

GEOG - GEOGRAPHY (GEOG)

GEOG 201 Introduction to Human Geography

Credits 3. 3 Lecture Hours. (GEOG 1302) Introduction to Human Geography. A survey of the major systems of man-land relations of the world and their dissimilar developments; the processes of innovation, diffusion, and adaptation stressed with regard to changing relationships between people and their environment; also taught at Galveston campus.

GEOG 202 Geography of the Global Village

Credits 3. 3 Lecture Hours. (GEOG 1303) Geography of the Global Village. Survey of world regions; globalization; environmental problems at multiple scales; human-environment interactions; cultural coherence and diversity; population and settlement; geopolitics; social and economic development; place identification; also taught at Galveston campus.

GEOG 203 Planet Earth

Credits 3. 3 Lecture Hours. (GEOG 1301) Planet Earth. Earth's physical environment including climate, water, landforms, and ecosystems; processes that control these systems and their global distributions; human effects on these processes.

GEOG 205 Environmental Change

Credits 3. 3 Lecture Hours. Systems perspective on important attributes, elements, and connections within earth's physical environment; dynamic nature of environment at multiple spatial and temporal scales.

GEOG 213 Planet Earth Lab

Credit 1. 3 Lab Hours. Exercises and maps to illustrate principles of physical geography.

GEOG 215 Geospatial Cornerstone

Credit 1. 1 Lecture Hour. Professional career options, methods, strategies and skills involved in successful career planning in the geospatial sciences; highlights high impact learning opportunities such as study abroad and internships and the development of scientific communication skills. **Prerequisites:** GEOG and GIST majors; sophomore classification or approval of instructor.

GEOG 232 Cartography and Visualization

Credits 3. 2 Lecture Hours. 3 Lab Hours. Introduction to science and art of map production; principles of thematic map compilation and design; history of thematic mapping; map projections; data management and symbolization; common types and styles of thematic maps.

GEOG 285 Directed Studies

Credits 1 to 4. 1 to 4 Other Hours. Individually-supervised research or intensive study on topics not covered in regular courses. **Prerequisite:** Approval of department head.

GEOG 289 Special Topics In...

Credits 1 to 4. 1 to 4 Other Hours. Selected topics in an identified area of geography. May be repeated for credit. **Prerequisite:** GEOG, GIST or USGE majors, or approval of instructor.

GEOG 291 Research

Credits 0 to 4. 0 to 4 Other Hours. Research conducted under the direction of faculty member in geography. May be taken 2 times for credit. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded. **Prerequisites:** Freshman or sophomore classification and approval of instructor.

GEOG 301 Geography of the United States

Credits 3. 3 Lecture Hours. Geographic personality (physical and cultural) of the United States; also taught at Galveston campus.

GEOG 303 Health Geography

Credits 3. 3 Lecture Hours. Overview of health-related issues within society, including diseases, healthcare services, access to healthcare, environmental health, food and nutrition, urban health, neighborhood health, climate and health using geographical approaches. **Prerequisites:** Junior or senior classification.

GEOG 304 Economic Geography

Credits 3. 3 Lecture Hours. Location of economic activities over the earth; distribution of agriculture, manufacturing, tertiary activities and transportation; economic growth of areas.

GEOG 305 Geography of Texas

Credits 3. 3 Lecture Hours. Exploration into the geographic personality of Texas: past and current physical and biotic environments; cultural pluralism, including ethnic origins and distinctive human ecologies; and the social, economic and political sources of environmental problems.

GEOG 306 Introduction to Urban Geography

Credits 3. 3 Lecture Hours. Reasons humankind tends to congregate in cities. Overview of patterns in the geographic distribution of cities, and in the geographic distribution of peoples and activities within cities, and the dynamics of these distributions.

GEOG 309 Geography of Energy

Credits 3. 3 Lecture Hours. Development of high-energy society; renewable and nonrenewable energy resources and systems; physical and social economies of energy use; geography of energy systems; energy problems and decisions; energy governance; dependence of other resources on energy; decarbonization policies and scenarios; alternative energy futures. **Prerequisite:** Junior classification or approval of instructor.

GEOG 311 Cultural Geography

Credits 3. 3 Lecture Hours. Human factors which affect man-land relationship; concept of culture, culture areas; population growth and migrations, types of economic activity, urban and transportation geography.

GEOG 312 Data Analysis in Geography

Credits 3. 3 Lecture Hours. Foundation for collection and analysis of quantitative and qualitative geographic data; emphasis on hands-on, practical experience with commonly used analysis software and qualitative methods including interviewing and archival research; problems commonly encountered in dealing with data. **Prerequisite:** STAT 303.

