

Geography and Environmental Science Department (GEO)

College of Science and Health
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www.uwlax.edu/geography-and-earth-science (<http://www.uwlax.edu/Geography-and-Earth-Science/>)

Geography is an integrative spatial science that investigates complex interactions between humans and the environment. Students in geography programs develop the analytical and communication skills needed to address pressing local to global-scale environmental and societal issues including land use change, natural resource management, climate change, natural hazards and disaster management, population growth and migration, and globalization. Geographers possess an understanding of spatial connectivity in the natural and built environment and recognize how past and present conditions on earth guide societal decisions that will influence future generations of people and their interaction with natural systems.

Faculty in the Department of Geography and Environmental Science teach courses and conduct research in the discipline's four major subfields: physical geography, human geography, geographic information science (GIS), and environmental science. Experiential learning is valued by the Department of Geography and Environmental Science faculty and is incorporated throughout the curriculum. Students work hands-on with industry-standard GIS software and analytical equipment in modern classrooms and research laboratories in the Prairie Springs Science Center. Faculty incorporate cutting-edge field mapping technology and environmental sampling equipment during outdoor excursions in the bluffland, wetland, and riverine environments near campus. Course-embedded research, undergraduate research, and study abroad experiences further enhance student understanding of earth surface processes, environmental change, water resource management, and cultural diversity. Through partnerships with local employers, students frequently obtain internships in the field prior to graduation – providing them the opportunity to engage with professionals in the field and further refine their skillsets.

The topics studied by geographers are inherently interdisciplinary. The Department of Geography and Environmental Science offers minors in geoarchaeology, GIS, and earth science, and many of its courses are elective options within biology, chemistry, environmental studies, and international and global studies.

For students with interests in the environment, mapping and geospatial technology, planning, or global politics and cultures, the Department of Geography and Environmental Science would be a good fit. The U.S. Bureau of Labor Statistics expects continued growth in geography-related jobs in the next decade. UWL geography majors have been highly successful finding employment upon graduation, holding positions in environmental consulting, urban and regional planning, transportation planning, environmental monitoring and restoration, natural and cultural resource mapping, meteorology, and surveying.

General education writing emphasis

This department incorporates a significant amount of writing through the required courses instead of identifying particular courses as writing emphasis courses. Students who complete a major in this department will fulfill the general education writing emphasis requirement (<http://catalog.uwlax.edu/undergraduate/generaleducation/#generaleducationrequirementstext>).

2023-24 Faculty/Staff

The following is the department's faculty and staff as of the publication date of this catalog. This list will not be updated again until the next catalog is published in July.

Professor

Colin Belby, Ph.D., Department Chair

Cynthia Berlin, Ph.D.

Joan Bunbury, Ph.D.

Gargi Chaudhuri, Ph.D.

Associate Professor

John Kelly, Ph.D.

Niti Mishra, Ph.D.

Daniel Sambu, Ph.D.

Associate Teaching Professor

Jeffrey Kueny

Assistant Teaching Professor

Brian Pompeii, Ph.D.

Lecturer

Shrobona Karkun Sen

GIS Lab Manager

Steven Fulton

Administrative Support

Anita Willis-Frels

Majors

- Geography major: environmental science concentration - BA (<http://catalog.uwlax.edu/undergraduate/geography/environmental-science-ba/>)
- Geography major: environmental science concentration - BS (<http://catalog.uwlax.edu/undergraduate/geography/environmental-science-bs/>)
- Geography major: geographic information science concentration - BA (<http://catalog.uwlax.edu/undergraduate/geography/geographic-information-science-ba/>)

- Geography major: geographic information science concentration - BS (<http://catalog.uwlax.edu/undergraduate/geography/geographic-information-science-bs/>)
- Geography major: humans and the environment emphasis - BA (<http://catalog.uwlax.edu/undergraduate/geography/humans-and-the-environment-ba/>)
- Geography major: humans and the environment emphasis - BS (<http://catalog.uwlax.edu/undergraduate/geography/humans-and-the-environment-bs/>)

