GEOPHYSICS

Geography is the study of the relationships between people and their environment, relationships that vary from place to place over the Earth. Geography students assess those factors responsible for the variable and changing character of Earth’s systems, which over time have been transformed into human habitat. Geography integrates physical science, social science, and the humanities. The Department requires that students understand both the physical and human components, and develop the spatial analytical skills to study these systems.

Physical geography emphasizes a systematic and interdisciplinary approach to the study of landforms, climate, soils, and vegetation. Human geography seeks to describe and explain the spatial patterns of human activities on Earth. These range from economic activities such as the distribution of retail sales and industrial production to cultural landscapes, which often have strong historical roots. Geographic Information Science (GIS), quantitative methods, and remote sensing provide geographers with the analytical techniques to study spatial phenomena.

Faculty

Bishop, Michael P, Professor
Geography
PHD, Indiana State University, 1987

Brannstrom, Christian, Professor
Geography
PHD, University of Wisconsin - Madison, 1998

Cairns, David M, Professor
Geography
PHD, University of Iowa, 1995

Filippi, Anthony M, Associate Professor
Geography
PHD, University of South Carolina, 2003

Frauenfeld, Oliver W, Associate Professor
Geography
PHD, University of Virginia, 2003

Goldberg, Daniel W, Assistant Professor
Geography
PHD, University of Southern California, 2010

Guneralp, Burak, Research Assistant Professor
Geography
PHD, University of Illinois at Urbana-Champaign, 2006

Guneralp, Inci, Associate Professor
Geography
PHD, University of Illinois at Urbana-Champaign, 2007

Jepson, Wendy E, Professor
Geography
PHD, University of California, Los Angeles, 2003

Johnson, Jeremy S, Visiting Assistant Professor
Geography
PHD, Texas A&M University, 2016

Klein, Andrew G, Professor
Geography
PHD, Cornell University, 1997

Lafon, Charles W, Professor
Geography
PHD, University of Tennessee, 2000

Lauermann, John A, Visiting Assistant Professor
Geography
PHD, Clark University, 2016

Loisel, Julie, Assistant Professor
Geography
PHD, Lehigh University, 2012

O’Reilly, Kathleen M, Associate Professor
Geography
PHD, University of Iowa, 2002

Patzewitsch, Wendy W, Instructional Assistant Professor
Geography
PHD, Texas A&M University, 2007

Prout, Erik, Instructional Associate Professor
Geography
PHD, Louisiana State University, 2001

Ritz, Thor M, Visiting Assistant Professor
Geography
PHD, Syracuse University, 2016

Roark, Erin B, Associate Professor
Geography
PHD, University of California, Berkeley, 2005

Smith, Jonathan, Professor
Geography
PHD, Syracuse University, 1991

Tchakerian, Vatche P, Professor
Geography
PHD, University of California, Los Angeles, 1989

Majors

• Bachelor of Science in Geographic Information Science and Technology - Computation, Design and Analysis Track (http://catalog.tamu.edu/undergraduate/geosciences/geography/geographic-information-science-technology-bs-computation-design-analysis)

• Bachelor of Science in Geographic Information Science and Technology - Earth Systems Analysis Track (http://catalog.tamu.edu/undergraduate/geosciences/geography/geographic-information-science-technology-bs-earth-systems-analysis)

• Bachelor of Science in Geographic Information Science and Technology - Human Systems and Society Track (http://catalog.tamu.edu/undergraduate/geosciences/geography/geographic-information-science-technology-bs-human-systems-society)
• Bachelor of Science in Geography (http://catalog.tamu.edu/undergraduate/geosciences/geography/bs)
• Bachelor of Science in University Studies, Geographic Information Science and Technology Concentration (http://catalog.tamu.edu/undergraduate/geosciences/geography-geographic-information-science-technology-university-studies-bs)
• Bachelor of Science in University Studies, Geography Concentration (http://catalog.tamu.edu/undergraduate/geosciences/geography/university-studies-bs)

Minors
• Geographic Information Science and Technology Minor (http://catalog.tamu.edu/undergraduate/geosciences/geography/geoinformatics-minor)
• Geography Minor (http://catalog.tamu.edu/undergraduate/geosciences/geography/minor)

Courses
GEOG 201 Introduction to Human Geography
Credits 3. 3 Lecture Hours. 1 Lab Hour.
(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.

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.

GEOG 203 Planet Earth
Credits 3. 3 Lecture Hours. 1 Lab Hour.
(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 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 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.

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; physical and social economies of energy use; geography of energy; energy problems and decisions; dependence of other resources on energy; 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 327 Geography of South Asia
Credits 3. 3 Lecture Hours.
South Asian geography; political and physical geographic divisions of South Asia; diversity of region; people, history, religion, cultures, political systems, rural and urban settings, climate, and environment; current problems and solutions.
Prerequisite: Junior or senior classification or approval of instructor.

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.

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 355 Concepts in Geographic Education
Credits 3. 3 Lecture Hours.
Key concepts and generalizations of geography; learning theory applied to geography and environmental education; development of field and computerbased technical/intellectual skills required to teach geography; curriculum and instructional issues related to geography.
Prerequisites: GEOG 201 or GEOG 202; GEOG 203 or equivalent.

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.

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 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.
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 and ESSM 465 or equivalents, or approval of instructor; junior or senior classification.

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 404 Spatial Thinking, Perception and Behavior
Credits 3. 3 Lecture Hours.
Spatial thinking, spatial perception of the environment and the ways thinking and perception influence spatial behavior; role of geospatial technologies in supporting spatial thinking; models of spatial thinking acquisition; cognitive maps and spatial decision making; developing spatial thinking and individual differences.
Prerequisite: Junior or senior classification.

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: Geography course at the 200-level or registration therein; 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 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 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: ATMO 201, or GEOG 203, or GEOL 101, or GEOL 104, or OCNG 251; junior or senior classification.
Cross Listing: GEOG 442/Geog 442.

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. Field 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/ESSM 462 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: ESSM 351/REN 405 or AGSM 461/SPSC 461 or equivalent or approval of instructor; junior or senior classification.
Cross Listing: ESSM 462/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 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: Junior or senior classification and approval of instructor.