GEOGRAPHY

Undergraduate Program Information

The Geography Program emphasizes the interaction of humans with the environment, and the program prepares students for professional positions in the public and private sectors, as well as for graduate work. The Department offers two concentrations for the major:

- The Geographic Information Science and Technology (GIS&T) Concentration emphasizes the acquisition of knowledge and skills in geographic information systems and remote sensing tools and concepts;
- The Human-Environment Relationships (HER) Concentration focuses on the analysis and interpretation of the coupled and complex interactions between people and the environment.

As detailed above, the Department also offers minors in Geography and GIS&T. The requirements for teaching fields in earth sciences are listed under the Department of Curriculum and Instruction in the College of Education.

Note: A grade of "C-" or better is required for all courses taken for the major. Students may not take any of these courses S/U.

Graduate Program Information

The Department of Geography offers graduate study leading to the Master of Applied Geography degree, with a specific focus on the use of geographic perspectives and tools to examine an array of applied research questions related to land use change, water resources, biogeography, desertification, landscape conservation, and urban and transportation planning. A minor in Geographic Information Science and Technology (GIS&T) is also available for all graduate students, regardless of major; details are provided above. Admission to the program is in accord with the general regulations of the Graduate School. Foreign students must receive a minimum score of 570 on the paper-based or 230 on the computer-based Test of English as a Foreign Language (TOEFL) examination. Any applicant who does not have an adequate undergraduate background in geography will be required to make up the deficiencies. Applicants must submit three letters of recommendation and a formal statement of intent to the Department as part of the application process. Please contact Dr. Daniel Dugas, Geography Graduate Director (ddugas@nmsu.edu) if you have any questions about the program.

The Department is a sponsor of the interdisciplinary graduate degree program, which offers both MS and Ph.D. degrees in water science and management. Program details, application procedures, and funding resources are listed under the program description that is part of the College of Agricultural Consumer and Environmental Sciences, the lead College for the program. Interested students are encouraged to contact Dr. Christopher Brown, at (575) 646-1892 or brownchr@nmsu.edu, for more information.

The Department is also a participant in the Western Regional Graduate Program (WRGP) supported by the Western Interstate Commission for Higher Education (WICHE). The WRGP is a tuition-reciprocity arrangement that enables students that are legal residents in WICHE states (Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, North Dakota, Oregon, South Dakota, Utah, Washington and Wyoming) to attend NMSU and pay the resident tuition rate, instead of the nonresident rate that an out-of-state student would normally pay.

The Department has a contract research laboratory (Spatial Applications Research Center-SpARC) and a state-of-the-art computer teaching laboratory, both of which support the full suite of ESRI and ENVI geospatial analytical software. The SpARC laboratory employs graduate students who work with local and state governments and research agencies, as well as with businesses on applied geography projects. Our teaching laboratory supports graduate students engaged in course work and research projects. The Department has good working relationships with the Water Resources Research Institute, the Jornada Experimental Range, the Physical Sciences Laboratory, and other units on campus. The Department has its own field equipment and field vehicle, which graduate students can use to support their thesis research. The potential for financial support exists for graduate students in Geography through teaching assistantships and research assistantships. Inquiries regarding the program and assistantships should be directed to the Dr. Daniel Dugas, Geography Graduate Director (ddugas@nmsu.edu). Financial aid questions should be addressed to the Office of Financial Aid at NMSU.

Degrees for the Department

Geography (Geographic Information Science & Tech)- Bachelor of Science

Geography (Human Environment Relationships)- Bachelor of Science

Geography - Master of Applied Geography

Minors for the Department

Geography - Undergraduate Minor

Geographic Information Science and Technology - Undergraduate Minor

Geographic Information Science and Technology - Graduate Minor

Associate Professor, Carol Campbell, Department Head

Professors DeMers; Associate Professors Brown, Buenemann, Campbell; Assistant Professors Dugas, Magrane; Adjunct Faculty Whitford; Professor Emeritus Czerniak, Wright

C. P. Brown, Ph.D., (California-Santa Barbara/San Diego State) – geographic information systems, water resources, U.S. Mexico border environmental issues; M. Buenemann, Ph.D. (Oklahoma) – geographic information science and technology, land change science, drylands; C. L. Campbell, Department Head, Ph.D. (UCLA) – biogeography, landscape ecology, remote sensing, sustainability; M. N. DeMers, Ph.D. (Kansas) – geographic information science, landscape ecology, geographic education; D. Dugas, Ph.D. (Oregon) – geomorphology, physical geography; E. Magrane, Ph.D. (U of Arizona) – cultural geography and creativity, human-environment geography, geopoetics, art & environment.

