

GEOGRAPHY, ENVIRONMENT, AND SUSTAINABILITY (GES)

GES 102 The Historical Geography of the Western World 3

A study of the geographical factors which combine to form the major cultural regions of North America, Europe, and Australia-New Zealand.

GES 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.

MAC: MAC Nat Sci Data Analysis

Corequisites: GES 103L.

GES 103L Earth Science Laboratory 1

Laboratory exercises to accompany GES 103. Topics include atmospheric data analysis, topographic map interpretation, and hydrological measurements.

Corequisites: GES 103.

GES 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.

MAC: MAC Global and Intercultural

GES 105 Introduction to Human Geography 3

Introduction to geographical characteristics of population, political systems, settlement patterns, and cultural mosaics.

MAC: MAC CritThink Soc and BehavSci

GES 108 Our Dynamic Planet 3

The earth's atmosphere, hydrological, and tectonic systems. Includes applications to natural resources management and environmental planning. Emphasis on human interactions with Earth's physical processes.

MAC: MAC CritThink Nat Sci

GES 110 Introduction to Geography 3

Changing interaction of man and his environment and the resultant human and economic patterns in various parts of the world.

GES 111 Physical Geology 3

Survey of tectonic and erosional processes, mountain building, rivers, glaciers, deserts, and coastal landform development.

MAC: MAC Nat Sci Data Analysis

Corequisites: GES 111L.

GES 111L Physical Geology Laboratory 1

Laboratory demonstrations and map interpretation exercises to accompany GES 111, which must be taken concurrently.

Corequisites: GES 111.

GES 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.

MAC: MAC Nat Sci Data Analysis

Corequisites: GES 121L.

GES 121L Intro to Geographic Information Science Laboratory 1

Introduction to the fundamental concepts of geographic information science (geographic data acquisition, representation, analysis, and interpretation). Technologies reviewed include topographic mapping, global positioning systems, aerial photography, and satellite remote sensing.

Corequisites: GES 121.

GES 162 Introduction to Sustainability 3

Survey of sustainability from four perspectives; environment, economy, social equity, and aesthetics. Local, global, ethical, and experiential dimensions help prepare students to apply sustainability in a variety of contexts.

GES 163 North Carolina Environments 3

This interdisciplinary course provides a mountains-to-sea approach to places and people in North Carolina. Students address problem solving with UNCG as a living laboratory for environmental and sustainability issues.

MAC: MAC Foundations

Prerequisites: Must have fewer than 60 credits to enroll or can enroll by Written Permission.

GES 164 Introduction to Environment 3

Interdisciplinary survey of environmental issues. Emphasis on sciences (biology, chemistry, ecology, geography). Also includes perspectives from social sciences (anthropology, economics, politics, sociology) and humanities (arts, history, literature, philosophy, religion).

GES 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.

GES 260 Sustainable Campus Operations 3

Study of facilities operations for universities and similar organizations, emphasizing sustainable infrastructure and institutional change. Focus on professional development, applied knowledge, and experiential learning.

Prerequisites: Either GES 162, GES 163, or GES 164, or permission of instructor.

GES 270 Environment and Experience 3

Consideration of an environment or place emphasizing sustainability and experiential learning. Involves readings/lectures on ecological, economic, social, and aesthetic aspects; field work and/or travel; and reflective, synthetic, and/or research writing.

Prerequisites: Either GES 162, GES 163, or GES 164, or permission of instructor.

Notes: May be repeated when the topic varies for up to 9 s.h. of credit in the major.

GES 301 Cities of the World 3

Urbanization processes and the development of mega-cities and urban hierarchies emphasizing the differences between cities from across the world.

GES 302 Urban Geography: Sustainable Land Use 3

An introduction to theories of urban process and urban land-use change. Emphasis on basic forces acting on land-use patterns in American cities and neighborhoods to understand new processes, new problems, and new opportunities for urban sustainability.

