GEOGRAPHY & ENVIRONMENTAL STUDIES

Academic Programs

The Department of Geography & Environmental Studies offers several undergraduate, master's, and doctoral degrees as well as minors in Geography, Environmental Studies, and Geographic Information Science and Technology (GIS&T):

Bachelor Degrees

- Bachelor of Science in Geography (Environmental Studies) (https://catalogs.nmsu.edu/nmsu/arts-sciences/geography/geography-environmental-studies-bachelor-science/)
- Bachelor of Science in Geography (Geographic Information Science and Technology) (https://catalogs.nmsu.edu/nmsu/arts-sciences/geography/geography-gis-tech-bachelor-science/)

Master Degrees

- Master of Applied Geography (https://catalogs.nmsu.edu/nmsu/graduate-school/geography-master-applied-geography/)
- Master of Science in Geographic Information Science and Technology (Online) (https://catalogs.nmsu.edu/global/nmsu-global/geographic-information-science-technology-ms-online/)

Doctoral Degree

- Doctor of Philosophy in Geography (https://catalogs.nmsu.edu/nmsu/graduate-school/geography-doctor-philosophy/)

Undergraduate Minors

- Undergraduate Minor in Geography (https://catalogs.nmsu.edu/nmsu/arts-sciences/geography/geography-undergraduate-minor/)
- Undergraduate Minor in Geographic Information Science and Technology (https://catalogs.nmsu.edu/nmsu/arts-sciences/geography/geographic-information-science-technology-undergraduate-minor/)

Graduate Minor

- Graduate Minor in Geographic Information Science and Technology (https://catalogs.nmsu.edu/nmsu/graduate-school/geographic-information-science-technology-graduate-minor/)

For more information about these degrees and minors, follow the links above or explore the Degrees and Minors tabs on this webpage.

Interdisciplinary Learning & Career Pathways

Students in the Department of Geography and Environmental Studies have the flexibility to tailor their studies to their interests. While some specialize in one particular area, many integrate concepts and methods from Geography, Environmental Studies, and GIS&T to develop interdisciplinary solutions to complex challenges.

Geography
As a broad and integrative field, geography examines how human activities, natural processes, and their interactions shape the world across space and time. Through critical and spatial thinking and qualitative, quantitative, and mixed-methods approaches, students develop the expertise to address pressing challenges such as environmental degradation, climate change, natural disasters, public health crises, and economic and social inequality. Graduates pursue careers in government, academia, private industry, and non-profit organizations in fields related to Environmental Studies, GIS&T, and beyond.

Environmental Studies
This concentration integrates insights from the natural sciences, social sciences, and humanities to address environmental challenges. Students develop expertise in critical, qualitative, and creative research methods, preparing for careers in fields such as environmental consulting, policy, education, outreach, advocacy, conservation, and sustainability.

GIS&T
This concentration focuses on the collection, analysis, and visualization of geospatial data using cutting-edge technologies. Students learn to apply GIS, remote sensing, and spatial analysis and modeling to tackle human and environmental challenges, preparing for careers in fields such as urban and regional planning, cultural and natural resources management, emergency management, data and information management, and public health.

Course Offerings Across Subfields

Students in the Department of Geography & Environmental Studies can choose from a wide range of courses in physical geography, human geography, regional geography, environmental studies, and GIS&T, tailoring their educational journey to align with their individual interests and career goals.

Physical Geography
This field examines Earth's natural processes—such as plate tectonics, weather patterns, and ecological interactions—and how they shape landscapes and influence life on Earth. Students explore diverse topics through courses like Geomorphology, Weather & Climate, and Biogeography, which focus on landforms and surface processes, atmospheric dynamics, the distribution of plants and animals, and more.

Human Geography
This field examines how people shape—and are shaped—by the world around them. Students explore diverse topics through courses like The City, Cultural Geography, and Challenges and Opportunities of Globalization, which focus on urban life and development, concepts of place and landscape, cultural exchange and regional disparities, and other key societal dynamics.

Regional Geography
This field bridges human and physical geography by examining the unique characteristics of places and regions. It explores how landscapes, cultural identities, economies, and political systems interact across geographic areas, helping to understand human-environment relationships at multiple spatial and temporal scales. Students can engage with these concepts through courses focusing on regions such as Latin America, Europe, and New Mexico and the American West.

Environmental Studies
This field focuses on the complex relationships between humans and the environment, emphasizing topics like environmental change, conservation, and sustainability. Students examine how natural and social systems interact, exploring issues such as land use, environmental policy, and ecosystem management. Courses like Planning a Sustainable World, Field Explorations, and U.S. National Parks provide applied learning opportunities to analyze real-world environmental challenges, study conservation strategies, and engage with landscapes ranging from urban green spaces to protected wilderness areas.

GIS&T
This field focuses on the collection, analysis, modeling, and visualization of spatial data to solve complex human and environmental challenges. Students gain expertise in geospatial data, methods, and technologies applicable across disciplines. In courses such as Cartography & GIS, Fundamentals of GIS, Remote Sensing, Programming, and Spatial Analysis and Modeling, students develop theoretical and technical proficiency through lab exercises and independent research projects tailored to their interests—whether in the natural sciences, social sciences, engineering, or beyond.

For more information about course offerings, visit the Courses tab on this webpage.

Research & Applied Learning Resources

To support students' educational and research needs, the Department of Geography & Environmental Studies maintains a computer teaching laboratory and the Spatial Applications Research Center (SpARC), a grants and contracts research lab. Both are equipped with state-of-the-art workstations running a wide array of specialized software packages. The Department also provides access to unoccupied aerial systems (drones), a field spectroradiometer, survey-grade GPS units, and other advanced equipment to support research and applied learning. Additionally, strong collaborations with campus units such as the Water Resources Research Institute and Jornada Experimental Range offer students valuable opportunities for inter-, multi-, and transdisciplinary research.

A Supportive & Engaging Community

The Department of Geography & Environmental Studies is more than just a place to learn—it's a community. Through student organizations, departmental events, and close faculty mentorship, we foster an environment where students feel supported both academically and personally. Whether participating in research symposiums, networking with professionals, or joining student groups, students have opportunities to connect, collaborate, and grow. We are committed to providing an inclusive and welcoming space where students from all backgrounds can find their place, pursue their passions, and thrive.

Mission, Vision, & Core Values

Mission
The Department of Geography & Environmental Studies applies holistic and integrative approaches in geography, environmental studies, and geographic information science and technology to advance human and environmental well-being in our local community, state, and beyond. We embrace student-centered, inclusive, collaborative, ethical, and positively impactful scholarship and creative activities, teaching and mentoring, service, and outreach.

Vision
We envision a future where human and environmental well-being thrives in our local community, state, and beyond.

Core Values
We are guided by a commitment to fostering an inclusive and impactful learning environment that supports both human and environmental well-being. Our core values are student-centered learning, human and environmental well-being, collaboration and teamwork, belonging and inclusion, and integrity and ethical practice.

More Information

For more information about programs, faculty, funding opportunities, scholarships, student organizations, and more in the Department of Geography and Environmental Studies, please visit the departmental website (https://geography.nmsu.edu/).

Bachelor Degree(s)

- Geography (Environmental Studies) - Bachelor of Science (https://catalogs.nmsu.edu/nmsu/arts-sciences/geography/geography-environmental-studies-bachelor-science/)
- Geography (Geographic Information Science and Technology) - Bachelor of Science (https://catalogs.nmsu.edu/nmsu/arts-sciences/geography/geography-gis-tech-bachelor-science/)

Master Degree(s)

- Geographic Information Science and Technology - Master of Science (Online) (https://catalogs.nmsu.edu/global/nmsu-global/geographic-information-science-technology-ms-online/)
- Geography - Master of Applied Geography (https://catalogs.nmsu.edu/nmsu/graduate-school/geography-master-applied-geography/)

Doctoral Degree(s)

- Geography - Doctor of Philosophy (https://catalogs.nmsu.edu/nmsu/graduate-school/geography-doctor-philosophy/)

Minor(s)

- Geographic Information Science and Technology - Graduate Minor (https://catalogs.nmsu.edu/nmsu/graduate-school/geographic-information-science-technology-graduate-minor/)
- Geographic Information Science and Technology - Undergraduate Minor (https://catalogs.nmsu.edu/nmsu/arts-sciences/geography/geographic-information-science-technology-undergraduate-minor/)
- Geography - Undergraduate Minor (https://catalogs.nmsu.edu/nmsu/arts-sciences/geography/geography-undergraduate-minor/)

