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)

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. 1-2 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.

214 Geography of Drugs
Fall of even years. 3(3-0)
Physical, ecological, and human geographies of drugs, drug crops, pharmaceuticals, alcohol, and their diffusions. Cultural geographies and geopolitical implications of drugs’ consumption, trade, and regulation and prohibition.

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, geographic 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(2-2) 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(3-0) 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.

326 Cartographic Design and Production
Fall. 4(2-2) P: GEO 221 SA: GEO 423
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.

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. Contemporaneous recreational opportunities.

335 Geography of Latin America
Fall of even 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, and 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 of odd years. 3(3-0)

363 Introduction to Quantitative Methods for Geographers
Fall. 3(3-0) RB: Completion of University mathematics requirement. SA: GEO 483
Quantitative techniques in the analysis and classification of spatial data.

370 Introduction to Zooloogy
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.
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 Bio- systems 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.

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.

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.

412 Glacial Geology and the Record of Climate Change
Spring. 3(3-0) Interdepartmental with Geological Sciences. Administered by Geologi- cal 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. 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 or sophomores.
Spatial principles of transportation. Theories of interregional 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 Geo- graphy. P: GEO 113 or UP 201 R: EC 201 or EC 202 R: Not open to freshmen or sophomores.

418 The Ghetto
Fall of odd years. 3(3-0) Interdepartmental with Urban Planning. Administered by Geo- graphy. R: Not open to freshmen or sophomores.
Analysis of the ghetto including its spatial organiza- tion 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 Bio- systems 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.

424 Advanced Remote Sensing
Spring. 4(3-2) P: GEO 324
Interaction of solar radiation with the atmosphere, lithosphere, hydrosphere, and biosphere. Introducto- ry 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 geo- graphic information science utilizing a problems oriented approach. Development and implementa- tion 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 the- matic 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, man- agement, analysis, and display of terrain data. Ap- plication of photogrammetry, geographic information systems, and cartography.

429 Geoprocessing
Spring. 3(3-0) P: GEO 325 or GEO 802 or approval of department
Applications of computer programming to address geographic information problems. Integration of digital spatial data, geographic information systems, spatial analysis, and expert systems.

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 plan- ning.

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, migra- tion, and characteristics at different geographic scales. Sources of spatial population data. Visualiza- tion and analysis of data in a geographical infor- mation system.

440 Critical Geopolitics
Spring of even years. 3(3-0) R: Not open to freshmen.

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 organiza-
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 develop-
ments, 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. Exam-
amples 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 gradu-
ate students.
Green roof and wall design and installation practices
including plant species and substrates. Environmen-
tal impact, ecosystem services, integration with
other environmental practices. Influence of econom-
ic, public policy, and industry organizations on the
implementation of green roofs on a wide scale.
Multidisciplinary nature of planning and implementa-
tion 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 analy-
sis of resulting ecological data sets. Monitoring
system design, model specification and implementa-
tion, 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 Geogra-
phy 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 II Writing
Requirement R: Open to seniors in the Geo-
graphy Major or in the Geography Minor.
History, philosophy, and methodology of the geo-
graphic discipline as it has evolved within academic
and social contexts.
spatial zones. Point patterns, spatially continuous data, and data in Theory and techniques for statistical analysis of 

867 Hierarchical Modeling and Computing for Spatial-temporal Environmental Data 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.

867 Hierarchical Modeling and Computing for Spatial-temporal Environmental Data Spring of odd years. 3(3-0) Interdepartmental with Forestry. Administered by Forestry. RB: (FW 849 or concurrently) and (GEO 866 or concurrently) Specification and application of modeling frameworks for spatial and temporal data. Emphasis on point-referenced data analysis using Bayesian statistics, uncertainty assessment, forecasting, and computing. Applied focus on the analysis of environmental data sets.

868 Spatial Regression and Modeling Fall. 3(3-0) P: GEO 865 or approval of department. RB: 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.

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.