GES 303 World Population Problems 3

Major world population problems, trends, and significant policy and action alternatives for the future. Impact of various geographical factors on problems and trends.

GES 304 Sustainable Transport and Mobility 3

Transportation systems as they affect urban and economic growth patterns, accessibility and mobility, and the environment. Emphasis will be given to the future of sustainable accessibility and mobility.

GES 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.

CIC: CIC College Writing

Prerequisites: GES 103 or equivalent.

GES 306 World Economic Geography 3

Theories of economic development and industrial location; world patterns of natural resources, industry, finance, and urbanization; causes and consequences of economic change and globalization.

CIC: CIC College Writing

GES 312 Geomorphology of North America 3

A survey of the various landscape regions of the North America. Emphasis on the relationships between the geologic, erosional, and climatic processes occurring in each region.

GES 313 Natural Resource Regions of North America 3

Regional natural resource use and associated human interaction with the natural environment. Instruction takes place during an extended field trip across portions of North America.

Prerequisites: GES 103 or GES 314 and permission of instructor.

GES 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.

Prerequisites: GES 103 or equivalent.

Corequisites: GES 314L.

GES 314L Physical Geography Laboratory 1

Laboratory demonstrations and map interpretation exercises to accompany GES 314, which must be taken concurrently.

Corequisites: GES 314.

GES 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.

GES 319 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.

Prerequisites: GES 103 or equivalent.

Corequisites: GES 319L.

GES 319L Climatology Laboratory 1

Laboratory work to accompany GES 319.

Corequisites: GES 319.

GES 320 Tourism Planning and Development 3

Geographic distribution of tourist development. Emphasis on the spatial dimension of origin-destination flows, economic geography of the travel industry, socio-economic and environmental impacts. Emphasis on tourism planning issues.

Notes: Same as STH 320.

GES 322 Research Methods in Spatial Science 3

Development of fundamental research and quantitative skills in Spatial Science. Use of the scientific method, data collection, spatial analysis, and technical writing.

CIC: CIC College Writing

GES 325 Introduction to Spatial Analysis 3

Introduction to the basic concepts of spatial analysis (space, scale, location, and spatial data and their representation) as well as elementary statistical methods and their application in geographical analysis.

Prerequisites: GES 103 and GES 103L.

GES 328 The Water Planet 3

The course focuses on interactions between water and society, including the use of water as a natural resource and the impacts of humans on water quantity and quality.

Prerequisites: GES 103 or GES 108.

GES 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.

CIC: CIC College Writing

Prerequisites: GES 103 or GES 319 or GES 314, or permission of instructor.

GES 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 HTM 335.

GES 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.

GES 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.

GES 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.

GES 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.

GES 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: GES 121.

GES 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: GES 121 or permission of instructor.

GES 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.

CIC: CIC College Writing

Prerequisites: GES 121.

GES 366 Internship in Environment & Sustainability 3

150 hours of supervised work in a private, nonprofit, or public environmental agency; seminars or meetings to discuss readings and internship experiences; research paper or written field project required.

Prerequisites: Written permission of instructor.

Notes: May be repeated once for credit when the internship site varies.

GES 367 Research in Environment & Sustainability 3

Considers various current environmental and sustainability issues in depth from interdisciplinary perspectives. Students conduct research, prepare a written report, and disseminate results.

CIC: CIC College Writing

Prerequisites: GES 162, GES 164, and junior or senior standing. or permission of instructor.

GES 368 Individual Study in Environment & Sustainability 1-3

Reading or research. Available to qualified students upon recommendation of supervising instructor.

Prerequisites: Departmental permission.

Notes: May be repeated for credit if the topic of study changes.

GES 402 Sustainable Urban Planning in an Entrepreneurial Environment 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 410.

GES 404 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 standing or permission of instructor.

GES 405 Sustainable Regional Planning 3

Sustainable regional development and planning processes focused on regional planning techniques and law.

