

## GEOGRAPHY

## GEO

Department of Geography  
College of Social Science**113 Introduction to Economic Geography**

Fall, Spring. 3(3-0)

Spatial distribution of resources, population, enterprise, trade, consumption, and production. Interaction of those distributions at local to global scales.

**151 Introduction to Human Geography**

Fall, Spring. 3(3-0)

Systematic study of spatial patterns and processes that have shaped human use and alteration of the world.

**203 Introduction to Meteorology**

Fall. 3(3-0)

Fundamentals of meteorology. Energy balance, adiabatic processes, horizontal motion, cyclogenesis, and severe weather.

**204 World Regional Geography**

Fall. 3(3-0)

Economic, political, cultural, environmental, and technological processes and conditions that explain the diversity of world regions.

**206 Physical Geography**

Fall, Spring. 3(3-0)

Geographic and functional interrelationships within the physical environment: Earth-sun relationships, weather, climate, soils, vegetation and landforms (terrain characteristics).

**206L Physical Geography Laboratory**

Fall, Spring. 1(0-2) P: GEO 113 or GEO 151 or GEO 203 or GEO 204 or (GEO 206 or concurrently) or GEO 208 or GEO 211 or GEO 215 or GEO 221

Geographic aspects of weather, climate, soil, vegetation, and terrain. Interpretation and application of maps and remotely sensed imagery.

**208 Physical Geography of the National Parks**

Fall of odd years. 2(2-0)

Physical features such as geology, landforms, biota, and waters of United States and Canadian national parks, forests, seashores and lakeshores. Emphasis on formation and distribution.

**211 Environmental Policy and Practice**

Fall. 3(3-0)

Systematic study of environmental policy and resource management practices in the United States and the broader global context, emphasizing geographical and other social sciences perspectives.

**215 Sports Geography**

Fall of odd years. 3(3-0)

Geographical variables that influence the location, character, and spread of sports at the national and global scale. Human cultures and diffusion. Themes associated with the geography of sports. Origin and spread of collegiate, professional, international, and Olympic sports

**221 Introduction to Geographic Information**

Fall, Spring. 3(3-0)

Principles and methods of spatial data collection, handling, analysis, and display. Introduction to remote sensing, geographic information systems, and cartography.

**221L Introduction to Geographic Information Laboratory**

Fall, Spring, Summer. 1(0-2) P: GEO 221 or concurrently RB: Basic computer and math skills

Basic skills for working with Geographic Information Systems, remotely sensed imagery, design of maps, geospatial tools and technologies for data analysis and problem-solving.

**259 Geography of Recreation and Tourism**

Fall. 3(3-0)

Cultural, physical, and biotic factors affecting the distribution of recreation and tourism resources and participation. U.S. and international examples and case studies.

**306 Environmental Geomorphology**

Fall of even years. 3(3-0) Interdepartmental with Geological Sciences. Administered by Geography. P: CSS 210 or GEO 206 or GEO 333 or GLG 201 or GLG 304 or ISP 203A

Relationships of running water, weathering, gravity, ice, waves, wind, and biota (including humans) to terrain and soils. Evolution of landscapes. Classical and modern interpretations.

**314 Methods for Investigation of Urban Systems**

Spring. 4(3-2) Interdepartmental with Urban Planning. Administered by Urban Planning. P: UP 201 and CSE 101 and STT 201

Models, approaches, and techniques for urban and regional problem analysis, research, program evaluation, and project management. Application of related computer software.

**324 Remote Sensing of the Environment**

Fall. 4(2-4) P: GEO 221 SA: GEO 224

Features and interpretation methods of remotely-sensed imagery, especially black-and-white and color infrared airphotos. Basic features of radar, thermal, and multispectral imagery. Interpretation for agriculture, archaeology, fisheries, forestry, geography, landscape architecture, planning, and wildlife management.

**325 Geographic Information Systems**

Fall. 3(2-2) P: GEO 221 and GEO 221L

Technical and theoretical issues in the design, implementation, and use of geographic information systems for research and applications.

**330 Geography of the United States and Canada**

Spring, Summer. 3(3-0) SA: GEO 230

Regional analysis. Evolution and status of environmental, demographic, economic, and sociocultural patterns and processes.

