

# GEOG - GEOGRAPHY

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## GEOG 603 Processes in Economic Geography

**Credits 3. 3 Lecture Hours.** Spatial organization and distribution of economic activity; patterns of land rent and land use; theories of economic development; models of spatial decision making. **Prerequisite:** GEOG 304 or equivalent or approval of instructor.

## GEOG 604 Processes in Physical Geography

**Credits 3. 3 Lecture Hours.** Methodologies and problems of physical geography with emphasis on the interrelationships of the physical environment; a foundation course for graduate work in geography. **Prerequisite:** Approval of instructor.

## GEOG 605 Processes in Cultural Geography

**Credits 3. 3 Lecture Hours.** Evolution of cultural landscapes; processes of innovation, diffusion and adaptation in context of developing human-environment relationships. **Prerequisite:** Approval of instructor.

## GEOG 610 Geographical Methods and Theory

**Credits 3. 3 Lecture Hours.** Development of geography as a discipline; methods and theories used in geography for understanding place and for spatial analysis of human and biophysical phenomena. **Prerequisite:** Graduate classification in geography or approval of instructor.

## GEOG 611 Geographical Research Design

**Credits 3. 3 Lecture Hours.** Methods, techniques and conceptual models for the conception, design, planning and conduct of geographical research. **Prerequisite:** Graduate classification in geography or approval of instructor.

## GEOG 612 Applied Climatology

**Credits 3. 3 Lecture Hours.** Climate data and methods to solve a wide range of environmental problems; collection, processing, analysis and interpretation of surface observations, radar, satellite, reanalysis and climate model data; statistical methods and physical modeling; practical problems and development of tools for decision makers. **Prerequisite:** Graduate classification.

## GEOG 616 Urban Geography

**Credits 3. 3 Lecture Hours.** Spatial patterns and processes of urban systems; growth and sprawl; environmental impacts; residential choice models; political fragmentation; economic development; power and privilege; place-based identity. **Prerequisite:** GEOG 306 or equivalent.

## GEOG 619 Human Impact on the Environment

**Credits 3. 3 Lecture Hours.** Human alterations of landscapes, the atmosphere and the waters of the earth; interference with natural chemical cycles; disturbance of ecological equilibria; depletion of natural resources; roles of technology and population growth. **Prerequisite:** Approval of instructor.

## GEOG 621 Land-Use and Land-Cover Change

**Credits 3. 3 Lecture Hours.** Concepts and approaches to understanding human dimensions of land use and land cover change; history of land change science and research programs; theories of global and regional land changes that emphasize patterns and drivers of change at multiple scales; methodological approaches, including geospatial analysis, remote sensing, modeling and social science approaches; integration of physical and critical human geography. **Prerequisite:** Graduate classification.

## GEOG 624 Biogeography: Theory and Methods

**Credits 3. 3 Lecture Hours.** Theory and methods utilized in contemporary biogeography; emphasis on the analysis of vegetation communities and their environmental controls; various methods of ordination and predictive methods for analyzing vegetation ranges; spatial analysis of vegetation. **Prerequisite:** Approval of instructor.

## GEOG 625/ENTO 625 Landscape Ecology

**Credits 3. 2 Lecture Hours. 2 Lab Hours.** Study of structure, function, and change in a heterogeneous land area composed of interacting ecosystems; examine basic ecological principles dealing with landscape structure. **Prerequisite:** Approval of instructor. **Cross Listing:** ENTO 625/ GEOG 625.

## GEOG 626 Fluvial Geomorphology

**Credits 3. 3 Lecture Hours.** Concepts and methods applicable to the fluvial systems; components affecting rivers and drainage basin and analysis geomorphology; analytical treatment of problems arising from fluvial changes. **Prerequisite:** GEOG 203 or approval of instructor.

## GEOG 627 Arid Lands

**Credits 3. 3 Lecture Hours.** Processes and landforms in dryland environments; nature and dynamics of gravity, water and wind in deserts; Quaternary climates and arid lands; human impact in drylands. **Prerequisite:** GEOG 604 or approval of instructor.

