

- WLSC 466. Advanced Wildlife Management- Mammals 3 cr.  
Ecological principles, production and harvest, habitat management, and techniques of mammal management.
- WLSC 482. Ichthyology 3 cr. (2+2P)  
Classification, morphology, identification, physiology, life history, and ecology of fishes. Prerequisite: WLSC 230 or consent of instructor.
- WLSC 488. Communicating Wildlife Resource Conservation in Society 3 cr.  
Multi-disciplinary interactive forum in wildlife conservation topics. Stresses communication processes that enhance thought and judgement of professionals in environmental and conservation roles. Prerequisite: senior or graduate standing or consent of instructor.
- WLSC 509. Population Ecology (s) 3 cr. (2+2P)  
Quantitative analysis of vital statistics and mechanisms promoting stability in wild populations. Theory and application of life tables and population models.
- WLSC 515. Graduate Seminar 1 cr.  
Current topics. May be repeated for unlimited credit.
- WLSC 522. Fishery and Wildlife Research Methods (f) 3 cr.  
Methods and techniques of conducting research in fishery and wildlife management to include organization of research problems; the recording, analyses, and presentation of results. Prerequisite: E ST 461 or consent of instructor.
- WLSC 529. Ecological Modeling 3 cr.  
Introduction to ecological modeling and simulation; assumes minimal mathematical background. Dynamics of populations, metapopulations, interacting populations, and consumer-resource systems. Analytical and numerical methods for exploration of deterministic and stochastic models. Prerequisite: WLSC 509 or consent of instructor.
- WLSC 532. Environmental Biology of Fishes 4 cr. (3+3P)  
What makes a fish a fish. Mechanisms of circulation, gas exchange, osmotic and ionic regulation, swimming, migration, reproduction, and chemoreception. Students are responsible for all requirements for WLSC 432 plus additional work.
- WLSC 534. Aquatic Contaminants and Toxicology 4 cr. (3+3P)  
Basic principles and methodologies of aquatic toxicity testing. Routes of exposure and modes of action. Environmental legislation and ecological risk assessment. Students are responsible for all requirements for WLSC 434 plus additional work.
- WLSC 535. Special Topics 1-4 cr.  
Specific subjects to be announced in the Schedule of Classes. Maximum of 4 credits per semester. No more than 9 credits toward a degree.
- WLSC 545. Advanced Fish and Wildlife Habitat Management (f) 4 cr. (3+2P)  
Principles and methods for managing aquatic and terrestrial habitats for use by fish and wildlife. Quantitative methods and computer programs for evaluating habitats. Field trips and use of computer programs by students are required. Prerequisite: WLSC 522 or consent of instructor.
- WLSC 547. Wildlife Law, Policy, and Administration 3 cr.  
Organization and policy of fish and wildlife management. The role of wildlife law and law enforcement in wildlife management. Field trips required. Prerequisite: consent of instructor.
- WLSC 548. Graduate Problems 1-3 cr.  
Individual studies in fishery and wildlife sciences. Maximum of 3 credits per semester. No more than 6 credits of this course and WLSC 598, combined, toward a degree.
- WLSC 555. Systems Ecology in Wildlife Management 3 cr.  
Systems approach to wildlife management including natural processes, scale, linkages, policy and field implementation. Includes case studies and required field trips. Prerequisite: WLSC 255 or consent of instructor.
- WLSC 558. Nonthesis Project 1-6 cr.  
Independent study to satisfy nonthesis project requirement. Maximum of 6 credits toward degree. Available only to nonthesis students.
- WLSC 560. Wildlife Ethology (s) 3 cr.  
Comparative vertebrate behavior including social organization, dominance, marking, territoriality, and mother/offspring relationships and their management implications. Introduction to sociobiology. Prerequisite: consent of instructor.
- WLSC 565. Advanced Management of Aquatic Systems 3 cr.  
Principles and methods for managing aquatic ecosystems. Evaluation of case histories and regional approaches for managing aquatic and riparian ecosystems. Field trips may be required. Design and analysis of a field project required. Prerequisite: consent of instructor.
- WLSC 578. Advanced Limnology (s) (a) 3 cr.  
Concepts in aquatic production ecology and analytical methods for lake and flowing waters. Prerequisite: consent of instructor.
- WLSC 585. Fish and Wildlife Planning (f) 3 cr.  
Covers planning methodologies and concepts for fishery and wildlife professionals.
- WLSC 595. Internship 1-6 cr.  
Supervised professional on-the-job learning experience. Limited to Master of Agriculture candidates. No more than 6 credits toward the degree.
- WLSC 598. Special Research Programs 1-3 cr.  
Individual investigations, either analytical or experimental. Maximum of 3 credits per semester. No more than 6 credits of this course and WLSC 548, combined, toward a degree. Not available to students in the nonthesis program.
- WLSC 599. Master's Thesis 0-88 cr.  
Thesis.

