GEN 100 ISSUES IN AGRICULTURE: THE DEVELOPMENT OF MODERN AGRICULTURE. (3)
An introductory course requiring critical analysis of the major social, economic, political and scientific issues in agriculture and related disciplines. The historical development of agriculture will be surveyed, followed by discussions of major issues in modern agriculture. Development of skills in information gathering, critical analysis of issues, and written and oral communication will be emphasized. Prereq: Freshman enrolled in College of Agriculture.

GEN 101 THE ECONOMICS OF FOOD AND AGRICULTURE. (3)
An introduction to the field of agricultural economics and some of the basic tools and concepts of decision making. Concepts are illustrated in terms of selected current social and economic issues including the role of agriculture in both a national and international dimension.

GEN 102 THE DYNAMICS OF RURAL SOCIAL LIFE. (3)
Introduces major concepts of sociology by exploring social, political and cultural issues confronting rural society and American agriculture, such as: population change, industrialization, energy developments, agricultural change. Student may not receive credit for both this course and SOC 101.

GEN 105 ENGINEERING APPLICATIONS IN AGRICULTURE. (3)
This course is a comprehensive overview of basic engineering principles and technology which have applications in agricultural production and resource management. It is designed for freshman and sophomore students in the College of Agriculture.

GEN 200 ISSUES IN AGRICULTURE: CONTEMPORARY PROBLEMS IN AGRICULTURE AND NATURAL RESOURCES. (3)
An intermediate course which extends the critical analysis of selected issues in agriculture and related disciplines begun in GEN 100. Continues the development of skills in information gathering, critical analysis, and written and oral communication. Students will be required to investigate scientific literature germane to the issues covered and develop reviews, reports and position papers. Prereq: Sophomore enrolled in College of Agriculture.

GEN 300 SPECIAL COURSE. (1-3)
Interdisciplinary, topical or experimental courses to be approved by the Dean of the College of Agriculture. A particular course may be offered at most twice under the GEN 300 number, and no GEN 300 course may be given for more than three credits per semester. Open to all University students, subject to such limits or prerequisites as set by the instructor. Hours are variable with each special course. Prereq: As specified by the instructor.

GEN 301 AN INTRODUCTION TO CHINESE CULTURE THROUGH AGRICULTURE. (3)
This course is designed to introduce students to basic culture in China. Students will learn about Chinese agriculture, languages, customs, history, the political and educational system, geography and the economy. The culmination of the course is a three-week trip to China. Only students committed to go on trip to China will be enrolled in the course. First priority for the trip is given to College of Agriculture students.

GEO 130 EARTH’S PHYSICAL ENVIRONMENT. (3)
A course exploring the fundamental characteristics of earth’s physical environment. Emphasis is placed on identifying interrelationships between atmospheric processes involving energy, pressure, and moisture, weather and climate, and terrestrial processes of vegetative biomes, soils, and landscape formation and change. Fulfills elementary certification requirements in education, and USP cross-disciplinary requirement.

GEO 152 REGIONAL GEOGRAPHY OF THE WORLD. (3)
A geographical study of the world by regions with a focus on the world’s physical and human landscapes. Emphasis on how regions are connected to each other. Also how each region is affected by, and affects, global issues such as economic restructuring, food production, and environmental change, will be examined. Fulfills elementary certification requirement for Education and USP disciplinary social science requirement.

GEO 160 LANDS AND PEOPLES OF THE NON-WESTERN WORLD. (3)
The geographic study of the conceptual and historical definition of regions of the world as “Non-Western.” Global patterns of social, cultural, economic, and political difference between the West and Non-West as well as the processes key to the making of the Non-Western world (such as colonialism and imperialism) are discussed. In addition, selected current issues of significance to peoples in the Non-Western world, such as sustainable development, environment, human rights, and gender relations, are considered. Fulfills USP Cross-Cultural requirement.