Minors

- Earth science minor (<http://catalog.uwlax.edu/undergraduate/geography/earthscienceminor/>)
- Geoarchaeology minor (<http://catalog.uwlax.edu/undergraduate/geography/geoarchaeologyminor/>)
- Geographic information science minor (<http://catalog.uwlax.edu/undergraduate/geography/geographicinformationscienceminor/>)
- Human and environmental geography minor (<http://catalog.uwlax.edu/undergraduate/geography/humanandenvironmentalgeographyminor/>)

Certificate

- Geographic information science certificate (<http://catalog.uwlax.edu/undergraduate/geography/geographicinformationsciencecertificate/>)

Honors

- Geography and environmental science honors program (<http://catalog.uwlax.edu/undergraduate/geography/honors-program/>)

Courses

+GEO 101 Cr.4

Earth Environments

This course concentrates on understanding the earth's dynamic environments through the study of processes and physical and human interactions related to the lithosphere, hydrosphere and atmosphere. A scientific approach is used to examine fundamental concepts in earth and environmental science related to topics such as plate tectonics, landform development, atmospheric processes, global climate, and water resources, in order to provide an understanding of how the earth system functions and the human role in these phenomena. Lect. 3, Lab 2. Offered Fall, Spring.

+GEO 102 Cr.3

Maps and Society

This course introduces all aspects of maps and how they affect the individual in society. It examines the evolution of maps, the map as an art form, the map as a communication medium for spatial knowledge, the meaning of maps and their relationship to culture and society past and present, the influence of maps on an individual through mass media and the Internet, and the way maps reflect personal and societal points of view. It focuses on privacy and civil liberty issues of the individual in the age of digital information where maps and map databases can disclose the privacy of personal space. In addition, today's GIS maps (in planning, in marketing, in hazard controls, etc.) embed substantial amounts of personal information that can affect personal security and how our lives are directly, indirectly, knowingly, and unknowingly influenced. Offered Fall, Spring.

+GEO 110 Cr.3

World Cultural Regions

This course provides an understanding of the global distribution of world cultures. The cultural, economic and natural patterns and their interrelationships are examined on a global and regional scale. The development and distribution of cultural regions within countries are included when appropriate. Offered Fall, Spring.

+GEO 200 Cr.3

Conservation of Global Environments

Introduction to natural resources, resource management, environmental and land use ethics, environmental impacts of resource utilization and strategies to resolve environmental conflicts. Course examines the relationships between society and the environment from the global to the local scale. Offered Fall, Spring.

+GEO 202 Cr.3

Contemporary Global Issues

This course will offer a contemporary multi-disciplinary perspective regarding the major issues and trends confronting the global society as it enters the 21st century. Emphasis will be given to a critical review and assessment of the origin and present condition of the plethora of situations and problems affecting modern global society. The student will also learn to critically evaluate current and future events. The course will incorporate the views and approaches of the following disciplines: sociology/anthropology, economics, geography, political science, and history. Students may only earn credit in one of the following: ANT 202, GEO 202, HIS 202, POL 202, SOC 202. Offered Fall, Spring.

+GEO 211 Cr.3

Global Climate Change

This course serves as an introduction to causes of natural and human-induced climate change, and the current and future impacts of climate change on environmental systems and society. Actions that could be taken by governments, industry, non-profit organizations, and individuals to mitigate the magnitude and effects of climate change will be addressed. The course will investigate social, cultural, and political aspects associated with climate change policy, including how vulnerability, resilience, and adaptability to a changing climate vary across the globe. Offered Fall, Spring, Summer.

GEO 221 Cr.4

Weather and Climate

An introduction to physical principles and the dynamic processes that govern the behavior of the atmosphere at global and regional scales. Spatial and temporal variations of energy, moisture, circulation, and weather systems; and the patterns of the world climate systems are discussed. Lect. 3; Lab 2. Prerequisite: GEO 101. Offered Fall.

GEO 222 Cr.4

Earth Surface Processes and Landforms

An introduction to the earth surface processes that are dominant in forming various types of landforms. Spatial variations in landforms are studied both at the local scale and as the outcome of large-scale global processes. Lect. 3, Lab 2. Prerequisite: GEO 101. Offered Spring.

