880. Special Problems
Fall, Winter, Spring, Summer. 1 to 4 credits. May enroll 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 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. Doctoral Dissertation Research
Fall, Winter, Spring, Summer. 3 to 12 credits. May re enroll for a maximum of 19 credits. 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. 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) Sophomore.

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.

252. Physical Geography Laboratory
Fall, Winter, Spring. 3(3-0) Sophomore or approval of department.

Geophysical interpretation of maps. Emphasis on usage (land use) and on interpretation of cartographic techniques. Co-requisite with GEO 251. Laboratory study of atmospheric weather processes and patterns, including surface and middle atmospheric (jet stream) features.

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) Sophomore 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 the geography of the United States as they existed in the past.

315. South America
Spring. 3(3-0) Sophomore or approval of department.

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

316. Middle America
Winter. 3(3-0) Sophomore 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) Sophomore or approval of department.

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

322. Africa: Contemporary Problems
Spring. 3(3-0) Sophomore or approval of department. GEO 251 recommended.

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

340. Western Europe
Winter. 3(3-0) Sophomore 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.

342. Eastern and Southern Europe
Spring. 3(3-0) Sophomore 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) Sophomore 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
Fall. 4(4-0) Sophomore 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 4 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 4 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.

433. 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.

434. 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 225. 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.

460. Social and Spatial Approaches to Community Service Spring. 3(3-0) GEO 301 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, ecology, 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 965, AET 965.) Spring. 4(3-0) 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 490. Selected research topics.


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.
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. Prosenser 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. 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.