GEOG 320 The Middle East

Credits 3. 3 Lecture Hours. Regional geography of the Middle East; physical setting and the historical evolution of Middle Eastern landscapes; current issues. **Prerequisites:** Junior or senior classification.

GEOG 323 Geography of Latin America

Credits 3. 3 Lecture Hours. Physical and cultural characteristics of Latin America; physical landscape, cultural succession and the present cultural landscape; details on sub-regions.

GEOG 324 Global Climatic Regions

Credits 3. 3 Lecture Hours. Climatological processes and their consequences for spatial distributions of climates; survey of earth's climates; relationships among climate, landforms, vegetation, soils and humans. **Prerequisite:** GEOG 203 or ATMO 201 or approval of instructor.

GEOG 325 Geography of Europe

Credits 3. 3 Lecture Hours. Regional geography of European landmass; global, political and cultural characteristics of European geography in historical and ecological contexts. **Prerequisite:** Junior or senior classification.

GEOG 330 Resources and the Environment

Credits 3. 3 Lecture Hours. Changing demand for land and sea resources; international conditions of population growth, resource depletion and geopolitical control; resource perceptions and decision-making.

GEOG 331 Geomorphology

Credits 3. 2 Lecture Hours. 3 Lab Hours. Principles and fundamentals of landform analysis. Laboratory work in advanced map interpretation. **Prerequisite:** GEOL 101 or GEOG 203; also taught at Galveston campus.

GEOG 335 Pattern and Process in Biogeography

Credits 3. 3 Lecture Hours. Distribution of organisms across the earth and on environmental and cultural processes that have contributed to these patterns of distribution; dynamic nature of biogeographic patterns; impacts of contemporary and prehistoric humans on plant and animal distributions; methods for exploring biogeographic patterns and detecting change. **Prerequisite:** Junior or senior classification.

GEOG 352/GEOL 352 GNSS in the Geosciences

Credits 3. 2 Lecture Hours. 3 Lab Hours. Fundamentals of Global Navigation Satellite Systems (GNSS); basic geodesy, figure of the earth; frames of reference, map projection, datums, ellipsoids; GPS accuracy and precision; applications in earth resource mapping and database creation; elementary GPS phase data processing. **Prerequisite:** Junior or senior classification or approval of instructor. **Cross Listing:** GEOL 352/ GEOG 352.

GEOG 360 Natural Hazards

Credits 3. 3 Lecture Hours. Introduction to the types and causes of natural events that pose risk to society; an examination of prevailing concepts and theories of human response and vulnerability; characteristics of natural events; natural hazard paradigms; case studies. **Prerequisites:** GEOG 203 or GEOL 101; junior or senior classification; also taught at Galveston campus.

GEOG 361 Remote Sensing in Geosciences

Credits 4. 3 Lecture Hours. 2 Lab Hours. Introduction to the principles, techniques and applications of remote sensing technology in geosciences including the analysis and interpretation of airborne and spaceborne remote sensing data for studying key earth system processes. **Prerequisite:** Junior or senior classification.

GEOG 370/MARS 370 Coastal Processes

Credits 3. 3 Lecture Hours. Introduction to the coastal system, waves and wave dominated coasts, shoreline morphodynamics, tidal and lake coasts, long term coastal development, sea level changes, subtidal and beach ecosystems, coastal dunes and wetlands, structures and organizations, coastal management and coastal hazards. **Cross Listing:** MARS 370/GEOG 370.

GEOG 380 Workshop in Environmental Studies

Credits 2 to 6. 2 to 6 Lab Hours. The study, understanding and solution of human environment problems based on principles learned in the classroom; library, laboratory and field work carried out by individuals and in groups; reports on work accomplished. May be repeated for credit as many as three times. **Prerequisite:** GEOG 330.

GEOG 390 Principles of Geographic Information Systems

Credits 4. 3 Lecture Hours. 2 Lab Hours. Basic concepts of design, planning and implementation of geographic information systems. **Prerequisite:** Junior or senior classification.

GEOG 391 Geodatabases

Credits 4. 3 Lecture Hours. 2 Lab Hours. 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. **Prerequisite:** Junior or senior classification.

GEOG 392 GIS Programming

Credits 4. 3 Lecture Hours. 2 Lab Hours. Programming for geographic information science applications; principles of programming syntax and data structures; development of custom GIS programs; integration of programs into commercial GIS platforms. **Prerequisites:** GEOG 390 or equivalent, or approval of instructor; junior or senior classification.