GEO 305 Cr.3

Geographic Information Systems and Science I

Students will acquire fundamental knowledge and learn key concepts underlying spatial data, different map types and uses, thematic symbolization and visualization, and spatial analytical techniques. They will learn how to critically assess and communicate knowledge concerning spatial environments. Students will also learn how to use GIS and Web mapping technologies. Lect. 2, Lab 2. Offered Fall, Spring.

GEO 307 Cr.3

Power, Space, and Global Change

As individuals and groups interact, they create and modify political and economic structures. Conflicts and inequalities, as well as improvements to the human condition, are examined at multiple scales. Territorialities, population dynamics, states, borders, and elections are explored with the tools of human geography. Offered Fall.

GEO 309 Cr.3

Cities: Past, Present, and Future

More than half of the world's population lives in cities that represent the most complex phenomenon created by humans. Contemporary cities are vibrant and complex phenomena formed by conflicting social forces and economic processes. They are centers of human interactions and the innovations that arise from them. Urbanization has led to many positive developments for society, but also contributes to many of our most pressing challenges, from sustainability and climate change to poverty and inequality. This course explores the evolution of cities around the world and analyzes the social, cultural, economic, and environmental factors that have shaped urban areas. Overall, this course provides a comprehensive understanding of the patterns and processes of urbanization through the lens of environmental sustainability and equity. It equips students with the skills and knowledge necessary to critically analyze and develop solutions for the complex urban challenges of the 21st century. Offered Fall - Odd Numbered Years.

GEO 310 Cr.3

Transportation Equity and Sustainable Communities

This course explores the intersection of transportation, urban design, and sustainability. It examines the spatial patterns and processes of human mobility across different geographical scales and how transportation systems shape and are shaped by the built environment, land use patterns, social, environmental, and economic factors. This interdisciplinary course draws on concepts and methods from transportation engineering, urban planning, geography, and environmental science to analyze and explore solutions for sustainable transportation systems in urban areas. Overall, this course provides a comprehensive framework for understanding the complex relationships between transportation systems and the built environment within the context of sustainable and equitable transportation solutions for the future. Offered Fall - Even Numbered Years.

GEO 318 Cr.3

The Geography of Latin America and the Caribbean

The cultural and physical characteristics of Latin America and the Caribbean region are systematically examined and explained. This includes an examination of diverse physical and 'built' environments that encompass this region, from the borderlands of northern Mexico to the Tierra Del Fuego of the south; from the lush tropical environments of the Amazon, Jamaica, and Puerto Rico, to the Altiplano and arid regions of the west; from disparate lowlands to the startling mountain zones of the Andes. Indigenous civilizations which developed out of unique arrangements with these complex environments as well as those imposed and imported since 1500 will be explored in depth. Offered Spring - Even Numbered Years.

GEO 321 Cr.3

Sustainable Development and Conservation

This course is designed to engage students in critical thinking with regard to how the current momentum in environmental conservation is shaping global development practices. The dual and seemingly conflicting mandates of conservation and development are examined not only through theory but also case studies from different parts of the world. Offered Spring.

GEO 335 Cr.3

Islamic Asia: Cradle of Civilizations, Geographies of Conflict

The Middle East and nearby areas (sometimes collectively called Southwest Asia) have played a key role in the development of cultures and human interactions with the environment for millennia. This course will apply a critical scholarly approach to understanding the complex human geographic patterns, structures, and interactions at the crossroads of Asia, Europe, and Africa. Special attention is given to the political, cultural, economic, and military geographies of recent and current conflicts. Offered Spring - Odd Numbered Years.

+GEO 340 Cr.3

Polar Environments

This course explores the human and environmental geography of the Arctic and Antarctic, including physical landscape and climate, terrestrial and marine ecosystems, natural resources and development, exploration, governance, and indigenous peoples. The circumpolar northern Arctic region will be compared with the southern continent of Antarctica. Anthropogenic and climate change impacts on the Arctic and Antarctic will be discussed, as will the interconnectedness of polar regions to global processes and international issues. Offered Fall - Even Numbered Years.

