

**880. Special Problems**

Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 9 credits. Approval of instructor.

Students with special interests and abilities may study published literature in a selected genetics topic or they may carry on research in the laboratory on a selected subject in collaboration with genetics faculty.

**890. Selected Topics in Genetics**

Fall, Winter, Spring, Summer. 2 to 5 credits. May reenroll for a maximum of 9 credits. ZOL 441 and approval of instructor.

Topics will be selected from molecular genetics, physiological genetics, population genetics, quantitative genetics, evolution, radiology and mutagenesis, microbial genetics, somatic cell genetics, behavioral genetics, and human genetics.

**999. Doctoral Dissertation Research**

Fall, Winter, Spring, Summer. 3 to 12 credits. Majors.

Research for the doctoral dissertation in genetics.

**GEOGRAPHY**

**GEO**

**College of Social Science**

**100. People, Location and Environment (S)**

Fall, Winter, Spring. 4(4-0) Not open to Geography majors.

Relationships between people and environments, their spatial consequences and resulting regional structures across the earth's surface.

**122. The World of Maps**

Fall, Winter, Spring. 3(3-0)

Discussion of types, practical applications, and sources of maps. Map reading skills.

**150. Geography of Selected Current Problems**

Fall, Winter, Spring. 2(2-0)

The geographic perspective is used to examine U.S. and world problems of major concern such as international conflicts, environment quality, spatial change, and economic development.

**201. Geography of Culture**

Fall, Winter, Spring. 3(3-0)

A systematic discussion of cultural geography, stressing cultural processes and relationships.

**203. Resource Ecology**

(IDC 200.) Fall, Winter, Spring, Summer. 3(3-0) Interdepartmental with the departments of Fisheries and Wildlife, Forestry, Resource Development, and Zoology. Administered by the Department of Fisheries and Wildlife.

Basic concepts of ecology which are the unifying basis for resource management, conservation policy and the analysis of environmental quality. Extensive use of guest lecturers.

**204. World Regional Geography (S)**

Fall, Winter, Spring, Summer. 4(4-0)

Human relationships with natural and cultural environments.

**206. Physical Geography**

Fall, Winter, Spring, Summer. 4(4-0)

Analysis of weather, climate, landforms, soils, water and biotic factors of the human environment, including its spatial, genetic, and functional interrelationships.

**206L. Physical Geography Laboratory**

Fall, Winter, Spring. 1(0-2) GEO 206 or concurrently.

Laboratory study of geographic aspects of map interpretation, aerial photographs, weather, climate, soils, landforms, and vegetation.

**213. World Economic Geography**

Fall, Winter, Spring, Summer. 4(4-0)

Emphasis on distribution of natural resources, industries and service activities, stressing factors of location and economic concepts of locational change.

**223. Introduction to Cartography**

Fall, Spring. 4(2-4)

Principles and techniques of constructing maps. Mapping methods and mapping decisions emphasized.

**224. Remote Sensing: Airphoto Interpretation**

Fall, Winter, Spring. 4(2-4) Sophomores.

Use of aerial photographs in the identification and interpretation of physical and cultural features of the terrestrial environment. Includes principles of photogrammetry, and stresses application and practice.

**IDC. Contemporary Japan**

For course description, see Interdisciplinary Courses.

**300. North America**

Fall, Winter, Spring. 3(3-0)

Human and physical geography of North America, north of the Mexican border.

**307. Geography of Environmental Quality**

Spring. 3(3-0) Sophomores or approval of department.

Identification of the physical, cultural and psychological factors which constitute human environments, and how they vary and may be modified or controlled.

**309. Geography of Recreation**

Winter. 3(3-0)

Natural and cultural factors influencing the use of space for recreation. Emphasis on recreation land use in the United States and current problems and conflicts.

**310. Historical Geography of the United States**

Spring. 3(3-0)

Reconstruction of geographies of the United States as they existed in the past.

