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 Cultural Geography
Fall, Spring of even years. 3(3-0)
Systematic approach to the spatial distribution of cultural features, processes, and relationships.

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)
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-including 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:M: 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
Fall of even years, Spring. 3(3-0) Interdepartmental with Geological Sciences. Administered by Geography. P:M: (CSS 210 or GEO 203 or GEO 206 or GEO 330 or GEO 333 or GEO 259 or GLG 201 or GLG 304 or ISP 203A or ISS 310) or completion of Tier I writing requirement
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:M: STT 201 and CSE 101
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, Spring. 4(2-4) 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:M: 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
Fall of odd years. 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:M: 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 migration, urbanization, and industrialization.

336 Geography of Europe
Fall of odd years. 3(3-0) P:M: Completion of Tier I writing requirement. R: Not open to freshmen.
Major regions and nations, including their physical resources, peoples, political structures, and economies.

337 Geography of East Asia
Spring. 3(3-0) P:M: Completion of Tier I writing requirement. R: Not open to freshmen.
Spatial patterns and processes of physical and human geography in China, Japan, Korea, and Taiwan. Emphasis on development problems, especially since 1950.

338 Geography of Africa
Fall. 3(3-0) P:M: 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.

370 Introduction to Zoogeography
Fall. 3(3-0) Interdepartmental with Fisheries and Wildlife and Zoology. Administered by Zoology. P:M: (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:M: GEO 206 R: Not open to freshmen or sophomores.
Geography of Plants in North America, including the ecological processes and human impacts responsble 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:M: 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.

405 Weather Analysis and Forecasting
Spring of odd years. 4(3-2) P:M: 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
Fall of odd years. 3(3-0) P:M: 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. 4(2-4) P:M: CSS 210 or GEO 306 or GLG 201 or GLG 412 or ISP 203A or ISP 203B 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:M: GEO 206
Analysis of climate change and variability at various time and space scales with emphasis on climate systems, paleoclimatology, global warming, climate models, and climate impact assessment.

412 Glacial Geology and the Record of Climate Change
Spring. 4(3-2) Interdepartmental with Geological Sciences. Administered by Geological Sciences. RB: GLG 201 or GEO 306 or GEO 408 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. Laboratory focuses on glacial processes. One weekend field trip required.

413 Urban Geography
Fall. 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:M: 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. 3(3-0) Interdepartmental with Urban Planning. Administered by Geography. P:M: GEO 113 or UP 201 RB: One of the prerequisites or an introductory ECON course. 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. Multilocational 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 Community, Agriculture, Recreation and Resource Studies and Biosystems Engineering and Forestry and Fisheries and Wildlife. Administered by Fisheries and Wildlife. RB: GEO 221 Not open to students with credit in GEO 425.
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:M: 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
Fall. 4(3-2) RB: 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:M: GEO 325 or GEO 492
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
Fall of even years. 4(3-2) P:M: 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:M: GEO 221 R: Open only to juniors or seniors.
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:M: Completion of Tier I writing requirement. R: Open only to juniors or seniors.
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.

453 Metropolitan Environments: Urban Forms and Land Uses
Spring. 3(2-2) P:M: 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) P:M: 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 or PRR 213
The role of tourism in regional development. Examples from Michigan, and the United States and other nations. Environmental considerations.

463 Introduction to Quantitative Methods for Geographers and Planners
Fall. 3(3-0) Interdepartmental with Urban Planning. Administered by Geography. RB: Completion of University mathematics requirement. R: Open only to students in the Geography major or Urban and Regional Planning major or Landscape Architecture major.
Quantitative techniques in the analysis and classification of spatial data.

478 Urban Transportation Planning
Spring. 3(3-0) Interdepartmental with Urban Planning. Administered by Urban Planning. R: Open only to juniors or seniors in the Urban and Regional Planning major or Geography major or approval of department.
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:M: Completion of Tier I writing requirement. R: Open only 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:M: (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:M: 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 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.

801 Issues in Geographical Information Science
Fall. 3(3-0) P:M: 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. 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.

819 Spatial Epidemiology and Medical Geography
Summer of even years. 3(3-0) Interdepartmental with Epidemiology. Administered by Epidemiology. RB: EPI 810 R: Open to graduate students in the Epidemiology major or approval of department. SA: HM 819
Concepts, techniques, and utilization of spatio-epidemiologic analyses for human health.

820 GIS and Management
Fall. 3(3-0) P:M: 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. 3(3-0) P:M: (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.

824 Monitoring the Biosphere from Space
Spring of even years. 3(3-0) P:M: GEO 424
Remote sensing in support of global and other environmental change research. Observing patterns in satellite imagery and linking them with human processes. Monitoring Earth from space at variable spatial and temporal scales. Advanced digital image processing, information extraction, interpretation, and applications.

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 Seminar in Cartography and Geoprocessing
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:M: 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.

835 Biogeography
Spring of odd years. 3(3-0) Interdepartmental with Fisheries and Wildlife and Plant Biology and Zoology. Administered by Fisheries and Wildlife. RB: Courses in evolution and ecology at undergraduate level.
Geographical distributions of plants and animals; biogeographic realms. Ecological and evolutionary mechanisms determining distributional patterns. Application of biogeography to conservation problems.

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 Environmental Studies and Applications 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 465
Statistical and mathematical approaches. Multiple regression, principal components and factor analysis, discriminant analysis. Related taxonomic methods.

866 Spatial Data Analysis
Spring. 4(3-2) Interdepartmental with Statistics and Probability. Administered by Geography. RB: (GEO 463 or STT 421 or STT 430) or 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.

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 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 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.

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.

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 Theory and Methods in Geography
Spring. 3(3-0) R: Open only to doctoral students in the Geography major.
Historical development of the discipline within social and intellectual contexts. Current methodological and philosophical approaches to geographic research.

999 Doctoral Dissertation Research
Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 99 credits in all enrollments for this course.
Doctoral dissertation research.