GEOG 395 Cartography and Geovisualization

Credits 4. 3 Lecture Hours. 2 Lab Hours. Cartographic and data visualization applications of Geographic Information Systems (GIS); theory and practice of cartographic decisions and design; user interface, map design, and visualization of geospatial, spatiotemporal, 3D, and big data; designed map experiences for different environments and purposes. **Prerequisites:** GEOG 390.

GEOG 398 Interpretation of Aerial Photographs

Credits 3. 2 Lecture Hours. 3 Lab Hours. Identification and evaluation of natural and cultural features on aerial photographs; methods for extracting information concerning land use, vegetative cover, surface and structural features, urban/industrial patterns and archaeological sites.

Prerequisites: Junior or senior classification or approval of instructor.

GEOG 400 Arid Lands Geomorphology

Credits 3. 3 Lecture Hours. Introduction to the geomorphology of deserts; processes, origin and evolution of arid lands; urban geomorphology in drylands; desertification.

GEOG 401 Political Geography

Credits 3. 3 Lecture Hours. The political process at a variety of geographic scales: international, intranational and urban; origins of territorial organization and conflicts over access to and use of space and its resources.

GEOG 405 Field Trips

Credits 1 to 4. 1 to 4 Other Hours. Supervised field trip to investigate the physical, economic and cultural processes that influence the spatial development and distribution on the landscape. May be repeated for credit. **Prerequisites:** GEOG 201, GEOG 202, GEOG 203 or GEOG 205, or concurrent enrollment; approval of instructor.

GEOG 406 Geographic Perspectives on Contemporary Urban Issues

Credits 3. 3 Lecture Hours. Contemporary readings on spatial patterns and processes in urban environments; sprawl; human-environment interaction; housing; development and growth; concept of place; scale; power and policy. **Prerequisite:** GEOG 304 or GEOG 306 or equivalent.

GEOG 409 Geographies of Decarbonization

Credits 3. 3 Lecture Hours. Geographical analysis of decarbonizing energy systems; territorialization and justice processes associated with decarbonization; implications of decarbonization for places and landscapes; influence of path dependencies and institutions on decarbonization. **Prerequisites:** GEOG 330 or GEOG 309 or approval of instructor.

GEOG 410/OCNG 412 Global Change

Credits 3. 3 Lecture Hours. The interaction of the earth, atmosphere, oceans, cryosphere and life, including the impact of human society on the environment and climate; global change modeling; politics, policy and decision making; and personal awareness. **Prerequisite:** Junior or senior classification. **Cross Listing:** OCNG 412/GEOG 410.

GEOG 420 Geography of Terrorism

Credits 3. 3 Lecture Hours. Exploration of global terrorism and counter terrorism; regional conflicts and mass violence; construction of places and regions associated with terror; American reactions to global terrorism. **Prerequisite:** Junior or senior classification.

GEOG 430 Environmental Justice

Credits 3. 3 Lecture Hours. Exploration into the spatial variability and human geography of exposure to environmental hazards in U.S. and international contexts; emphasizes environmental equity and environmental racism as it relates to occupational, leisure, and residential geography. **Prerequisites:** GEOG 201 or GEOG 202; junior or senior classification.

GEOG 434 Hydrology and Environment

Credits 4. 3 Lecture Hours. 2 Lab Hours. Examination of hydrologic processes in relation to climate, soils, vegetation, land use practices, and human impacts; natural scientific perspectives emphasized; field and laboratory included. **Prerequisite:** GEOG 203 or equivalent.

GEOG 435 Principles of Plant Geography

Credits 3. 2 Lecture Hours. 3 Lab Hours. Plant distributions, their associations and environmental relationships; survey of the principal explanatory systems; field and laboratory study of area patterns at various geographic scales. A weekend field trip is required. **Prerequisite:** BIOL 101 or BIOL 107 or BIOL 301 or approval of instructor.

GEOG 440 History and Nature of Geography

Credits 3. 3 Lecture Hours. Summary of classical knowledge of world; development of thought on nature of geography from 1800 to present. **Prerequisite:** Junior or senior classification.

GEOG 442/GEOL 442 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. **Prerequisites:** GEOL 101, GEOL 104, GEOL 150, ATMO 201, GEOG 203, or OCNG 251; junior or senior classification. **Cross Listing:** GEOL 442/GEOG 442.

GEOG 443/GEOL 443 Global Biogeochemical Cycles

Credits 3. 3 Lecture Hours. Use of biogeochemical cycles to study the Earth system; description of movement and transformation of major elements such as C, N, P and trace elements; flux of material in and out of atmosphere, hydrosphere, pedosphere, and lithosphere; chemical and physical transformations that occur in Earth system. **Prerequisites:** CHEM 119 and CHEM 120; select two from ATMO 201, or OCNG 251, or GEOG 203 or GEOG 205, or GEOL 101 or GEOL 104 or GEOL 150. **Cross Listing:** GEOL 443/GEOG 443.