Department Faculty

Academic Department Head Dr. Michaela Buenemann, Professor

Professors *Brown, Buenemann;* ***Associate Professors*** Campbell, Magrane; ***Assistant Professors*** Dugas, Fan; ***Visiting Assistant Professors*** Standen; ***Professors Emeriti*** Czerniak, DeMers, Wright

C. P. Brown, Ph.D. (University of California, Santa Barbara / San Diego State University) – US-Mexico and US-Canada border environment and water resources research, GIS, comparative environmental analysis*; M. Buenemann, Department Head, Ph.D. (University of Oklahoma)* – remote sensing, GIS, spatial modeling, human-environment geography, land system science, landscape ecology, drylands*; C. L. Campbell, Ph.D. (University of California, Los Angeles)* – biogeography, ecology, avian ecology, GIS, sustainability, national parks, human-environment relationships*; D. Dugas, Ph.D. (University of Oregon)* – geomorphology, landscape ecology, paleoclimate and climate change, geographic education*; Chao Fan, Ph.D. (Arizona State University)* – GIScience, spatial analysis and modeling, remote sensing, climate change, land cover land use change; *E. Magrane, Ph.D. (University of Arizona)* – climate & culture, art & environment, human-environment geography, geopoetics, geohumanities, critical methodologies*.; A Standen, Ph.D. (University of Colorado Boulder)* - environmental history, hurricanes and disaster events,

history of energy, agriculture, political ecology, environmental justice, social movements.

Professors Emeriti: R. J. Czerniak, Ph.D. (University of Colorado, Boulder) – land use and transportation planning, Europe, urban geography; *M. N. DeMers, Ph.D. (University of Kansas)* – geographic information science, landscape ecology, geographic education*; J. B. Wright, Ph.D. (University of California, Berkeley)* – environmental conservation, cultural geography, American West.

Geography Courses

GEOG 1110G. Physical Geography
4 Credits (3+3P)
This course introduces the physical elements of world geography through the study of climate and weather, vegetation, soils, plate tectonics, and the various types of landforms as well as the environmental cycles and the distributions of these components and their significance to humans.
Learning Outcomes
1. Define, describe, illustrate, distinguish among or explain the use of maps, map scale, globes, map projections, and remote sensing.
2. Define, describe, illustrate, distinguish among or explain the various elements of the earth's atmosphere, earth's relation to the sun, incoming solar radiation, the ozone layer, the primary temperature controls, and the unequal heating of land and water.
3. Define, describe, illustrate, distinguish among or explain the weather makers (air temperature, air pressure, humidity, clouds, precipitation, visibility, and wind [including pressure gradient, the Coriolis force, and friction]).
4. Define, describe, illustrate, distinguish among or explain air masses, pressure systems, the various fronts and associated types of storms, weather symbols, monsoons, the various forms of precipitation, along with causes and effects of lightning.
5. Define, describe, illustrate or explain the hydrologic cycle, the characteristics and influences of the oceans and continents on the weather, the Southern Oscillation (i.e., El Nino), the effects of land/water distribution, and climates and their global distribution.
6. Define, describe, illustrate or explain the biosphere, including organisms (flora and fauna), food chains, ecosystems and relationships. Define, describe, illustrate or explain soils in terms of soil-forming processes, components, properties, and classification.
7. Define, describe, illustrate or explain the structure of the earth, the internal processes, weathering and mass wasting, fluvial processes, characteristics and processes of arid regions, processes of coastal and Karst topographical regions, the processes and characteristics of glaciation (mountainous and continental).
8. Define, describe, illustrate, distinguish among or explain specific impacts by humans on weather, climate, and on the ecosystem at large.
9. Perform tests and collect data to analyze and classify weather, climate and landforms characteristics, processes, and impacts both quantitatively and quantitatively. This includes reading and extracting basic information from maps, diagrams, remote sensing devices, graphs, and tables. 1
10. Apply critical thinking skills such as inductive, deductive, and mathematical reasoning to solve problems using the scientific method. This includes interpreting maps, graphs and photos. 1
11. Recognize and discuss the effect of human activity on climate, climate change, the greenhouse effect, and on landforms at large. 1
12. Synthesize information from external, current sources and personal observations and discuss their relationships to class material.

GEOG 1115G. Maps and GIScience
3 Credits (3+3P)
Explore the principles of Geographic Information Science (GIScience) and its applications in solving human, natural, and socio-environmental challenges. Learn to evaluate geospatial data and technologies; analyze their significance, implications, and applications; and communicate insights effectively. Topics include map use, spatial data analysis, Geographic Information Systems (GIS), remote sensing, and Global Navigation Satellite Systems (GNSS).
Corequisite: GEOG 1115L.
Learning Outcomes
1. Explain key concepts and methods of geographic information science (GIScience).
2. Articulate the significance of geographic information in decision-making processes that address human, natural, and socio-environmental challenges.
3. Evaluate the ethical, socio-environmental, and legal implications of geospatial data, technologies, and applications.
4. Evaluate spatial and aspatial data to assess human, natural, and socio-environmental problems, as well as potential solutions.
5. Communicate effectively in written and oral formats.

GEOG 1115L. Maps and GIScience Laboratory
1 Credit (1P)
Gain hands-on field and laboratory experience with geospatial tools, including Geographic Information Systems (GIS), remote sensing, and Global Navigation Satellite Systems (GNSS). Manage, collect, analyze, interpret, and visualize spatial data to solve real-world problem, and develop your own GIScience research report.
Corequisite: GEOG 1115G.
Learning Outcomes
1. Collect spatial and aspatial data using various web and mobile apps.
2. Apply spatial and aspatial quantitative methods for data management, visualization, analysis, interpretation, and spatial problem-solving.
3. Create functional and aesthetically pleasing maps.
4. Develop a GIScience research report.
5. Communicate effectively in written and oral formats.

GEOG 1120G. 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.
Learning Outcomes
1. Identify, describe, illustrate, distinguish among or explain the basic concepts of geography, the major world regions, areal differences and similarities, the processes that shape geography natural and human, the use of maps, and the key topics of geographical interpretation (e.g., location, world importance, population, political status, resources, etc.).
2. Identify, describe, illustrate, distinguish among or explain the regional groups of Europe, its historical background, its languages and religions, major features, the diversified economy, political structures, and impact on globalization.
3. Identify, describe, illustrate, distinguish among or explain the regional groups of Russia and its satellite nations, its historical background,

their languages and religions, major features, their diversified economies, political structures, current problems, and impact on globalization.

4. Identify, describe, illustrate or explain the regional nations of Middle East, their historical background, their languages and religions, the major features, the diversified economies and political structures, the current problems.
5. Identify, describe, illustrate, distinguish among or explain the regional groups of Asia, their historical background its languages and religions, major features, the diversified economy and political structures, current problems, and impact on globalization.
6. Identify, describe, illustrate, distinguish among or explain the regional groups of the Pacific World, their historical background its languages and religions, major features, the diversified economy and political structures, current problems, and impact on globalization.
7. Identify, describe, illustrate, distinguish among or explain the regional groups of Africa, their historical background its languages and religions, major features, the diversified economy and political structures, current problems, and impact on globalization.
8. Identify, describe, illustrate, distinguish among or explain the regional groups of Latin America, their historical background its languages and religions, major features, the diversified economy and political structures, current problems, and impact on globalization.
9. Identify, describe, illustrate, distinguish among or explain the regional groups of Anglo-America, their historical background its languages and religions, major features, the diversified economy and political structures, current problems, and impact on globalization. 1
10. Collect data to analyze or classify the region various historical developments and trends relating to globalization 1
11. Apply critical thinking skills in predicting future developments and impacts in economics, cultural diversity, and political stability globally. 1
12. Recognize and discuss current political "hot-spots," their causes, and potential results with regards to globalization. 1
13. Synthesize information the data into a comprehensive world-view.

GEOG 1130G. Human Geography
3 Credits (3)
This course serves as an introduction to the study of human geography. Human geography examines the dynamic and often complex relationships that exist between people as members of particular cultural groups and the geographical "spaces" and "places" in which they exist over time and the world today.
Learning Outcomes
1. Locate on maps, globes, and other technologies various geo-political spaces and places around the world, including in the United States.
2. Describe the primary concepts, theories, methods and terms prevalent in the field of human geography.
3. Apply core geographic concepts to the spatial patterns demonstrated in real-world scenarios.
4. Identify the relationships that influence human-environmentinteraction in a specific location at a specific time.
5. Define and utilize key concepts to explain human social and cultural change over time and across geographical space.
6. Explain the geographic context of a current event or conflict.
7. Identify a current event that illustrates a core cultural geographic concept.
8. Think critically, discuss, and write about the relationships of the natural world to human geography.