## GEOG 629 Cultural and Political Ecology

**Credits 3. 3 Lecture Hours.** History of ideas about humans and environment; political and social meanings of nature and culture; access and control of resources; theories of environmental change; geographic approaches to political ecology research; current debates and future directions.

## GEOG 634 Hydrology and Environment

**Credits 3. 3 Lecture Hours.** Examination of hydrologic processes affecting surface and groundwater resources; impact of climate, soils, vegetation, land-use practices, and human effects on hydrologic processes; natural-scientific perspectives emphasized. **Prerequisite:** Graduate classification.

## GEOG 635 Advanced Biogeography

**Credits 3. 3 Lecture Hours.** Theory and contemporary research in biogeography; methods used in conducting biogeographical research; spatial and temporal changes in the distribution of organisms; influences of humans and the physical environment on biogeographic patterns. **Prerequisite:** GEOG 624 or approval of instructor.

## GEOG 642/GEOS 642 Past Climates

**Credits 3. 3 Lecture Hours.** Terrestrial and marine proxy records of past climate variability, including tree rings, coral, and sediments; past climate change events such as the Little Ice Age and Medieval Warm Period; greenhouse gases and global temperature; insight into the nature of climate change and challenges humankind faces in the next few centuries. **Prerequisite:** Graduate classification. **Cross Listing:** GEOS 642/ GEOG 642.

## GEOG 643 Advanced Geographies of Energy

**Credits 3. 3 Lecture Hours.** Renewable and fossil energy resource systems and landscapes; territorialization of energy use; politics and geopolitics of energy; energy problems and decisions; energy governance; decarbonization policies and scenarios; alternative energy futures.

## GEOG 651 Remote Sensing for Geographical Analysis

**Credits 3. 3 Lecture Hours. 1 Lab Hour.** Provides an introduction to remote sensing fundamentals. Discussion of past, present and planned earth observing sensors as well as technical issues involved in the collection, processing and interpretation of remote sensing images with emphasis on application to geographic problems, including geomorphology, hydrology and coastal oceanography. **Prerequisite:** Graduate classification.

## GEOG 652 Quantitative Methods in Geography

**Credits 3. 3 Lecture Hours.** Designed to acquaint with quantitative methods commonly used in geographical research to describe, characterize, model and analyze geo-spatial data. **Prerequisite:** Approval of instructor.

## GEOG 659 Geodatabases

**Credits 3. 3 Lecture Hours. 1 Lab Hour.** GIS data modeling; introductory and advanced spatial SQL (structured query language); spatial database management system (DBMS) server setup, management and maintenance; spatial DBMS design, implementation, tuning, performance analysis and indexing; connecting spatial data services and warehouses to GIS software.

## GEOG 660 Applications in GIS

**Credits 3. 3 Lecture Hours. 1 Lab Hour.** Basic concepts of design, planning, and implementation of geographic information systems. **Prerequisite:** Graduate classification.

## GEOG 661 Digital Image Processing and Analysis

**Credits 3. 3 Lecture Hours. 1 Lab Hour.** Principles of georectifying, processing, manipulating and interpreting data collected by nonphotographic sensors concentrating on solid earth resources. **Prerequisite:** GEOG 651 or equivalent or approval of instructor.

## GEOG 662 GIS in Land and Property Management

**Credits 3. 3 Lecture Hours. 1 Lab Hour.** Introduction to concepts of design, planning and implementation of geographic information systems (GISs) for land and property management applications; rural land and agricultural property; urban and residential land uses; cadastral surveying. **Prerequisite:** GEOG 660 or equivalent or approval of instructor.

## GEOG 663 GIS in Petroleum

**Credits 3. 3 Lecture Hours. 1 Lab Hour.** Investigation of the use of Geographic Information Systems within the Petroleum Industry; case studies present geospatial workflows used in various industry sectors; laboratory exercises provide practical applications incorporating industry-standard data sources. **Prerequisite:** GEOG 660 or equivalent, or approval of instructor.

