

puter simulation in natural resources. Modeling of decision systems in natural resources management.

**999. Research**  
Fall, Winter, Spring, Summer. Variable credit. Approval of department.

## FRENCH

See Romance Languages

## GEOGRAPHY

## GEO

### College of Social Science

Courses are classified as follows:

Cultural—301, 404, 419, 801, 901.  
Economic—213, 309, 409, 412, 413, 435, 454, 806, 807, 809, 835, 906.  
Field Techniques—415, 850.  
Geographic Education—458, 858.  
Historical—310, 810, 910.  
Independent Research—400H, 411, 818, 899, 918, 999.  
Medical—470, 870, 970.  
Physical—206, 206L, 429, 430, 431, 432, 451, 834, 902.  
Political—416, 808, 908.  
Population—320, 836, 934.  
Quantitative Methods—427, 428, 811.  
Regional—204, 300, 405, 406, 407, 408, 418, 420, 421, 440, 441, 450, 460, 461, 462, 463, 464, 812, 912.  
Theory and Philosophy—150, 425, 480, 825, 826, 827.  
Urban—318, 402, 403, 805.  
Visual Media and Techniques—222, 223, 324, 424, 426.

#### 150. *Geography of Selected Current Problems*

Fall. 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.

#### 200. *Resource Ecology and Man*

For course description, see *Interdisciplinary Courses*.

#### 204. *World Regional Geography*

Fall, Winter, Spring, Summer. 4(3-0)

Analysis of the world's major natural habitats and man's relation to them.

#### 206. *Physical Geography*

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

Principal earth surface elements of physical geography including weather, climate, landforms, soils, water and biotic resources, in their genetics, distributional and functional interrelationships.

#### 206L. *Physical Geography Laboratory*

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

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

#### 213. *Economic Geography*

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

Emphasis on world distribution of economic and business activities, stressing factors of location and economic concepts of locational change.

#### 222. *The World of Maps*

Fall. 3(3-0).

Discussion of types, practical applications, and sources of maps.

#### 223. *Introduction to Cartography*

Fall, Winter. 4(2-4)

Principles and techniques of constructing maps and other graphic devices. Types of map reproduction, application of quantitative methods to cartography.

#### 300. *Geography of North America*

Fall, Winter, Summer. 4(3-0)

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

#### 301. *Geography of Culture*

(401.) Fall, Winter, Spring, Summer.

4(3-0) 204.

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

#### 309. *Geography of Recreation*

Winter. 3(3-0)

Recreational land use and services in the United States, including analysis of resources basic to such land use and their distribution.

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

Spring, Summer. 4(3-0)

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

#### 318. *Cities of the World*

Fall, Winter, Spring, Summer. 4(3-0)

A cross-cultural examination of cities, their historic growth, regional functions, and internal dynamics.

#### 320. *Geography of Population*

Fall. 4(3-0).

A geographical analysis of world population including demographic characteristics, growth rates, and distributional patterns.

#### 324. *Remote Sensing: Airphoto Interpretation*

Fall, Winter. 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.

#### 341. *Contemporary Problems of South Asia*

For course description, see *Interdisciplinary Courses*.

#### 384. *Contemporary Problems of Japan*

For course description, see *Interdisciplinary Courses*.

#### 390. *Survey of Subsaharan Africa*

For course description, see *Interdisciplinary Courses*.

#### 391. *Survey of Subsaharan Africa*

For course description, see *Interdisciplinary Courses*.

#### 400H. *Honors Work*

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

#### 402. *The Geography of the City*

Fall. 4(3-0).

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

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

Winter. 4(3-0).

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

#### 404. *Advanced Cultural Geography*

Spring. 4(3-0) 301 or approval of department.

Geographical analysis of selected aspects of human culture.

#### 405. *Geography of South America*

Winter, Spring. 4(3-0) 204 or approval of department.

Regional geography of South America excluding countries bordering the Caribbean Sea; and the interpretation of present cultural-physical patterns.

#### 406. *Geography of Middle America*

Fall. 4(3-0) 204 or approval of department.

Description and interpretation of the physical and cultural environment of Mexico, Central America, West Indies, and northern South America.

#### 407. *Geography of Michigan*

Spring, Summer. 4(3-0) 204 or approval of department.

Selected aspects of the geography of Michigan, including the physical environment and cultural and economic considerations.

#### 408. *Geography of Canada*

Spring. 4(3-0) 204 or approval of department.

Analysis of the cultural, economic, and physical regions of Canada and the role played by Canada in world affairs.

#### 409. *Geography of Transportation*

(308.) Fall. 4(3-0).

Analysis of spatial principles of transportation, including factors of route, location, theories of interaction, 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.

#### 412. *Geography of Agriculture*

(312.) Winter. 4(3-0).