GEO 401 Cr.1

Focus on Geography: A Capstone Course

This seminar-style course is designed to prepare students for graduate school and/or a career in geography and earth science. This course covers the basic concepts of interviewing, cover letter and resume development, portfolios, and oral and written communication. Guest speakers will discuss graduate and career opportunities available to geography majors. Students are expected to actively participate in the assessment of their major and their programmatic learning outcomes. Prerequisite: senior standing. Offered Fall, Spring.

GEO 405/505 Cr.3

Geographic Information System and Science II

Building upon lessons learned in GEO 305, this course focuses on geospatial analysis and database development. The course includes both theoretical and applied aspects of GIS analysis. GIS software, with an emphasis on ArcGIS, will be used to explore geographic questions. Hands-on exercises pertaining to environmental science, natural resource management, business, and urban planning will be used to complement lecture material. Topics will include data organization, database structure, input and output, data quality, and geographic analysis of spatial and attribute data. This course is taught largely at an undergraduate level. Graduate students will have additional course requirements/expectations. Lect. 2, Lab 2. Prerequisite: GEO 305; STAT 145; junior standing. Offered Fall, Spring.

GEO 410/510 Cr.3

Geospatial Field Methods

This course covers fundamental concepts of geospatial data collection, analysis, and representation. Students gain hands-on experience using geospatial technology at field sites in the La Crosse area. It includes reconnaissance and surveys using current methods, including GPS, total stations, sonar, and unmanned aerial systems; and practical integration of field data into a geographic information system. This course is taught largely at an undergraduate level. Graduate students will have additional course requirements/expectations. Lect. 2, Lab 2. Prerequisite: GEO 305; junior standing. Offered Fall.

GEO 412/512 Cr.3

Geospatial Applications of Unmanned Aerial Systems

This course provides an introduction to the Unmanned Aerial System (UAS) from the geospatial perspective which includes: UAS sensors and platforms, civilian and remote sensing applications, sensors calibration and boresighting, operational requirements, data processing using specialized software to derive products such as ortho-rectified imagery, multispectral imagery, digital terrain and surface models, current rules and regulations governing owning and operating a UAS in the United States. Students in this course will get hands-on experience of UAS mission planning and flying with both fixed-wing and multi-rotor UAS for environmental data collection outside the classroom. The course content will also prepare the students for the remote pilot exam conducted by the FAA. They will complete hands-on lab exercises involving UAS data pre-processing and analysis to generate geospatial products and assess their accuracy. This course is taught largely at an undergraduate level. Graduate students will have additional course requirements/expectations. Lect. 2, Lab 2. Prerequisite: GEO 305; junior standing. Offered Occasionally.

GEO 415/515 Cr.3

Remote Sensing of the Environment I

This course is an introduction to remote sensing, emphasizing satellite multispectral observations of the earth applied to such fields as agriculture, forestry, water resources, urban and regional planning, and environmental assessment. Upper Midwest and selected areas worldwide are explored with visual and digital image processing techniques. This course is taught largely at an undergraduate level. Graduate students will have additional course requirements/expectations. Lect. 2, Lab 2. Prerequisite: GEO 305; junior standing. Offered Fall.

GEO 418/518 Cr.3

Map Design and Geovisualization

In this course students will learn about the process of making maps, how to acquire and appropriately manipulate spatial data, and how to design clear, compelling, and beautiful maps. In addition to the key theories underlying the cartographic discipline, students will learn technical skills to enhance their other research interests and make them far more competitive on the job market once they graduate. Students will apply their knowledge about map design using cutting edge software. This course is taught largely at an undergraduate level. Graduate students will have additional course requirements/expectations. Lect. 2, Lab 2. Prerequisite: GEO 305; junior standing. Offered Fall.

GEO 422/522 Cr.3

Meteorology

Atmospheric concepts and processes of the earth's weather are covered. Principles and laws which govern the behavior of the atmosphere are investigated, including energy exchange between the earth and the atmosphere, forces governing atmospheric motion, atmospheric moisture and stability, condensation and precipitation processes, air masses and cyclogenesis, thunderstorm and tornado development, and hurricanes. Surface and upper-air charts, synoptic patterns, thermodynamic charts, radar and satellite images, and weather patterns are analyzed. This course is taught largely at an undergraduate level. Graduate students will have additional course requirements/expectations. Prerequisite: GEO 221; junior standing. Offered Spring.