## GEOGRAPHY

Department website: <http://www.nmsu.edu/~geoweb/>  
(575) 646-3509  
jowright@nmsu.edu

*J. B. Wright, Ph.D., department head (California-Berkeley)-environmental conservation, cultural geography, American West; C. P. Brown, Ph.D. (California-Santa Barbara/San Diego State)-geographic information systems, water resources, U.S.-Mexico border environmental issues; C. L. Campbell, Ph.D. (UCLA)-biogeography, landscape ecology, remote sensing; R. J. Czerniak, Ph.D. (Colorado-Boulder)-land use and transportation planning, Europe, urban geography; M. N. DeMers, Ph.D. (Kansas)-geographic information systems, landscape ecology, geographic education; D. Dugas, Ph.D. (Oregon)-geomorphology, physical geography; L. Lacey, Ph.D. (Cornell)-regional planning.*

The Department of Geography offers graduate study leading to the Master of Applied Geography degree. A minor in GIS is also available for all graduate students, regardless of major. 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 on the 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 GRE scores and three letters of recommendation.

The basic requirement for the Master of Applied Geography is a minimum of 30 graduate credits including 6 thesis credits. A nonthesis option requires 36 graduate credits with a minimum of 3 credits of professional residency and an approved final research report. All candidates must maintain an overall GPA or 3.00 or higher. All candidates must receive a grade of B- or better in the following required courses: GEOG 501, Research Design; GEOG 585, Advanced Spatial Analysis; and one graduate-level GIS course either prior to entering the program or before graduation.

A total of at least 15 credits must be earned in courses numbered 500 and above, and at least 15 graduate credits must be in geography.

The department has a contract research laboratory (SPARC), an environmental spatial analysis lab (LESA), a computer teaching laboratory, and a physical geography wet lab. The contract research laboratory employs graduate students who work with local and state governments and research agencies, as well as with businesses on applied geography projects. The LESA laboratory conducts research on environmental issues and employs graduate and undergraduate students. Our teaching laboratory is used by graduate students for course work and short-term 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, wet lab, and field vehicle. Financial support is available to 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 advisor (ddugas@nmsu.edu). Financial aid questions should be addressed to the Office of Financial Aid at NMSU.

### GEOGRAPHY

- GEOG 453. Fluvial and Environmental Geomorphology 3 cr. (2+3P)  
An analysis of drainage basins, channel patterns, and channel geometry, and an assessment of man's impact on river regimes. Prerequisite: GEOG 353/GEOL 353 or consent of instructor. Same as GEOL 453.