GES 415 National Parks and Protected Areas 3

This course is devoted to the changing geography of the National Park System and related protected areas in the USA, with an emphasis on their environmental, historical and political significance.

Prerequisites: GES 103 or GES 105 or permission of instructor. Junior or senior.

GES 418 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: GES 314 or GES 319 or BIO 301. or permission of instructor.

GES 419 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: GES 319 or permission of instructor.

GES 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: GES 121, GES 357, GES 359.

GES 430 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 or senior standing.

Notes: Same as ENT 430, LIS 430, MKT 430.

GES 432 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.

GES 433 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.

GES 450 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.

GES 451 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.

GES 455 Qualitative Methods in Human Geography 3

Survey of common qualitative approaches to human geography research, with emphasis on real-world research applications, methods training, and thesis/capstone development.

Prerequisites: 75 credit hours or permission of instructor.

GES 457 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: GES 357 or permission of instructor.

GES 458 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: GES 358 or permission of instructor.

GES 459 Advanced Remote Sensing-Imaging 3

Remote sensing of the environment using scientific visualization and digital image processing techniques.

Prerequisites: GES 359 or permission of instructor.

GES 462 Sustainability 3

Seminar addressing sustainability in an interdisciplinary framework connecting environmental sciences, equity & society, development & economics, and ethics & aesthetics.

Prerequisites: GES 162 and GES 164, or permission of instructor.

GES 464 Environment 3

Advanced study of coupled human-environmental problems and solutions. Focus on classic cases and current topics in environmental studies.

Prerequisites: GES 162 and GES 164.

GES 481 Topics in Sustainability and Environment 3

Seminar addressing interdisciplinary topics in sustainability and environment.

Prerequisites: Permission of instructor.

Notes: May be repeated when the topic varies for up to 9 credits in the major.

GES 482 Topics in Ethics and Aesthetics 3

Seminar dealing with topics in ethics and/or aesthetics as related to environmental and/or sustainability issues in an interdisciplinary framework.

CIC: CIC College Writing

Prerequisites: GES 162 and GES 164 or permission of instructor.

Notes: May be repeated twice for credit when topic varies.

GES 484 Topics in Development and Economics 3

Seminar dealing with topics in development and/or economics as related to environmental and/or sustainability issues in an interdisciplinary framework.

CIC: CIC College Writing

Prerequisites: GES 162 and GES 164 or permission of instructor.

Notes: May be repeated twice for credit when topic varies.

GES 486 Topics in Equity and Society 3

Seminar dealing with topics in equity and/or society as related to environmental and/or sustainability issues in an interdisciplinary framework.

Prerequisites: GES 162 and GES 164 or permission of instructor.

Notes: May be repeated twice for credit.

GES 488 Topics in Environmental Sciences 3

Seminar dealing with topics in environmental sciences as related to environmental and/or sustainability issues in an interdisciplinary framework.

Prerequisites: GES 162 and GES 164 or permission of instructor.

Notes: May be repeated twice for credit as topic varies.

GES 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.

GES 491 Current Topics in Regional Geography 3

Seminar dealing with major national and international topics in their current geographical context.

Notes: May be repeated for credit when topic varies.

GES 493 Honors Work 3-6

Honors Work.

Prerequisites: Permission of instructor. 3.30 GPA in the major, 12 s.h. in the major;

Notes: May be repeated for credit if the topic of study changes.

GES 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.

GES 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).

GES 602 Sustainable Urban Planning in an Entrepreneurial Environment 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 610.

GES 603 Understanding Geographic Information Systems 3

Study and application of geographic information systems for professional problem-solving, spatial analysis, and mapping.

GES 604 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.

GES 605 Sustainable Regional Planning 3

Sustainable regional development and planning processes focused on regional planning techniques and law.

GES 606 Environmental Planning 3

Examination and analysis of environmental concepts and their relationship to various planning and management scenarios, including environmental issues, strategies, and plans.

GES 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.

GES 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.

GES 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.

GES 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.

GES 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.