GEOG 1150G. Introduction to Environmental Studies
3 Credits
This course provides an introduction to core environmental issues and how these have been debated over time. In the process, it is intended to help you read critically, write effectively, and to reflect on your own environmental concerns in relation to the analytical as well as the cultural, social, and political perspectives that have been brought to bear on environmental issues over time. Through extensive exposure to environmental issues, solutions, and institutions, the course will help prepare you for a professional career relating to environmental management and policy.
Learning Outcomes
1. Survey the major environmental issues facing humankind.
2. Assess the conflicts or perceived conflicts between society and the environment.
3. Evaluate the relationships between the environment and the economy.
4. Analyze potential solutions.
5. Develop clear and effective communicators skills.

GEOG 2130. Map Use and Analysis
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 2996. Special Topics
1-3 Credits
Specific subjects to be announced in the Schedule of Classes. May be repeated for a maximum of 12 credits.
Learning Outcomes
1. Varies

GEOG 315V. World Agriculture and Food Problems
3 Credits (3)
This course examines key concepts and issues relevant to the world's food production systems. Topical highlights include the causes and consequences of hunger, agriculture's economic and environmental significance, sustainable development, biotechnology, and globalization of agricultural markets. As students learn about these issues from both local and global perspectives, they are engaged in the development of both their literacy of economic concepts and their core research and communication skills. We do this through a combination of relevant course readings, in class discussion exercises, and focused writing assignments on current issues of relevance. May be repeated up to 3 credits.
Learning Outcomes
1. Integrate conceptual and systems thinking and design.
2. Assess the nutrition and healthfulness of food choices.
3. Describe structure and function of food and agricultural systems.
4. Analyze roles of and relationships between food producers, consumers, and policy makers.
5. Apply basic economic concepts to describe and interpret food and agricultural issues.

GEOG 325V. New Mexico and the American West
3 Credits (3)
Discover the diverse landscapes, histories, and human-environment interactions that define New Mexico and the American West. In this

course, we examine the historical, cultural, political, economic, and environmental forces that have shaped the region, from Indigenous histories and colonial legacies to contemporary land use, sustainability challenges, and climate impacts. Through critical discussions, landscape interpretation, and geographic inquiry, we will explore how people and the environment have co-evolved in the West, how narratives and representations influence conceptions of the region, and how modern challenges continue to shape its present and future. By the end of the course, you will develop a deeper understanding of the complex and contested landscapes of the West and the forces that shape this iconic region.

Learning Outcomes

1. Discuss the human and physical geography of New Mexico and the American West.
2. Critically examine definitions and narratives of the American West.
3. Evaluate contemporary environmental and cultural challenges in the West.
4. Critically interpret the landscapes of the West.

GEOG 326. U.S. National Parks
3 Credits (3)

Explore the U.S. public lands system, where conservation, history, and public access intersect. We will examine the evolution, purpose, and management of national parks, investigating how they preserve geological, ecological, and cultural resources while addressing complex environmental and social challenges. Through discussions and case studies, we will analyze the cultural, social, political, economic, and environmental forces that shape national parks today. The course culminates in an independent research or creative project, allowing you to dive deep into a parks-related topic of your choice and share your findings in a compelling and meaningful way.

Learning Outcomes

1. Discuss the history and current structure of the U.S. public lands system.
2. Describe the diverse physical landscapes represented in U.S. National Parks and their value to human and environmental well-being.
3. Explain the social, cultural, political, and economic role and function of national parks and protected places.
4. Evaluate current challenges related to parks and conservation and how critical spatial and place-based perspectives and methods might help meet those challenges.
5. Communicate an independent research or creative project on a parks-related topic through written, verbal, visual, digital, or multimedia formats.

GEOG 328V. Environment and Society of Latin America
3 Credits (3)

This course takes you on an exciting journey through Latin America, examining how geography shapes the environment, culture, and society of the region. You'll dive into the dynamic interplay between natural landscapes and human development, exploring everything from environmental issues to socioeconomic challenges. Through case studies and real-world examples, we'll tackle pressing topics like urban growth, resource management, climate change, and political conflict. Whether you're interested in sustainability, culture, or global economics, this course will provide a deeper understanding of Latin America's unique challenges and its role in the world today.

Learning Outcomes

1. Analyze how societal and environmental patterns vary across Latin American countries and regions.
2. Evaluate how globalization, development, and other factors shape societies and environments of Latin America.
3. Discuss strategies for addressing contemporary societal and environmental challenges in Latin America.
4. Critically evaluate diverse perspectives on environmental and societal challenges in Latin America using evidence-based reasoning.
5. Communicate challenges and opportunities in human-environment dynamics across Latin America's through clear, structured writing and discussion.

GEOG 331V. Environment and Society of Europe
3 Credits (3)

Join us on an in-depth exploration of Europe as both a physical place and a cultural idea. This course examines the interplay between physical landscapes, environmental dynamics, economic systems, social structures, and political institutions that shape the region. We will critically assess what defines Europe as a region, its historical and contemporary transformations, and the role of the European Union (EU) in addressing key challenges. Through critical discussions, geographic analysis, and hands-on assignments, you will engage with current regional and international issues, including migration, climate change, economic disparities, and political shifts. By the end of the course, you will not only develop a strong understanding of Europe's geography but also gain the skills to analyze its evolving identity and global significance.

Learning Outcomes

1. Critically evaluate conceptions of Europe as both a physical place and a cultural idea.
2. Explain the importance of the major countries, cities, and physical features of Europe.
3. Analyze major regional and international issues facing Europe today.
4. Evaluate the European Union (EU) and current challenges to its stability and influence.
5. Apply knowledge of Europe through a variety of forms, including critical discussions on contemporary issues, a writing assignment, and a plan for a detailed European trip.

GEOG 351. Biogeography
3 Credits (3)

Unravel the mysteries of life's distribution across the planet! In this course, you will explore how species and ecosystems are shaped by time, space, and environmental forces. From deserts to rainforests, you'll investigate the factors driving biodiversity patterns, species dispersal, and ecosystem dynamics. Along the way, you'll examine how evolution, climate, and human influences shape life on Earth. Expect hands-on learning, interactive discussions, and an independent research project culminating in a presentation of your findings. By the end of the course, you'll have a deeper appreciation for the forces that shape life on Earth—and the tools to start exploring them yourself!

Learning Outcomes

1. Analyze how species move, adapt, and survive across diverse environments, from islands to mountaintops.
2. Explain how Earth's history—plate tectonics, climate shifts, and extinctions—has shaped global biodiversity.
3. Evaluate why some places are bursting with life while others have extreme or limited biodiversity, using key biogeographic principles.
4. Apply real-world data and tools, including satellite imagery, geographic information systems, and field data, to study species distributions.

5. Conduct independent research on a biogeographic topic of your choice, culminating in a written and verbal presentation.

GEOG 353. Geomorphology
3 Credits (2+3P)
This course examines the principal theories and concepts of landform creation through an exploration of the roles of structure, processes, climate, and time.
Learning Outcomes
1. Outline the basic history of geomorphic theory and research methods.
2. Describe the trends and probable causes of Cenozoic climate change and its links to basic landform processes.
3. Describe the main landform processes including weathering, soil formation, hillslope evolution and associated natural hazards, fluvial processes, arid land processes, glacial/interglacial climates and processes.
4. Integrate field observations into basic landscape evolution reconstructions.
5. Conduct a fluvial system experiment, incorporating experimental design, implementation, and data analysis.

GEOG 357. Weather & Climate: Earth's Dynamic Atmosphere
3 Credits (3)
From basic atmospheric processes to paleoclimate analysis and modern forecast modeling, from local-to-global, we will investigate climate's influences on natural environments, cultures, economics, politics, the characteristics of regional climates, and issues of global climate change.
Learning Outcomes
1. Explain fundamental atmospheric processes that drive weather patterns and climate systems.
2. Evaluate the evidence for climate change, including historical climate data and modern forecasting models.
3. Integrate perspectives from the natural sciences, social sciences, and humanities to assess the influences of climate on nature and society from local to global scales.
4. Apply knowledge of climate dynamics to current global issues, including environmental policies, sustainability practices, and climate adaptation strategies.