Emeritus Faculty – R.J. Czerniak, Ph.D. (Colorado-Boulder) – land use and transportation planning, Europe, urban geography; J. B Wright, Ph.D. (California-Berkeley) – environmental conservation, cultural geography, American West
**Geography Courses**

**GEOG 111G. Geography of the Natural Environment**
3 Credits (3+3P)
Introduction to the physical processes that shape the human environment: climate and weather, vegetation dynamics and distribution, soil development and classification, and geomorphic processes and landform development.

**GEOG 112G. World Regional Geography**
3 Credits (3)
Overview of the physical geography, natural resources, cultural landscapes, and current problems of the world’s major regions. Students will also examine current events at a variety of geographic scales.

**GEOG 120G. Culture and Environment**
3 Credits (3)
Study of human-environmental relationships: how the earth works and how cultures impact or conserve nature. Introduction to relationships between people and natural resources, ecosystems, global climate change, pollution, and conservation.

**GEOG 257. Introduction to Weather Science**
4 Credits (3+3P)
Introduction to Earth’s atmosphere and the dynamic world of weather as it happens. Working with current meteorological data delivered via the Internet and coordinated with learning investigations keyed to the current weather; and via study of select archives. Crosslisted with: SOIL 257 and AGRO 257

Prerequisite(s): None.

**GEOG 259. Introduction to Oceanography**
4 Credits (3+3P)
Introduces the origin and development of the ocean and marine ecological concepts. Examines physical processes such as waves, tides, and currents and their impact on shorelines, the ocean floor, and basins. Investigates physical processes as they relate to oceanographic concepts. Includes media via the Internet and laboratory examination of current oceanic data as an alternative to the actual oceanic experience. Students will gain a basic knowledge and appreciation of the ocean’s impact on the world’s ecology. Branch campuses only. Consent of Instructor required.

**GEOG 281. Map Use: Reading, Analysis and Interpretation**
3 Credits (2+3P)
Exploration of the cartographic medium. Development of critical map analysis and interpretation skills, and map literacy. Comprised of traditional lecture, labs, and map use projects.

**GEOG 291. Special Topics**
1-3 Credits
Specific subjects to be announced in the Schedule of Classes. May be repeated for a maximum of 12 credits.

**GEOG 295. Introduction to Climate Science**
4 Credits (3+3P)
Examines fundamentals and related issues of Earth’s climate system, climate variability, and climate change. Develops solid understandings of Earth’s climate system framed in the dynamic, Earth system based approach to the science. Branch Campuses only. May be repeated up to 4 credits.

**GEOG 315V. World Agriculture and Food Problems**
3 Credits (3)
Same as AG E 315V.

**GEOG 325V. New Mexico and the American West**
3 Credits (3)
Examination of the cultural and historical patterns, economic activities, and physical characteristics of New Mexico and the American West. Special focus is given to human, environmental, and cultural landscapes, as well as current issues and challenges in New Mexico, the West, and the border region.

**GEOG 326. U.S. National Parks**
3 Credits (3)
Exploration of origins, landscapes, ecosystems, management issues, and conflicts in U.S. National Parks. The regional geography of the United States as seen through the creation and protection of biologically and culturally significant lands.

**GEOG 328V. Geography of Latin America**
3 Credits (3)
Explores Latin America from a geographical perspective, integrating environmental, cultural and socioeconomic factors in an in-depth study of the development of the region and contemporary issues and challenges facing the region. Special focus is given to examining applied problems facing Latin America at a range of scales.

