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)
In a time of increasing globalization of economic, political and technological processes, different societies on different continents are responding in various ways. This course explores the conditions that contribute to diversity in different world regions—economic, social, political and environmental processes.

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 206 or concurrently
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) Interdepartmental with Park, Recreation and Tourism Resources. Administered by Geography. 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.

221 Introduction to Geographic Information
Fall, Spring. 3(2-2) SA: GEO 223, GEO 225 Principles and methods of spatial data collection, handling, analysis, and display. Introduction to remote sensing, geographic information systems, and cartography.

259 Geography of Recreation and Tourism
Fall of even years. 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
Spring of odd 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

324 Remote Sensing of the Environment
Fall. 4(2-4) SA: GEO 224 Features and interpretation methods of remotely sensed imagery, especially black-and-white and color infrared and aerial photographs. Basic features of radar, thermal, and multiscalar 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 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
Fall, 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. 3(3-0) P: Completion of Tier I writing requirement. R: Not open to freshmen. Physical and human geography of Latin America. Current development issues, especially people-environment interaction in urban and rural areas. Topics include drought, agricultural patterns, hunger, rural development, migration, and urbanization.

338 Geography of Africa
Fall. 3(3-0) P: Completion of Tier I writing requirement. R: Not open to freshmen. 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)

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
Spring of even years. 3(3-0) P: 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 104 or 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
Spring. 3(3-0) P: MTH 234 and GEO 203 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 of odd years. 3(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) P: GEO 306 or GLG 201 or GLG 412 or ISP 203A or ISP 203B Geomorphic characteristics of physiographic regions of the United States.
480 Senior Seminar (W)  
Spring. 3(3-0) P: Completion of Tier I writing requirement. R: Open to seniors in the Geography major. 
History, philosophy, and methodology of the geographic discipline as it has evolved within academic and social contexts. 

485 Senior Seminar in Geography Education  
Spring of even years. 3(3-0) P: (GEO 113 or GEO 151) and (GEO 204 and GEO 206 and GEO 221 and (GEO 330 or concurrently) and (GEO 333 or concurrently)) R: Open only to students in the Geography disciplinary teaching minor. 
Geography educational standards will guide the development of knowledge and technical expertise of future K-12 teachers. Emphasis will be on continued learning of geography, integration of physical and human concepts, the role of representation (maps, etc.), and the use of current events, local observations, and technology to integrate geography into the K-12 curriculum. 

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. 

494 Remote Sensing Field Techniques  
Summer. 2(0-4) P: GEO 424 
Collection and processing of field data to coordinate with remotely sensed imagery. Data correction and analysis. The use of global positioning systems (GPS) receivers and of sensors for determining chlorophyll levels and other biophysical properties. Hands-on experiences; considerable time outdoors. 

495 Field Study  
Fall, Spring. Summer. 1 to 4 credits. A student may earn a maximum of 6 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 6 credits in all enrollments for this course. 
Individual experience in geography in an approved organization. 

800 The World System of Cities  
Spring. 3(3-0) Interdepartmental with Social Science, Anthropology, and Sociology. R: Open to freshmen or sophomores. Approval of department. 
Theoretical and empirical discussions on current social, economic, environmental, and spatial challenges facing contemporary urban China in an era of globalization. Comparative and thematic approach. 

801 Issues in Geographical Information Science  
Fall. 3(3-0) P: GEO 221 
Manipulation and display of geographic data. Interpreting and using geographic information in social and scientific contexts. Ethical issues associated with geographical information science. 

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. R: 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. R: 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) 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. R: 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 or in the Department of Geography or approval of department. Students must be knowledgeable in the application of GIS technology. 
Concepts, techniques, and utilization of spatio-epidemiologic analyses for human health. 

820 GIS and Management  
Fall. 3(3-0) P: GEO 425 or approval of department R: 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. 

821 GIS Practicum  
Spring. 3(3-0) P: GEO 425 or approval of department and (GEO 820 or approval of department) R: 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. 

825 Geoprocessing  
Spring. 4(4-0) Integration of digital remote sensing data, geographic information systems, spatial analysis, and expert systems in solving research problems. Class research project. 

826 Geocomputation  
Spring. 3(3-0) A student may earn a maximum of 9 credits in all enrollments for this course. 
Review of research 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. R: 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 Forestry and Fisheries and Wildlife and Sociology. R: 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. Gend-er 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 Sociology. R: 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) R: GEO 363 Statistical and mathematical approaches. Multiple regression, principal components and factor analy-sis, discriminant analysis. Related taxonomic me-thods. 

GEO—Geography
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  

871  Seminar in Physical Geography  
Fall. 3(3-0) A student may earn a maximum of 6 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 6 credits in all enrollments for this course. RB: at least one course in physical 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 6 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 6 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.

875  Tourism and Global Change  
Spring of odd years. 3(3-0) Interdepartmental with Community, Agriculture, Recreation and Resource Studies. Administered by Community, Agriculture, Recreation and Resource Studies.  
Inter-relationship among tourism and economic, social, political, and environmental forces. Local, national, and international levels. Focus on vulnerable, less developed regions with the lowest natural levels of adaptation to global, social, and environmental change.

886  Research Design in Geography  
Spring. 3(3-0)  
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.