**333 Geography of Michigan and the Great Lakes Region**

Spring. 3(3-0) SA: GEO 233

Michigan's physical, historical, and economic geography. Interrelationships between the physical environment (rocks, landforms, soils, climate, vegetation, hydrology) and historical and contemporary land uses. Demographic and agricultural patterns. Human history and settlement patterns. Contemporary recreational opportunities.

**335 Geography of Latin America**

Fall of odd years. 3(3-0)

Physical and human geography of Latin America. Current development issues, especially people-environment interaction in urban and rural areas. Topics include migration, urbanization, and industrialization.

**336 Geography of Europe**

Fall of even years. 3(3-0)

Major regions and nations, including their physical resources, peoples, political structures, and economies.

**337 Geography of Asia-Pacific**

Spring of odd years. 3(3-0)

Spatial patterns and processes of economic, urban, human and physical geography in eastern Asia, including China, Korea, Japan, Australia, New Zealand, the Indian subcontinent and other Asian countries. Contemporary regional development.

**338 Geography of Africa**

Fall. 3(3-0)

Physical and human geography of Africa. Current development issues, especially people-environment interaction in urban and rural areas. Topics include drought, agricultural patterns, hunger, rural development, migration, and urbanization.

**339 Geography of the Middle East and North Africa**

Spring. 3(3-0)

Physical and human geographies of the Middle East and North Africa. Historical and contemporary topics of ethno-nationalism, religion, state-building, and peace and conflict. Current issues of environment, development, urbanization, and global interactions.

**363 Introduction to Quantitative Methods for Geographers**

Fall. 3(3-0) RB: Completion of University mathematics requirement. SA: GEO 463

Quantitative techniques in the analysis and classification of spatial data.

**370 Introduction to Zoogeography**

Fall. 3(3-0) Interdepartmental with Fisheries and Wildlife and Zoology. Administered by Zoology. P: (ZOL 355)

Patterns of geographical distribution of animals and the ecological and historical processes leading to these patterns.

**401 Geography of Plants of North America**

Fall of odd years. 3(3-0) RB: GEO 206 R: Not open to freshmen or sophomores.

Geography of Plants in North America, including the ecological processes and human impacts responsible for this geography. Opportunity for field study.

**402 Agricultural Climatology**

Fall of even years. 3(3-0) Interdepartmental with Biosystems Engineering. Administered by Geography. P: MTH 110 or MTH 116 R: Not open to freshmen or sophomores.

Relationships between climate and agriculture in resource assessment, water budget analysis, meteorological hazards, pests, crop-yield modeling, and impacts of global climate change.

**403 Dynamic Meteorology (W)**

Spring. 3(3-0) P: (MTH 234 and GEO 203) and completion of Tier I writing requirement RB: GEO 405 R: Open to juniors or seniors or masters students or doctoral students.

Principles of fluid dynamics and their application to the atmosphere.

**405 Weather Analysis and Forecasting**

Spring. 4(3-2) P: GEO 203 and (MTH 110 or MTH 116)

Dynamic and thermodynamic principles of atmospheric science applied to the development and evolution of extratropical cyclones. Laboratory sessions include analysis of current observations and satellite imagery.