**GEOG 331V. Europe**
3 Credits (3)
Focus on the cultural continent of Europe. An overview of climate, physical geography, and human geography of Europe, including a brief historical geography of the continent. Current environmental, social, and political issues of Europe will be discussed, with a particular focus on the fate of EU.

**GEOG 351. Fundamentals of Biogeography**
3 Credits (3)
Exploration of life in space and time. Floristic and physiognomic characteristics of the Earth’s major ecosystems and their distributions; ecosystem dynamics, evolution, and physical environment. Includes an individual research project resulting in a poster presentation. Crosslisted with: GEOG 557.

**GEOG 353. Geomorphology**
3 Credits (2+3P)
Examination of the principle theories and concepts of landform creation; exploration of the roles of structure, processes, climate, and time in the formation of various types of landforms. Taught with GEOG 553. Crosslisted with: GEOL 353.

**GEOG 357. Climatology**
3 Credits (3)
Elements and controls of climate. Energy and hydrologic cycles, general circulation, climate classification, distribution of climate types, microscale effects, applications. Same as AGRO 357, SOIL 357.

Prerequisite(s): C- or better in MATH 120.

**GEOG 361V. Economic Geography**
3 Credits (3)
The geographic relationships of supply and demand resources, population, and transportation. Site analysis and decision-making in different economic systems and cultures and how these decisions affect the environment and the location of economic activities.

**GEOG 363V. Cultural Geography**
3 Credits (3)
The world’s diverse cultural landscapes. Emphasis on the connections between social, political, religious, and agricultural patterns and the impact of societies on the natural environment.
GEOG 365V. Urban Geography  
3 Credits (3)  
The global historical development of urban areas, as well as the changing functions of today’s cities. A comparison between the North American city system and cities in Europe, Asia, and South America, including the development of the city form, the internal spatial organization of commercial, residential, and industrial areas, and socio-economic and political factors.

GEOG 373. Introduction to Remote Sensing  
4 Credits (3+3P)  
Introduction to the theory, techniques, and applications of remote sensing. Topics include electromagnetic radiation; remote sensing systems; remote sensing of the biosphere, hydrosphere, atmosphere, lithosphere, and cultural landscapes. Course includes lectures and also labs focused on the basic analysis and interpretation of remote sensing products. Taught with GEOG 573.

GEOG 381. Cartography and Geographic Information Systems  
4 Credits (3+3P)  

GEOG 401. Internship/Co-op  
1-3 Credits (1-3)  
Provides an opportunity whereby students work with a local, regional, or federal agency, or private sector firm on applied geographic work, under the supervision of an agency or firm professional and a geography faculty member. Consent of instructor required.

GEOG 435. Environmental Planning  
3 Credits (3)  
Exploration of planning tools that advance the management of land and water resources, meeting current societal needs, while also minimizing damage to nature and society. Class activities include applied exercises that explore contemporary planning issues, including land conservation, natural hazards, biophysical analysis, water resource management, Federal land issues, and remediation of Superfund sites. Taught with GEOG 535.

GEOG 441. System Design for Geographic Information Science (GIS)  
3 Credits (3)  
A critical aspect of GIS is its ability to provide the necessary products within the organization in which it is implemented. This is an in-depth analysis of currently accepted system design methodologies intended to create a successful implementation of GIS inside organizations. Crosslisted with: GEOG 581.

GEOG 452. Landscape Ecology  
4 Credits (3+2P)  
Analysis of the structure, function and change of natural and anthropogenic landscapes. Patches, corridors, matrix and network, spatial organization, landscape dynamics, and role of disturbance in overall functioning of landscapes. Role of landscape heterogeneity in landscape management. Crosslisted with: GEOG 552.

GEOG 455. Southwest Environments  
3 Credits (3)  
The U.S. Southwest: physical and human geography, coupled human-environment interactions, causes and consequences of environmental issues, and implications for sustainable development. Taught with GEOG 555.

GEOG 467. Transportation Geography  
3 Credits (3)  
Nature and distribution of land, air and water transport facilities and their importance in regional development.  
Prerequisite(s): C- or better in GEOG 120G.

GEOG 472. Soil Morphology and Classification  
4 Credits (2+2P)  
Same as SOIL 472. Crosslisted with: SOIL 472.