GEO 172 HUMAN GEOGRAPHY. (3)
A study of the spatial distributions of significant elements of human occupancy of the earth’s surface, including basic concepts of diffusion, population, migration, settlement forms, land utilization, impact of technology on human occupancy of the earth. (Fulfills elementary certification requirement for Education and University Studies requirement.)

GEO 210 POLLUTION, HAZARDS, AND ENVIRONMENTAL MANAGEMENT. (3)
An introduction to environmental systems such as weather and climate, vegetation, land forms and soils, and how the quality of these systems is modified by human use. Resource issues discussed include: atmospheric pollution and global warming; groundwater, flooding, and flood plain management; volcanic activity and earthquakes; and biocentric processes associated with deforestation and lake eutrophication. Case studies based upon important environmental problems illustrate how human activity and environmental systems interrelate. Fulfills USP Cross-Disciplinary requirement.

GEO 222 CITIES OF THE WORLD. (3)
Focuses on the historical development, contemporary character, and alternative futures of cities in both developing and developed regions. The spatial, social, economic, and political processes of major world cities are studied and contemporary urban problems are discussed. Fulfills USP disciplinary social science requirement.

GEO 240 GEOGRAPHY AND GENDER. (3)
Adopts a geographic approach to the study of gender relations. The role of space and place in shaping the diversity of gender relations throughout the world will be considered. Through case studies the importance of gender relations in understanding a variety of issues will be stressed. Such issues include: the design and use of urban and rural environments; “Third World” development; regional economic restructuring; changing political geographies; and migration.

GEO 251 WEATHER AND CLIMATE. (3)
A survey of the atmospheric controls associated with local, regional, and global weather and climate variability. Includes fundamental coverage of the physics and chemistry of energy, gasses, pressure and moisture, with a goal of promoting understanding of general weather analysis and forecasting, severe storms, atmospheric pollution, descriptive climatology, and global climate change. Prereq: GEO 130 or consent of instructor.

GEO 256 BEHAVIOR IN SPACE AND TIME. (3)
An examination of how space and time are organized and how space and time influence human behavior. Included will be notions of territoriality, life-space and the meaning of space at the personal and social level. The course will explore implications of these concepts for understanding individual and group behavior in everyday life as well as important social issues.

GEO 260 THIRD WORLD DEVELOPMENT. (3)
The course focuses on characteristics of developing countries as well as solution strategies to development problems and conditions. Cultural distinctions, traditions, and institutions are recognized as keys to development condition and progress. Selected theories show how cultural variations in language and religion may be used to explain development. Numerous case studies are discussed, including Indonesia, China, India, Brazil, Kenya, and Zimbabwe. Prereq: One of the following: ECO 202, GEO 152, GEO 160, GEO 172, or GEO 222.

GEO 285 INTRODUCTION TO PLANNING. (3)
An introduction to the history, purpose, and objectives of planning with emphasis on urban and regional planning, planning processes, techniques, and legislation.