## Geography—GEO

- 407 Regional Geomorphology of the United States**  
Spring of odd years. 3(3-0) RB: GEO 306 or GLG 201 or GLG 412 or ISP 203A or ISP 203B  
Geomorphic characteristics of physiographic regions of the United States.
- 408 Soil Geomorphology Field Study**  
Fall of odd years. 4(2-4) P: CSS 210 or GEO 306 or GLG 201 or GLG 412 or GEO 206 R: Not open to freshmen or sophomores.  
Common geographic relationships among soils, landforms, and vegetation in lower Michigan. Description, analysis, and genesis of soils and landscapes. Surficial processes.
- 409 Global Climate Change and Variability**  
Fall of odd years. 3(3-0) P: GEO 203 or GEO 206  
Analysis of climate change and variability at various time and space scales. Climate systems, paleoclimatology, global warming, climate models, and climate impact assessment.
- 410 Geography of Food and Agriculture**  
Fall of even years. 3(3-0) RB: GEO 113 or GEO 151 or GEO 204 or GEO 206 R: Not open to freshmen or sophomores.  
Spatial patterns of contemporary global agriculture and food systems. Human-environment geography of select agricultural practices and food systems. Effects of agricultural practices on natural and human resources.
- 411 Stream Systems and Landforms**  
Spring of even years. 3(3-0) RB: GEO 206 or GEO 306 or GLG 201 or GLG 431 R: Not open to freshmen or sophomores.  
Themes associated with stream systems. Evolution of drainage basins and channel hydrology. The nature of flowing water, stream discharge, and flooding. Controls of stream behavior. Channel patterns and landform development. Character of Michigan stream systems. Field project.
- 412 Glacial Geology and the Record of Climate Change**  
Spring. 3(3-0) Interdepartmental with Geological Sciences. Administered by Geological Sciences. RB: GLG 201 or GEO 306 or GEO 408 or GLG 301 R: Not open to freshmen or sophomores.  
In-depth analysis of glacial geology and the record of climate change, with emphasis on North America and Europe. One weekend field trip required.
- 413 Urban Geography**  
Spring. 3(3-0) Interdepartmental with Urban Planning. Administered by Geography. R: Not open to freshmen or sophomores.  
Theories and models of urban spatial form. Underlying structures and processes. Socio-spatial dimensions of modern urbanism. Differentiation and locational conflict in residential, commercial, and industrial space.
- 414 Geography of Transportation**  
Fall of odd years. 3(3-0) Interdepartmental with Urban Planning. Administered by Geography. P: GEO 113 R: Not open to freshmen.  
Spatial principles of transportation. Theories of interaction, network structures, and location-allocation models. Role of transport and transport planning.
- 415 Location Theory and Land Use Analysis**  
Fall of even years. 3(3-0) Interdepartmental with Urban Planning. Administered by Geography. P: GEO 113 or UP 201 RB: EC 201 or EC 202 R: Not open to freshmen or sophomores.  
Classical and neoclassical, static and dynamic models of industrial location and spatial organization. Land rent theory. Central place theory. Multi-locational organization. Growth transmission.
- 418 The Ghetto**  
Fall of odd years. 3(3-0) Interdepartmental with Urban Planning. Administered by Geography. R: Not open to freshmen or sophomores.  
Analysis of the ghetto including its spatial organization and structure. Distribution of racial and ethnic populations. Emphasis on U.S. cities.
- 419 Applications of Geographic Information Systems to Natural Resources Management**  
Spring. 4(2-4) Interdepartmental with Biosystems Engineering and Forestry and Fisheries and Wildlife. Administered by Fisheries and Wildlife. RB: GEO 221  
Application of geographic information systems, remote sensing, and global positioning systems to integrated planning and management for fish, wildlife, and related resources.
- 423 Cartographic Design and Production**  
Fall. 4(2-4) P: GEO 221  
Elements of map design including planning, layout, typography, color theory and selection, and user issues. Techniques of map production, for both printed and electronic display.
- 424 Advanced Remote Sensing**  
Spring. 4(3-2) P: GEO 324  