Analysis of the nature and world distribution of agricultural activities and settlements.

#### 413. *Geography of Manufacturing*

Winter. 4(3-0) 213 or Juniors.

Evaluation of the place to place variation of different types of manufacturing industries, phasing the changes in regional structure of manufacturing and industrial location theory.

#### 415. *Field Techniques in Geography*

Fall, Spring. 4(1-7) May re-enroll for a maximum of 8 credits. Approval of department.

Geographic field work including recognition and classification of natural and cultural features, interview procedures, and preparation of reports and maps based on field data.

#### 416. *Political Geography*

Winter, Summer. 4(3-0) 204 or Juniors.

Spatial aspects of territoriality, boundaries, voting patterns, government programs, formation of political units, political development and integration, and environmental policy.

#### 418. *Geography of Polar Regions*

Winter of even-numbered years. 4(3-0) 204 or approval of department.

The arctic, including the continental fringe lands of North America and Eurasia, and the Antarctic. Emphasis on exploration, physical geography, and recent developments in settlement and resource use.

- 419. Geography of Environmental Quality**  
Spring. 4(3-0).  
Analysis of man's perception and attempted regulations of his habitat; spatial and policy implications.
- 420. Systematic Geography of Africa**  
Winter. 4(3-0) 204 or approval of department.  
Systematic study of Subsaharan Africa: geomorphology, air mass climatology, vegetation, agriculture, historical, political, and economic geography.
- 421. Regional Geography of Africa**  
Spring. 4(3-0) 420 or approval of department.  
Analysis of selected countries and regions of Subsaharan Africa.
- 424. Advanced Remote Sensing Techniques**  
Spring. 4(2-4) 324 or approval of department.  
Geographic interpretation of records obtained from remote sensors including conventional, infrared, and radar imagery. Introduction to stereo-plotting devices.
- 425. Development of Geographic Thought**  
Winter, Spring. 4(3-0) Approval of department.  
Evolution, theory and methodology of geographic science.
- 426. Advanced Cartography**  
Spring of even-numbered years. 4(1-6) 223; Juniors.  
Development of skills in selection of cartographic source materials and in map construction.
- 427. Quantitative Methods in Geographic Research**  
Fall, Spring. 4(3-0) Approval of department.  
Introduction to role of selected quantitative techniques used in the theory of geographic distributions and the analysis and classification of regional data.
- 428. Computer Techniques in Geography**  
Spring. 3(3-0) 427 or STT 421 and approval of department.  
The preparation of computer maps and the application of the computer to the development and testing of models in geography.
- 429. Landforms of North America**  
(305.) Winter. 4(3-0) 206, GLG 201 or approval of department.  
Description and interpretation of the surface configuration of the United States and Canada. Will concentrate on Eastern and Western U.S.A. during even and odd years, respectively.
- 430. Climates of the World**  
Spring. 4(3-0) 206 or approval of department.  
Regional analysis of the world's weather and climate.
- 431. Landform Analysis**  
Fall. 4(3-0) 206, GLG 201 or approval of department.  
Treatment of selected aspects relating to surface configuration.
- 432. Biogeography**  
Spring. 4(3-0) 206 or approval of department.  
A systematic introduction to the principles and analysis of biotic geography.
- 435. Spatial Analysis and Location Theory**  
Spring. 4(3-0) 213 or approval of department.  
Location principles and theories of economic activities, including methods of regional analysis.
- 440. Geography of Western Europe**  
Winter. 4(3-0) 204 or approval of department.  
Geographic analysis of physical and human resources of Western Europe (Scandinavia, British Isles, Benelux, Germany, France, and Switzerland). Emphasis on spatial problems.
- 441. Geography of Eastern and Southern Europe**  
Spring. 4(3-0) 204 or approval of department.  
Physical and human geography of Eastern and Mediterranean Europe.
- 450. Geography of Australia and Pacific Islands**  
Winter of odd-numbered years 4(3-0) 204 or approval of department.  
Physical and cultural geography of Australia, New Zealand, Melanesia, Micronesia, and Polynesia.
- 451. Climatology**  
Fall. 4(3-0) 206 or approval of department.  
A systematic treatment of climatological processes and their geographic implications.
- 454. Geography of Water**  
Fall. 4(3-0) 206 or 213.  
Geographic aspects of global water resources, their utilization patterns, and the role of water in agricultural and industrial production.
- 458. Trends in Geographic Education**  
Winter. 4(3-0)  
Selected trends and problems in geography and their implications for the schools.
- 460. Geography of the Soviet Union**  
Fall. 4(3-0) 204 or approval of department.  
Physical and human geography of the U.S.S.R., including its role in world affairs.
- 461. Geography of South Asia**  
Fall. 4(3-0) 204 or approval of department.  
A geographical analysis of the physical environment and human societies of India, Pakistan and Ceylon.
- 462. Geography of East Asia**  
Fall. 4(3-0) 204 or approval of department.  
Physical and cultural geography of eastern Asia—China and Japan.
- 463. Geography of Southeast Asia**  
Spring. 4(3-0).  
A geographical analysis of the culture, political, economic and physical environment of mainland and insular Southeast Asia.
- 464. Geography of Southwest Asia and North Africa**  
Winter. 4(3-0)  
Socio-political and economic geography and physical environment of southwest Asia and Northern Africa.
- 470. Geography of Health and Disease**  
Fall. 4(3-0) 204 or approval of department.  
Application of geographical concepts of space and environment to study of health-related problems.
- 476. Canadian-American Studies**  
For course description, see **Interdisciplinary Courses**.
- 480. Undergraduate Seminar in Geography**  
Spring. 2(2-0) Majors or approval of department.  
An introduction to the profession of geography for the undergraduate major through an exposure to various faculty points of view and interests.
- 801. Seminar in Cultural Geography**  
Fall. 3(3-0) Approval of department.  
Theory, methodology, and techniques in cultural geography.
- 805. Seminar in Urban Geography**  
(804.) Spring. 3(3-0) Approval of department.  
Selected research topics on the geography of the city.
- 806. Seminar in Agricultural Geography**  
Spring. 3(3-0) Approval of department, 412.  
Research problems on selected topics of agricultural geography.
- 807. Seminar in Manufacturing Geography**  
Spring. 3(3-0) Approval of department, 413.  
Research problems on selected topics of industrial location.
- 808. Seminar in Political Geography**  
Spring. 3(3-0) Approval of department.  
Spatial analysis of selected political phenomena.
- 809. Seminar in Transportation Geography**  
Winter. 3(3-0) Approval of department, 409.  
Selected research topics.
- 810. Seminar in Historical Geography**  
Winter. 3(3-0) Approval of department.  
Approaches in research in historical geography.
- 811. Advanced Quantitative Methods in Geographic Research**  
(814.) Winter. 3(3-0) Approval of department, 427.  
Statistical and mathematical approaches to spatial distributions and areal data.
- 812. Regional Seminar**  
Fall, Winter, Spring, Summer. Variable credit. May re-enroll for a maximum of 9 credits. Approval of department.  
Selected research topics in regional geography.
- 818. Readings in Geography**  
Fall, Winter, Spring, Summer. Variable credit. May re-enroll for a maximum of 15 credits. Approval of department.