GEOG 473. Advanced Remote Sensing  
4 Credits (3+3P)  
Introduction to advanced topics in digital image processing, analysis, interpretation, and visualization. Topics include geometric and radiometric correction, image enhancement, image classification, change detection, and accuracy assessment. Lectures focus on the discussion of advanced remote sensing concepts, techniques, and applications; labs are applications-oriented. Taught with GEOG 573.  
Prerequisite(s): C- or better in GEOG 373.

GEOG 481. Fundamentals of Geographic Information Science (GIS)  
4 Credits (3+3P)  
Fundamentals of computer-based systems which organize, analyze, and present spatially referenced data. Crosslisted with: GEOG 578.

GEOG 482. Geodatabase Design  
3 Credits (2+3P)  
A practical introduction to designing geodatabases. The course takes you through the eleven steps of geodatabase design divided into four stages: thematic characterization; developing the database elements, relationships and properties; capture and collection; and finally, implementation and documentation. Taught with GEOG 572.  
Prerequisite(s): C- or better in GEOG 481.

GEOG 483. Field Explorations in Geography  
3 Credits (6P)  
A field-based class where students complete exercises in physical, human, and environmental geography in the Southwest. May be offered as a two-week intensive class where students are away from Las Cruces and camping; or may be offered with weekend field trips depending on the instructor. A lab fee for transportation and other expenses is required. Taught with GEOG 583.

GEOG 488. GIS and Water Resources  
3 Credits (3)  
Explores a range of GIS tools, routines, and data structures and then applies them to a range of research questions and management issues in the area of Water Resources. The class has both a lecture and laboratory component, and students will have opportunities to explore a range of GIS tools in formal lab exercises and a project in the student area of interest. Taught with GEOG 588.

GEOG 491. Special Topics  
1-3 Credits  
Specific subjects to be announced in the Schedule of Classes. May be repeated for a maximum of 12 credits.

GEOG 492. GIS&T Applications and Modeling  
3 Credits (3)  
Group oriented class in which students conduct an applied research project in GIS application or modeling area of choice and conduct focused library research. Taught with GEOG 521.  
Prerequisite(s): C- or better in GEOG 481.
GEOG 493. Special Problem Research  
1-3 Credits  
For advanced and exceptional students. Research, and preparation of a paper in some phase of geography. A maximum of 6 credits may be earned. Consent of instructor required.

GEOG 495. Directed Readings  
1-3 Credits  
Individual study through selected readings. A maximum of 6 credits may be earned. Consent of instructor required.

GEOG 501. Research Design and History of Geographic Thought  
3 Credits (3)  
Understanding and application of the research process, including conceptualization and definition of a research problem, study designs, data sources, data collection, and report writing in development of geographic thought.

GEOG 521. GIS & T Applications and Modeling  
3 Credits (3)  
Group oriented class in which students conduct an applied research project in a GIS application or modeling area of choice and conduct focused library research. Taught with GEOG 492.

GEOG 535. Environmental Planning  
3 Credits (3)  
Exploration of planning tools that advance the management of land and water resources, meeting current societal needs, while also minimizing damage to nature and society. Class activities include applied exercises that explore contemporary planning issues, including land conservation, natural hazards, biophysical analysis, water resource management, Federal land issues, and remediation of Superfund sites. Taught with GEOG 435.

GEOG 552. Landscape Ecology  
4 Credits (3+2P)  
Analysis of the structure, function and change of natural and anthropogenic landscapes. Patches, corridors, matrix and network, spatial organization, landscape dynamics, and role of disturbance in overall functioning of landscapes. Role of landscape heterogeneity in landscape management. Taught with GEOG 452.

GEOG 553. Geomorphology  
3 Credits (2+3P)  
Examination of the principle theories and concepts of landform creation; exploration of the roles of structure, processes, climate, and time in the formation of various types of landforms. Taught with GEOG 353.

GEOG 555. Southwest Environments  
3 Credits (3)  
The U.S. Southwest: physical and human geography, coupled human-environment interactions, causes and consequences of environmental issues, and implications for sustainable development. Taught with GEOG 455.