GES 612 Natural Resource Geography 3

Application of geographical theory to natural resource use and distribution. Emphasis on resource use and constraints to development.

GES 614 GIS Programming and Design Application 3

Theory and practice in the creation of Geographic Information Systems using logic based programming and database construction tools. Emphasis on modeling of spatial information and logic-based approaches to GIS.

Prerequisites: GES 658.

GES 615 National Parks and Protected Areas 3

This course is devoted to the changing geography of the National Park System and related protected areas in the USA, with an emphasis on their environmental, historical and political significance.

GES 618 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: GES 314 or GES 319 or BIO 301. or admission to graduate program in geography; or permission of instructor.

GES 619 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: Admission to graduate program in Geography or permission of instructor.

GES 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: GES 658 and STA 571 or equivalent.

GES 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: GES 359 and GES 458 or GES 658 or permission of instructor.

Notes: May be repeated once for credit when topic changes.

GES 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: GES 322 (or equivalent) and GES 603 or permission of instructor.

GES 630 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.

Notes: Same as ENT 630, LIS 530, MKT 530.

GES 631 Sustainable Transportation Planning 3

Advanced theories, models, and practices of sustainable transportation planning with an emphasis on U.S. urban transportation systems.

Prerequisites: GES 602 or permission of instructor.

GES 632 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.

GES 633 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.

GES 634 Advanced Topics in European Geography 3

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.

GES 635 Geography of Asia 3

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.

GES 641 Earth Surface Processes and Landforms 3

Advanced systematic study of geomorphology with applications to human responses to natural hazards and environmental management.

Prerequisites: GES 314/GES 314L or equivalent advanced undergraduate course in geomorphology.

GES 650 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.

GES 651 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.

GES 655 Qualitative Methods in Human Geography 3

Survey of common qualitative approaches to human geography research, with emphasis on real-world research applications, methods training, and research proposal development.

GES 657 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: GES 357 or permission of instructor.

GES 658 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: GES 358 or permission of instructor.

GES 659 Advanced Remote Sensing-Imaging 3

Remote sensing of the environment using scientific visualization and digital image processing techniques.

Prerequisites: GES 359 or permission of instructor.

GES 660 Sustainable Campus Operations 3

Study of facilities operations for universities and similar organizations, emphasizing sustainable infrastructure and institutional change. Focus on professional development, applied knowledge, and experiential learning.

Prerequisites: GES 662 or permission of instructor.

GES 662 Sustainability 3

Foundational course addressing sustainability in an interdisciplinary framework connecting environmental sciences, equity and society, development and economics, and ethics and aesthetics.

Prerequisites: Permission of instructor.

Notes: Open to graduate students in any field of study.

GES 664 Environment 3

Advanced study of coupled human-environmental problems and solutions. Focus on classic cases and current topics in environmental studies.

Prerequisites: GES 662 or permission of instructor.

GES 670 Environment and Experience 3

Consideration of an environment or place emphasizing sustainability and experiential learning. Involves readings and lectures on ecological, economic, social, and aesthetic aspects; field work and/or travel; and reflective, synthetic, and/or research writing.

Prerequisites: GES 662 or permission of instructor.

Notes: May be repeated when the topic varies for up to 9 credits in the major.

GES 681 Topics in Sustainability and Environment 3

Seminar addressing interdisciplinary topics in sustainability and environment.

Prerequisites: Permission of instructor.

Notes: May be repeated when the topic varies for up to 9 credits in the major.

GES 682 Topics in Ethics and Aesthetics 3

Seminar dealing with topics in ethics and/or aesthetics as related to environmental and/or sustainability issues in an interdisciplinary framework.

Prerequisites: GES 662 or permission of instructor.

Notes: May be repeated when the topic varies for up to 9 credits in the major.

GES 684 Topics in Development and Economics 3

Seminar dealing with topics in development and/or economics as related to environmental and/or sustainability issues in an interdisciplinary framework.

