

# Geography and Geographic Information Science (Geog)

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B.S. with a Major in Geography (<http://und-public.courseleaf.com/undergraduateacademicinformation/departmentalcoursesprograms/geography/geog-bs>)

B.S. with a Major in Environmental Studies (<http://und-public.courseleaf.com/undergraduateacademicinformation/departmentalcoursesprograms/geography/geog-bs-es>)

B.A. with a Major in Environmental Studies (<http://und-public.courseleaf.com/undergraduateacademicinformation/departmentalcoursesprograms/geography/geog-ba-es>)

Minor in Geography (<http://und-public.courseleaf.com/undergraduateacademicinformation/departmentalcoursesprograms/geography/geog-minor>)

Minor in Geospatial Technologies (<http://und-public.courseleaf.com/undergraduateacademicinformation/departmentalcoursesprograms/geography/geog-minor-gt>)

The geography courses that may be used to satisfy the 4-credit Essential Studies laboratory science requirement are Geography 121 and 134.

Geography courses that may be used to satisfy the 9-credit Essential Studies social science requirement include: Geography 151, 161 and 262.

## Courses

### **GEOG 121. Global Physical Environment. 3 Credits.**

A study of the pattern of distribution of the physical elements of the global environment. The origin and characteristics of the terrestrial grid, earth-space relations, climate, landforms, vegetation, and soils. F,S,SS.

### **GEOG 121L. Global Physical Environment Laboratory. 1 Credit.**

A basic environmental science laboratory to complement Geography 121. F,S,SS.

### **GEOG 122. Foundations of Environmental Science. 3 Credits.**

Introduction to the study of environmental dimensions of human activities, emphasizing the interdisciplinary nature of environmental studies. The course integrates principles of natural science, social science, policy, and humanistic perspectives needed understand and solve environmental problems, and to communicate those problems, policy options, and solutions to various constituencies. S.

### **GEOG 134. Introduction to Global Climate. 3 Credits.**

An introduction to the global climate, emphasizing atmospheric processes, weather and climate elements, and climate change. Emphasis is placed upon the factors that control climate and climatic distributions. S.

### **GEOG 134L. Introduction to Global Climate Laboratory. 1 Credit.**

A basic physical science laboratory focused upon specific atmospheric-climatic phenomenon; wet and dry lab experiments, plus written lab exercises. S.

### **GEOG 151. Human Geography. 3 Credits.**

A systematic analysis of people's cultural regions including settlement patterns and change via migration and diffusion. F,S.

### **GEOG 161. World Regional Geography. 3 Credits.**

Development of the concept of region with analysis of the relationship of physical and cultural features to the contemporary world situation. F,S.

### **GEOG 250. Introduction to Geopolitics. 3 Credits.**

As a branch of political geography, the study of Geopolitics is concerned with the spatial dynamics of power relations especially at the international level. From a geographic perspective, this course surveys changing relations among states and the influences of national and transnational actors and events. The course attempts to help students apply a broad range of theoretical perspectives to the analysis of global and regional issues and events, and develop insights into what is happening in the world today. From war and terrorism to economic globalization, human rights and sustainable development, this course will explore a myriad of important issues and challenges that face the world today. S.

### **GEOG 262. Geography of North America I. 3 Credits.**

A spatial approach to the development of Canada and the United States which emphasizes the transformation of the cultural landscape by exploring the contributions of the diverse peoples who inhabit the two nation-states and deal with a global economy. F.

### **GEOG 263. Geography of North Dakota. 3 Credits.**

Study of the interrelationships that exist between North Dakota's physical and cultural environments. Specific topics include physiography, climate, flora, prehistoric occupation, historic development, demography, and economic structures. S.

### **GEOG 271. The Power of Maps. 3 Credits.**

Maps are essential and powerful tools for those who study geographical phenomena. Improvements in GIS and the World Wide Web (WWW) have empowered more people to make and use maps in highly varied and creative ways. This course serves as an introduction to maps and cartography, with emphasis on their role in GIS and on the WWW. Course content includes the characteristics of geographic data, the map abstraction and generalization process, map types and uses, and map interpretation. The course covers technical and social issues relevant to mapping, as well as a survey of map application. S, even years.

### **GEOG 274. Introduction to Geospatial Technologies. 3 Credits.**

Students engage with a range of geospatial technologies to explore, analyze, and represent geographical phenomena and data through a series of field-based exercises. Students will learn about the types of societal problems that geospatial scientists are uniquely positioned to solve. Through guest speakers, readings, and discussions, they will learn about the knowledge and skills required to enter this rapidly-expanding career field and the courses in the geography curriculum that will help them to acquire these skills. F.