GEOG 361V. Challenges and Opportunities of Globalization
3 Credits (3)
This course takes a deep dive into how globalization shapes our world—creating both exciting opportunities and serious challenges. From booming cities to struggling communities, we'll uncover why some places thrive while others get left behind. But globalization isn't just about uneven development—it's also about innovation, cultural exchange, and creative solutions to pressing global issues. Through engaging discussions, thought-provoking readings, and short writing assignments, we'll connect economic geography to real-world events, giving you new ways to understand and navigate our interconnected world.
Learning Outcomes
1. Analyze the economic, political, and cultural forces driving globalization.
2. Evaluate how globalization contributes to both uneven development and regional disparities.
3. Discuss how globalization fosters regional opportunities, innovation, and cultural exchange in response to global challenges.
4. Assess the impacts of competing economic models and trade approaches on sustainability, equity, and human and environmental well-being.
5. Communicate well-reasoned perspectives on globalization's challenges and opportunities through writing and discussion.

GEOG 363V. Culture, Nature, and the Environment
3 Credits (3)
In this course, we will explore the interactions between geography and culture, and dive into key cultural geographic concepts such as landscape, place, nature, and environment. We will consider multiple ways of doing cultural geography, focusing on cultural geography as both a critical and creative practice. We will especially emphasize the cultural geography tradition, critical cultural geographies, and cultural geography and creativity.
Learning Outcomes
1. Describe critical approaches to the cultural geographic concepts of landscape, place, space, nature, and environment
2. Analyze contemporary cultural geographic approaches to topics such as place and capitalism, place and nature, environmental narratives, and the Anthropocene
3. Articulate the connections between geography and artistic/literary practices.
4. Develop essays, discussions, story maps, and/or visual essays to apply their own practice of cultural geography through multiple forms of output.

GEOG 365V. The City
3 Credits (3)
This course takes you on a fascinating journey through the past, present, and future of urban life, exploring how cities grow, change, and adapt in an increasingly globalized world. We'll uncover the history of urban development and compare cities across North America, South American Europe, Asia, and Africa, highlighting both their unique identities and shared transformations. You'll discover how cities are shaped—not just in their layout and design, but in how people live, work, and innovate within them. From bustling markets to cutting-edge smart cities, we'll explore the economic, social, and political forces that drive urbanization while also showcasing creative solutions to urban challenges. Whether you're curious about skyscrapers, sustainable city planning, or how neighborhoods evolve, this course will change the way you see the world's cities!
Learning Outcomes
1. Define cities from statistical, historical, cultural, economic, and political perspectives
2. Analyze how historical urban development shapes modern city form and function.
3. Evaluate how globalization, migration, transportation, technology, governance, and environmental change transform urban spaces.
4. Examine how cultural, economic, social, political, and environmental factors influence urban life and well-being.
5. Apply research and critical thinking to propose solutions for contemporary urban challenges.

GEOG 373. Introduction to Remote Sensing
4 Credits (3+3P)
Discover the exciting world of remote sensing! This course introduces the theory, methods, and real-world applications of capturing Earth from above. Explore how energy and light are used to generate stunning images of our planet from aerial and satellite platforms and learn to analyze them to uncover insights about the biosphere, hydrosphere,

atmosphere, lithosphere, and cultural landscapes. Hands-on labs and engaging lectures will guide you through the basics of analyzing and interpreting remote sensing products. Dive into the science of seeing our world in a whole new way.

Learning Outcomes

1. Explain basic remote sensing concepts, data, and methods.
2. Evaluate remotely sensed products.
3. Map built and natural environments using remote sensing data and methods.
4. Execute an original remote sensing investigation.
5. Communicate an original remote sensing investigation in written and oral formats.

GEOG 381. Cartography and GIS
4 Credits (3+3P)

Unleash your inner mapmaker! This course introduces the essential concepts and techniques of cartography and geographic information systems (GIS) through dynamic lectures and hands-on labs. Explore topics like map scale, projections, and symbolization in class, and then apply these principles to design maps that are both functional and aesthetically appealing. By the end of the semester, you'll master the science and art of creating and presenting your very own GIS mapping project—a unique blend of data, design, and storytelling that's ready to impress.

Learning Outcomes

1. Explain key cartographic concepts and methods.
2. Evaluate the content, implications, and functionality of maps.
3. Create functional and aesthetically pleasing maps.
4. Execute an original GIS mapping project.
5. Communicate an original GIS mapping project in written and oral formats.

GEOG 401. Internship/Co-op
1-3 Credits

This course provides students with hands-on experience in applied geographic work through an internship or cooperative education placement. Students will work with a local, regional, or federal agency, private-sector firm, or nonprofit organization under the supervision of both an on-site professional and a geography faculty mentor. This course allows students to apply geographic knowledge and skills in professional settings while gaining valuable career experience, networking opportunities, and practical insights into the field of geography. May be repeated up to 3 credits.

Learning Outcomes

1. Apply geographic concepts, skills, and methods to real-world challenges in a professional setting.
2. Develop professional competencies, including communication, problem-solving, and project management, in an applied geographic context.
3. Reflect on internship experiences to evaluate career interests, professional growth, and the role of geography in the workplace.

GEOG 412. Geohumanities
3 Credits (3)

In recent years, artists, writers, and humanities scholars have increasingly engaged with geographic concerns, and geographers have incorporated humanities-based approaches to their work. Broadly known as the geohumanities, these interdisciplinary endeavors offer exciting ways to engage with key geographic concepts such as place, landscape, and nature. This graduate level seminar will examine both critical and creative approaches to the geohumanities.

Learning Outcomes

1. Articulate an understanding of the geohumanities as an interdisciplinary field, including its practices and its histories that draw on geography's intersection with multiple humanities fields.
2. Identify key texts, thinkers, and practices in the geohumanities, as well as spaces (such as both scholarly and public-facing journals and digital spaces) where geohumanities work is currently being advanced and developed.
3. Engage with current debates and directions within the geohumanities.
4. Develop a creative and/or critical project that uses geohumanities approaches and advances your research/scholarly/creative interests.

GEOG 435. Planning a Sustainable World
3 Credits (3)

This course tackles the big challenges we face when imagining and building the places where we live. In addition to exploring today's most pressing issues through engaging readings, we jump into solving real-world problems. You'll explore topics like how to make sustainable development fair for everyone, how to create affordable housing, and how to design land use and transportation systems that actually work together. Plus, we'll examine ways to grow local economies and build cities that are not just livable, but truly sustainable, drawing on ideas like new urbanism and neo-traditional planning.

Learning Outcomes

1. Describe key urban planning principles and how they are applied in practice.
2. Analyze the multiple dimensions of sustainable development and their role in environmental planning.
3. Evaluate strategies for addressing contemporary urban and environmental planning challenges.
4. Critically evaluate scholarly literature on planning themes and a self-selected research topic in written and oral formats.
5. Collaborate on an applied research project to develop solutions for real-world planning scenarios.

GEOG 442. Programming for GIS
3 Credits

Unlock the power of Geographic Information Systems (GIS) with the art of programming! In this dynamic course, you'll dive into the fundamentals of GIS programming through interactive lectures and hands-on lab assignments. Discover the essentials of Python, a versatile and in-demand programming language, as you learn to process, analyze, and develop geospatial applications. Explore key tools and techniques for manipulating and analyzing geographic data while building practical skills. By the end of the semester, you'll confidently harness Python to tackle real-world geospatial challenges and take your GIS expertise to the next level.

Learning Outcomes

1. Explain fundamental rules and syntax in Python including variables, data types, flow of execution, and functions.
2. Articulate key concepts and principles in geospatial data models, processing, and analysis.
3. Use classes, functions, and modules in ArcPy to perform geospatial data processing and analysis.

GEOG 452. Landscape Ecology
3 Credits (3+3P)

This course explores the dynamic patterns and processes that shape landscapes across spatial and temporal scales. Students will investigate how natural forces and human activities interact to influence biodiversity, habitat connectivity, ecosystem services, landscape resilience, and other environmental characteristics. Through the application of geospatial tools—including GIS, remote sensing, and spatial modeling—students will assess landscape change and evaluate conservation strategies. The course culminates in an independent research project, allowing students to apply landscape ecology principles to real-world challenges and communicate their findings in engaging and impactful ways.