Prerequisites: GES 662 or permission of instructor.

Notes: May be repeated when the topic varies for up to 9 credits in the major.

GES 686 Topics in Equity and Society 3

Seminar dealing with topics in equity and/or society as related to environmental and/or sustainability issues in an interdisciplinary framework.

Prerequisites: GES 662 or permission of instructor.

Notes: May be repeated when the topic varies for up to 9 s.h. of credit in the major.

GES 688 Topics in Environmental Sciences 3

Seminar dealing with topics in environmental sciences as related to environmental and/or sustainability issues in an interdisciplinary framework.

Prerequisites: GES 662 or permission of instructor.

Notes: May be repeated when the topic varies for up to 9 credits in the major.

GES 690 Research Problems in Applied Geography 3

Independent study on a special topic of interest.

Prerequisites: Graduate course on the topic.

Notes: May be repeated for credit when topic varies.

GES 695 Internship 1-6

Practical experience in a professional setting related to the student's main topic of interest. Includes written paper linking the topic to the experience.

Prerequisites: 18 credit hours in the M.A. in Applied Geography or the M.S. in Sustainability and Environment.

Notes: May be repeated for a maximum of 6 credits.

GES 697 Capstone in Sustainability and Environment 3

Advanced research report on a sustainability and environment problem that proposes interdisciplinary solutions.

Prerequisites: Permission of instructor.

GES 699 Thesis 1-6

Individual guidance in the development of a specific research problem.

Prerequisites: Permission of GES Thesis Committee.

GES 700 Sustainable Urban Planning in an Entrepreneurial Environment 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: Students may not receive credit for both GES 602 and GES 700.

GES 701 History of Geographic Thought 3

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.

GES 702 Research Design 3

Design and execution of applied research projects as practiced by professional geographers.

Prerequisites: STA 571 or equivalent.

GES 703 Understanding Geographic Information Systems 3

Study and application of geographic information systems for professional problem-solving, spatial analysis, and mapping.

GES 704 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.

GES 705 Regional Planning 3

Regional development and planning processes focused on regional planning techniques and law.

GES 706 Environmental Planning 3

Examination and analysis of environmental concepts and their relationship to various planning and management scenarios, including environmental issues, strategies, and plans.

GES 707 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.

GES 708 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.

GES 709 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.

GES 710 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.

GES 712 Natural Resource Geography 3

Application of geographical theory to natural resource use and distribution. Emphasis on resource use and constraints to development.

GES 713 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.

Notes: Students may not receive credit for both GES 611 and GES 713.

GES 714 GIS Programming and Design Application 3

Theory and practice in the creation of Geographic Information Systems using logic based programming and database construction tools. Emphasis on modeling of spatial information and logic-based approaches to GIS.

Prerequisites: GES 758.

GES 715 National Parks and Protected Areas 3

This course is devoted to the changing geography of the National Park System and related protected areas in the USA, with an emphasis on their environmental, historical and political significance.

GES 716 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: GES 758 and STA 571 or equivalent.

Notes: Students may not receive credit for both GES 620 and GES 716.

GES 718 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: Admission to graduate program in Geography or permission of instructor.

GES 719 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: Admission to graduate program in Geography or permission of instructor.

GES 720 Advanced Spatial Analysis 3

Theory and practice in spatial analysis with an emphasis on spatial statistics. Spatial pattern analysis, spatial association and interpolation, spatial data mining.

Prerequisites: GES 620.

GES 721 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: GES 359, GES 458 or GES 758, or permission of instructor.

Notes: May be repeated once for credit when topic varies.

GES 722 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: GES 322 or equivalent, and GES 703, or permission of instructor.

GES 730 Seminar in Earth Science/Natural Resources 3

Directed readings and research proposal development on selected aspects of natural resource policy and management from the perspective of earth science.

Prerequisites: GES 612 or GES 641 or permission of instructor.

Notes: May be repeated once for credit when topic changes.