GEOG 557. Fundamentals of Biogeography  
3 Credits (3)  
Exploration of life in space and time. Floristic and physiognomic characteristics of the Earth’s major ecosystems and their distributions; ecosystem dynamics, evolution, and physical environment. Includes an individual research project resulting in a poster presentation. Additional work for graduate students. Crosslisted with: GEOG 351.

GEOG 571. Cartography and Geographic Information Systems  
4 Credits (3+3P)  
Graduate level design and construction of thematic maps. Introduction to cartographic principles in lecture. Emphasis on map-making using GIS software in the labs. Taught with GEOG 381.

GEOG 572. Geodatabase Design  
3 Credits (2+3P)  
Graduate level introduction to designing geodatabases. The course takes you through the eleven steps of geodatabase design divided into four stages: thematic characterization; developing the database elements, relationships and properties; capture and collection; and finally implementation and documentation. Taught with GEOG 482.

GEOG 573. Introduction to Remote Sensing  
4 Credits (3+3P)  
Graduate level introduction to the theory, techniques, and applications of remote sensing. Topics include electromagnetic radiation; remote sensing systems; remote sensing of the biosphere, hydrosphere, atmosphere, lithosphere, and cultural landscapes. Course includes lectures and also labs focused on the basic analysis and interpretation of remote sensing product. Taught with GEOG 373.

GEOG 578. Fundamentals of Geographic Information Science (GIS)  
4 Credits (3+3P)  
Graduate level fundamentals of computer-based systems which organize, analyze, and present spatially referenced data. Additional work for graduate students. Crosslisted with: GEOG 481.

GEOG 581. System Design for Geographic Information Science (GIS)  
3 Credits (3)  
A critical aspect of GIS is its ability to provide the necessary products within the organization within which it is implemented. This is an in-depth analysis of currently accepted planning methodologies designed to create a successful implementation of GIS inside organizations. Taught with GEOG 441.

GEOG 582. Advanced Remote Sensing  
4 Credits (3+3P)  
Graduate level introduction to advanced topics in digital image processing, analysis, interpretation, and visualization. Topics include geometric and radiometric correction, image enhancement, image classification, change detection, and accuracy assessment. Lectures focus on the discussion of advanced remote sensing concepts, techniques, and applications; labs are applications-oriented. May be repeated up to 4 credits.

GEOG 583. Field Explorations in Geography  
3 Credits (6P)  
A graduate level field-based class where students complete exercises in physical, cultural, and environmental geography in the Southwest. May be offered as a two-week intensive class where students are away from Las Cruces and camping; or may be offered with weekend field trips depending on the instructor. A lab fee for transportation and other expenses is required. May be repeated up to 3 credits.

GEOG 585. Advanced Spatial Analysis  
3 Credits (3+2P)  
Introduction to basic spatial and aspatial descriptive statistics, statistical analysis of point and area patterns, critical review of quantitative research in geography, and exploration of advanced spatial analysis routines including cluster analysis, hot/cold spot analysis, and spatially weighted regression.  
Prerequisite(s): Knowledge of basic statistics recommended.
GEOG 588. GIS and Water Resources
3 Credits (3)
This is a graduate level class that explores a range of GIS tools, routines, and data structures and then applies them to a range of research questions and management issues in the area of Water Resources. The class has both a lecture and laboratory component, and students will have opportunities to explore a range of GIS tools in formal lab exercises and a project in the student's area of interest. Taught with GEOG 488.

GEOG 595. Directed Readings
1-3 Credits
Advanced individual study through selected readings. May be repeated for a maximum of 6 credits.

GEOG 596. Residency
1-12 Credits (1-12)
A contractual learning experience in the public or private sector under the supervision of a field supervisor and two faculty members. May be repeated up to 12 credits. Consent of Instructor required. Restricted to: Geography majors.

GEOG 598. Selected Topics
1-3 Credits
Readings, discussions, lectures or laboratory studies of selected geographic themes. May be repeated for unlimited credit.

GEOG 599. Master's Thesis
1-12 Credits (1-12)
Supervised individual study of a student's thesis topic. May be repeated for an unlimited number of credits. Thesis/Dissertation Grading.

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