

General Catalog 76/78

The University of Iowa

Iowa City, Iowa

THE UNIVERSITY OF IOWA BULLETIN



Geography

Department chairman: Clyde F. Kohn

Faculty: professors Kenneth J. Ducker, Clyde F. Kohn, James B. Lindberg, Michael L. McNulty, David R. Reynolds, Gerard Rushton, Neil E. Salisbury; assistant professors William Graf, Rex D. Honey, Konstantinos Koutsopoulos

Degrees offered: B.A., B.S., M.A., Ph.D.

Modern geography is concerned, mainly, with the spatial aspects of human geography and with man/environment relations. Students who elect courses in geography soon find that the insights and methods of inquiry they develop are applicable to the solution of many of the complex problems confronting modern societies, such as air and water pollution, transportation problems, the development of ghettos in large cities, distribution and consumption of natural resources, rapidly increasing populations and conflicts between nations. Studies in geography provide students with concepts and methods for organizing such spatial units as urban areas, market regions, school districts and other kinds of service areas. Thus, today's geography contributes to the decision-making processes involved in determining how individuals or groups of individuals can improve the quality of life in this complex age.

Much of modern geography is problem-oriented. It is scientific as well as humanistic in its approach to the solution of these problems. It is involved with two basic considerations: the best means to obtain accurate factors or data; and the tools and techniques necessary for analyzing these data to see if they verify or alter existing explanations for the facts as they are observed.

Career opportunities for majors in geography exist in various branches of government and in business. There is a demand for persons capable of dealing with resource management, economic development, market area analysis and other problems related to the distribution and spatial interaction of physical, economic, social and political phenomena in the world as a whole or in major parts of it.

There is also a growing demand for young people concerned with human perception of, and subsequent interactions with the total environment. Courses in geography are commonly required of students preparing to enter the teaching profession at the elementary and secondary school levels, of students who want to work in urban and regional planning, and as a background for many related professions, including law, health care delivery systems and transportation engineering.

The Undergraduate Program

The geography faculty has developed an undergraduate instructional program which provides educational opportunities for a variety of students: (1) for the nonmajor interested in one or more elective courses as they relate to a liberal education; or for those interested in electing a cluster of courses in conjunction with another discipline, or for the B.G.S. degree; and (2) for those interested in acquiring a major in geography. The Department also joins in significant interdepartmental programs involving regional, urban and environmental components.

Courses for the Non-major

Students in the College of Liberal Arts or other schools and colleges of the University who do not plan to major in geography find meaningful such courses as Urban Political Geography (44:116), Natural Hazards (44:120), The Inner City (44:136), Urban Problems (44:139), The Third World (44:162), The Changing World (44:165) and Energy in Contemporary Society (44:191). These students are able to pursue their own intellectual

curiosity; sometimes to gain breadth of knowledge, or sometimes to fulfill specific curricular needs, such as Maps and Mapping (44:107) or Environmental Impact Studies (44:125).

Students in several related disciplines and in the Bachelor of General Studies program take clusters of courses in geography according to their individual interests. Those specializing in environmental studies might elect such upper level courses as Introduction to Weather and Climate (44:101), Natural Environmental Issues (44:119), Natural Hazards (44:120), Streams and Water: Process and Resources (44:121), Natural Resources of the United States (44:122), Geography of Natural Resources (44:123), Environmental Impact Studies (44:125) and Field Techniques in Natural Environmental Problems (44:180).

For students interested in a cluster of advanced courses in urban geography, the Department offers Introduction to Urban Transportation (44:111), Urban Political Geography (44:116), Urban Geography (44:135), The Inner City (44:136), Metropolitan Growth and Development (44:137) and Urban Problems (44:139).

Students in business may benefit from taking such locational analysis courses as Introduction to Economic Geography (44:030), Location of Services (44:130) and Industrial Location (44:132).

Alternative Programs for the Undergraduate Major

Students electing to major in geography will be exposed to concepts and methods of inquiry in physical, economic, social and political geography, especially as they relate to urban areas. They will be taught how to state problems from a geographic point of view, where and how to find relevant data for analyzing these problems, how to relate their findings to existing theories and how to apply their findings to real world situations.

Students majoring in geography may choose alternative programs depending on their interests. The substantive strengths of the Department fall into three areas: environmental studies, urban and regional studies, and locational analysis. Students may choose to develop expertise in one of these areas, or they may choose to develop an individualized program within the curriculum offered by the Department. Students planning advanced training or seeking careers in geography should elect the Bachelor of Science degree. Those who wish to pursue a liberal arts objective are advised to elect the Bachelor of Arts degree.

