880. Special Problems  
Fall, Winter, Spring. Summer. 1 to 4 credits. May re-enroll for a maximum of 12 credits. Approval of instructor. 
Students with special interests and abilities may study published literature in a selected genetic topic or 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 re-enroll 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. May enroll. 
Research for the doctoral dissertation in genetics.

GEORGRAPHY GEO  
College of Social Science  
Courses are classified as follows:

Cultural—170, 201, 404, 801, 901.  
Field Techniques—415, 850.  
Geographic Education—458, 858.  
Historical—310, 810, 910.  
Independent Research—400H, 411, 450, 818, 890, 910, 996.  
Medical—470, 870, 970.  
Political—170, 416, 904, 912.  
Population—215, 320, 836, 934.  
Quantitative Methods—427, 429, 811.  
Recreational and Environmental—309, 828.  
Theory and Philosophy—150, 250, 458, 459, 825, 826, 827.  
Urban—318, 401, 402, 403, 805.  
Visual Media and Techniques—122, 293, 324, 424, 426, 446.

122. The World of Maps  
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.

170. Future Worlds  
Fall, Spring, Summer. 3(2-0)  
Geographical approach to environmental, biological, economic, social and political problems facing mankind between now and year 2000. Approved through Fall term 1979.

1DC. Resource Ecology and Man  
Fall. 3(3-0)  
For course description, see Interdisciplinary Courses.

201. Geography of Culture  
Fall, Winter, Spring. 4(3-0)  
A systematic discussion of cultural geography, stressing cultural processes and relationships.

204. World Regional Geography  
Fall, Winter, Spring. 4(4-0)  
Man's relationship with natural and cultural environments.

206. Physical Geography  
Fall, Winter, Spring. 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. 4(4-0)  
Laboratory study of geographic aspects of map interpretation, aerial photographs, weather, climatic, soils, landforms, and vegetation.

213. World Economic Geography  
Fall, Winter, Spring. 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(3-4)  
Principles and techniques of constructing maps and other graphic devices. Types of map reproduction.

224. Remote Sensing: Airphoto Interpretation  
Fall, Winter. 4(2-4)  
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.

230. Perspectives on Geography  
Spring. 2(2-0)  
Introduction to the profession of geography for majors.

232. Africa: Contemporary Problems  
Spring. 4(2-0)  
May study published literature in a selected topic in geography. May enroll 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.

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  
Fall. 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. 4(3-0)  
Reconstruction of geographies of the United States as they existed in the past.

315. South America  
Fall. 4(3-0)  
Sophomores or approval of department.  
Regional geography of South America with special attention to contemporary geographic problems.

316. Middle America  
Fall. 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. 4(3-0)  
A cross-cultural examination of cities, their historic growth, regional functions, and internal dynamics.

319. Polar Regions  
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  
Fall. 4(3-0)  
Sophomores or approval of department.  
Emphasis on continent south of Sahara: environments, peoples, problems, and potentials.

322. Africa: Contemporary Problems  
Spring. 4(2-0)  
May study published literature in a selected topic in geography. May enroll 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.
340. Western Europe (466.) 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 (460.) Winter. 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 major developmental (modernization) problems of South Asia. Focus is on China in odd-numbered years; on Japan, Korea, Taiwan, and Hong Kong in even-numbered years.

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) 201 or approval of department. Geographical analysis of selected aspects of human culture area, landscape, spatial diffusion, cultural ecology, and environmental perception.

405. Michigan
Fall, Spring, Summer. 4(3-0) Sophomores or approval of department. Selected aspects of the physical and cultural geography of Michigan.

406. 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 network, network structures, and the role of transport in space-economy.

410. Problems in Geography
Fall, Winter, Spring. 1 to 6 credits. Approval of department. Research on specialized geographic problems.

411. Geography of Agriculture
Winter. 4(3-0)
Analysis of the nature and world distribution of agricultural activities and settlements.

412. Geography of Manufacturing
Winter. 4(3-0) 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 re-enroll 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 traversing, sampling, questionnaire design, interviewing, analysis and reporting. Requires work off campus.

416. Man's Geo-Political World
Winter. 4(3-0) 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) 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(1-0) 223. Development of advanced skills in construction of maps, including ink drafting, lettering systems, map projections, scaling and photo reproduction.

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 150. 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 re-enroll for a maximum of 8 credits. 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) 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. 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) 206 or approval of department. Patterns of vegetation, with emphasis on forests of eastern North America. Option for some field study.

433. Land Use and Location Theory
Spring. 4(3-0) 213 or approval of department. Location principles and theories of economic activities, including methods of regional analysis.
446. Production Cartography  
Winter. 4(1-6) 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, typographic, and proofing.

451. Climatic Patterns and Atmospheric Circulation  
Fall, Winter. 4(3-0) 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) 206 or 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.

470. Geography of Health and Disease  
Fall. 4(3-0)  
Spatial-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(3-0)  
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.  
Research problems on selected topics of agricultural geography.

809. Seminar in Transportation Geography  
Winter. 3(3-0) Approval of department.  
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.  
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, 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) 390 or approval of instructor.  
Selected current problems in recreation geography in the U.S. and abroad.

834. Seminar in Physical Geography  
Winter, Spring. 2(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.  
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 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)  
Spatial-environmental analysis of selected health problems.

899. Research  
Fall, Winter, Spring, Summer. Variable credit.  
May re-enroll for a maximum of 6 credits.  
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. 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.