Learning Outcomes

1. Analyze spatial patterns and processes in landscapes using core principles of landscape ecology.
2. Evaluate how natural and human-induced processes interact to shape landscape structure and function across space and time.
3. Interpret ecological concepts that influence species distributions, ecosystem processes, and other environmental dynamics across multiple spatial and temporal scales.
4. Apply geospatial tools such as GIS, remote sensing, and spatial modeling to assess rates and patterns of landscape change and evaluate potential conservation strategies.
5. Communicate an independent applied landscape ecology research project in written, verbal, visual, digital, or multimedia formats.

GEOG 453. Geomorphology
3 Credits (2+3P)

Examination of the principal theories and concepts of landform creation; exploration of the roles of structure, processes, climate, and time in the formation of various types of landforms. Cross-listed with GEOG 553 and GEOL 353.

Learning Outcomes

1. Outline the basic history of geomorphic theory and research methods.
2. Describe the trends and probable causes of Cenozoic climate change and its links to basic landform processes.
3. Describe the main landform processes including weathering, soil formation, hillslope evolution and associated natural hazards, fluvial processes, arid land processes, glacial/interglacial climates and processes.
4. Integrate field observations into basic landscape evolution reconstructions.
5. Design and implement a fluvial system experiment and analyze the data.

GEOG 455. Southwest Environments
3 Credits (3)

This course introduces the U.S. Southwest, including its physical and human geography, coupled human-environment interactions, causes and consequences of environmental issues, and implications for sustainable development.

Learning Outcomes

1. Describe physical and human geographic patterns of the U.S. Southwest.
2. Discuss coupled human-environment interactions in the U.S. Southwest.
3. Explain how these interactions have produced a series of societal and/or ecological problems in the U.S. Southwest.
4. Assess critically the challenges and potentials of sustainability in the U.S. Southwest.

GEOG 473. Advanced Remote Sensing
4 Credits (3+3P)

Take your remote sensing skills to the next level! This course explores advanced concepts, methods, and applications in digital image processing, analysis, and visualization. Learn how to acquire, correct, enhance, transform, classify, evaluate, and interpret remotely sensed imagery to reveal insights about Earth's dynamic landscapes. Engaging lectures will introduce cutting-edge techniques, while hands-on labs provide opportunities to apply advanced image processing workflows to real-world data. The course culminates in an independent research project, allowing you to explore a remote sensing topic of your choice and present your findings in a compelling format.

Learning Outcomes

1. Explain advanced remote sensing concepts, data, and methods.
2. Employ several approaches for acquiring and preprocessing remotely sensed data.
3. Apply spectral and spatial analysis techniques to enhance and transform remotely sensed imagery.
4. Implement traditional pixel-based, object-based, spectral unmixing, AI-driven, and hybrid classification and change detection techniques for remote sensing applications.
5. Communicate an independent remote sensing research project in written, verbal, visual, digital, or multimedia formats.

GEOG 481. Fundamentals of GIS
4 Credits (3+3P)

Discover the potential of Geographic Information Systems (GIS) in this dynamic and hands-on introductory course! Whether you're passionate about mapping, solving real-world problems, or analyzing geographic data, this course will teach you how to harness the power of GIS to make an impact. You'll learn to manage, integrate, analyze, and visualize geospatial data to uncover patterns, relationships, and solutions to pressing challenges in fields like urban planning, environmental management, public health, and beyond. Using the industry-leading ArcGIS Pro software, you'll gain practical experience through engaging activities that blend theory with cutting-edge technology. Whether you're a curious beginner or looking to add GIS skills to your toolkit, this course is your gateway to mastering one of today's most versatile and in-demand technologies. Join us and see the world through a whole new lens.

Learning Outcomes

1. Describe fundamental principles, concepts, and methods underlying geographic information science.
2. Discuss map projections, datums, coordinate systems, and grid systems.
3. Use a geographic information system for management and analysis of spatial data.
4. Utilize GIS concepts, tools, and techniques to answer geographic questions.
5. Communicate the results of spatial data analysis through data visualization.

GEOG 483. Field Explorations in Geography
3 Credits (6P)

This hands-on, field-based course immerses you in the natural and cultural landscapes of the U.S. Southwest. Using geographic field methods and tools, you will document, collect, and analyze data to interpret these diverse environments. Depending on the instructor and schedule, the course may be structured as a two-week immersive field experience with camping or as a series of weekend field excursions. The course culminates in a field research project, allowing you to investigate a topic of your choice and communicate your findings in a compelling

and meaningful way. A lab fee is required to cover transportation and field expenses.

Learning Outcomes

1. Apply geographic field methods and tools to document, collect, and analyze human and environmental data.
2. Interpret physical and cultural landscapes using field observations, geospatial technologies, and geographic reasoning.
3. Communicate geographic field research findings in written, verbal, visual, digital, or multimedia formats.

GEOG 484. Qualitative, Critical, and Creative Methodologies
3 Credits (3)

This course explores qualitative, critical, and creative methodologies within human geography and related fields. We will examine epistemology, methodology, ethics, and critical reflexivity in research, as well as particular methods such as interviews, oral histories, questionnaires, participant observation, focus groups, archival research, visual methodologies, textual and discourse analysis, and arts-based approaches.

Learning Outcomes

1. Discuss the relationship between epistemology, methodology, and methods.
2. Develop a nuanced understanding of multiple critical, qualitative, and/or creative methods within human geography and related fields.
3. Demonstrate knowledge of research ethics and the role of NMSU's Institutional Review Board (IRB) in human subjects research, including through the completion of the CITI Human Subjects training.

GEOG 485. Spatial Analysis and Modeling
3 Credits (3)

Leverage the power of spatial data in this hands-on course on spatial analysis and modeling. Building on fundamental statistical concepts, you will explore a range of geospatial techniques to analyze geographic patterns, relationships, and processes. Through lectures and applied labs, you will gain experience with methods such as spatial pattern analysis, spatial interpolation, geographically weighted regression, and ecological niche modeling. Emphasis is placed on critical thinking, real-world applications, and the integration of geospatial approaches to problem-solving. The course culminates in an independent spatial investigation, in which you apply advanced analytical techniques to a topic of your choice and effectively communicate your findings in a compelling format.

Learning Outcomes

1. Explain key concepts and methods in spatial analysis and modeling.
2. Apply diverse techniques to analyze spatial data, model human and environmental processes, and predict spatial distributions.
3. Communicate findings from an original spatial analysis and/or modeling investigation in written, verbal, visual, digital, or multimedia formats.

GEOG 488. GIS for Water Resources
3 Credits (3)

This course explores the application of Geographic Information Systems (GIS) in water resource research and management. Students will work with geospatial data, methods, and technologies to address challenges such as watershed characterization, water quality and availability assessment, flood risk analysis, groundwater-surface water interactions, and hydrological modeling. Through a combination of lectures and hands-on labs, students will gain practical experience applying GIS to real-world water resource issues. The course culminates in an independent or collaborative project tailored to students' interests.

Learning Outcomes

1. Apply GIS techniques to analyze and model water resources and hydrological processes.
2. Evaluate geospatial data and methods for decision-making in water resource planning and management.
3. Communicate an independent or collaborative GIS-based research project on water resources using written, verbal, visual, digital, or multimedia formats.

GEOG 491. Special Topics
1-3 Credits (1-3)

This course provides an in-depth exploration of selected geographic topics that vary by semester and instructor. Course content may include readings, discussions, lectures, hands-on applications, and/or research projects that examine contemporary challenges, emerging trends, and specialized themes in geography. Specific topics will be announced in the Course Schedule.

Learning Outcomes

1. Critically engage with geographic concepts, methods, and applications relevant to the selected topic.
2. Apply geographic reasoning and analytical skills to address topic-related problems.
3. Communicate ideas and findings effectively in written, verbal, visual, digital, or multimedia formats.

GEOG 493. Special Problem Research
1-3 Credits

This course provides advanced undergraduate students with the opportunity to conduct independent research on a specialized geographic topic under the mentorship of a faculty member. Students will formulate a research question, engage in independent inquiry, analyze geographic data, and produce a scholarly paper. Designed for highly motivated students seeking research experience beyond standard coursework, the course emphasizes original research, critical analysis, and effective communication of findings. May be repeated up to 6 credits.

Learning Outcomes

1. Develop a research approach for investigating a geographic problem.
2. Conduct independent research using appropriate geographic concepts and methods.
3. Communicate research findings in a well-structured scholarly paper.

GEOG 495. Independent Study
1-3 Credits

This independent study course allows undergraduate students to engage in focused learning under the guidance of a faculty mentor. Students will explore specialized topics aligned with their academic and professional interests, developing deeper knowledge through self-directed study. The course fosters critical thinking, independent inquiry, and the application of geographic concepts and methods to real-world questions and challenges. May be repeated up to 6 credits.