GEO 300 GEOGRAPHIC RESEARCH. (3)
Introduces students to past and contemporary geographic concepts and methods through a survey of different paradigms or schools of thought. Includes the historical development of geographic thought, as well as examples of research carried out within these paradigms. Focuses on the relationship between different research methods and the paradigmatic and disciplinary structures that influence them. Prereq: GEO 130, 152, 160, or 172.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEO 305</td>
<td>ELEMENTS OF CARTOGRAPHY</td>
<td>(3)</td>
<td>Fundamental training in map drafting, compilation, symbolization, scales, projections, and map reproduction, including emphasis on the conceptual planning and designing of maps and graphs as a medium for communication.</td>
</tr>
<tr>
<td>GEO 310</td>
<td>QUANTITATIVE TECHNIQUES IN GEOGRAPHY</td>
<td>(3)</td>
<td>The application of spatial techniques geographers use to collect, sample, map, and analyze data in human and physical geography. Students will be introduced to automated data processing. Prereq: STA 200.</td>
</tr>
<tr>
<td>GEO 320</td>
<td>GEOGRAPHY OF THE UNITED STATES AND CANADA.</td>
<td>(3)</td>
<td>A systematic review of the physical context, economic, historic, and cultural diversity that distinguish U.S. and Canadian regions. Topical emphasis on the geographic aspects of regional problems. Prereq: GEO 130 or 152 or 172, or consent of instructor.</td>
</tr>
<tr>
<td>GEO 321</td>
<td>LAND, PEOPLE, AND DEVELOPMENT IN APPALACHIA.</td>
<td>(3)</td>
<td>Major themes revolve around regional diversity and regional development. Major topics examined include physical environmental context, historical development, and economic and population geography. The study region includes the upland areas between southern New York State and central Alabama. Prereq: GEO 130, 152 or 172, or consent of instructor.</td>
</tr>
<tr>
<td>GEO 322</td>
<td>GEOGRAPHY OF KENTUCKY</td>
<td>(3)</td>
<td>An examination of the cultural, economic, political, and environmental diversity of Kentucky. In addition to studying the state’s historical evolution, emphasis will be placed on contemporary problems facing the state. Kentucky’s regional, national, and international contexts are discussed. Prereq: GEO 130, 152, 160, or 172.</td>
</tr>
<tr>
<td>GEO 324</td>
<td>GEOGRAPHY OF CENTRAL AND SOUTH AMERICA AND THE CARIBBEAN.</td>
<td>(3)</td>
<td>A study of the diversity of physical environments and human societies. The various historical geographies (pre-Columbian and after) of the region are presented as essential to an understanding of contemporary geographical patterns and processes in transport, agricultural, industry and mining, urbanization, and population. Throughout the course case-studies are presented and students are guided as they develop their own case studies. Prereq: GEO 152 or 160 or 172.</td>
</tr>
<tr>
<td>GEO 326</td>
<td>GEOGRAPHY OF EUROPE</td>
<td>(3)</td>
<td>This course explores the physical, cultural, and political geography of the European continent. Diversity of populations and physical landscapes is stressed. The geographic context for current events that are changing the face of Europe are presented. Prereq: GEO 152 or 172.</td>
</tr>
<tr>
<td>GEO 328</td>
<td>GEOGRAPHY OF THE MIDDLE EAST AND NORTH AFRICA.</td>
<td>(3)</td>
<td>A comprehensive regional overview, emphasizing cultural adaptation to desert environments. The interrelationships among religions, cultures, and the physical environment will be examined, along with the region’s position and influence in the global system. Prereq: GEO 152, GEO 160, GEO 172, or consent of instructor. (Same as AAS 328.)</td>
</tr>
<tr>
<td>GEO 329</td>
<td>GEOGRAPHY OF THE FORMER SOVIET UNION</td>
<td>(3)</td>
<td>A study of this region’s diverse physical and human landscapes, emphasizing the historical and contemporary interlinkages between the various states. Contemporary problems of the post-Soviet era (such as environmental degradation, economic and regional restructuring, or the international position of the region) will be studied from a geographical perspective. Prereq: GEO 152, 160, or 172.</td>
</tr>
<tr>
<td>GEO 330</td>
<td>GEOGRAPHY OF SOUTH ASIA</td>
<td>(3)</td>
<td>A study of the human, economic, and environmental aspects of India, Pakistan, Bangladesh, Himalayan Nepal and Bhutan, and Sri Lanka. Topics include basic physical and cultural regionalisms, land use and population problems, and patterns of economic development involving urbanization, resources, and industrialization. Prereq: GEO 152 or 160 or 172.</td>
</tr>
<tr>
<td>GEO 332</td>
<td>GEOGRAPHY OF SOUTHEAST ASIA</td>
<td>(3)</td>
<td>A study of the cultural, economic, and political patterns and processes in mainland and insular Southeast Asia. Major themes examined are how the region’s diverse physical geography, uneven natural resource base, cultural diversity, and colonial heritage provide a background to understanding contemporary development. Prereq: GEO 152 or 160 or 172.</td>
</tr>
<tr>
<td>GEO 333</td>
<td>GEOGRAPHY OF EAST ASIA</td>
<td>(3)</td>