All geography majors must complete a minimum of 26 semester hours of geography course work, at least 15 of which must be at the 100-level. Many students will find that they will need more than the minimum requirements for mastery of a specific subfield.

All majors must complete the course Introduction to Quantitative Methods in Geography (44:108), or its equivalent as approved by the departmental chairman on recommendation of the student's adviser, and the Undergraduate Seminar for Geography Majors (44:150). Other than these two courses, the requirements vary with the specific program selected by the student.

Bachelor of Science students must complete either Introduction to Computing with FORTRAN (22C:100) or Calculus I (22M:025).

Environmental Studies

The undergraduate program in environmental studies is designed for students with career expectations or personal interests in resource management or environmental protection, or who have interests in physical geography per se. The program provides a knowledge of physical processes in landform development, atmospheric conditions, soil development and biotic communities. It stresses the interrelationships among those processes and gives the

student knowledge necessary to assess the impact of human activities on physical systems. Training in field observation, quantitative analysis, computer methods and cartographic representation are included in this concentration.

Required technique courses include Introduction to Quantitative Methods in Geography (44:108), Undergraduate Seminar for Geography Majors (44:150), Field Techniques in Natural Environmental Problems (44:180) and Introduction to Computing with FORTRAN (22C:100) or Calculus I (22M:025).

Students concentrating in environmental studies are advised to select substantive courses from among the following:

- 44:001 Introduction to Human Geography
- 44:002 Natural Environment and Man
- 44:101 Introduction to Weather and Climate
- 44:119 Natural Environmental Issues
- 44:120 Natural Hazards
- 44:121 Streams and Water: Processes and Resources
- 44:122 Natural Resources of the United States
- 44:123 Geography of Natural Resources
- 44:125 Environmental Impact Studies

Also recommended are Maps and Mapping (44:107) and Computer Methods in Geographical Analysis (44:109).

Under the direction of an adviser, students should select courses in related disciplines.

Urban and Regional Studies

Students with interests in urban and regional analysis or in development problems will find this concentration relevant, either as background training for graduate work or as preparation for entry level positions in government and private businesses. This track stresses the problems and potentials of towns, cities and regions. The decision-making processes of individuals and institutions are stressed. Dealing with such problems as assessing sites for development potential, locating public facilities and gauging neighborhood change bring the student "inside" the dynamic of contemporary cities. Requisite skills in quantitative analysis, cartography and computer usage are developed. Opportunities for experience in working with real problems are included.

Required technical courses are: Introduction to Quantitative Methods in Geography (44:108), Spatial Organization (44:138), Undergraduate Seminar for Geography Majors (44:150), Introduction to Computing with FORTRAN (22C:100) or Calculus I (22M:025).

Students concentrating in urban and regional analysis or in problems of development are advised to select substantive courses from the following:

- 44:001 Introduction to Human Geography
- 44:002 Natural Environment and Man
- 44:011 Introduction to Social Geography
- 44:030 Introduction to Economic Geography
- 44:033 Introduction to Transportation Geography
- 44:035 Introduction to Urban Geography
- 44:111 Introduction to Urban Transportation
- 44:116 Urban Political Geography
- 44:130 Location of Services
- 44:132 Industrial Location
- 44:135 Urban Geography
- 44:136 The Inner City
- 44:137 Metropolitan Growth and Development
- 44:139 Urban Problems

Also recommended are Maps and Mapping (44:107) and Computer Methods in Geographical Analysis (44:109).

Under the direction of an adviser, students should select courses in related disciplines.

Locational Analysis

The concentration in locational analysis is designed for students who wish to gain expertise in this more traditional problem-solving field within human geography. Students learn to use modern technology to help them calculate solutions to such locational problems as selecting the best site for a store or public facility, estimating demand in an area, developing models of consumer behavior and gauging the impact of locational decisions.

The required professional courses include Introduction to Quantitative Methods in Geography (44:108), Spatial Organization (44:138), Undergraduate Seminar for Geography Majors (44:150), Introduction to Computing with FORTRAN (22C:100) or Calculus I (22M:025).