GEO 425/525 Cr.3

Biogeography

A systematic analysis of the geographic distribution of organisms from historical, ecological and regional perspectives. Emphasis is placed on the principles and the methods of biogeography. Special reference is made to bio-geographic regions, the distribution of organisms in space and time, and ecological biogeography. This course is taught largely at an undergraduate level. Graduate students will have additional course requirements/expectations. Prerequisite: GEO 101; junior standing. Offered Fall - Odd Numbered Years.

GEO 427/527 Cr.3

Sustainable Water Resource Management

This course is designed to engage students in critical thinking with regard to the management of water resources within the socio-ecological framework. Students will understand how the interacting dynamics of the natural environment, social factors, politics, and economics shape sustainable water resources policies and practices. This course is taught largely at an undergraduate level. Graduate students will have additional course requirements/expectations. Prerequisite: junior standing. Offered Fall - Odd Numbered Years.

GEO 428/528 Cr.3

Past Environmental Change

An overview of the study of environmental change during the Quaternary. Approaches used to understand past climatic conditions and effects on terrestrial and marine ecosystems at global, regional and local scales will be explored, as will physical, geochemical and biological methods associated with continuous and depositional environments. This course is taught largely at an undergraduate level. Graduate students will have additional course requirements/expectations. Prerequisite: GEO 221 and GEO 222; junior standing. Offered Alternate Years.

GEO 430/530 Cr.3

River Systems

A systematic study of the interactions between flowing water and surface landforms. Emphasis is placed on watershed and stream development, sediment transport and storage, flow frequency analysis, and applications of fluvial principles to river management and stream restoration. Class activities will include field exercises in the La Crosse region, mathematical analysis of hydrologic variables, and spatial analysis with Geographic Information Systems. This course is taught largely at an undergraduate level. Graduate students will have additional course requirements/expectations. Prerequisite: GEO 222; junior standing. Offered Spring - Odd Numbered Years.

GEO 445/545 Cr.3

Remote Sensing of the Environment II

This course covers advanced techniques of digital satellite and airborne image analysis and processing, emphasizing theory and applications in natural resource, land use and environmental assessment. It includes practical approaches to integrating imagery with geographic information systems for spatial analyses and decision making. Data acquisition, integrity, manipulation, formatting, storage, and retrieval are also examined. This course is taught largely at an undergraduate level. Graduate students will have additional course requirements/expectations. Lect. 2, Lab 2. Prerequisite: GEO 415; junior standing. Offered Spring.

GEO 450 Cr.1-6

Internship in Geography and Earth Science

This internship experience is an academically relevant field experience in geography or earth science within government, industry, business, nonprofit, or community agency. The internship must be arranged through Career Services and approved by a faculty supervisor in the Department of Geography and Earth Science. Students must participate in the internship experience during the semester for which they are registered for academic credit. No more than three credits may be applied to a major or minor in geography and earth science. Repeatable for credit - maximum 12. Consent of instructor. Pass/Fail grading. Offered Fall, Spring, Summer.

GEO 455/555 Cr.3

Web Mapping

In this course, students will learn how to produce and design interactive web maps for communication. Web maps take many forms and they are continually changing. Thus, the objective of this course is to do two things: (1) develops proficiency in the scripting languages and tools most frequently used to design and create these maps; and (2) teaches the theory and concepts underlying good web map design so that as the technologies change in the future students will still be able to design effective web maps. At the end of this course, students will be able to design a web map from scratch. This course is taught largely at an undergraduate level. Graduate students will have additional course requirements/expectations. Lect. 2, Lab 2. Prerequisite: GEO 305; GEO 418; junior standing. Offered Spring.

GEO 460/560 Cr.3

Environmental Hazards

Environmental processes are investigated in light of the hazards they might pose for development and how they may be avoided, mitigated and managed. This course is taught largely at an undergraduate level. Graduate students will have additional course requirements/expectations. Prerequisite: GEO 221 or GEO 222; junior standing. Offered Fall - Even Numbered Years.