<td>Provides an understanding of the life and landscapes in East Asian nations, with special focus on China and Japan. Emphasis is placed on contemporary issues of sustainable development, environmental management, minority groups, human rights and gender relations. Prereq: GEO 152, GEO 160, GEO 172 or consent of instructor.</td>
</tr>
<tr>
<td>GEO 334</td>
<td>ENVIRONMENT, SOCIETY AND ECONOMY OF JAPAN.</td>
<td>(3)</td>
<td>This course examines some of the major aspects of the society, culture, and economy of Japan. It discusses Japan’s human and natural environments; natural hazards and disasters; cultural history and geography; economic and technological developments, their prospects and potentials; challenges to the management of environment and its resources; and Japan’s role in global economy. (Same as JPN 134.)</td>
</tr>
<tr>
<td>GEO 336</td>
<td>GEOGRAPHY OF SUB-SAHARAN AFRICA.</td>
<td>(3)</td>
<td>This course focuses on the cultural and environmental geographies of the subcontinent, rural landscapes and cultures and environmental problems, the historical geography of precolonial and colonial Africa, and the social geography of contemporary economic development. Prereq: GEO 130 and 152, 160, or 172. (Same as AAS 336.)</td>
</tr>
<tr>
<td>GEO 356</td>
<td>SPECIAL TOPICS IN REGIONAL GEOGRAPHY (Subtitle required)</td>
<td>(3)</td>
<td>Offers coverage of world regions not usually covered in other geography courses, or in-depth examinations of specific subregions. Topics covered include: elements of climate and physical landscapes; political and economic systems and their historical development and dynamics; social and cultural processes and landscapes. May be repeated to a maximum of six credit hours under different subtitles. Prereq: Any 100-level geography course or consent of instructor.</td>
</tr>
<tr>
<td>GEO 405G</td>
<td>CARTOGRAPHIC PRODUCTION AND DESIGN</td>
<td>(3)</td>
<td>A course involving the modern techniques of designing, drafting and reproducing commercial quality, multi-color cartographics and graphics. Scribing, photocomposition, color-proofing and planning are the principal topics of study. Lecture, one hour per week; laboratory, four hours per week. Prereq: GEO 305.</td>
</tr>
<tr>
<td>GEO 409G</td>
<td>INTRODUCTION TO GEOGRAPHIC INFORMATION SYSTEMS</td>
<td>(3)</td>
<td>An introductory investigation of the phenomenon of Geographic Information Systems (GIS), including theory and applications areas. A major portion of the course will be based on use of a current widely used GIS computer software system. Considered will be aspects of geographic data entry and editing, spatial analysis, and map development and display. Relationship of GIS to the Global Positioning System (GPS) and satellite generated data will be addressed. Prereq: Junior standing or permission of instructor.</td>
</tr>
<tr>
<td>GEO 415G</td>
<td>MAP INTERPRETATION</td>
<td>(3)</td>
<td>An introduction to reading and interpreting maps. Special attention given to the study of physical and cultural geographic portrayal on large scale topographic maps. Emphasis on the relationship between the environmental setting and human activities, surveys and boundaries, transportation, urban and rural settlement and land use, and place names. Prereq: GEO 130 or 172 or consent of instructor.</td>
</tr>
<tr>
<td>GEO 420G</td>
<td>URBAN AND REGIONAL PLANNING</td>
<td>(3)</td>
<td>An analysis of urban and regional planning with emphasis on the contemporary urban and regional planning activities. Prereq: GEO 285 or consent of instructor.</td>
</tr>
<tr>
<td>GEO 430G</td>
<td>PHYSICAL GEOGRAPHY FOR TEACHERS</td>
<td>(3)</td>
<td>This course offers the modern techniques of designing, drafting and reproducing commercial quality, multi-color cartographics and graphics. Scribing, photocomposition, color-proofing and planning are the principal topics of study. Lecture, one hour per week; laboratory, four hours per week. Prereq: GEO 305.</td>
</tr>
<tr>
<td>GEO 430G</td>
<td>PHYSICAL GEOGRAPHY FOR TEACHERS</td>
<td>(3)</td>
<td>The basic content of this course is quite similar to GEO 130 Physical Geography, with emphasis on atmospheric processes of weather and climate, and terrestrial processes of landscape formation and alteration. The human element, in terms of impacts on the environment and the converse impact through pollution and natural hazards, presents a common theme throughout the class. The primary focus in this course, however, is in developing effective teaching techniques for levels K-12 by fostering an understanding of material, a knowledge of resource materials, and experience in applying physical geography to situations outside the classroom. Open to senior education majors and practicing instructors. Lecture, ten hours per week for four weeks.</td>
</tr>
</tbody>
</table>
GEO 455 ECONOMIC GEOGRAPHY. (3)
An examination of the geography of the capitalist global economy as it has developed unevenly. Emphasis will be placed on contemporary issues (such as industrial restructuring), and specific regions (such as Kentucky). Competing theories (classical, neoclassical, and marxian) aimed at explaining these patterns and processes are discussed and applied. Prereq: GEO 152, 160, or 172.