Students concentrating in locational analysis are advised to select substantive courses from the following:

- 44:001 Introduction to Human Geography
- 44:030 Introduction to Economic Geography
- 44:033 Introduction to Transportation Geography
- 44:111 Introduction to Urban Transportation
- 44:130 Location of Services
- 44:132 Industrial Location
- 44:137 Metropolitan Growth and Development
- 44:139 Urban Problems

Two additional technique courses are also recommended: Maps and Mapping (44:107) and Computer Methods in Geographical Analysis (44:109).

Under the direction of an adviser students should select courses in related disciplines.

General Program

For those who do not wish to concentrate in any particular area of interest, a more general liberal arts program in geography may be designed to provide such majors with a broad understanding of the discipline. The students must elect Introduction to Quantitative Methods in Geography (44:108) and Undergraduate Seminar for Geography Majors (44:150). Other courses should be chosen under the direction of an adviser. Such courses selected should be appropriate to each student's interests and needs.

Individual Programs

If none of these four alternatives are appropriate, students may design their own individual programs of instruction with the help of their advisers. Such programs, however, must include Introduction to Quantitative Methods in Geography (44:108), Spatial Organization (44:138), Undergraduate Seminar for Geography Majors (44:150), and either Introduction to Computing with FORTRAN (22C:100) or Calculus I (22M:025).

Students who wish to specialize in such areas as the geography of the third world, political geography or social geography, may want to design individual programs.

The Cooperative Education Program

The Department of Geography is a participant in the University's Cooperative Education Program, which provides opportunities for both undergraduate and graduate students to secure cooperative training assignments related to their academic programs.

The Graduate Program

The goals of the Department at the graduate level are to prepare students to carry on creative and productive research in geography involving the use of theory, modeling and formal verification methods; to prepare students for positions in research, teaching, or some area of applied geography; and to help students develop their ability to apply knowledge of facts, theories and methodology to specific societal programs. The achievement of these goals is demonstrated in large measure by the demand for Iowa graduates to fill positions on college and university faculties, in research-oriented institutions and in business and government.

The graduate program at Iowa is concerned with the locational analysis of physical, economic, social and political phenomena; the spatial aspects of human behavior; and the interaction of humans and their environment.

The Department offers specialized instruction in the teaching of geography at the college level (44:206 Teaching College Geography and 44:306 Research Seminar: The Teaching of Geography) for those interested in academic careers. Opportunities are provided for all graduate students to gain practical teaching experience through service as departmental teaching assistants or through other supervised teaching duties. Graduate students who plan to become college teachers are strongly encouraged to complete 44:206 Teaching College Geography.

Master of Arts Programs

The Department offers two programs leading to the Master of Arts degree, with and without thesis. Within this framework, there are two major tracks: one for students who wish to prepare for positions in research or teaching; the other for students who are interested in some area of applied geography.

Students whose objective is the Master of Arts degree leading to a career in teaching or research are required to complete a minimum of 30 semester hours of graduate work including 44:201 Geographical Analysis I and 44:208 Quantitative Analysis I. The remainder of their programs must be composed of graduate-level courses or research seminars as approved by the faculty or the student's adviser. A maximum of six semester hours of credit may be earned by the satisfactory completion of a thesis for those who wish to take the Master of Arts degree with thesis. All students must pass a final examination.

Students whose objective is the Master of Arts degree leading to a career in some area of applied geography (commonly referred to as the Master of Arts program in Applied Geography) are required to complete a minimum of 30 semester hours of graduate work including 44:208 Quantitative Analysis I and 44:300 Seminar in Applied Problems. A computer language course, a cartography course or its equivalent and 44:208 Quantitative Analysis I, are required as prerequisites for 44:300. The remainder of the program will be composed of courses in geography and related departments as approved by the student's faculty adviser. Students are advised that it is possible to complete the Master of Arts program in applied geography in one year if they enter with sufficient background. Those whose background is not adequate should plan additional time. All students must pass a final oral and/or written examination. The coordinator of the program will conduct an initial screening and advising of incoming students. An appropriate adviser in the student's specified area of interest will be assigned to assist in tailoring a program to suit the needs of the student. Suggested sample programs have been formulated and may be used as guidelines. Students should inquire about the internship program.

Doctor of Philosophy

Students whose objective is the Doctor of Philosophy degree are required to complete 44:201-202 Geographical Analysis I-II and 44:208-209 Quantitative Analysis I-II. The courses 44:201, 208 and 209 should be elected during the first year in residence; the course 44:202 may be taken at any time during the student's residence. Students may meet these requirements with a satisfactory performance in written examinations during the first week of the first semester for which they register.