### **GEOG 300. Special Topics in Geography. 1-3 Credits.**

Topic of course will change from semester to semester but will typically emphasize recent developments in geography. Repeatable to six credits. Repeatable to 6 credits. F,S,SS.

### **GEOG 322. Environmental Hazards. 3 Credits.**

An overview of the field of environmental hazards emphasizing risk assessment, hazard impacts, human vulnerability, and hazard mitigation. Prerequisites: GEOG 121 and GEOG 161 or consent of instructor. F, even years.

### **GEOG 334. Climatology. 3 Credits.**

An overview of the field of climatology, emphasizing surface transfers of energy and water, the general circulation of the atmosphere, and climate change. Prerequisites: GEOG 134 or ATSC 110. S, odd years.

### **GEOG 352. Economic Geography. 3 Credits.**

A study of the local, national, and global economic life describing and explaining the geographic factor involved in the production, distribution, and consumption of the major commodities and resources of the world. Special emphasis is placed upon the global issue of the underdeveloped or Third World countries and theories, which have been, developed to explain spatial structure. Prerequisite: Sophomore standing or consent of instructor. F.

### **GEOG 362. Geography of Canada. 3 Credits.**

A regional and topical analysis of the physical, cultural and economic features of Canada. S.

### **GEOG 374. Environmental Remote Sensing. 2 Credits.**

A thorough examination of optical, infrared, and microwave methods for remote observation of Earth systems, with a focus on the use of aircraft and satellite data for addressing environmental problems. The course includes an overview of modern remote sensing systems for data collection at a variety of scales, as well as an introduction to digital image processing. Corequisite: GEOG 374L. F.

**GEOG 374L. Environmental Remote Sensing Laboratory. 1 Credit.**

A systematic coverage of visual and digital laboratory techniques used to interpret aerial photography and satellite imagery. Students gain hands-on experience assessing environmental problems using remotely sensed data. Corequisite: GEOG 374. F.

**GEOG 377. Quantitative Applications in Geography. 2 Credits.**

Application of statistical and mathematical techniques to research topics in geography. Prerequisite: MATH 103 or consent of instructor. F.

**GEOG 377L. Spatial Analysis Laboratory. 1 Credit.**

Practical applications of statistical and mathematical techniques for geographic problems. Students work on projects which involve solving problems by spatial-oriented computations. Use of relevant statistical programs on computers are emphasized. Prerequisite: MATH 103. Corequisite: GEOG 377. F.

**GEOG 378. Global Positioning Systems: Applications and Theory. 2 Credits.**

This course examines the equipment, procedures, and techniques related to GPS technology, as well as its integration with Geographic Information Systems. Foci include the fundamentals of satellite navigation, the history of GPS, and applications related to mapping and analysis in the environmental sciences. Strong emphasis is placed on providing hands-on experience. S, even years.

**GEOG 386. Geography Education Field Placement. 1-3 Credits.**

A variable credit course with amount of credit depending upon the extent of the geographic education work of the student in a K-12 school setting. Recommended for secondary education social studies majors interested in how geography is taught at the high school level and for elementary/middle school social studies majors concerned about how federal legislation is affecting teaching grades K-8. Prerequisite: Department approval. Repeatable. F,S,SS.

**GEOG 397. Cooperative Education. 1-6 Credits.**

A practical work experience with an employer closely associated with geography. May be repeated to a maximum of 6 credits. Prerequisites: 60 credits completed and a minimum GPA of 2.75 or consent of Department Co-op Coordinator and Chair. Repeatable to 6 credits. S/U grading. F,S,SS.

**GEOG 419. Methods and Materials of Teaching Middle and Secondary School in Geographic Education. 3 Credits.**

Various teaching methods, strategies and the materials used in teaching middle and secondary school geographic education. Prerequisites: T&L 250 and T&L 345. Corequisite: T&L 486. S.

**GEOG 421. Selected Topics in Physical Geography. 3 Credits.**

An examination of an advanced physical geography topic chosen from field methods, biogeography, human impact on the environment, physiography, or others. Repeatable to nine credits if different topics are examined. Prerequisite: GEOG 121 or consent of instructor. Repeatable to 9 credits. F,S.

**GEOG 453. Historical Geography. 3 Credits.**

Using the spatial approach, landscape change is analyzed over time in various regions of the world using a variety of scales of study. Emphasis is placed upon the relationship of historical geography to historic preservation and tourism. On demand.