- GEOG 461. U.S. Mexico Border Development** 3 cr.  
Analysis of the socioeconomic development of the U.S.-Mexican border region, including perspectives and issues from both sides of the border. Opportunities for individualized study of contemporary issues in the region. Prerequisite: GEOG 361 or consent of instructor.
- GEOG 465. Land Use and Land Rent** 3 cr.  
Techniques of land use analysis including those used to determine current and future land uses.
- GEOG 467. Transportation Geography** 3 cr.  
Nature and distribution of land, air and water transport facilities and their importance in regional development. Prerequisite: GEOG 120G or consent of instructor.
- GEOG 472. Soil Morphology and Classification** 4 cr. (2+2P)  
Same as SOIL 472.
- GEOG 477. Soil Physics** 3 cr. (2+2P)  
Same as SOIL 477.
- GEOG 481. Fundamentals of Geographic Information Systems** 4 cr. (3+3P)  
Fundamentals of computer-based systems which organize, analyze, and present spatially referenced data. Prerequisite: GEOG 281 or GEOG 381.
- GEOG 482. Digital Image Processing** 3 cr. (2+3P)  
Analysis of digital images produced from multi-spectral scanners or conversion of aerial photography. Prerequisite: GEOG 382.
- GEOG 487. GIS Practicum** 3 cr. (2+3P)  
Practical experience and problem solving with specific GIS software. Software may change from semester to semester. Prerequisites: GEOG 281 and one of the following: GEOG 381, GEOG 481, or GEOG 482.
- GEOG 491. Special Topics** 1-3 cr.  
Specific subjects to be announced in the Schedule of Classes. May be repeated for a maximum of 12 credits.
- GEOG 493. Special Problem Research** 1-3 cr.  
For advanced and exceptional students. Research, and preparation of a paper in some phase of geography. A maximum of 6 credits may be earned. Prerequisite: consent of instructor.
- GEOG 495. Directed Readings** 1-3 cr.  
Individual study through selected readings. A maximum of 6 credits may be earned. Prerequisite: consent of instructor.
- GEOG 501. Research Design and History of Geographic Thought** 3 cr.  
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 520. Soil Genesis** 3 cr.  
Same as SOIL 520.
- GEOG 521. GIS Applications** 3 cr.  
Group oriented class in which students conduct applied research in a Geographic Information Science application area of choice and conduct focused library research. Prerequisite: GEOG 481, or consent of instructor.
- GEOG 552. Landscape Ecology** 3 cr.  
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. Prerequisite: either GEOG 351, BIOL 301, or other basic ecology course or consent of instructor. Same as BIOL 552.
- GEOG 553. Applied Geomorphology** 3 cr. (2+3P)  
Geomorphic concepts applied to human activities that affect landforms. Prerequisite: GEOG/GEOL 353 or GEOG/GEOL 453 or consent of instructor. Same as GEOL 553.
- GEOG 557. Biogeography** 3 cr.  
Global distributions of plants and animals: their origins, radiations, and factors controlling distribution.
- GEOG 581. GIS Modeling and System Design** 3 cr.  
Advanced cartographic modeling including both descriptive and prescriptive models. GIS system design including product level design, database design, legal and institutional considerations, system life span, modeling needs and final system implementation. Prerequisites: GEOG 481 or consent of instructor.
- GEOG 582. Advanced Digital Image Processing** 3 cr. (2+3P)  
Advanced analysis of digital images produced from a variety of multi-spectral scanners, sensors and aerial photography. Prerequisite: GEOG 382 or consent of instructor.
- GEOG 584. Seminar in Geographic Information Science** 3 cr.  
Selected topics in geographic information science research and applications. Prerequisite: graduate students only.
- GEOG 585. Advanced Spatial Analysis** 3 cr.  
Statistical analyses of point and areal patterns. Emphasis on quantitative research in geography. Prerequisite: STAT 251 or E ST 311; or consent of instructor.
- GEOG 587. Advanced Topics in Geographic Information Science** 3 cr.  
Current research in Geographic Information Science (GIS) through lecture, article review, discussion, and hands-on exercises. Topics variable but typically include alternative logics, expert systems, open GIS, visualization, computational geography, and interoperability.
- GEOG 595. Directed Readings** 1-3 cr.  
Advanced individual study through selected readings. May be repeated for a maximum of 6 credits.
- GEOG 596. Residency** 3-12 cr.  
A contractual learning experience in the public or private sector under the supervision of a field supervisor and two faculty members. Restricted to majors. PR/U grading only.
- GEOG 597. Seminar in Advanced Digital Imagery** 3 cr.  
Supervised group study of geospatial techniques using advanced digital imagery. May be repeated for a maximum of 6 credits when topics change. Prerequisite: Graduate standing or consent of instructor.
- GEOG 598. Selected Topics** 1-3 cr.  
Readings, discussions, lectures or laboratory studies of selected geographic themes. May be repeated for unlimited credit.
- GEOG 599. Master's Thesis** 0-88 cr.  
Supervised individual study of a student's thesis topic. Prerequisite: consent of instructor. May be repeated for an unlimited number of credits. Restricted to majors.

## PLANNING

- PLAN 465. Public Land Analysis** 3 cr.  
Description of federal and state land holdings. Analysis of how these lands are used and planned.
- PLAN 475. Transportation Planning** 3 cr.  
Basic concepts in transportation planning, travel-demand forecasting, trip-distribution and modal split analysis. Transport-related land use models. Transportation technology. Strategic transport planning processes. Consent of instructor.
- PLAN 491. Special Topics** 1-3 cr.  
Specific subjects to be announced in the Schedule of Classes. May be repeated for a maximum of 12 credits.
- PLAN 493. Special Problem Research** 1-3 cr.  
For advanced and exceptional students. Research paper in some phase of city and/or regional planning. Maximum of 6 credits. Prerequisite: consent of instructor.
- PLAN 495. Directed Readings** 1-3 cr.  
Individual study through readings. A maximum of 6 credits may be earned. Prerequisite: consent of instructor.

## GEOLOGICAL SCIENCES

Department website: <http://www.nmsu.edu/~geology/>  
(575) 646-2708  
tlawton@nmsu.edu

*T. F. Lawton, department head, Ph.D. (Arizona)-stratigraphy, basin analysis; J. M. Amato, Ph.D. (Stanford)-structural geology, tectonics; K.A. Giles, Ph.D. (Arizona)-carbonate sedimentology, paleontology; T. H. Giordano (Emeritus), Ph.D. (Penn State-University Park)-geochemistry, ore deposits; G. F. Huff, Ph.D. (Louisiana State)-geohydrology, low-temperature geochemistry; W. E. King (Emeritus), Ph.D. (Wisconsin)-invertebrate paleontology; G. H. Mack, Ph.D. (Indiana-Bloomington)-sedimentary petrology, sedimentology; N. J. McMillan, Ph.D. (Southern Methodist)-igneous petrology; W. R. Seager (Emeritus), Ph.D. (Arizona)-structural geology, tectonics*

The Department of Geological Sciences offers graduate study leading to the Master of Science degree in geology. Admission to the program is in accord with the general regulations of the Graduate School. Admission to this program without deficiency is based on an undergraduate program essentially equivalent to that pursued by a geology major at this university. The Graduate Record Examination (verbal and quantitative only) is required. A candidate for a master's degree must complete a minimum of 30 graduate credits, including 6 credits for thesis. Early selection of a research adviser is encouraged. A thesis proposal