GEO 465/565 Cr.3

Scripting in GIS

This course will teach students how to customize within GIS software using scripting and programming tools commonly used in GIS discipline. Students will learn about the conceptual and practical aspects of programming for geographic applications using Python, a free open-source scripting language. Python is well integrated with all the major GIS softwares and a very popular language among GIS professionals. The course focuses on solving geographic problems by modifying and automating generic GIS software through programming. In this course, students will learn general and transferable scripting skills, and GIS-specific applications, including the basics of writing and modifying scripts, batch processing and automation of repetitive geoprocessing tasks, and designing complex geoprocessing tasks. The skills learned in this course are equally applicable in scientific research, the public sector, and in industry. Students taking this course must be familiar with geographic data structures, basic GIS concepts, and demonstrate basic understanding of geospatial analysis. No prior programming experience is required or expected. This course is taught largely at an undergraduate level. Graduate students will have additional course requirements/expectations. Lect. 2, Lab 2. Prerequisite: GEO 405; junior standing. Offered Occasionally.

GEO 470/570 Cr.1-3

Special Topics in Geography/Earth Science

Specifically selected topics or skills which may be designed for the interest of special groups will be offered with formalized instruction and methodology appropriate to geography and/or earth science. This course is taught largely at an undergraduate level. Graduate students will have additional course requirements/expectations. May be counted as an elective in the geography major or earth science minor at the discretion of the Geography/Earth Science Department. Prerequisite may be required at the discretion of the department. Repeatable for credit - maximum six. Prerequisite: junior standing. Offered Occasionally.

GEO 476 Cr.1-3

Geography/Earth Science Topics for Teachers

Selected topics in geography and/or earth science pertinent to applications in the teachers' classrooms. Courses are designed to meet the needs of teachers so that they may implement the course material into their classroom teaching. This course is taught largely at an undergraduate level. Graduate students will have additional course requirements/expectations. Prerequisite: junior standing. Offered Occasionally.

GEO 485/585 Cr.3

Geographic Information System and Science III

This course covers advanced theories in geographic information systems database structures, advanced applications, database transfers, database management, use of census data, spatial analysis, and decision-making. There will be an emphasis on ARCGIS and its applications and integration of GIS with remote sensing and GPS. This course is taught largely at an undergraduate level. Graduate students will have additional course requirements/expectations. Lect. 2, Lab 2. Prerequisite: GEO 405; STAT 145; junior standing. Offered Spring.

GEO 490/590 Cr.1-3

Independent Study

This course is a directed study of a topic in geography and earth science that is outside what is offered through regularly scheduled courses and is completed under the direction and supervision of a member of the Geography and Earth Science faculty. This course is taught largely at an undergraduate level. Graduate students will have additional course requirements/expectations. A written report is an expected outcome. Repeatable for credit - maximum six. Maximum three credits applicable to major. Prerequisite: junior standing. Consent of department. Offered Fall, Winter, Spring, Summer.

GEO 495/595 Cr.1-3

Seminar in Geography/Earth Science

Investigation into various topics in geography or the earth sciences. Topics will be offered at intervals with a specific title assigned to each. Check schedule of classes for the next offered topic. This course is taught largely at an undergraduate level. Graduate students will have additional course requirements/expectations. Repeatable for credit - maximum six. Prerequisite: two semesters of geography and/or earth science; junior standing. Additional prerequisite may be required by the instructor. Offered Occasionally.

GEO 499 Cr.1-3

Undergraduate Research

Individual research by an advanced student under the supervision of a faculty member in the Geography/Earth Science Department. The student must present a written report and either have their work published in an appropriate journal or presented either orally or by poster at a conference acceptable to the department chair and adviser. A contract must be signed by the student, the project advisor, the student's advisor and the Geography/Earth Science Department Chair. Repeatable for credit - maximum three. Three credits may be applied to a major or minor in geography and earth science. Prerequisite: 12 credits of geography and/or earth science with six of the credits numbered 300 or above, or consent of the instructor and department chair. Offered Fall, Winter, Spring, Summer.