Learning Outcomes

1. Develop specialized knowledge and skills in a chosen geographic topic through independent study and faculty mentorship.
2. Apply geographic concepts and methods to a research or applied project.
3. Communicate findings effectively in a format appropriate to the project's scope and objectives.

GEOG 501. Geographic Theory and Application
3 Credits (3)

This graduate seminar provides an overview of geographic philosophies, methodologies, and the relationship between theory and practice. Students will explore key ontological, epistemological, and methodological debates that shape contemporary geographic research across human geography, physical geography, human-environment geography, and GIScience. Through critical discussions, written assignments, and a literature review in their area of interest, students will gain a broad understanding of how geographers approach research and engage with different intellectual traditions. Emphasizing intra- and interdisciplinary synthesis and collaboration, this course prepares students to articulate their research perspectives and work effectively across subfields.

Learning Outcomes

1. Evaluate contemporary philosophies and methodologies in major areas of geographical research.
2. Discuss diverse contemporary applications of geographic research.
3. Communicate effectively in written and oral formats.

GEOG 502. Integrative Research Design
3 Credits (3)

This graduate seminar guides students through the process of designing rigorous and impactful research projects. Students will explore quantitative, qualitative, critical, creative, and mixed-methods approaches, along with research frameworks, ethical considerations, proposal writing, and project management. Designed for students in geography and related fields, this hands-on course fosters critical thinking, collaboration, and effective communication, culminating in the development of a polished research proposal tailored to their goals.

Prerequisite: GEOG 501.

Learning Outcomes

1. Design a significant and feasible research project.
2. Evaluate strategies for successful project management and assessment.
3. Communicate effectively in written and oral formats.

GEOG 505. GIS&T Capstone I - Geospatial Research Design
3 Credits

This course is designed to support the professional development of students with an interest in conducting research using Geographic Information Science and Technology (GIS&T). More specifically, the course asks you to dig into the literature in an area of geospatial research of interest to you and to develop a plan for a research project that aligns with your interests and/or professional work.

Learning Outcomes

1. Conceptualize an independent geospatial research project.
2. Plan an independent geospatial research project.
3. Propose an independent geospatial research project.

GEOG 506. GIS&T Capstone II - Geospatial Research Implementation
3 Credits

This course is designed to support the professional development of students with an interest in conducting research using Geographic Information Science and Technology (GIS&T). The course provides you an opportunity to implement the geospatial work you proposed in Capstone I. You will then then share the results of this research through oral presentations and a written document that supports your professional portfolio and work.

Prerequisite: GEOG 505.

Learning Outcomes

1. Implement an independent geospatial research project.
2. Present orally the rationale, data, methods, results, and implications of this independent geospatial research project.
3. Present in writing the rationale, data, methods, results, and implications of this independent geospatial research project.

GEOG 512. Geohumanities
3 Credits (3)

In recent years, artists, writers, and humanities scholars have increasingly engaged with geographic concerns, and geographers have incorporated humanities-based approaches to their work. Broadly known as the geohumanities, these interdisciplinary endeavors offer exciting ways to engage with key geographic concepts such as place, landscape, and nature. This graduate level seminar will examine both critical and creative approaches to the geohumanities.

Learning Outcomes

1. Articulate an understanding of the geohumanities as an interdisciplinary field, including its practices and its histories that draw on geography's intersection with multiple humanities fields.
2. Identify key texts, thinkers, and practices in the geohumanities, as well as spaces (such as both scholarly and public-facing journals and digital spaces) where geohumanities work is currently being advanced and developed.
3. Engage with current debates and directions within the geohumanities.
4. Develop a creative and/or critical project that uses geohumanities approaches and advances your research/scholarly/creative interests.

GEOG 526. U.S. National Parks
3 Credits (3)

Explore the U.S. public lands system, where conservation, history, and public access intersect. We will examine the evolution, purpose, and management of national parks, investigating how they preserve geological, ecological, and cultural resources while addressing complex environmental and social challenges. Through discussions and case studies, we will analyze the cultural, social, political, economic, and environmental forces that shape national parks today. The course culminates in an independent research or creative project, allowing you to dive deep into a parks-related topic of your choice and share your findings in a compelling and meaningful way.

Learning Outcomes

1. Discuss the history and current structure of the U.S. public lands system.
2. Describe the diverse physical landscapes represented in U.S. National Parks and their value to human and environmental well-being.
3. Explain the social, cultural, political, and economic role and function of national parks and protected places.
4. Evaluate current challenges related to parks and conservation and how critical spatial and place-based perspectives and methods might help meet those challenges.
5. Communicate an independent research or creative project on a parks-related topic through written, verbal, visual, digital, or multimedia formats.

GEOG 535. Planning a Sustainable World
3 Credits (3)

This course tackles the big challenges we face when imagining and building the places where we live. In addition to exploring today's most pressing issues through engaging readings, we jump into solving real-world problems. You'll explore topics like how to make sustainable

development fair for everyone, how to create affordable housing, and how to design land use and transportation systems that actually work together. Plus, we'll examine ways to grow local economies and build cities that are not just livable, but truly sustainable, drawing on ideas like new urbanism and neo-traditional planning.

Learning Outcomes

1. Describe key urban planning principles and how they are applied in practice.
2. Analyze the multiple dimensions of sustainable development and their role in environmental planning.
3. Evaluate strategies for addressing contemporary urban and environmental planning challenges.
4. Critically evaluate scholarly literature on planning themes and a self-selected research topic in written and oral formats.
5. Collaborate on an applied research project to develop solutions for real-world planning scenarios.

GEOG 542. Programming for GIS
3 Credits

Unlock the power of Geographic Information Systems (GIS) with the art of programming! In this dynamic course, you'll dive into the fundamentals of GIS programming through interactive lectures and hands-on lab assignments. Discover the essentials of Python, a versatile and in-demand programming language, as you learn to process, analyze, and develop geospatial applications. Explore key tools and techniques for manipulating and analyzing geographic data while building practical skills. By the end of the semester, you'll confidently harness Python to tackle real-world geospatial challenges and take your GIS expertise to the next level.

Learning Outcomes

1. Explain fundamental rules and syntax in Python including variables, data types, flow of execution, and functions.
2. Articulate key concepts and principles in geospatial data models, processing, and analysis.
3. Use classes, functions, and modules in ArcPy to perform geospatial data processing and analysis.

GEOG 544. GIS&T Professional Portfolio
1 Credit

This course provides students with the opportunity to develop their GIS&T professional portfolio and disseminate it via multiple platforms. The portfolio will showcase students' experience, knowledge and skills, and potential for professional development and employment in the geospatial workforce.

Learning Outcomes

1. Identify content for a GIST professional portfolio.
2. Visualize the portfolio content.
3. Describe the portfolio content.
4. Reflect on the portfolio content.
5. Create a compelling static document and interactive web versions of the portfolio.

GEOG 545. Geospatial Professionalism
2 Credits

Geospatial data, technologies, and applications are influenced by and shape our social, political, and legal environments in numerous ways. This course introduces you to these environments and provides opportunities to explore them through a series of readings, writing exercises, and class discussions. We also examine in detail the moral and ethical implications of geospatial data, technologies, and applications. With this grounding in place, we develop skills to communicate the results of our geospatial work in a professional, effective, and morally and ethically responsible manner.

Learning Outcomes

1. Discuss the moral and ethical implications of geospatial data, technologies, and applications.
2. Examine the social, political, and legal implications of geospatial data, technologies, and applications.
3. Communicate geospatial work in a professional, effective, and morally and ethically responsible manner.

GEOG 551. Biogeography
3 Credits (3)

Unravel the mysteries of life's distribution across the planet! In this course, you will explore how species and ecosystems are shaped by time, space, and environmental forces. From deserts to rainforests, you'll investigate the factors driving biodiversity patterns, species dispersal, and ecosystem dynamics. Along the way, you'll examine how evolution, climate, and human influences shape life on Earth. Expect hands-on learning, interactive discussions, and an independent research project culminating in a presentation of your findings. By the end of the course, you'll have a deeper appreciation for the forces that shape life on Earth—and the tools to start exploring them yourself!

Learning Outcomes

1. Analyze how species move, adapt, and survive across diverse environments, from islands to mountaintops.
2. Explain how Earth's history plate tectonics, climate shifts, and extinctions has shaped global biodiversity.
3. Evaluate why some places are bursting with life while others have extreme or limited biodiversity, using key biogeographic principles.
4. Apply real-world data and tools, including satellite imagery, geographic information systems, and field data, to study species distributions.
5. Conduct independent research on a biogeographic topic of your choice, culminating in a written and verbal presentation.