GEOG 450 Field Geography

Credits 3. 1 Lecture Hour. 6 Lab Hours. Introduction to field methods; documenting materials, reconnaissance, the field plan; mapping traverse, base maps and aerial photographs; recording techniques; interview procedures. Fields trips required, some on weekends and/or semester breaks, for which departmental fees may be assessed to cover costs. **Prerequisite:** 15 hours of geography or equivalent.

GEOG 461 Digital Image Processing in the Geosciences

Credits 4. 3 Lecture Hours. 2 Lab Hours. Key remote-sensing digital image processing methods; advanced topics in feature extraction, radiometric calibration, image enhancement, pattern recognition and geoscience applications. **Prerequisite:** GEOG 361 or equivalent and junior or senior classification.

GEOG 462/ECCB 406 Advanced GIS Analysis for Natural Resources Management

Credits 3. 2 Lecture Hours. 2 Lab Hours. Advanced topics in geographic information systems (GIS) to solve natural resource problems; manipulation of raster data types; three-dimensional modeling; emphasis on geoprocessing as it relates to applied projects particularly with habitat suitability models; field and lab use of global positioning systems (GPS); internet-based GIS modeling. **Prerequisites:** ECCB 351, RWFM 351, or AGSM 461, or equivalent, or approval of instructor; junior or senior classification. **Cross Listing:** ECCB 406/GEOG 462.

GEOG 467 Dynamic Modeling of Earth and Environmental Systems

Credits 4. 3 Lecture Hours. 2 Lab Hours. Dynamical systems modeling; key concepts and processes in earth and environmental systems; human impact on these systems; model building and testing; system behavior over time; model validation and sensitivity; examples from the applications in earth and environmental sciences. **Prerequisite:** GEOG 203 or approval of instructor.

GEOG 475 Advanced Topics in GIS (Geographic Information Systems)

Credits 4. 3 Lecture Hours. 2 Lab Hours. Advanced Topics in Geographic Information Systems. Topics related to GIS implementation, spatial database design, spatial data analysis, and various advanced GIS applications. **Prerequisite:** GEOG 390 or equivalent.

GEOG 476 GIS Practicum

Credits 3. 3 Other Hours. Introduction to current topics in Geographic Information Science including ethical and legal issues surrounding spatial technologies, proper GIS management practices and professional certification; development of professional research, technical and communication skills through participation in a coordinated internship or independent research project. Meets writing-intensive course requirements for environmental geosciences, environmental studies and geography majors. **Prerequisites:** Senior classification and enrollment in Geographic Information Science and Technology or approval of instructor.

GEOG 477 Terrain Analysis and Mapping

Credits 4. 3 Lecture Hours. 2 Lab Hours. Geomorphometry for land surface characterization; fundamentals of terrain analysis; theory of land surface dynamics; application of software for digital terrain modeling and analysis. **Prerequisites:** GEOG 361 and GEOG 390 or equivalents, or approval of instructor; junior or senior classification.

GEOG 478 WebGIS

Credits 4. 3 Lecture Hours. 2 Lab Hours. Investigation of web-based geographic information systems; introduction to server-oriented architectures for web-based applications and services; development of web applications; management of web servers, web services and databases. **Prerequisites:** GEOG 390 or equivalent, or approval of instructor; junior or senior classification.

GEOG 479 Principles of Geocomputation

Credits 4. 3 Lecture Hours. 2 Lab Hours. Geocomputation including geospatial technologies, computational techniques and algorithms utilizing high-performance computing; fundamental geocomputation principles, artificial and computational intelligence. **Prerequisites:** GEOG 361, GEOG 390, GEOG 475; CSCE 110 or CSCE 111.

GEOG 484 Internship

Credits 0 to 12. 0 to 12 Lecture Hours. Directed internship in a private firm, government agency or non-governmental organization to provide work experience related to the student's degree program and career objectives. **Prerequisites:** Junior or senior classification and approval of internship agency and departmental internship director.

GEOG 485 Directed Studies

Credits 1 to 23. 1 to 23 Other Hours. Individually supervised research or advanced study on restricted areas not covered in regular courses. **Prerequisite:** Approval of department head.

GEOG 489 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 491 Research

Credits 0 to 4. 0 to 4 Other Hours. Research conducted under the direction of faculty member in geography. May be repeated for credit. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded. **Prerequisites:** Junior or senior classification and approval of instructor.