**GEOG 454. Conservation and Sustainable Use of Natural Resources. 3 Credits.**

Geographic principles applied to the analysis of natural resources and their efficient utilization. Emphasis is on sustainable development. S.

**GEOG 457. Urban Geography and Planning. 3 Credits.**

This course examines the internal workings of cities from political, economic, and social perspectives. Geographic approaches to urban analysis are discussed, as are various methods for contemporary urban planning. Students learn to view the city as a geographic phenomenon created by human effort. S.

**GEOG 458. Community Development. 3 Credits.**

This course examines the historical evolution, conceptual framework, and implementation of community development. Students will be introduced to a broad range of community development issues from a geographical perspective with emphasis on local and statewide scales of study. Prerequisite: GEOG 151 or consent of instructor. F.

**GEOG 459. Population Geography. 3 Credits.**

The core components of population change (fertility, mortality, migration) are explored in the context of contemporary and historical population debates. The course focuses on understanding and critically assessing global, regional, national, and local population trends and issues. Topics include the impact of population growth, spatial diffusion processes, migration trends and theories, aging of societies, and population policies. S, even years.

**GEOG 462. Geography of North America II. 3 Credits.**

A regional analysis of the physical, cultural, and economic features of a selected region or group of regions within North America. May be repeatable to six credits if a different region is examined. Prerequisite: GEOG 262 or consent of instructor. On demand.

**GEOG 463. Regional Geography. 2-3 Credits.**

A regional and topical analysis of the physical and cultural features with emphasis on one continent or region. May be repeated up to nine credits provided different regions and approaches are involved. Repeatable to 9 credits. S.

**GEOG 471. Cartography and Visualization. 2 Credits.**

This course examines the art, science, and technology of cartography and visualization. It familiarizes students with basic cartographic principles and with GIS, both of which are applicable to a wide range of professional fields and academic disciplines. Students learn how maps are designed and used to accurately represent and effectively communicate spatial phenomena and relationships. The course also includes a discussion of selection of proper thematic mapping techniques. Corequisite: GEOG 471L. F.

**GEOG 471L. Cartography and Visualization Laboratory. 1 Credit.**

Students apply concepts learned in GEOG 471 to produce accurate, appropriate and well-designed maps using GIS software. Lab activities hone the ability of students to be informed producers and consumers of maps and provide hands-on experience that demonstrates how maps function as a communicative visual medium. Corequisite: GEOG 471. F.

**GEOG 474. Introduction to Geographic Information Systems (GIS). 2 Credits.**

An introductory course that examines the digital representation, manipulation, and analysis of geographic data, with emphasis on the analytical capabilities that GIS brings to bear on the solution of geographic problems. Prerequisites: GEOG 471 and 471L or equivalent or consent of instructor. Corequisite: GEOG 474L. F,S.

**GEOG 474L. GIS Laboratory. 1 Credit.**

Hands-on application of theory and methods associated with digital spatial data representation, manipulation, and analysis. Corequisite: GEOG 474. F,S.

**GEOG 475. Digital Image Processing. 3 Credits.**

A course focused on the concepts and principles involved in the use of digital remotely sensed data as they are applied to environmental monitoring and natural resource management. Emphasis is placed on algorithm development and 'hands-on' application of digital techniques to select imagery. Prerequisites: GEOG 374 and 374L. S.

**GEOG 476. Selected Topics in Geographic Information Systems. 3 Credits.**

An examination of a specific application area or set of techniques in GIS including, but not limited to, Business GIS, Environmental GIS, GIS Databases, GIS Scripting and Web-Based GIS. Repeatable to six credits if different topics are examined. Prerequisites: GEOG 474 and GEOG 474L, or instructor consent. Repeatable to 3 credits. On demand.

**GEOG 494. Directed Studies in Geographical Problems. 1-3 Credits.**

Designed for students who wish to explore advanced topics in Geography on an individual or small group basis. May be repeated to a maximum of six credit hours. Prerequisites: Upper division status and consent of instructor. Repeatable to 6 credits. F,S,SS.

**GEOG 497. Geography Internship. 1-3 Credits.**

Must involve work of a geographical nature performed as an unpaid volunteer to a PVO, NGO, youth organization, service organization or other not-for-pay jobs either on or off campus. May be repeated to a maximum of three credit hours. Prerequisite: Geography major or minor or consent of the supervising faculty member. Repeatable to 3 credits. S/U grading. F,S,SS.