GEOG 552. Landscape Ecology
4 Credits (3+3P)

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.

Learning Outcomes

1. Apply a vocabulary of terms and phrases employed by landscape ecologists.
2. Demonstrate familiarity with articles and researchers in landscape ecology.
3. Identify influences of scale and spatial configuration on ecosystem processes.
4. Discuss approaches, tools, and techniques to describe, quantify, and analyze landscape characteristics.
5. Demonstrate knowledge of various landscape ecology approaches by accurately applying landscape ecology terms and concepts in answers to a select group of the end-of-chapter questions as well as in discussion posts.

GEOG 553. Geomorphology
3 Credits (2+3P)

This course examines the principal theories and concepts of landform creation through an exploration of the roles of structure, processes, climate, and time.

Learning Outcomes

1. Outline the basic history of geomorphic theory and research methods.
2. Describe the trends and probable causes of Cenozoic climate change and its links to basic landform processes.
3. Describe the main landform processes including weathering, soil formation, hillslope evolution and associated natural hazards, fluvial processes, arid land processes, glacial/interglacial climates and processes.
4. Integrate field observations into basic landscape evolution reconstructions.
5. Conduct a fluvial system experiment, incorporating experimental design, implementation, and data analysis.

GEOG 555. Southwest Environments
3 Credits (3)

This course introduces the U.S. Southwest, including its physical and human geography, coupled human-environment interactions, causes and consequences of environmental issues, and implications for sustainable development. Taught with GEOG 455.

Learning Outcomes

1. Describe physical and human geographic patterns of the U.S. Southwest.
2. Discuss coupled human-environment interactions in the U.S. Southwest.
3. Explain how these interactions have produced a series of societal and/or ecological problems in the U.S. Southwest.
4. Assess critically the challenges and potentials of sustainability in the U.S. Southwest.

GEOG 556. Weather & Climate: Earth's Dynamic Atmosphere
3 Credits (3)

From basic atmospheric processes to paleoclimate analysis and modern forecast modeling, from local-to-global, we will investigate climate's influences on natural environments, cultures, economics, politics, the characteristics of regional climates, and issues of global climate change.

Learning Outcomes

1. Explain the fundamental atmospheric processes that drive weather patterns and create climate systems.
2. Evaluate the evidence for climate change, including historical climate data and modern forecasting models.
3. Integrate perspectives from the natural sciences, social sciences, and humanities to assess the influences of climate on nature and society from local to global scales.
4. Apply knowledge of climate dynamics to current global issues, including environmental policies, sustainability practices, and climate adaptation strategies.

GEOG 571. Cartography and GIS
4 Credits (3+3P)

Unleash your inner mapmaker! This course introduces the essential concepts and techniques of cartography and geographic information systems (GIS) through dynamic lectures and hands-on labs. Explore topics like map scale, projections, and symbolization in class, and then apply these principles to design maps that are both functional and aesthetically appealing. By the end of the semester, you'll master the science and art of creating and presenting your very own GIS mapping project—a unique blend of data, design, and storytelling that's ready to impress.

Learning Outcomes

1. Explain key cartographic concepts and methods.
2. Evaluate the content, implications, and functionality of maps.
3. Create functional and aesthetically pleasing maps.
4. Execute an original GIS mapping project.
5. Communicate an original GIS mapping project in written and oral formats.

GEOG 573. Introduction to Remote Sensing
4 Credits (3+3P)

Discover the exciting world of remote sensing! This course introduces the theory, methods, and real-world applications of capturing Earth from above. Explore how energy and light are used to generate stunning images of our planet from aerial and satellite platforms and learn to analyze them to uncover insights about the biosphere, hydrosphere, atmosphere, lithosphere, and cultural landscapes. Hands-on labs and engaging lectures will guide you through the basics of analyzing and interpreting remote sensing products. Dive into the science of seeing our world in a whole new way.

Learning Outcomes

1. Explain basic remote sensing concepts, data, and methods.
2. Evaluate remotely sensed products.
3. Map built and natural environments using remote sensing data and methods.
4. Execute an original remote sensing investigation.
5. Communicate an original remote sensing investigation in written and oral formats.

GEOG 578. Fundamentals of GIS
4 Credits (3+3P)

Discover the potential of Geographic Information Systems (GIS) in this dynamic and hands-on introductory course! Whether you're passionate about mapping, solving real-world problems, or analyzing geographic data, this course will teach you how to harness the power of GIS to make an impact. You'll learn to manage, integrate, analyze, and visualize geospatial data to uncover patterns, relationships, and solutions to pressing challenges in fields like urban planning, environmental management, public health, and beyond. Using the industry-leading ArcGIS Pro software, you'll gain practical experience through engaging activities that blend theory with cutting-edge technology. Whether you're a curious beginner or looking to add GIS skills to your toolkit, this course is your gateway to mastering one of today's most versatile and in-demand technologies. Join us and see the world through a whole new lens.

Learning Outcomes

1. Describe fundamental principles, concepts, and methods underlying geographic information science.
2. Discuss map projections, datums, coordinate systems, and grid systems.
3. Use a geographic information system for management and analysis of spatial data.
4. Utilize GIS concepts, tools, and techniques to answer geographic questions.
5. Communicate the results of spatial data analysis through data visualization.

GEOG 582. Advanced Remote Sensing
4 Credits (3+3P)

Take your remote sensing skills to the next level! This course explores advanced concepts, methods, and applications in digital image processing, analysis, and visualization. Learn how to acquire, correct, enhance, transform, classify, evaluate, and interpret remotely sensed imagery to reveal insights about Earth's dynamic landscapes. Engaging lectures will introduce cutting-edge techniques, while hands-on labs provide opportunities to apply advanced image processing workflows to real-world data. The course culminates in an independent research project, allowing you to explore a remote sensing topic of your choice and present your findings in a compelling format.

Learning Outcomes

1. Explain advanced remote sensing concepts, data, and methods.
2. Employ several approaches for acquiring and preprocessing remotely sensed data.
3. Apply spectral and spatial analysis techniques to enhance and transform remotely sensed imagery.
4. Implement traditional pixel-based, object-based, spectral unmixing, AI-driven, and hybrid classification and change detection techniques for remote sensing applications.
5. Communicate an independent remote sensing research project in written, verbal, visual, digital, or multimedia formats.

GEOG 583. Field Explorations in Geography
3 Credits (6P)

This hands-on, field-based course immerses you in the natural and cultural landscapes of the U.S. Southwest. Using geographic field methods and tools, you will document, collect, and analyze data to interpret these diverse environments. Depending on the instructor and schedule, the course may be structured as a two-week immersive field experience with camping or as a series of weekend field excursions. The course culminates in a field research project, allowing you to investigate a topic of your choice and communicate your findings in a compelling and meaningful way. A lab fee is required to cover transportation and field expenses.

Learning Outcomes

1. Apply geographic field methods and tools to document, collect, and analyze human and environmental data.
2. Interpret physical and cultural landscapes using field observations, geospatial technologies, and geographic reasoning.
3. Communicate geographic field research findings in written, verbal, visual, digital, or multimedia formats.

GEOG 584. Qualitative, Critical, and Creative Methodologies
3 Credits (3)

This course explores qualitative, critical, and creative methodologies within human geography and related fields. We will examine epistemology, methodology, ethics, and critical reflexivity in research, as well as particular methods such as interviews, oral histories, questionnaires, participant observation, focus groups, archival research, visual methodologies, textual and discourse analysis, and arts-based approaches.

Learning Outcomes

1. Discuss the relationship between epistemology, methodology, and methods.
2. Develop a nuanced understanding of multiple critical, qualitative, and/or creative methods within human geography and related fields.
3. Demonstrate knowledge of research ethics and the role of NMSU's Institutional Review Board (IRB) in human subjects research, including through the completion of the CITI Human Subjects training.

GEOG 585. Spatial Analysis and Modeling
3 Credits (3)

Leverage the power of spatial data in this hands-on course on spatial analysis and modeling. Building on fundamental statistical concepts, you will explore a range of geospatial techniques to analyze geographic patterns, relationships, and processes. Through lectures and applied labs, you will gain experience with methods such as spatial pattern analysis, spatial interpolation, geographically weighted regression, and ecological niche modeling. Emphasis is placed on critical thinking, real-world applications, and the integration of geospatial approaches to problem-solving. The course culminates in an independent spatial investigation, in which you apply advanced analytical techniques to a topic of your choice and effectively communicate your findings in a compelling format.