All doctoral students must also complete two research seminars, preferably during their second year in residence, under the direction of different faculty members. They are also required, unless excused by the faculty, to register for 44:350 Research Staff Seminar each semester while in residence. One semester hour of credit will be awarded each semester on a satisfactory/unsatisfactory basis for this course.

The remainder of the Ph.D. program includes appropriate graduate courses, seminars and research in geography chosen by students to reflect their area of interest; courses in disciplines closely related to the student's objectives and interests; and courses which satisfy the tool requirements. Students develop their programs with the advice and consent of their advisers.

Programs for students who wish to study for the Ph.D. in geography are established separately for each student. For this reason, as soon as possible after beginning graduate work, doctoral students are urged to declare a general area of specialization within the discipline and to secure a faculty adviser. No later than their fourth semester in residence, doctoral students should declare a field of specialization within their general areas of interest and secure a faculty adviser to direct their program of study.

Preferably during their second year in residence, and not later than the fifth semester, doctoral students who have been admitted to the graduate program without advanced credit, must submit an original research paper to the faculty, with the approval of their adviser. Students who have been admitted with advanced graduate credit of 24 semester hours or more, or the equivalent, must meet this requirement no later than their third semester in residence. The faculty will pass upon the merits of the research thus demonstrated. Students become Ph.D. candidates when their qualifying paper has been accepted. No graduate appointment can be extended beyond the third semester in residence for students admitted with 24 semester hours or more of advanced credit, or beyond the fifth semester in residence of other students, unless the student has completed an acceptable qualifying paper and has thereby become a candidate for a doctoral degree.

Research tool requirements for the Ph.D. candidates are of two kinds. One is the course 44:209 Quantitative Analysis II; the other may be satisfied by completing any other appropriate course, as approved by the faculty at the time the student declares his or her specific area of specialization.

Candidates for the Ph.D. degree are required to pass a comprehensive examination consisting of written and oral parts, demonstrating analytical proficiency in a major area of specialization and a general knowledge of the discipline, including both content and methodology. Prior to taking the comprehensive examination, students must present a definition and review of their area of specialization in an appropriately scheduled open meeting, as for example, 44:350. Upon passing the comprehensive examination, the doctoral candidate will prepare a research design to be presented before the staff seminar. After receiving the critical comments of faculty and students, the candidate is expected to conduct the necessary research and to present his or her findings in

a dissertation which must be defended in a final oral examination.

All doctoral candidates are expected to have supervised experiences as classroom instructors and research assistants before being awarded the Ph.D. degree.

Graduate Admission

In determining the admission of a student to the graduate program, the Geography Department considers the total record of each student individually. In addition to the general rules and regulations set forth in the *Manual of Rules and Regulations of the Graduate College*, the Department considers the student's undergraduate grade-point average, especially during his or her junior and senior years; scores on the Graduate Record Examination Aptitude Test; letters of recommendation from those with whom he or she has taken courses; and an essay in which the applicant sets forth the reasons for wanting to study geography at The University of Iowa. An applicant with an undergraduate grade-point average between 2.3 and 2.75 will be admitted only for the M.A. degree on the condition that he or she achieves a grade-point average of 2.75 or better on the first 12 hours of graduate work as approved by the Department. Foreign students and others from undergraduate institutions which evaluate students on a basis other than grade-point averages will be considered according to their relative academic standing in their respective institutions. Applications for graduate appointments are usually considered at the end of the second week in February.

Special Facilities

The Department possesses substantial equipment in the computer-mapping area including a Graf pen digitizer supported by the IMLAC-PDS-4 mini-computer with a CRT for on-line editing of digitizing work. It is expected that this system will be enlarged to include additional core space, a magnetic disc drive system and a hard copier. The University has an IBM 360 Model 65 computer and a CALCOMP plotter available to the Department. In addition an HP 2000F system with beehive terminals is available for instructional use. Housed on the third floor of the Main Library, the Map Library contains more than 75,000 maps, a total of 2050 atlases and reference works, and about 80,000 aerial photographs, primarily of Iowa. The map collection in the library is a depository library for maps of the U.S. Army Topographic Command, formerly Army Map Service. The Geology Library contains approximately 50,000 maps, including both geologic maps and U.S. Geological Survey topographic maps. The Department of Geography has its own collection of topographic maps, maps of large urban centers and aerial photographs for use by students in working out laboratory exercises.