**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. 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.

**827. Contemporary Theory and Methodology in Geographic Research**  
(816.) Spring. 3(3-0) Approval of department.  
Examination of the forward edges of geographic research, particularly with respect to its relation to other disciplines, scientific methodology in general, and the evolution of geography as a professional scholarly discipline.

**834. Seminar in Physical Geography**  
Winter, Spring. 3(3-0) May re-enroll 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, 435.  
Recent developments and research in location analysis and regional science.

**836. Population Geography Seminar**  
Spring. 3(3-0) Approval of department.  
Studies of particular topics and problems in population geography.

**838. Interdisciplinary Seminar on Africa**  
For course description, see Interdisciplinary Courses.

**850. Advanced Field Techniques**  
Fall, Winter, Spring, Summer. Variable credit. May re-enroll for a maximum of 6 credits.  
Instruction and practical training in the selection, data-gathering, on-site analysis, and presentation of geographic field problems.

**858. Seminar in Geographic Education**  
Spring. 3(3-0) Approval of department.  
Treatment of selected topics in geographic education.

**870. Seminar in Medical Geography**  
Winter. 3(3-0).  
Spatio-environmental analysis of selected health problems.

**899. Research**  
Fall, Winter, Spring, Summer. Variable credit. Approval of department.

**901. Problems in Cultural Geography**  
Fall, Winter, Spring. Variable credit. May re-enroll for a maximum of 6 credits. Approval of department.  
Special research problems.

**902. Problems in Physical Geography**  
Fall, Winter, Spring, Summer. Variable credit. May re-enroll for a maximum of 6 credits.  
Supervised research in specific topics of physical geography.

**906. Problems in Economic Geography**  
Fall, Winter, Spring, Summer. Variable credit. May re-enroll for a maximum of 6 credits. Approval of department.  
Special research problems.

**908. Problems in Political Geography**  
Fall, Winter, Spring, Summer. Variable credit. May re-enroll for a maximum of 6 credits. Approval of department, 416.  
Special research problems.

**910. Problems in Historical Geography**  
Fall, Winter, Spring, Summer. Variable credit. May re-enroll 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. Variable credit. May re-enroll for a maximum of 15 credits. Approval of department.  
Individual studies in regional geography.

