

**GENETICS**

**GEN**

**GEOGRAPHY**

**GEO**

**College of Natural Science**

**800. Genetics Seminar**

*Fall, Winter, Spring. 1(1-0) May reenroll for a maximum of 12 credits. Approval of director.*

Student seminar to cover genetics subjects not considered in formal courses. Course is also intended to give students experience in reviewing and organizing literature in a subject, and orally presenting and defending the analysis.

**804. Gene Transmission**

*(801.) Fall. 3(3-0) ZOL 441 or approval of instructor.*

Molecular and formal genetic studies of the replication, recombination, repair and segregation of genetic information in prokaryotes and eukaryotes. Experimental design and methodology will be emphasized.

**805. Genetic organization, Action and Regulation**

*(803.) Winter. 3(3-0) GEN 804.*

Molecular and formal genetic studies of the organization, expression and regulation of gene activity in prokaryotes and eukaryotes. Experimental design and methodology will be emphasized.

**806. Population and Quantitative Genetics**

*(802.) Spring. 3(3-0) ZOL 441 or approval of instructor.*

Genetics of quantitative characteristics in populations with special reference to polygenic variation and its interactions with environment, gene action and its measurement, mating systems, and selection.

**880. Special Problems**

*Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 12 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. Research**

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

Research for the doctoral dissertation in genetics.

**College of Social Science**

Courses are classified as follows:

Cultural—170, 201, 404, 801, 901.

Economic—213, 409, 412, 413, 435, 454, 806, 809, 835, 906.

Field Techniques—415, 850.

Geographic Education—458, 858.

Historical—310, 810, 910.

Independent Research—400H, 411, 480, 818, 899, 918, 999.

Medical—470, 870, 970.

Physical—206, 206L, 429, 430, 431, 432, 451, 834, 902.

Political—170, 416, 908.

Population—215, 320, 836, 934.

Quantitative Methods—427, 428, 811.

Regional—204, 300, 315, 316, 319, 321, 322, 340, 342, 350, 360, 361, 362, 363, 364, 812, 912.

Recreational and Environmental—100, 307, 309, 828.

Theory and Philosophy—150, 280, 425, 480, 825, 826, 827.

Urban—318, 401, 402, 403, 466, 805.

Visual Media and Techniques—122, 223, 224, 424, 426, 446.

**100. Man, Location and Environment**  
*Winter, Spring. 3(3-0)*

Concepts, theory, and methods of modern Geography.

**122. The World of Maps**  
*(222.) Fall. 3(3-0)*

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

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

**IDC. Resource Ecology and Man**  
*For course description, see Interdisciplinary Courses.*

**201. Geography of Culture**  
*(301.) Fall, Winter, Spring, Summer. 4(3-0)*

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

**204. World Regional Geography**  
*Fall, Winter, Spring, Summer. 4(4-0)*

Man's relationship 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 man's environment, including their 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.

**IDC. Introduction to Latin America I**  
*For course description, see Interdisciplinary Courses.*

**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.

**215. World Food Issues**  
*Spring. 3(3-0) Interdepartmental with Food Science.*

Food resources as related to world distributions of population, soil, water, fuel and minerals. Special attention to urbanization, irrigation, and future food needs and global constraints.

**223. Introduction to Cartography**  
*Fall, Winter, Spring. 4(2-4)*

Principles and techniques of constructing maps and other graphic devices. Types of map reproduction.

**224. Remote Sensing: Airphoto Interpretation**  
*(324.) 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, and stresses application and practice.

**IDC. Continuing Revolution in China: Problems and Approaches**  
*For course description, see Interdisciplinary Courses.*

**280. Perspectives on Geography**  
*Spring. 2(2-0)*

Introduction to the profession of geography for majors.

**300. North America**  
*Fall, Winter, Summer. 4(3-0)*

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

**307. Geography of Environmental Quality**  
*Spring. 4(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, Summer. 4(3-0)*

