instruction in cartographic production techniques and introduction to cartographic research. Students will learn to evaluate academic literature and to implement research ideas using state-of-the-art technology.
Prerequisites: GEO 357 or permission of instructor.

GEO 558 Advanced Geographic Information Systems 3
Advanced concepts and methods in Geographic Information Systems (GIS). Emphasis is placed on the analysis and modeling of geospatial data using raster and vector data models.
Prerequisites: GEO 358 or permission of instructor.

GEO 559 Advanced Remote Sensing-Imaging 3
Remote sensing of the environment using scientific visualization and digital image processing techniques.
Prerequisites: GEO 359 or permission of instructor.

GEO 560 Seminar in Regional Geography 3
Case studies of regionalism and the regional method in geography.
Notes: May be repeated once for credit when topic changes.

GEO 570 Applied Physical Geography 3
Applications in physical geography. Topics include field experience in hydrology, dendrochronology, geomorphology, climatology, and mapping.
Notes: May be repeated once when topic changes.

GEO 589B Ex Cr: Biogeography 3

GEO 601 Research Trends in Geography 1
Overview of major research themes in geography. Student will meet faculty and other professional geographers, facilitating the development of research through field experience, colloquia, and conferences.
Prerequisites: Admission to graduate program in geography.
Notes: Grade: Satisfactory/Unsatisfactory (S/U).

GEO 602 Regional Planning 3
Regional development and planning processes focused on regional planning techniques and law.

GEO 603 Understanding Geographic Information Systems 3
Study and application of geographic information systems for professional problem-solving, spatial analysis, and mapping.

GEO 605 Seminar in Environmental Studies 3
Selected topics of current interest in environmental studies.
Notes: May be repeated once for credit when topic changes.

GEO 607 Earth Science for Educators 5
Study of the processes that shape Earth’s lithospheric, hydrospheric, and atmospheric realms. Practicum and course content are synchronized with the NC Standard Course of Study for Earth and Environmental Science.

GEO 608 Weather and Climate for Educators 5
Examination of Earth’s physical atmospheric processes as they apply to weather and climate systems. Practicum and course content are synchronized with the NC Standard Course of Study for Earth and Environmental Science.

GEO 609 Hydrology for Educators 5
Examination of Earth’s water sphere, including Earth-Atmosphere interactions, and its importance as a resource. Practicum and course content are synchronized with the NC Standard Course of Study for Earth and Environmental Science.

GEO 610 Physical Geology for Educators 5
Study of the materials that comprise Earth, and the processes shaping its near-surface environment. Practicum and course content are synchronized with the NC Standard Course of Study for Earth and Environmental Science.

GEO 611 Natural Hazards and Society for Educators 5
Study of the Earth’s near-surface natural hazards, with discussion of anthropogenic influences and societal consequences. Practicum and course content are synchronized with the NC Standard Course of Study for Earth and Environmental Science.

GEO 612 Natural Resource Geography 3
Application of geographical theory to natural resource use and distribution. Emphasis on resource use and constraints to development.

GEO 614 GIS Programming and Design Application 3
Theory and practice in combining Geographic Information Systems software with statistical analysis software. Emphasis will be on the quantitative analysis and visual display of spatial information.
Prerequisites: GEO 558 and STA 571 or equivalent.

GEO 620 Spatial Analysis 3
Theory and practice in combining Geographic Information Systems software with statistical analysis software. Emphasis will be on the quantitative analysis and visual display of spatial information.
Prerequisites: GEO 558 and STA 571 or equivalent.

GEO 621 Seminar in Geographic Information Science 3
Research in geographic information science. Focus on current research in application of remotely sensed imagery, geographic information systems, and maps in the visualization and analysis of spatial data.
Prerequisites: GEO 359 and GEO 558 or permission of instructor.
Notes: May be repeated once for credit when topic changes.

GEO 622 GIS Applications in Urban Planning 3
Theory and practice integrating Geographic Information Systems with land use planning practice. Emphasis on advanced analysis and display of spatial data and information in support of land use planning decision-making.
Prerequisites: GEO 322 (or equivalent) and GEO 603 or permission of instructor.