**315. South America**

Spring. 3(3-0) Sophomores or approval of department.

Regional geography of South America with special attention to contemporary geographic problems.

**316. Middle America**

Winter. 3(3-0) Sophomores or approval of department.

Interpretation of physical and cultural environment of Mexico, Central America, and the West Indies. Special attention to contemporary geographic problems.

**320. Geography of Population**

Fall. 3(3-0)

Relationship of the size, composition, and distribution of population to geographic variations in the nature of places.

**321. Africa**

Fall. 3(3-0) Sophomores or approval of department.

Emphasis on continent south of Sahara: environments, peoples, problems, and potentials.

**322. Africa: Contemporary Problems**

Spring. 3(3-0) Sophomores or approval of department. GEO 321 recommended.

Major development problems examined from environmental, historical, economic, and social perspectives.

**340. Western Europe**

Winter. 3(3-0) Sophomores or approval of department.

Geographic analysis of physical and human character and resources of Western Europe (Scandinavia, British Isles, Benelux, Germany, France and Switzerland). Emphasis on major problems.

**IDC. Contemporary South Asia**

For course description, see Interdisciplinary Courses.

**342. Eastern and Southern Europe**

Spring. 3(3-0) Sophomores or approval of department.

A geographical analysis of countries of Eastern and Southern Europe with emphasis on economic, political, social and ethnic problems.

**351. Weather and Climate**

Fall. 3(3-0)

Non-mathematical treatment of general weather processes and patterns, including surface and middle atmospheric (jet stream) features, with emphasis on the U.S.

**360. The Soviet Union**

Fall. 3(3-0) Sophomores or approval of department.

A geographical analysis of the Soviet Union and its inhabitants with emphasis on economic, social, political and ethnic problems.

**365. China**

Winter. 3(3-0)

The physical and human geography of China and their relationship to the development problems of the country, with emphasis on the post-1949 period.

**400H. Honors Work**

Fall, Winter, Spring. 1 to 16 credits. Approval of department.

**401. The Ghetto**

(UMS 401.) Fall, Spring. 4(4-0) Juniors or approval of department.

Analysis of the ghetto including its spatial organization, structure and distribution of nonwhite and ethnic populations in cities with emphasis on the United States.

**Descriptions — Geography  
of  
Courses**

**402. The Geography of the City**

Spring, 3(3-0)

Spatial theories, concepts, and designs of internal urban economic, social, and political structures.

**403. The American City and Its Region**

Winter, 3(3-0)

The regional system of cities in terms of size, spacing, and functional relationships.

**407. Michigan**

Fall, Spring, 3(3-0) *Sophomores or approval of department.*

Selected aspects of the physical and cultural geography of Michigan.

**408. Canada**

Spring, 3(3-0) *Sophomores or approval of department.*

An analysis of the physical, economic and cultural patterns of Canada.

**409. Geography of Transportation**

Fall, 3(3-0)

Analysis of spatial principles of transportation, including theories of interaction, network structures, and the role of transport in space-economy.

**411. Problems in Geography**

Fall, Winter, Spring, Summer, 1 to 6 credits. *Approval of department.*

Research on specialized geographic problems.

**415. Field Techniques**

Fall, 4(1-7) *May reenroll for a maximum of 8 credits. Approval of department.*

Basic methods for making physical and cultural observations and measurements including map reading, photo interpretation, field sketch mapping, compass traverses, sampling, questionnaire design, interviewing, analysis and reporting. Requires work off campus.

**418. Critical Issues in Contemporary Africa**

Fall, Spring, 3(3-0) *May reenroll for a maximum of 9 credits if different topics are taken. One course on African subject and approval of instructor. Interdepartmental with African Languages and the departments of Anthropology, History, Political Science, and Sociology. Administered by the Department of History.*

Four separate multidisciplinary topics will be offered at different times: The Horn of Africa, Southern Africa, Africa and the Americas, Social Impact Studies.