Learning Outcomes

1. Explain key concepts and methods in spatial analysis and modeling.
2. Apply diverse techniques to analyze spatial data, model human and environmental processes, and predict spatial distributions.
3. Communicate findings from an original spatial analysis and/or modeling investigation in written, verbal, visual, digital, or multimedia formats.

GEOG 588. GIS for Water Resources
3 Credits (3)

This course explores the application of Geographic Information Systems (GIS) in water resource research and management. Students will work with geospatial data, methods, and technologies to address challenges such as watershed characterization, water quality and availability assessment, flood risk analysis, groundwater-surface water interactions, and hydrological modeling. Through a combination of lectures and hands-on labs, students will gain practical experience applying GIS to real-world water resource issues. The course culminates in an independent or collaborative project tailored to students' interests.

Learning Outcomes

1. Apply GIS techniques to analyze and model water resources and hydrological processes.
2. Evaluate geospatial data and methods for decision-making in water resource planning and management.
3. Communicate an independent or collaborative GIS-based research project on water resources using written, verbal, visual, digital, or multimedia formats.

GEOG 595. Independent Study
1-3 Credits

This independent study course provides master's students with the opportunity to engage in focused learning under the guidance of a faculty mentor. Students will explore specialized topics relevant to their academic and professional interests, gaining deeper expertise through self-directed study. The course fosters critical inquiry, independent scholarship, and the application of geographic concepts, theories, and methods to research and practical applications. May be repeated up to 6 credits.

Learning Outcomes

1. Develop specialized knowledge and skills in a chosen geographic topic through independent study and faculty mentorship.
2. Apply geographic concepts, theories, and methods to an independent research or applied project.
3. Communicate findings effectively in a format appropriate to the project's scope and objectives.

GEOG 596. Residency
1-12 Credits

This course provides graduate students with a structured, contractual learning experience in the public or private sector. Under the supervision of a field supervisor and faculty member, students apply geographic knowledge and skills to real-world projects, gaining professional experience in research, analysis, and decision-making. The residency allows students to integrate academic learning with applied practice, preparing them for careers in government agencies, private industry, nonprofit organizations, and other professional settings. May be repeated up to 12 credits.

Learning Outcomes

1. Apply geographic concepts, methods, and analytical tools in a professional setting.
2. Demonstrate problem-solving and decision-making skills in an applied geographic project.
3. Communicate professional experiences and research findings effectively in written, verbal, or digital formats.
4. Evaluate the role of geographic expertise in public, private, and nonprofit sector work.

GEOG 598. Special Topics
1-3 Credits

This course provides an in-depth exploration of selected geographic topics that vary by semester and instructor. Course content may include readings, discussions, lectures, hands-on applications, and/or research projects that examine contemporary challenges, emerging trends, and specialized themes in geography. Specific topics will be announced in the Course Schedule. May be repeated up to 12 credits.

Learning Outcomes

1. Critically engage with geographic concepts, methods, and applications relevant to the selected topic.
2. Apply geographic reasoning and analytical skills to address topic-related problems.
3. Communicate ideas and findings effectively in written, verbal, visual, digital, or multimedia formats.
4. Conduct independent or collaborative research to develop deeper insights into the selected theme.

GEOG 599. Master's Thesis
1-12 Credits

This course supports master's students in conducting independent research for their thesis under the guidance of a faculty advisor and thesis committee. Students engage in all phases of the research process, including conceptualization, planning, implementation, management, and communication through written and verbal research reports. The course provides a structured framework for developing original geographic research with intellectual merit and broader impacts. May be repeated up to 99 credits.

Learning Outcomes

1. Develop a rigorous and well-structured research design.
2. Accurately implement appropriate methods for data collection and analysis.
3. Correctly evaluate their research findings.
4. Effectively communicate the study's research design, findings, and significance in written and verbal formats.

GEOG 601. Geographic Theory and Application
3 Credits (3)

This graduate seminar provides an overview of geographic philosophies, methodologies, and the relationship between theory and practice. Students will explore key ontological, epistemological, and methodological debates that shape contemporary geographic research across human geography, physical geography, human-environment geography, and GIScience. Through critical discussions, written assignments, and a literature review in their area of interest, students will gain a broad understanding of how geographers approach research and engage with different intellectual traditions. Emphasizing intra- and interdisciplinary synthesis and collaboration, this course prepares students to articulate their research perspectives and work effectively across subfields.

Learning Outcomes

1. Evaluate contemporary philosophies and methodologies in major areas of geographical research.
2. Discuss diverse contemporary applications of geographic research.
3. Communicate effectively in written and oral formats.

GEOG 602. Integrative Research Design
3 Credits (3)

This graduate seminar guides students through the process of designing rigorous and impactful research projects. Students will explore quantitative, qualitative, critical, creative, and mixed-methods approaches, along with research frameworks, ethical considerations, proposal writing, and project management. Designed for students in geography and related fields, this hands-on course fosters critical thinking, collaboration, and effective communication, culminating in the development of a polished research proposal tailored to their goals.

Prerequisite: GEOG 601.

Learning Outcomes

1. Design a significant and feasible research project.
2. Evaluate strategies for successful project management and assessment.
3. Communicate effectively in written and oral formats.

GEOG 603. Professional Geographic Practice
3 Credits (3)

This core course equips students with essential professional skills for careers in academia, government, private industry, and nonprofit organizations. It covers professional communication, ethics, and grant proposal writing while also providing tailored training aligned with students' career goals. Depending on their focus, students may develop expertise in academic teaching, applied policy work, community engagement, or scientific communication. As all students in the doctoral geography program are expected to incorporate applied projects into their research, this course provides a foundation for integrating geographic expertise into real-world problem-solving.

Learning Outcomes

1. Explain the ways in which geographers contribute to research, policy development, and decision-making in professional contexts.
2. Communicate effectively with diverse audiences in academic, government, private sector, and nonprofit settings.
3. Evaluate ethical considerations in geographic research and practice.
4. Develop a competitive grant proposal that aligns with funding priorities and research goals.
5. Apply geographic expertise in a professional setting through a practical exercise in teaching, policy work, community engagement, or scientific communication.

GEOG 695. Independent Study
1-3 Credits (1-3)

This independent study course provides doctoral students with the opportunity to engage in focused learning under the guidance of a faculty mentor. Students will explore specialized topics aligned with their academic and professional interests, deepening their expertise through

self-directed study. The course fosters critical inquiry, independent scholarship, and the application of geographic theories and methods to advanced research. May be repeated up to 6 credits.

Learning Outcomes

1. Develop specialized knowledge and skills in a chosen geographic topic through independent study and faculty mentorship.
2. Apply appropriate geographic theories, data, and methods to a self-directed research project.
3. Apply appropriate geographic theories, data, and methods to a self-directed research project.

GEOG 696. Supervised Research
3-9 Credits (3-9)

This supervised research course provides doctoral students with structured guidance as they prepare for key doctoral candidacy requirements, including comprehensive exams, dissertation proposal defenses, and funding applications. Under the mentorship of a faculty advisor, students will engage in independent study and research activities tailored to their dissertation focus. The course emphasizes critical engagement with scholarly literature, research design, and professional communication, equipping students with the skills needed for the next stage of their doctoral journey. May be repeated up to 18 credits.

Learning Outcomes

1. Explain key geographic theories and methodologies in both broad disciplinary contexts and in relation to their specific research focus.
2. Develop a well-structured and persuasive research proposal, including both a written document and an oral presentation.
3. Pursue funding opportunities through grant applications or other funding mechanisms.

GEOG 700. Doctoral Dissertation
1-18 Credits

This highly individualized research course is designed for doctoral students who have completed their comprehensive exams and are actively working on their dissertation. Under the guidance of a faculty advisor and dissertation committee, students refine their research design, conduct independent research, and produce a significant contribution to the field of geography. The course emphasizes advanced research skills, scholarly writing, and professional dissemination of findings. May be repeated up to 99 credits.

Learning Outcomes

1. Expand expertise in a specialized area of geographic research through independent study.
2. Execute a rigorous, original research project that contributes to the field.
3. Apply advanced methods of data collection, analysis, and synthesis in geographic research.
4. Communicate research findings effectively through scholarly writing and presentations.
5. Demonstrate project management skills in organizing, executing, and completing a doctoral dissertation.

Contact Info

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