**918. Problems in Geography**  
Fall, Winter, Spring, Summer. Variable credit. May re-enroll for a maximum of 9 credits. Approval of department.  
Research on specific geographical problems.

**934. Problems in Population**  
Fall, Winter, Spring, Summer. Variable credit. May re-enroll for a maximum of 9 credits. Approval of department.  
Special research problems.

**970. Problems in Medical Geography**  
Fall, Winter, Spring. Variable credit. May re-enroll for a maximum of 6 credits. Approval of department.  
Selected research topics in medical geography.

**999. Research**  
Fall, Winter, Spring, Summer. Variable credit. Approval of department.

**201. General Geology—Physical**  
Fall, Winter, Spring. 4(4-2) Credit will be given for only one of the following: 200, 201, 306.  
Minerals and rocks of the earth's crust; constructive and destructive forces including volcanism, mountain building, rock deformation, erosion and deposition; economic aspects of geology; concepts of earth origin and methods of age determination. Laboratory study of minerals, rocks, experimental models and maps; field trips.

**202. General Geology — Historical**  
Fall, Winter, Spring. 4(4-2) 201 or 306; or approval of department.  
Physical and biological history of the earth; environmental interpretation of sedimentary rocks and fossils; mountain building, sea-floor spreading and continental drift; organic evolution and diversification; paleoecology.

**205. Oceanology: The Marine Environment and Man**  
Fall. 3(3-0)  
Physical oceanography, including origin, hydrologic, chemical, geological properties; and environmental quality of the oceans. Man-sea interactions are emphasized including resource utilization and pollution.

**302. Vertebrate Life of the Past**  
Fall. 3(3-0) Not open to zoology majors. Interdepartmental with the Zoology Department.  
Fossil vertebrates from fish to man.

**303. Introductory Geomorphology**  
Winter. 3(3-0)  
Descriptive course treating the geological origin and development of important surface features including special consideration of Pleistocene landforms of the Great Lakes region.

**303L. Laboratory—Introductory Geomorphology**  
Winter. 1(0-2) 303 or concurrently.  
Methods of map interpretation and use of aerial photographs in geomorphology. Supplemental field trip to study the geology of pertinent landforms.

**304. Geology of Michigan**  
Fall. 3(3-0) 200 or 201 and/or 202; or approval of department.  
A historical accounting of the physical, historical and economic geology of Michigan and its environs; a course designed for students seeking an overall picture of the rather unique Michigan geological environment.

**306. Engineering Geology**  
Fall. 3(3-2) Credit will be given for only one of the following: 200, 201, 306. Sophomore Engineering students.  
Fundamental principles of geology as applied to civil engineering practice. Minerals and rocks, aerial photographs, topographic and areal geologic maps and geologic cross sections studied in laboratory. Source of geologic literature and maps.

**307. Geology Central Appalachians**  
Winter. 1(0-2) 200, or 201, or 202, or concurrently.  
General geology of the Central Appalachians. A preparatory course for 308. Field excursions—Central Appalachians during spring vacation.

**308. Field Excursion—Central Appalachians**  
Spring. 2 or 3 credits. 307.  
Training in stratigraphic, sedimentological, paleontologic, and structural principles as applied to field methods.

**309. Geology of Michigan**  
Fall. 3(3-0) 200 or 201 and/or 202; or approval of department.  
A historical accounting of the physical, historical and economic geology of Michigan and its environs; a course designed for students seeking an overall picture of the rather unique Michigan geological environment.

**310. Engineering Geology**  
Fall. 3(3-2) Credit will be given for only one of the following: 200, 201, 306. Sophomore Engineering students.  
Fundamental principles of geology as applied to civil engineering practice. Minerals and rocks, aerial photographs, topographic and areal geologic maps and geologic cross sections studied in laboratory. Source of geologic literature and maps.

**311. Geology Central Appalachians**  
Winter. 1(0-2) 200, or 201, or 202, or concurrently.  
General geology of the Central Appalachians. A preparatory course for 308. Field excursions—Central Appalachians during spring vacation.

**312. Field Excursion—Central Appalachians**  
Spring. 2 or 3 credits. 307.  
Training in stratigraphic, sedimentological, paleontologic, and structural principles as applied to field methods.

**GEOLOGY GLG**

**College of Natural Science**

**200. The Geology of Man's Environment**  
Fall, Winter, Spring, Summer. 3(3-0)  
Not open to Geology majors.  
The relation of geological processes and Earth materials to man. The nature and evolution of the Earth and life upon it. Man's exploitation of the non-renewable resources of the Earth.

**200L. Laboratory—Geology of Man's Environment**  
Fall, Winter, Spring, Summer. 1(0-3) 200 or concurrently.  
The geological reasoning concerning the nature and evolution of the Earth.