Interaction of solar radiation with the atmosphere, lithosphere, hydrosphere, and biosphere. Introductory digital image processing. Earth-resources satellite sensors, data products, and applications. Radar and thermal remote sensing.
- 425 Problems in Geographic Information Science (W)**  
Spring. 3(2-2) Interdepartmental with Urban Planning. Administered by Geography. P: (GEO 325 or GEO 802) and completion of Tier I writing requirement  
Advanced theoretical and technical issues in geographic information science utilizing a problems oriented approach. Development and implementation of geographic information science solutions and formal documentation of work.
- 426 Thematic Cartography**  
Spring. 4(3-2) P: GEO 221 SA: GEO 326  
Principles, techniques, and decision making in thematic mapping. Use of computer-mapping and geographic information systems (GIS) software to produce individual thematic maps and map series. Electronic delivery of thematic maps.
- 428 Digital Terrain Analysis**  
Fall of even years. 4(3-2) P: GEO 325  
Theoretical and technical issues of collection, management, analysis, and display of terrain data. Application of photogrammetry, geographic information systems, and cartography.
- 432 Environmental Ethics (W)**  
Fall. 3(3-0) P: Completion of Tier I writing requirement. R: Not open to freshmen or sophomores.  
Ethical dimensions of environmental and spatial issues and associated public policies
- 435 Geography of Health and Disease**  
Fall. 3(3-0) R: Not open to freshmen or sophomores.  
Spatio-environmental concepts and techniques applied to health problems. Disease transmission cycles, community nutrition, and health-care planning.
- 436 Spatial Analysis of Populations**  
Spring of odd years. 3(3-0) R: Not open to freshmen or sophomores.  
Concepts and methods to measure and evaluate geo-spatial and temporal trends in populations and their components, such as natality, mortality, migration, and characteristics at different geographic scales. Sources of spatial population data. Visualization and analysis of data in a geographical information system.
- 440 Critical Geopolitics**  
Spring of even years. 3(3-0) R: Not open to freshmen.  
Political geographies of origins and conduct of nation-states. Identity-place dynamics. Colonialism and imperialism. Geopolitics and geopolitical ideas. Resource and environmental politics. Resistance and terrorism.
- 441 Cultural Geography**  
Spring of odd years. 3(3-0) RB: GEO 151 R: Not open to freshmen.  
Survey of the geographic study of world cultures, cultural ecologies, cultural landscapes, and cultural influences on societies' patterns of spatial organization.
- 453 Metropolitan Environments: Urban Forms and Land Uses**  
Spring. 3(2-2) P: GEO 221  
Land use change, the physical fabric of the city, and the growth of regional centers in the American urban landscape. Issues associated with urban developments, practices and patterns in the 20th century and the resulting metropolitan form and function. Extensive use of geographic information software in spatial analysis.
- 454 Geography of Environment and Development**  
Spring of odd years. 3(3-0) RB: GEO 113 or GEO 151 or GEO 330 or GEO 333 or GEO 335 or GEO 336 or GEO 337 or GEO 338  
Spatial patterns and processes associated with regional development in selected world areas.
- 459 Tourism in Regional Development**  
Spring of odd years. 3(3-0) RB: GEO 259  
The role of tourism in regional development. Examples from Michigan, and the United States and other nations. Environmental considerations.
- 460 Green Roofs and Walls**  
Fall of even years. 1(1-0) Interdepartmental with Fisheries and Wildlife and Horticulture and Planning, Design and Construction. Administered by Horticulture. P: HRT 203 or FW 101 or GEO 206 or PDC 120 or EGR 100 R: Open to juniors or seniors or graduate students.  
Green roof and wall design and installation practices including plant species and substrates. Environmental impact, ecosystem services, integration with other environmental practices. Influence of economics, public policy, and industry organizations on the implementation of green roofs on a wide scale. Multidisciplinary nature of planning and implementation of successful green roof and wall projects.