Courses

Courses open to undergraduate students may be taken in any order or simultaneously. No undergraduate course in geography has any prerequisites. It is recommended, however, that majors take 44:108, 44:138 and 44:150 in that sequence. All courses below the 100-level are open to freshmen; 44:1, 44:2, 44:11, 44:19, 44:30 and 44:35 are available for social science core credit.

Primarily for Undergraduates

44:1 Introduction to Human Geography 4 s.h.
Application of geographic principles to contemporary social, economic and political problems; urban growth; problems of the ghetto; diffusion of innovations; territoriality and perception.

- 44:2 Natural Environment and Man** 4 s.h.
Spatial distribution of the world's natural resources including climate, water, landforms, soils, vegetation and minerals; human role in defining nature of resource base; regional problems in resource use, environmental pollution and natural hazards.
- 44:11 Introduction to Social Geography** 4 s.h.
Spatial considerations of population growth and distribution; minorities within a population; poverty; housing; social organization and disorganization; social systems including education, religion, recreation, medical, and social services; diffusion of ideas and traits over space.
- 44:19 Natural Environmental Issues** 2 s.h.
Issues arising from human use of natural environment and related problems resulting from expanding world population; air, water and land pollution; population pressures on agricultural resources; energy and mineral resource requirements versus quality of environment.
- 44:30 Introduction to Economic Geography** 3 s.h.
Location and spatial organization of world's major types of economies; agricultural energy and minerals, manufacturing, transportation; trade and service centers.
- 44:33 Introduction to Transportation Geography** 3 s.h.
Basic concepts of transportation and their relationship to geography; spatial processes and spatial structures associated with transportation.
- 44:35 Introduction to Urban Geography** 3 s.h.
Processes of urbanization and city growth; spatial structure and pattern of urban activities; geographic considerations of contemporary urban problems; the city and its physical setting; comparative urban studies.
- 44:100 Readings for Undergraduates** arr.
Supervised readings in geography. Prerequisite: consent of instructor.

Courses for Undergraduates and Graduates

- 44:101 Introduction to Weather and Climate** 3 s.h.
Spatial distribution of weather elements, wind circulation, air masses, storms and general world climatic conditions including air pollution and climatic change; laboratory work in study of weather maps and climatic data.
- 44:106 Geography in the School Curriculum** 3 s.h.
Concepts and content of geography essential to effective educational programs; methods of geographic inquiry; use of audiovisual media in teaching geography.
- 44:107 Maps and Mapping** 2 s.h.
Qualities of a good map or diagram; types of maps or diagrams for particular uses; major types of cartographic presentations; available tools for constructing maps and diagrams; procedures for the compilation of maps and diagrams; laboratory experiences in compiling maps and diagrams.
- 44:108 Introduction to Quantitative Methods in Geography** 3 s.h.
Applications of mathematical and statistical techniques in geography.
- 44:109 Computer Methods in Geographical Analysis** 2 s.h.
Use of computer mapping as a tool in geographic analysis; various mapping programs including SYMAP, CALFORM and others.
- 44:111 Introduction to Urban Transportation** 3 s.h.
Urban transportation defining the land use/transport system and the urban transportation planning process; transportation problems, especially as evidenced in Iowa City. Same as 102:111.
- 44:116 Urban Political Geography** 3 s.h.
Relationships between individual political behavior and the functional and geographical organization of urban political systems; U.S. metropolitan areas and the satisfaction of citizen preferences for public goods and services.
- 44:119 Natural Environmental Issues** 2 s.h.
Issues arising from human use of the natural environment and related problems resulting from an expanding world population; air, water and land pollution; population pressures in agricultural resources; energy and mineral resource requirements versus the quality of the environment.
- 44:120 Natural Hazards** 3 s.h.
Human-environment relationships under extreme environmental conditions; causes, characteristics and consequences of extreme events such as earthquakes, tornadoes, blizzards, droughts and floods; human adjustments to these events, ranging from immediate responses like denial of occurrence and evacuation to long-term responses like forecasting, flood control, zoning, and insurance.
- 44:121 Streams and Water: Processes and Resources** 1-3 s.h.
Water as a resource and as an agent in shaping the form of the land surface, characteristics of stream drainage basins and alluvial landforms, floods and their interrelationships with land use.
- 44:122 Natural Resources of the United States** 3 s.h.
Nature and patterns of regional differences in the natural resource base for agriculture and industry including land, water and minerals; environmental problems and conflicts arising from resource development.