**424. Advanced Remote Sensing Techniques**

Spring, 4(2-4) GEO 224.

Extraction, analysis, and interpretation of information obtained from remote sensors including conventional, infrared and radar imagery. Introduction to stereo-plotting devices, stressing theories of remote sensing and applications.

**425. Development of Geographic Thought**

Spring, 3(3-0) *Approval of department.*

Evolution of geographic thought from antiquity to the present emphasizing developments in 20th century America. Survey of the theory and methodology of contemporary geography.

**427. Quantitative Methods in Geography**

Fall, 4(4-0) *Approval of department.*

Basic quantitative techniques used in the analysis and classification of geographic data.

**429. Landforms of North America**

Winter, Spring, 3(3-0) *May reenroll for a maximum of 6 credits. GEO 206, GLG 201 or approval of department.*

Study of the surface features of eastern U.S.A. (winter term) and western U.S.A. (spring term).

**431. Landform Analysis**

Fall, 3(3-0) *GEO 206, GLG 201 or approval of department.*

A problem approach is utilized to explain classical and contemporary interpretations of the nature of selected landforms, including treatment of related tools and techniques. Option for some field study.

**432. Biogeography**

Spring, 3(3-0) *GEO 206 or approval of department.*

Patterns of vegetation, with emphasis on forests of eastern North America. Option for some field study.

**435. Land Use and Location Theory**

Spring, 3(3-0) *GEO 213 or approval of department.*

Location principles and theories of economic activities, including methods of regional analysis.

**436. Microclimatology**

Winter, 3(3-0) *MTH 108; GEO 351 recommended. Interdepartmental with and administered by Agricultural Engineering Technology.*

Physical environment in the lower few hundred meters of the atmosphere and within the biosphere.

**440. Spatial Aspects of Regional Development**

Spring, 3(3-0) *GEO 213 or one 300 level regional geography course or approval of department.*

Spatial and environmental factors in regional development at national and international scales.

**446. Production Cartography**

Winter, 4(2-4) *GEO 223 or approval of department.*

Technical aspects of map and graphics production. Sequencing of procedures. Theoretical and applied aspects of process photography, typography, and proofing.

**447. Advanced Cartography**

Fall, 4(2-4) *GEO 223.*

Advanced concepts in mapmaking including statistical surfaces portrayal, quantitative data analysis, classing techniques, and nominal mapping.

**448. Computer Mapping**

Winter, Spring, 4(2-4) *CPS 115 or CPS 120.*

Programming microcomputers for cartographic manipulation and portrayal of geographic data.

**449. Computer Uses in Cartography**

Fall, 4(2-4) *GEO 223, CPS 120.*

Examination of use of various mapping programs and map data bases. Computer use in modern cartography. Includes some programming.

**451. Climatic Patterns and Atmospheric Circulation**

Winter, 3(3-0) *GEO 206 or approval of department.*

Relationship between weather, climate, and upper air flow, with emphasis on this climatology of North America.

**456. Map Design**

Spring, 4(2-4) *GEO 446.*

Technical and theoretical aspects of designing maps. Topics include color, lettering, content, layout, and the influence of the user.

**466. Social and Spatial Approaches to Community Service**

Spring, 3(3-0) *GEO 201 or S W 205 or approval of department. Interdepartmental with and administered by the School of Social Work.*

Analysis of major themes in social service planning: communities and neighborhoods, public policy administration, social service networks, location of public facilities, evaluation and accountability of service systems.

**470. Geography of Health and Disease**

Fall, Winter, 3(3-0)

Spatio-environmental concepts and the techniques applied to health problems: disease transmission cycles, community nutrition and health-care planning.

**805. Seminar in Urban Geography**

Spring, 3(3-0) *Approval of department.*

Selected research topics on the geography of the city.