GEO 631 Transportation Planning 3
Theory and practice of transportation planning with an emphasis on urban transportation systems.
Prerequisites: GEO 502 or permission of instructor.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Prerequisites/Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEO 633</td>
<td>Advanced Topics in European Geography 3</td>
<td>In-depth analysis of select advanced topics related to Europe. Combines systematic and regional traditions within geography. Possible themes include European integration, immigration, urbanization and cities, cultural preservation, tourism, the environment. Notes: May be repeated for credit when topic varies.</td>
</tr>
<tr>
<td>GEO 635</td>
<td>Geography of Asia 3</td>
<td>Examines dynamic economic, sociocultural, and political changes in Asia by looking at their roots in physical and human resources influencing rapid modernization within an ancient cultural framework.</td>
</tr>
<tr>
<td>GEO 641</td>
<td>Earth Surface Processes and Landforms 3</td>
<td>Advanced systematic study of geomorphology with applications to human responses to natural hazards and environmental management. Prerequisites: GEO 314/GEO 314L or equivalent advanced undergraduate course in geomorphology.</td>
</tr>
<tr>
<td>GEO 690</td>
<td>Research Problems in Applied Geography 3</td>
<td>Independent study on a special topic of interest. Prerequisites: Graduate course on the topic.</td>
</tr>
<tr>
<td>GEO 695</td>
<td>Internship 1-6</td>
<td>Practical experience in a professional setting related to the student's main topic of interest. Includes written paper linking the topic to the experience. Notes: May be repeated for a maximum of 6 hours credit.</td>
</tr>
<tr>
<td>GEO 697</td>
<td>Thesis 1-6</td>
<td>Prerequisite: Permission of Geography Thesis Committee.</td>
</tr>
<tr>
<td>GEO 701</td>
<td>History of Geographic Thought 3</td>
<td>Seminar on the nature of geography and what geographers do. Focus on the history of the discipline approaches to its study, major paradigms, and application of geographic theory. Prerequisites: Admission to doctoral program in geography or permission of instructor.</td>
</tr>
<tr>
<td>GEO 702</td>
<td>Research Design 3</td>
<td>Design and execution of applied research projects as practiced by professional geographers. Prerequisites: STA 571 or equivalent.</td>
</tr>
<tr>
<td>GEO 720</td>
<td>Advanced Spatial Analysis 3</td>
<td>Theory and practice in spatial analysis with an emphasis on spatial statistics. Spatial pattern analysis, spatial association and interpolation, spatial data mining. Prerequisites: GEO 620.</td>
</tr>
<tr>
<td>GEO 730</td>
<td>Seminar in Earth Science/Natural Resources 3</td>
<td>Directed readings and research proposal development on selected aspects of natural resource policy and management from the perspective of earth science. Prerequisites: GEO 612 or GEO 641 or permission of instructor. Notes: May be repeated once for credit when topic changes.</td>
</tr>
<tr>
<td>GEO 740</td>
<td>Seminar in Urban Planning/Economic Development 3</td>
<td>Directed readings on selected aspects of urban planning/economic development focused on theory and policy issues from a geographic perspective. Prerequisites: GEO 502 or GEO 533 or permission of instructor. Notes: May be repeated once for credit when topic changes.</td>
</tr>
<tr>
<td>GEO 741</td>
<td>Seminar in Regional Economic Development 3</td>
<td>A geographic perspective is applied to analysis of regional economic performance and change in the developed and developing world. Theory is integrated with strategies for development policy and planning. Prerequisites: GEO 533 or permission of instructor.</td>
</tr>
<tr>
<td>GEO 790</td>
<td>Independent Geographic Research 3</td>
<td>Independent study on topic of interest in theoretical geography. Prerequisites: Graduate course in topic. Notes: May be repeated for up to 6 semester hours.</td>
</tr>
<tr>
<td>GEO 799</td>
<td>Dissertation 1-21</td>
<td>Prerequisite: Completion of all PhD course requirements and examinations; Notes: Required of all PhD in geography candidates. May be taken in two or more semesters.</td>
</tr>
<tr>
<td>GEO 801</td>
<td>Thesis Extension 1-3</td>
<td></td>
</tr>
<tr>
<td>GEO 802</td>
<td>Dissertation Extension 1-3</td>
<td></td>
</tr>
<tr>
<td>GEO 803</td>
<td>Research Extension 1-3</td>
<td></td>
</tr>
</tbody>
</table>