- 44:123 Geography of Natural Resources** 3 s.h.
Definition, evaluation and exploitation of natural resources as developed through time and within different cultural settings.
- 44:124 Introduction to the Global Environment** 3 s.h.
Interdependence of the three major world ecosystems: land, atmosphere and oceans. Problems resulting from the impact upon the natural environment of human activities in support of world society.
- 44:125 Environmental Impact Studies** 3 s.h.
Writing, attacking and defending environmental impact assessments; sources of environmental information; photo interpretation for impact assessment.
- 44:130 Location of Services** 3 s.h.
Problems in the effective spatial organization of public and private facilities; central place theory; modeling spatial choices between service sites; spatial outcomes of alternative behavioral strategies for reorganizing service systems; location-allocation algorithms and their use in planning and evaluating the spatial delivery of social and economic services.
- 44:132 Industrial Location** 3 s.h.
Theory and practice of manufacturing location and its application to different industries and types of economy; investigations of selected case studies.
- 44:135 Urban Geography** 3 s.h.
Models of urban growth and urban forms; spatial patterns of selected activities; processes that generate these patterns; current problems.
- 44:136 The Inner City** 3 s.h.
Residential segregation of minorities, spatial structure of ghetto areas; environmental quality of inner city neighborhoods; spatial aspects of problems of economic and social stress. Same as American Civilization 45:136.
- 44:137 Metropolitan Growth and Development** 3 s.h.
Historical and contemporary forces affecting the development of metropolitan areas; contextual and spatial perspective of forces of change; population processes and spatial population forecasting; value orientation, change and conflict; policy issues.
- 44:138 Spatial Organization** 3 s.h.
Approaches to spatial analysis of human activities and natural processes.
- 44:139 Urban Problems** 3 s.h.
Geographical perspective on problems of urban life; processes involved and policy implications of such topics as sprawl, redevelopment, housing, segregation, transportation, crime, health care, air pollution.
- 44:141 United States and Canada** 3 s.h.
Methods of analysis of regional economic and social development with specific application to regions of United States and Canada.
- 44:150 Undergraduate Seminar for Geography Majors** 2 s.h.
Participation in a term project and preparation of a documented report. Prerequisites: 44:108 and 44:138, or equivalents.
- 44:161 African Development** 3 s.h.
Problems of economic, political and spatial integration in Africa; patterns and processes of economic development and nation-building. Same as Political Science 30:146 and American Civilization 45:162.
- 44:162 The Third World** 3 s.h.
Geographical patterns and processes of underdevelopment; spatial implications of colonialism and neocolonialism; alternate concepts of spatial planning in the Third World.
- 44:165 The Changing World** 3 s.h.
Conceptualization of the world as an increasingly interconnected system; similarities and differences in the ways diverse regions are participating in the changing world.
- 44:170 The World of Wines** 2 s.h.
Production, distribution and consumption of wines throughout the world with emphasis on quality of wine as related to landforms, soils, weather conditions; viticultural practices in the different grape-growing areas.
- 44:180 Field Techniques in Natural Environmental Problems** arr.
Mapping and survey techniques as applied to natural resources; problems in resource evaluation and management in their field settings.
- 44:191 Energy in Contemporary Society** 3 s.h.
Technical, legal, economic and behavioral issues in energy production, delivery and use; emphasis on cross-disciplinary implications of energy systems. Prerequisites: junior, senior, professional or graduate status. Same as Mechanical Engineering 527:101 and Law 91:191.
- 44:201 Geographical Analysis I** 2 s.h.
Past and recent philosophies of geography in light of philosophical developments in science in general; critical review of research literature of the past.
- 44:202 Geographical Analysis II** 2 s.h.
A critical examination and evaluation of recent methodological and theoretical developments in geography. Prerequisite: 44:201 or its equivalent, or permission of the instructor.
- 44:208 Teaching of College Geography** 3 s.h.
Roles of college faculties; goals and objectives of geography teaching; alternative instructional methods; evaluation systems; emphasis on application in the college classroom.
- 44:208 Quantitative Analysis I** 3 s.h.
Problems of drawing inferences from data in studies using simple measures; research design; commonly-used measures of statistical and spatial association; logic of statistical inference and hypothesis testing; simple correlation and regression analysis; introduction to computer modeling. Prerequisite: introductory statistics or consent of instructor.
- 44:209 Quantitative Analysis II** 3 s.h.
Statistical and mathematical analysis in current geographical research with emphasis on problem formulation and research design; multiple correlation and regression; analysis of variance; testing causal models; selected topics in multivariate analysis, scaling and network analysis. Prerequisites: 44:201 and 44:208, or consent of instructor. A continuation of 44:208.
- 44:215 Locational Analysis of Political Behavior** 3 s.h.
Locational basis of political and quasipolitical behavior at individual and various systems levels; spatial dimensions of electoral behavior; aspects of political modernization; urban public policy-making. Prerequisite: 44:208 or consent of instructor.
- 44:216 Behavioral Analysis in Geography** 3 s.h.
Various behavioral model-building strategies pertaining to spatial behavior and spatial structure with emphasis on environmental perception approaches. Prerequisite: 44:202, 44:208 or consent of instructor.
- 44:221 Advanced Landforms** 1-3 s.h.
Recent problems and theoretical developments in selected geomorphic topics and regions.
- 44:226 Seminar: Transportation Planning Issues** 3 s.h.
Process and policy considerations related to transportation planning; investigation of current issues and methodologies employed in transportation planning. Same as Urban and Regional Planning 102:226. Prerequisite: 44:111 or consent of instructor.
- 44:227 Geographic Information Systems** 3 s.h.
Application of information system concepts to spatial analysis and planning; data processing of small-area data to support research and planning. Same as Urban and Regional Planning 102:227. Prerequisite: consent of instructor.
- 44:230 Locational Analysis of Economic Behavior** 3 s.h.
Classical theories for location of economic activities contrasted with alternate approaches of spatial analysis school of economic geography; contemporary efforts to develop behavioral models of decision-making contrasted with mathematical programming and heuristic programming approaches to solutions of spatial allocation problems. Prerequisite: 44:130, 44:209 or consent of instructor.
- 44:236 Travel Behavior in Urban Areas** 3 s.h.
Theoretical and conceptual basis of urban travel behavior; current models of travel behavior; interaction between intra-urban spatial structure and travel behavior; new research strategies and experimental behavior models helpful in gaining insight into urban travel behavior processes. Prerequisite: 44:208 or consent of instructor.
- 44:237 Urban Spatial Analysis** 3 s.h.
Research issues, findings and methodologies in urban geography; spatial aspects of economic, social and political processes in urban settings; preparation of review papers.
- 44:261 Geographic Perspectives on Development** 3 s.h.
Theoretical and empirical studies of the development process with special emphasis on spatial implications of socioeconomic changes attendant upon development. Prerequisite: 44:201, 44:208 or consent of instructor.
- 44:275 Urban Growth in Developing Countries** 3 s.h.
Cross-cultural and interdisciplinary analysis of problems associated with urbanization and development in the developing nations. Same as Anthropology 113:275, Economics 6E:275, Social Work 42:275, Sociology 34:275, Urban and Regional Planning 102:275, and Political Science 30:275.
- 44:280 Field Techniques in Physical Geography** arr.
Sampling procedures and collection of field data in physical geography together with laboratory analysis of data.
- 44:300 Seminar in Applied Problems** 4 s.h.
Geographic skills, knowledge and analytical methods needed to solve real world problems presented in a case studies format, including problems in human geography,