## GEOG 665 GIS-Based Spatial Analysis and Modeling

**Credits 3. 3 Lecture Hours. 1 Lab Hour.** Investigates methodology of integrating various spatial analysis and modeling techniques with GIS for environmental/socio-economic applications; practical applications; theoretical/technical aspects of related issues in detail. **Prerequisite:** GEOG 660 or equivalent or approval of instructor; also taught at Galveston campus.

## GEOG 666 Coastal Geomorphology

**Credits 3. 3 Lecture Hours.** Essential concepts and methods to coastal geomorphology; review history and processes of coastal geomorphology; analytical treatment of problems associated with coastal environmental changes. **Prerequisite:** GEOG 203 or equivalent.

## GEOG 667 Dynamic Modeling of Earth and Environmental Systems

**Credits 4. 3 Lecture Hours. 2 Lab Hours.** Dynamical systems modeling; dynamic complexity; key concepts, processes and human impact on earth and environmental systems; model building and testing; system behavior over time; model validation and sensitivity; examples from the applications in earth and environmental sciences. **Prerequisite:** Approval of instructor.

## GEOG 668 Arctic Climates

**Credits 3. 3 Lecture Hours.** Arctic climate system, physical characteristics and climatic features, the atmospheric energy budget, the atmospheric circulation, the surface energy budget, the hydrologic cycle, and the interactions between the atmosphere, Arctic Ocean, and the sea ice cover. **Prerequisite:** Graduate classification.

## GEOG 676 GIS Programming

**Credits 3. 3 Lecture Hours. 1 Lab Hour.** Automation of GIS software; integration of custom code as extensions into GIS software; programmatic manipulation of GIS data. **Prerequisite:** Graduate classification.

## GEOG 677 Geomorphometry

**Credits 3. 3 Lecture Hours.** Introduction to discipline of geomorphometry; science of quantitative land-surface characterization; fundamental principles of terrain analysis; theory and concepts of land-surface and dynamics; software and digital terrain modeling; production of land-surface parameters and objects and terrain mapping applications.

**Prerequisites:** Equivalent of GEOG 361 and GEOG 390, or approval of instructor; graduate classification.

## GEOG 678 WebGIS

**Credits 3. 3 Lecture Hours. 1 Lab Hour.** Internet architectures; setup, management and maintenance of web-based Geographic Information System (WebGIS) servers, data and services; use of WebGIS data and services in the creation of custom web-based maps; analysis of WebGIS system architecture, design and implementation. **Prerequisite:** Graduate classification.

## GEOG 681 Seminar

**Credits 0-1. 0 Lecture Hours. 0-1 Other Hours.** Reports and discussions of current research and selected topics. Must be taken on a satisfactory/unsatisfactory basis. **Prerequisite:** Approval of department head.

## GEOG 685 Directed Studies

**Credits 1 to 6. 1 to 6 Other Hours.** For students with major or minor in geography to undertake investigations in special aspects of geography.

**Prerequisite:** Approval of instructor.

## GEOG 687/ANTH 624 Geoarchaeology

**Credits 3. 3 Lecture Hours.** Application of geological concepts and methods to archaeological research; history of geoarchaeology; site formation processes; modification of archaeological sites and sediments; landscape reconstruction and change and their effects on human behavior. **Prerequisite:** ANTH 602 or equivalent. **Cross Listing:** ANTH 624/ GEOG 687.

## GEOG 689 Special Topics in...

**Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.** Selected topics in an identified area of geography. May be repeated for credit. **Prerequisite:** Approval of instructor.

## GEOG 691 Research

**Credits 1 to 23. 1 to 23 Other Hours.** Original research in various areas of geography. Research for thesis or dissertation.

## GEOG 695 Frontiers in Geographic Information Science

**Credits 3. 3 Lecture Hours.** Theoretical foundations and the latest development of geographic information science (GIScience); topics related to representations of space and time, geocomputation, spatially integrated social sciences, and social informatics. **Prerequisite:** Introductory GIS.

## GEOG 696 Geomorphology and Remote Sensing

**Credits 3. 3 Lecture Hours.** Application of remote sensing to study landforms, imagery, includes, aerial photography; LANDSAT; SPOT, TM and shuttle photography. **Prerequisite:** GEOG 203 or approval of instructor.