- 472 Ecological Monitoring and Data Analysis**  
Fall. 3(2-2) Interdepartmental with Forestry. Administered by Forestry. P: ((MTH 124 or MTH 132) and completion of Tier I writing requirement) and (STT 201 or STT 224 or STT 231 or STT 421)  
Design of ecological monitoring systems and analysis of resulting ecological data sets. Monitoring system design, model specification and implementation, and computational considerations from both a design- and model-based perspective. Hands-on introduction to statistical software.
- 478 Urban Transportation Planning**  
Spring. 3(3-0) Interdepartmental with Urban Planning. Administered by Urban Planning. R: Open to juniors or seniors in the Geography Major or in the Urban and Regional Planning Major or approval of school.  
Principles of decision-making in urban transportation planning. Demand and supply analysis, social and environmental impacts, implementation programs. Use of computer models.
- 480 Senior Seminar (W)**  
Fall. 3(3-0) P: Completion of Tier I Writing Requirement R: Open to seniors in the Geography Major or in the Geography Minor.  
History, philosophy, and methodology of the geographic discipline as it has evolved within academic and social contexts.
- 490 Independent Study**  
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 12 credits in all enrollments for this course. R: Approval of department.  
Supervised individual study in an area supplementary to regular courses.
- 492 Geographic Research Problems**  
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 12 credits in all enrollments for this course. R: Not open to freshmen or sophomores. Approval of department.  
Supervised original research on selected aspects of geography.
- 495 Field Study**  
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 8 credits in all enrollments for this course.  
Supervised field study in geography.
- 498 Internship in Geography**  
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 8 credits in all enrollments for this course.  
Individual experience in geography in an approved organization.
- 802 Geospatial Technology**  
Fall. 3(3-0) RB: Familiarity with coordinate systems.  
Comprehensive introduction to geotechnologies. Concepts and theories of remote sensing to include image interpretation and processing. Global Positioning Systems, spatial data structures, and geographic information systems.
- 813 Seminar in Urban and Economic Geography**  
Spring. 3(3-0) A student may earn a maximum of 9 credits in all enrollments for this course. RB: Two of GEO 413, GEO 414, GEO 415, GEO 416, GEO 417, GEO 418.  
Review of research on selected topics in urban and economic geography.
- 814 Applied Research Methods for Planning and Development**  
Spring. 3(2-2) Interdepartmental with Urban Planning. Administered by Urban Planning. RB: UP 813 R: Open only to graduate students in the Urban and Regional Planning major or Public Administration major or Geography major.  
Techniques in urban and regional planning analysis. Forecasting models. Methods of urban project evaluation.
- 816 The World System of Cities**  
Spring. 3(3-0) Interdepartmental with Global Urban Studies Program. Administered by Geography. R: Open to graduate students.  
Modern global economic restructuring and its social, economic, and political impacts on the world system of cities
- 817 China and Globalization**  
Fall of even years. 3(3-0) Interdepartmental with Global Urban Studies Program. Administered by Geography. RB: GEO 113 or GEO 204 or GEO 337 or GEO 413 R: Open to graduate students.  
Theoretical debates and empirical discussions on current social, economic, environmental, and spatial challenges facing contemporary urban China in an era of globalization. Comparative and thematic approach.
- 819 Spatial Epidemiology and Medical Geography**  
Spring. 3(3-0) Interdepartmental with Epidemiology. Administered by Epidemiology. P: EPI 810 or GEO 435 R: Open to graduate students in the Department of Epidemiology and Biostatistics or in the Department of Geography or approval of department. SA: HM 819  
Concepts, techniques, and utilization of spatio-epidemiologic analyses for human health.
- 820 GIS and Management**  
Fall of odd years. 3(3-0) P: GEO 425 or approval of department RB: Students should be familiar with GIS Technology  
Exploration of the professional field of geographic information science (GIS) career management opportunities, organizational structures, and applications within the public, commercial and academic sectors.
- 821 GIS Practicum**  
Spring of even years. 3(3-0) P: (GEO 425 or approval of department) and (GEO 820 or approval of department) RB: Students should be knowledgeable in the application of GIS technology  
Instructor-guided geographic information science (GIS) practicum connecting University faculty and students with local communities. Students are assigned a community GIS project and work collaboratively to develop a proposal, manage the project, and present the output.
- 826 Geocomputation**  
Fall. 3(3-0) A student may earn a maximum of 9 credits in all enrollments for this course.  
Research on topics in cartography, geographic information systems, and remote sensing.
- 827 Digital Image Processing and Analysis**  
Fall. 4(2-4) P: GEO 424  
Use of computer to classify and enhance satellite images and to extract information from them. Combining images from different sources. Accuracy assessment of resulting information.
- 854 Economics of Planning and Development**  
Spring. 3(3-0) Interdepartmental with Urban Planning. Administered by Urban Planning. RB: UP 801  
The physical urban environment and local economic development.
- 858 Gender, Justice and Environmental Change : Issues and Concepts**  
Fall. 3(3-0) Interdepartmental with Anthropology and Criminal Justice and Forestry and Fisheries and Wildlife and Sociology. Administered by Fisheries and Wildlife. RB: Background in social science, environmental science, or natural resources.  
Issues and concepts related to gender, ecology, and environmental studies. Key debates and theoretical approaches to addressing environmental issues from a gender and social justice perspective. Gender and environment issues and processes from a global perspective.
- 859 Gender, Justice, and Environmental Change: Methods and Application**  
Spring of even years. 3(3-0) Interdepartmental with Anthropology and Forestry and Fisheries and Wildlife and Resource Development and Sociology. Administered by Anthropology. RB: Background in social science, environmental science, or natural resources.  
Methods and case studies related to gender, ecology, and environmental studies. Methodological and fieldwork issues from a feminist perspective in international and intercultural contexts. Qualitative and quantitative methods for integrating social and environmental data.
- 865 Advanced Quantitative Methods in Geography**  
Spring. 4(4-0) RB: GEO 363  
Statistical and mathematical approaches. Multiple regression, principal components and factor analysis, discriminant analysis. Related taxonomic methods.
- 866 Spatial Data Analysis**  
Fall. 4(3-2) Interdepartmental with Statistics and Probability. Administered by Geography. RB: (GEO 363 or STT 421 or STT 430) or equivalent quantitative methods courses. SA: GEO 466  
Theory and techniques for statistical analysis of point patterns, spatially continuous data, and data in spatial zones.
- 868 Spatial Regression and Modeling**  
Fall. 3(3-0) P: GEO 865 or approval of department RB: Linear regression and data analysis at graduate level SA: GEO 867  
Using spatial regression to address geographic problems. Modeling spatial processes with continuous and discrete dependent variables. Maximum likelihood estimation. Bayesian approaches.
- 869 Geosimulation**  
Spring. 3(3-0) Interdepartmental with Environmental Science and Policy. Administered by Geography. RB: Basic understanding of data structures and algorithms covered in an introductory course of any programming language. R: Approval of department.  
Theoretical concepts related to simulating dynamic geographic phenomena in the intersection between human and natural systems. Innovative agent-based methodology applied to complex social-environmental systems. Hands-on experience of agent-based modeling, with special emphasis on modeling human decision-making and its impact on the natural environment.