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

**315. South America**  
*(405.) Fall, Spring. 4(3-0) Sophomores or approval of department.*

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

- 316. Middle America**  
(406.) Winter. 4(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.
- 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.
- 319. Polar Regions**  
(418.) Winter of even-numbered years. 4(3-0) Sophomores 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.
- 320. Geography of Population**  
Fall. 4(3-0)  
Relationship of the size, composition, and distribution of population to geographic variations in the nature of places.
- 321. Africa**  
(420.) Fall. 4(3-0) Sophomores or approval of department.  
Emphasis on continent south of Sahara: environments, peoples, problems, and potentials.
- 322. Africa: Contemporary Problems**  
(421.) Spring. 4(3-0) Sophomores or approval of department. GEO 321 recommended.  
Major development problems examined from environmental, historical, economic, and social perspectives.
- 340. Western Europe**  
(440.) Winter. 4(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 Problems of South Asia**  
For course description, see *Interdisciplinary Courses*.
- 342. Eastern and Southern Europe**  
(441.) Spring. 4(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.
- 350. Australia and Pacific Islands**  
(450.) Winter of odd-numbered. 4(3-0) Sophomores or approval of department.  
Physical and cultural geography of Australia, New Zealand, Melanesia, Micronesia, and Polynesia.
- 360. The Soviet Union**  
(460.) Fall. 4(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.
- 361. South Asia**  
(461.) Fall of odd-numbered years. 4(3-0) Sophomores or approval of department.  
A geographical analysis of the physical environment and human societies of India, Pakistan and Ceylon.
- 362. East Asia**  
(462.) Winter. 4(3-0) Sophomores or approval of department.  
A geographical analysis of the major developmental (modernization) problems of East Asia. Focus is on China in odd-numbered years; on Japan, Korea, Taiwan and Hong Kong in even-numbered years.
- 363. Southeast Asia**  
(463.) Fall. 4(3-0) Sophomores or approval of department.  
A geographical analysis of the major developmental (modernization) problems of Southeast Asia (Philippines, Indochina, Thailand, Burma, Malaysia/Singapore, Indonesia).
- 364. Middle East and North Africa**  
(464.) Winter. 4(3-0) Sophomores or approval of department.  
Socio-political and economic geography and physical environment of southwest Asia and Northern Africa.
- IDC. Contemporary Problems of Japan**  
For course description, see *Interdisciplinary Courses*.
- IDC. Survey of Sub-Saharan Africa**  
For course description, see *Interdisciplinary Courses*.
- IDC. Survey of Sub-Saharan Africa**  
For course description, see *Interdisciplinary Courses*.
- 400H. Honors Work**  
Fall, Winter, Spring. 1 to 16 credits.  
Approval of department.
- 401. The Ghetto**  
Fall, Spring. 4(4-0) Juniors or approval of department. Interdepartmental with and administered by the Department of Urban and Metropolitan Studies.  
Analysis of the ghetto including its spatial organization, structure and distribution of non-white and ethnic populations in cities with emphasis on the United States.
- 402. The Geography of the City**  
Fall, Spring. 4(3-0) Interdepartmental with the Department of Urban and Metropolitan Studies.  
Spatial theories, concepts, and designs of internal urban economic, social, and political structures.
- 403. The American 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) GEO 201 or approval or department.  
Geographical analysis of selected aspects of human culture area, landscape, spatial diffusion, cultural ecology, and environmental perception.
- 407. Michigan**  
Fall, Spring, Summer. 4(3-0) Sophomores or approval of department.  
Selected aspects of the physical and cultural geography of Michigan.
- 408. Canada**  
Spring. 4(3-0) Sophomores or approval of department.  
An analysis of the physical, economic and cultural patterns of Canada.
- 409. Geography of Transportation**  
Fall. 4(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.
- 412. Geography of Agriculture**  
Winter. 4(3-0)  
Analysis of the nature and world distribution of agricultural activities and settlements.
- 413. Geography of Manufacturing**  
Winter. 4(3-0) GEO 213 or Juniors.  
Evaluation of the distribution of different types of manufacturing industries. Formulation of models of industries and analysis of the role of manufacturing in society, economics and development.
- 415. Field Techniques**  
Fall, Spring. 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.
- 416. Man's Geo-Political World**  
Winter. 4(3-0) GEO 204 or Juniors.  
The organization and behavior of man in political space with emphasis on the United States.
- 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**  
Winter, Spring. 4(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.
- 426. Advanced Cartography**  
Spring. 4(1-6) GEO 223.  
Development of advanced skills in construction of maps, including ink drafting, lettering systems, map projections, scribing and photo reproduction.

**Descriptions – Geography  
of  
Courses**

**427. Quantitative Methods in Geography**  
Fall, Spring. 4(3-0) Approval of department.  
Basic quantitative techniques used in the analysis and classification of geographic data.

**428. Computer Mapping in Geography**  
Fall. 4(4-0) CPS 120.  
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**  
Winter, Spring. 4(3-0) May reenroll for a maximum of 8 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).

**430. Climates of the World**  
Spring. 4(3-0) GEO 206 or approval of department.  
Regional analysis of the world's weather and climate.

**431. Landform Analysis**  
Fall. 4(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. 4(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. 4(3-0) GEO 213 or approval of department.  
Location principles and theories of economic activities, including methods of regional analysis.

**446. Production Cartography**  
Winter. 4(1-6) GEO 223 or approval of department.  
Deals with the technical aspects of map and graphics production both as a sequence of operations and as a series of problems of organizations. Theoretical and applied aspects, process photography, typography, and proofing.

**451. Climatic Patterns and Atmospheric Circulation**  
Fall, Winter. 4(3-0) GEO 206 or approval of department.  
Relationship between weather, climate, and upper air flow, with emphasis on this climatology of North America.

**454. Geography of Water**  
Fall. 4(3-0) GEO 206 or GEO 213.  
Geographic aspects of global water resources, their utilization patterns, and the role of water in agricultural and industrial production.

**458. Geography for Teachers**  
Winter. 4(3-0)  
Problems and practices of teaching geography in elementary and secondary schools.

**466. Social and Spatial Approaches to Community Services**  
Spring. 3(3-0) GEO 201 or S W 205 or approval of department. Interdepartmental with 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. 4(3-0)  
Spatio-environmental concepts and the techniques applied to health problems: disease transmission cycles, community nutrition and health-care planning.

**IDC. Canadian-American Studies**  
For course description, see Interdisciplinary Courses.

**480. Senior Seminar**  
Spring. 2(2-0) Senior majors or approval of department.  
Current developments in geographic research and theory.

**801. Seminar in Cultural Geography**  
Fall. 3(3-0) Approval of department.  
Theory, methodology, and techniques in cultural geography.

**805. Seminar in Urban Geography**  
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, GEO 412.  
Research problems on selected topics of agricultural geography.

**809. Seminar in Transportation Geography**  
Winter. 3(3-0) Approval of department, GEO 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**  
Winter. 4(2-4) Approval of department, GEO 427.  
Statistical and mathematical approaches to spatial distributions and areal data.

**812. Regional Seminar**  
Fall, Winter, Spring, Summer. Variable credit. May reenroll 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 reenroll 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, 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.

**827. Contemporary Theory and Methodology in Geographic Research**  
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.

**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.

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

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

**850. Advanced Field Techniques**  
Fall, Winter, Spring, Summer. Variable credit. May reenroll 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.