**808. Environmental Measurements**

(A E 805, AET 805.) Spring, 4(3-3) *Approval of department. Interdepartmental with and administered by Agricultural Engineering Technology.*

Methods and techniques for accurate measurement and interpretation of environmental parameters. Temperature, humidity, wind and air flow characteristics, radiation, light intensity, gaseous and particulate concentrations in atmospheric microclimates will be discussed.

**809. Seminar in Transportation Geography**

Winter, 3(3-0) *Approval of department, GEO 409.*

Selected research topics.

**811. Advanced Quantitative Methods in Geography and Planning**

Spring, 4(4-0) *Approval of department, GEO 427. Interdepartmental with Urban Planning.*

Statistical and mathematical approaches to spatial distributions and areal data.

**812. Regional Seminar**

Fall, Winter, Spring, Summer, 1 to 3 credits. *May reenroll for a maximum of 9 credits. Approval of department.*

Selected research topics in regional geography.

**814. Research Methods in Urban and Regional Analysis**

Winter, 3(3-0) *U P 427 or approval of department. Interdepartmental with and administered by Urban Planning.*

Basic quantitative techniques used in urban and regional analysis and planning, including statistical, linear, and network methods. Introduction to computer use.

## GEOLOGICAL SCIENCES

(Name changed effective July 1, 1983. Formerly the Department of Geology.)