## Geography—GEO

- 871 Seminar in Physical Geography**  
Fall. 3(3-0) A student may earn a maximum of 12 credits in all enrollments for this course. RB: at least one course in physical geography R: Approval of department.  
Research on topics in physical geography.
- 872 Seminar in Human Geography**  
Fall. 3(3-0) A student may earn a maximum of 12 credits in all enrollments for this course. RB: at least one course in human geography R: Approval of department.  
Research on topics in human geography.
- 873 Seminar in Human-Environment Geography**  
Spring. 3(3-0) A student may earn a maximum of 12 credits in all enrollments for this course. RB: at least one course in human geography and one course in physical geography. R: Approval of department.  
Research on topics in human-environment geography.
- 874 Seminar in Geographic Information Science**  
Spring. 3(3-0) A student may earn a maximum of 12 credits in all enrollments for this course. RB: at least one course in geographic information science, cartography or remote sensing R: Approval of department.  
Geographic information science (GIS) applications to social and environmental problems. Theory and related issues.
- 886 Research Design in Geography**  
Spring. 3(3-0) R: Approval of department.  
Research and writing in geography. Identification of geographic problems and their relative importance. Structuring and stating hypotheses. Data acquisition and tests for validity.
- 890 Advanced Readings in Geography**  
Fall, Spring, Summer. 1 to 8 credits. A student may earn a maximum of 12 credits in all enrollments for this course. R: Approval of department.  
Advanced independent readings.
- 892 Advanced Research in Geography**  
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 12 credits in all enrollments for this course.  
Advanced independent research.
- 899 Master's Thesis Research**  
Fall, Spring, Summer. 1 to 12 credits. A student may earn a maximum of 99 credits in all enrollments for this course. R: Open only to graduate students in the Geography major.  
Master's thesis research.
- 986 Theories and Philosophies in Geography**  
Spring of odd years. 3(3-0) R: Open to doctoral students in the Geography major.  
Historical development of the discipline within social and intellectual contexts. Philosophical approaches behind geographic research and theory.
- 999 Doctoral Dissertation Research**  
Fall, Spring, Summer. 1 to 36 credits. A student may earn a maximum of 36 credits in all enrollments for this course. R: Open to doctoral students in the Department of Geography.  
Doctoral dissertation research.