Courses for Graduates Only

- 44:200 Readings** arr.
Graduate students who have interest in pursuing specific topics of their choice may do so by registering for supervised readings in geography. Prerequisite: consent of instructor.

locational analysis and human-environment interactions. Prerequisites: 44:208, 44:107, Computer Science 22C:100, or their equivalents.

| | |
|--|------|
| 44:306 Research Seminar: The Teaching of Geography | arr. |
| 44:308 Research Seminar: Quantitative Methods, Computer Methods and Modeling | arr. |
| 44:315 Research Seminar: Locational Analysis of Political Behavior | arr. |
| 44:316 Research Seminar: Space Perception | arr. |
| 44:318 Research Seminar: Pleistocene | arr. |
| 44:319 Research Seminar: Physical Geography | arr. |
| 44:320 Research Seminar: Natural Hazards and Problems | arr. |
| 44:321 Research Seminar: Urbanization and Environment | arr. |
| 44:323 Research Seminar In Natural Resources | arr. |
| 44:330 Research Seminar: Geographic Analysis of Economic Behavior | arr. |
| 44:331 Research Seminar: Location Theory | arr. |
| 44:335 Research Seminar: Urban | arr. |
| 44:336 Research Seminar: Urban Travel Behavior | arr. |
| 44:337 Research Seminar: City Growth and Development | arr. |
| 44:350 Research Seminar Staff | arr. |
| 44:362 Research Seminar: Perspectives on Development | arr. |
| 44:380 Field Seminar | arr. |
| 44:406 Research: The Teaching of Geography | arr. |
| 44:408 Research: Quantitative Methods, Computer Methods and Modeling | arr. |
| 44:419 Research: Physical Geography | arr. |
| 44:440 Research: Environment and Behavior | arr. |
| 44:441 Research: Locational Analysis | arr. |
| 44:442 Research: Models of Spatial Behavior | arr. |
| 44:450 Thesis | arr. |