GES 731 Transportation Planning 3

Theory and practice of transportation planning with an emphasis on urban transportation systems.

Prerequisites: GES 700 or permission of instructor.

GES 732 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.

GES 733 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.

GES 734 Advanced Topics in European Geography 3

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.

GES 735 Geography of Asia 3

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.

GES 740 Seminar in Urban Planning/Economic Development 3

Directed readings on selected aspects of urban planning/economic development focused on theory and policy issues from a geographic perspective.

Prerequisites: GES 602 or GES 633 or permission of instructor.

Notes: May be repeated once for credit when topic changes.

GES 741 Seminar in Regional Economic Development 3

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: GES 633 or permission of instructor.

GES 742 Earth Surface Processes and Landforms 3

Advanced systematic study of geomorphology with applications to human responses to natural hazards and environmental management.

Prerequisites: GES 314 and GES 314L or equivalent advanced undergraduate course in geomorphology.

Notes: Students may not receive credit for both GES 641 and GES 742.

GES 750 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 varies.

GES 751 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.

GES 757 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: GES 357 or permission of instructor.

GES 758 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: GES 358 or permission of instructor.

GES 759 Advanced Remote Sensing-Imaging 3

Remote sensing of the environment using scientific visualization and digital image processing techniques.

Prerequisites: GES 359 or permission of instructor.

GES 760 Sustainable Campus Operations 3

Study of facilities operations for universities and similar organizations, emphasizing sustainable infrastructure and institutional change. Focus on professional development, applied knowledge, and experiential learning.

Prerequisites: GES 762 or permission of instructor.

GES 762 Sustainability 3

Seminar addressing sustainability in an interdisciplinary framework connecting environmental sciences, equity and society, development and economics, and ethics and aesthetics.

Prerequisites: Permission of instructor.

Notes: Open to graduate students in any field of study.

GES 764 Environment 3

Advanced study of coupled human-environmental problems and solutions. Focus on classic cases and current topics in environmental studies.

GES 771 Doctoral Seminar in Geographic Information Science 3

Advanced seminar in the theory, practice, and technical aspects of Geographic Information Science.

Notes: May be repeated once for credit when topic changes.

GES 782 Topics in Ethics and Aesthetics 3

Seminar dealing with topics in ethics and/or aesthetics as related to environmental and/or sustainability issues in an interdisciplinary framework.

Prerequisites: GES 662 or permission of instructor.

Notes: May be repeated when the topic varies for up to 9 credits in the major.

GES 784 Topics in Development and Economics 3

Seminar dealing with topics in development and/or economics as related to environmental and/or sustainability issues in an interdisciplinary framework.

Prerequisites: GES 762 or permission of instructor.

Notes: May be repeated when the topic varies for up to 9 credits in the major.

GES 786 Topics in Equity and Society 3

Seminar dealing with topics in equity and/or society as related to environmental and/or sustainability issues in an interdisciplinary framework.

Prerequisites: GES 762 or permission of instructor.

Notes: May be repeated when the topic varies for up to 9 credits in the major.

GES 788 Topics in Environmental Sciences 3

Seminar dealing with topics in environmental sciences as related to environmental and/or sustainability issues in an interdisciplinary framework.

Prerequisites: GES 762 or permission of instructor.

Notes: May be repeated when the topic varies for up to 9 credits in the major.

GES 790 Independent Geographic Research 3

Independent study on topic of interest in theoretical geography.

Prerequisites: Graduate course in topic.

Notes: May be repeated for up to 6 credit hours.

GES 799 Doctoral Dissertation Research 1-21

Individual direction in the development and execution of a doctoral dissertation.

Prerequisites: Completion of all PhD course requirements and examinations.

Notes: Required of all PhD in geography candidates. May be taken in two or more semesters.

GES 801 Thesis Extension 1-3

Thesis Extension.

GES 802 Dissertation Extension 1-3

Dissertation Extension.

GES 803 Research Extension 1-3

Research Extension.