GEO 460 URBAN GEOGRAPHY. (3)
Examines the relationship between urbanization and the larger social and economic contexts within which city growth occurs. Surveys a range of theoretical perspectives on the internal socio-economic structure and built environment of cities, including the contribution by Chicago School, neoclassical, marxist, and postmodern theorists. Emphasis also placed on relevant environmental, social, and political problems of cities. Primary focus is on North American cities, but includes cross-cultural comparisons. Prereq: GEO 152, 160, 172, or 222, or consent of instructor.

GEO 465 SPECIAL TOPICS IN HUMAN GEOGRAPHY (Subtitle required). (3)
Offers coverage of issues and themes not covered in other geography courses, or in-depth examinations of specific issues and themes. Topics covered will commonly address emerging national and global issues of both general and scholarly interest. May be repeated for a maximum of six credit hours (under different subtitles). Prereq: Any 100-level geography course or consent of instructor.

GEO 475G MEDICAL GEOGRAPHY. (3)
An examination of the basic principles of the two major traditions of medical geography: disease ecology and medical care. Examined are the etiology, diffusion, and distribution of selected diseases and diseases of major public health importance. Emphasis is on spatial relationships between accessibility and utilization of medical care resources are presented. Prereq: GEO 172 or consent of instructor.

GEO 480 INTERNSHIP IN GEOGRAPHY. (3)
Provides supervised professional experience in public and private sector positions, and is intended to introduce students to the skills and working environments of careers in geography. Students should consult with a geography faculty member in advance of registering for this class. Prereq: Junior or senior standing in the major.

GEO 490G AMERICAN LANDSCAPES. (3)
A review and analysis of America’s vernacular landscapes. Topics include: the history of settlement by Europeans, Africans, and others; evolving political allegiances; and the expansion of agricultural and industrial technologies in the context of diverse physical environments. The role of political philosophy in landscape development and historic preservation will be highlighted. Prereq: GEO 172 or consent of instructor. (Same as ARC 589.)

GEO 495 INTERNSHIP IN CARTOGRAPHY. (6 or 9)
Professional commercial cartography laboratory experience. Awarded competitively. Student assumes an entry level position involving research, production, or pre-press experience under the direction of a corporate operations supervisor. Applicants should request a faculty or University Cartography Laboratory advisor to direct and record the student’s experience for academic credit, and with the advisor’s assistance, file a signed learning agreement with the department prior to the start of the internship. Available fall, spring, and summer sessions. Credit: six hours fall and spring; nine hours summer session. Pass/fail only. Students should apply to the Director of Undergraduate Studies at least sixty days before the beginning of each semester. Prereq: Major in geography, GEO 405G and 415. The following courses are also recommended: GEO 505, 506, 507 or 508.