Geology

Department chairman: Richard A. Hoppin

Faculty: professors William Furnish, Brian Glenister, Richard Hoppin, Gilbert Klapper, George R. McCormick, Holmes Semken, Keene Swett, Sherwood Tuttle; adjunct professors Stanley Grant, George Hallberg, Walter Steinhilber; associate professors Richard Baker, John Carman, Kenneth Clark, Lon Drake, Phillip Heckel, Jeffery Schabillon; research associate Harrell Strimple

Degrees offered: B.A., B.S., M.S., Ph.D.

Geology is the theoretical and practical application of all scientific disciplines to the study of the earth. How the earth was formed, what it looks like now, how man acquires his material needs from it, and how man is changing it for future generations--all are geological concerns.

Career opportunities are available to professional geologists in industry, teaching, urban planning, geological and resource surveys, government and research organizations. The master's degree is regarded by most hiring agencies as the professional degree in geology. However, an undergraduate degree is fully satisfactory in certain teaching, federal and industrial situations.

Many of Iowa's geology graduates find employment in the petroleum industry as exploration geologists. Others go on to graduate school or take jobs with government conservation agencies. Some intend to enter law, medicine or business. Others are interested in urban planning, environmental studies, engineering, archeology, science education or oceanography as advanced areas. Geology is suited to all these.

The program at Iowa stresses theoretical geology and paleontology more than the engineering or agricultural phases of the discipline. The Department specializes in relating scientific thought to the study of the earth. Geology majors receive at least

an academic year's work in basic scientific areas--physics, biology, chemistry and mathematics--in addition to a course in each major area of geology.

Each year more than 1,000 students enroll in Earth Science 11:23 Earth History and Resources and 11:24 Man and His Physical Environment, a team-taught, laboratory-lecture course designed to fulfill the College of Liberal Arts requirement for natural science core studies.

Other offerings for nonmajors include a lecture sequence for persons interested in a general survey of geology, and several advanced courses with few prerequisites--paleontology, geology of Iowa, history of the vertebrates, a planet in crisis, minerals and world affairs, geomorphology, oceanography, use of native materials and oceanography.

Undergraduate Programs

Students majoring in geology must meet the general requirements of the College of Liberal Arts. It is recommended that they satisfy the language requirement with French, German or Russian, and the social science requirement with approved courses in economics, geography and/or anthropology.

Bachelor of Science Degree

The Bachelor of Science professional program is designed primarily as preparation for graduate study and for employment in industry. Required courses in this program (12:5 and 12:6 are the preferred introductory courses for geology majors):

Geology Courses

| | | |
|--------|---------------------------------------|--------|
| 12:5 | Introduction to Geology | 4 s.h. |
| 12:6 | Evolution of the Earth | 4 s.h. |
| 12:41 | Mineralogy | 4 s.h. |
| 12:52 | Elementary Petrology and Geochemistry | 4 s.h. |
| 12:112 | Geologic Field Methods | 1 s.h. |
| 12:113 | Summer Field Course | 6 s.h. |
| 12:121 | Principles of Paleontology | 3 s.h. |
| 12:191 | Structural Geology I | 4 s.h. |
| 12:198 | Junior Seminar | 1 s.h. |
| | Two elective geology courses | 6 s.h. |

37 s.h.

(11:23 and/or 11:24 may substitute for 12:5.)

Supporting Sciences

The geology major requires at least ten semester hours of college-level mathematics, including either one semester of calculus or 22M:35 Engineering Mathematics I (computer science or statistics courses may be counted toward the ten-hour requirement), and eight hours of physics, eight hours of chemistry and five hours of college-level zoology or botany.

Bachelor of Arts Degree

The B.A. program is designed to provide a general background in geology, with a broader choice of electives than in the B.S. program, for students who are not planning to become professional geologists. With appropriate coursework in education, the B.A. program provides a base for high school or community college