### College of Natural Science

#### Geology GLG

- 815. Application of Research Methods to Planning and Analysis**  
Spring. 3(3-0) U P 814. Interdepartmental with and administered by Urban Planning.  
Applied techniques used in planning research. Analysis and forecasting of urban population, economic activity, and land use. Analysis of transportation and other community facilities.
- 818. Readings in Geography**  
Fall, Winter, Spring, Summer. Variable credit. May reenroll for a maximum of 15 credits. Approval of department.
- 819. Theories of Urban Forms and Structure**  
Spring. 3(3-0) Approval of department. Interdepartmental with and administered by Urban Planning.  
Idealized urban forms, theories and models in urban form as it relates to function and location of urban activities.
- 825. History and Philosophy of Geography**  
Fall. 3(3-0) Approval of department.  
Analysis of the monographic and serial literature dealing with the theory and evolution of geographic science.
- 826. Research Design in Geography**  
Winter, Spring. 3(3-0) Approval of department.  
Formalized approach to research and writing in geography: Identification of geographic problems and their relative importance, structuring and stating hypotheses, data acquisitions, and tests for validity.
- 828. Seminar in Recreation Geography**  
Spring. 3(3-0) GEO 309 or approval of instructor.  
Selected current problems in recreation geography in the U.S. and abroad.
- 834. Seminar in Physical Geography**  
Winter, Spring. 3(3-0) May reenroll for a maximum of 9 credits. Approval of department.  
Analysis of classical and contemporary problems in physical geography treated as follows: climatology (winter), biogeography (spring), geomorphology (spring).
- 835. Seminar in Location Theory**  
Fall. 3(3-0) Approval of department, GEO 435.  
Recent developments and research in location analysis and regional science.
- 839. African Research**  
(IDC 838.) Fall, Winter, Spring. 2 to 4 credits. May reenroll for a maximum of 8 credits. Graduate standing or approval of instructor. Interdepartmental with African Languages and the departments of Anthropology, Educational Administration, History, Political Science, and Sociology. Administered by the Department of Anthropology.  
African-related archival and field research topics and methodologies viewed from perspective of relevant social science and humanistic disciplines associated with the African Studies Center.
- 845. Proseminar in Cartography**  
Winter. 3(3-0) Approval of department.  
Contemporary cartographic research. Research questions and methods in cartography.
- 846. Seminar in Cartography**  
Spring. 3(3-0) May reenroll for a maximum of 12 credits. Approval of department.  
Research projects in cartography.
- 850. Advanced Field Techniques**  
Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 8 credits.  
Instruction and practical training in the selection, data-gathering, on-site analysis, and presentation of geographic field problems.
- 870. Seminar in Medical Geography**  
Winter. 3(3-0)  
Spatio-environmental analysis of selected health problems.
- 899. Master's Thesis Research**  
Fall, Winter, Spring, Summer. Variable credit. Approval of department.
- 901. Problems in Cultural Geography**  
Fall, Winter, Spring. 1 to 3 credits. May reenroll for a maximum of 6 credits. Approval of department.  
Special research problems.
- 902. Problems in Physical Geography**  
Fall, Winter, Spring, Summer. 1 to 3 credits. May reenroll for a maximum of 6 credits.  
Supervised research in specific topics of physical geography.
- 906. Problems in Economic Geography**  
Fall, Winter, Spring, Summer. 1 to 3 credits. May reenroll for a maximum of 6 credits. Approval of department.  
Special research problems.
- 910. Problems in Historical Geography**  
Fall, Winter, Spring, Summer. 1 to 3 credits. May reenroll for a maximum of 6 credits. Approval of department.  
Special research problems in historical geography.
- 912. Independent Study in Regional Geography**  
Fall, Winter, Spring, Summer. 1 to 3 credits. May reenroll for a maximum of 15 credits. Approval of department.  
Individual studies in regional geography.
- 918. Problems in Geography**  
Fall, Winter, Spring, Summer. 1 to 3 credits. May reenroll for a maximum of 9 credits. Approval of department.  
Research on specific geographical problems.
- 934. Problems in Population**  
Fall, Winter, Spring, Summer. 1 to 3 credits. May reenroll for a maximum of 9 credits. Approval of department.  
Special research problems.
- 999. Doctoral Dissertation Research**  
Fall, Winter, Spring, Summer. Variable credit. Approval of department.
- 200. Geology of Human Environment (N)**  
Fall, Winter, Spring, Summer. 3(3-0) Not open to Geology majors. Credit will be given in only one of the following: GLG 200, GLG 201, GLG 306.  
An exploration of social philosophical and political events which require a geological viewpoint for resolution. The application of geologic and social/historical information will also reinforce the concept of the scientific method.
- 200L. Laboratory—Geology of Our Environment**  
Fall, Winter, Spring, Summer. 1(0-3) GLG 200 or concurrently.  
Laboratory study of geologic processes associated with environmental hazards. Emphasis placed on land-use planning, applying geologic criteria to evaluate land potentials.
- 201. Earth Processes**  
Fall, Winter, Spring. 4(4-2) Credit will be given for only one of the following: GLG 200, GLG 201, GLG 306.  
Physical processes concerning evolution of Earth and its environments. Conservation and interaction of energy and matter through time. Laboratory stresses interpretation of process through studies of geologic data.
- 202. Evolution of the Earth**  
Fall, Winter, Spring. 4(4-2) GLG 200; or GLG 201; or GLG 306.  
Integration of physical, chemical and biological processes from which our present environment has evolved; problems and controversies in the development of ideas of geologic and organic evolution.
- 205. Oceanology—The Marine Environment**  
Fall. 3(3-0)  
Physical oceanography, including origin, hydrologic, chemical, geological properties; and environmental quality of the oceans. Human-sea interactions are emphasized including resource utilization and pollution.
- 282. Energy Resources of the Earth**  
Winter. 3(3-0)  
World energy resources of petroleum, coal, and atomic fuel. Social, political, economic and environmental problems of fuels.
- 300. Solar System Geology**  
Winter. 4(4-0) AST 119 or AST 217 or AST 229; GLG 200 or GLG 201.  
The origin, relationships, make-up and features of the bodies in the solar system emphasizing recent space exploration results and developing theories.
- 302. Vertebrate Life of the Past**  
Fall. 3(3-0) One course in a physical or biological science or Juniors. Interdepartmental with the Department of Zoology.  
Fossil vertebrates from fish to humans.