GEO 505 PRACTICUM IN CARTOGRAPHY. (3)
Experience credit in which a small number of advanced students work under the direct supervision of the faculty or staff cartographer and in conjunction with other faculty members on departmental and contracted projects. May be repeated to a maximum of six hours. Prereq: GEO 305 and GEO 405; or GEO 506.

GEO 506 INTRODUCTION TO COMPUTER CARTOGRAPHY. (3)
A basic introduction to computer-assisted cartography. Emphasis on basic computer graphics literacy and automated techniques for spatial data acquisition, storage, processing, and output. Introduction to current mainframe, workstation, and desktop mapping programs. Prereq: GEO 305 or permission of instructor.

GEO 508 GEOGRAPHIC INTERPRETATION OF AERIAL PHOTOGRAPHY. (3)
Aerial photography is commonly used as a means of collecting information and enhancing the analysis of the earth’s landscapes. This course provides the technical background necessary to use aerial photography in a research setting and includes the application of the techniques in specialized fields, including agriculture, forestry, geology, and urban studies. Prereq: GEO 305 or equivalent, or consent of instructor.

GEO 509 APPLICATIONS OF GEOGRAPHIC INFORMATION SYSTEMS. (3)
An extension of GEO 409G, this course covers GISs in greater detail. Material common to GISs will be covered in lecture, and students choose between becoming familiar with several GISs or making intensive use of one or two systems. Actual data will be used and actual spatial issues or problems will be addressed. The student will be responsible for data procurement and input, analysis design, and output production, including maps. Prereq: An introductory GIS course (e.g. GEO 409G) or permission of instructor.

GEO 542 POLITICAL GEOGRAPHY. (3)
This course examines how space and political activities are related. Major topics will include: history of political geographic thought; geopolitics; nationalism and identity; territorial state; regionalism; conflicts; borders and frontiers, and electoral geography, at a range of scales.

GEO 544 HUMAN POPULATION DYNAMICS. (3)
The study of human population distributions, densities, and growth patterns through analyses of the processes of fertility, mortality and mobility. Topical coverage includes the environmental, social, political, economic, and behavioral impacts on personal action and population change. Emphasis is placed on historic and contemporary meanings and influences of population diversity, with special attention given to issues of gender, race, and class.

GEO 545 TRANSPORTATION GEOGRAPHY. (3)
This course addresses concepts critical to understanding transport systems. Economic, social and political as well as spatial perspectives to transport matters are emphasized. Problems, issues and trends facing the sector in both the developed and developing world along with appropriate responses are paramount. Topics include the bases and impact of transport, communications, mass transit, third world cities, regional development, shipping, railway policies, and the dynamics of airline survival. Prereq: GEO 455 or consent of instructor.

GEO 547 GEOGRAPHY OF INFORMATION AND COMMUNICATIONS. (3)
The increasing role of information, communications, and telecommunications in the economic and social transformations in rural and urban areas. Topics include geographic influences on the growth of information industries, the diffusion of innovations and patterns in newspaper, radio and television, and the impacts of transport, communications, mass transit, third world cities, regional development, shipping, railway policies, and the dynamics of airline survival. Prereq: GEO 172 or consent of instructor.

GEO 550 SUSTAINABLE RESOURCE DEVELOPMENT AND ENVIRONMENTAL MANAGEMENT. (3)
A study of the theories and strategies for environmental management and sustainable development of resources. Topics covered include contemporary environmental degradation and resource use problems, political economy of resource use and environmental change, design and management of sustainable resource development, impact of sustainable development on gender issues and poverty, and environmental accounting. Prereq: GEO 130 or GEO 210 or consent of instructor.

GEO 560 INDEPENDENT WORK IN GEOGRAPHY. (3)
Individualized study and/or research intended to provide opportunities for students to examine topics in more depth than is offered in existing courses, or to address topics not covered in existing courses. Students work with a faculty supervisor in defining a specific area of study, appropriate learning objectives, and suitable evaluation criteria. Course format may range from critical reading of selected literatures to innovative research projects. Students should identify and consult with faculty supervisor well in advance of registration for this course. Prereq: Restricted to Geography majors with GPA of 3.0 or above in the department.

GEO 565 TOPICS IN GEOGRAPHY. (3)
Discussion, readings, and papers focusing on relevant topics in geography directed by a staff member having specific competence for the topics under study. Current research developments in particular geographic subfields will be stressed. May be repeated under different subtitles to a maximum of six credits. Prereq: Consent of instructor.

*GEO 585 AGING AND ENVIRONMENT. (3)
Explores the elderly person’s changing experience of environment. Physiological, psychological, and social changes are related to adjustment within urban and rural community environments, special housing for the elderly, and long-term care environments. Prereq: Graduate or advanced undergraduate standing and consent of instructor. (Same as FAM/GRN 585.)

GEO 600 ANALYTICAL METHODS IN GEOGRAPHY. (3)
An introduction to the application of analytical methods to geographic problem solving. Topics cover sampling theory, probability theory and both parametric and nonparametric statistical techniques. Prereq: STA 570 or equivalent or consent of instructor.
GEO 643 URBAN TRANSPORTATION PLANNING. (3)
A detailed review of transportation planning process; inventory methodologies; trip generation, distribution and assignment with associated mathematical models and theories; prediction of future travel; land and use models; modal split; developing and testing proposed systems; simulation. Prereq: CE 543 or equivalent and STA 381 or 681 or equivalent statistics course. (Same as CE 631.)

GEO 655 SPECIAL STUDY OF SYSTEMATIC GEOGRAPHY. (3)
The application of the methods of systematic geography to particular special studies in topical areas, such as conservation, urban areas, climatology, cartography, or others. May be repeated to a maximum of six hours. Prereq: Appropriate 500-level course work in systematic or topical geography (e.g., conservation, urban, climatology, cartography).

GEO 700 ADVANCED ANALYTICAL METHODS IN GEOGRAPHY. (3)
A comprehensive review of the application of multivariate statistical techniques to geographic problem solving. Prereq: GEO 600 or consent of instructor.

GEO 702 CONCEPTS IN GEOGRAPHY. (3)
Contemporary geographic concepts and theories are examined with emphasis on concepts within human geography, especially with reference to the economic, urban, cultural, and population subfields within the discipline. Prereq: Graduate student status.

GEO 707 SEMINAR IN DEVELOPMENT OF GEOGRAPHIC THOUGHT. (3)
An analytical review of the evolution of geographic thought, in terms of concepts, methodologies and scholars, emphasizing the basic literature through a series of topics. Prereq: Geography major or consent of instructor.

GEO 710 RESEARCH METHODS AND METHODOLOGY IN GEOGRAPHY. (3)
A comprehensive review of the problems involved in designing geographical research, planning field work, analysis of data, and in writing geographic reports. Prereq: GEO 560 or equivalent.

GEO 716 TOPICAL SEMINAR IN CULTURAL GEOGRAPHY (Subtitle required). (3)
Study of selected topics on historic preservation, landscape evolution, regionalism, ethnicity, religion, architecture, and settlement. May be repeated to a maximum of nine credits under different subtitles. Prereq: Consent of instructor.

GEO 717 TOPICAL SEMINAR IN ECONOMIC AND URBAN GEOGRAPHY (Subtitle required). (3)
Examination of selected topics on location-allocation models, transportation development and impacts, industrial location, financial geography, urban growth, and postindustrial economies. May be repeated to a maximum of nine credits under different subtitles. Prereq: Consent of instructor.

GEO 718 TOPICAL SEMINAR IN GEOGRAPHY OF ENVIRONMENT AND RESOURCES (Subtitle required). (3)
Study of selected topics on agriculture-resource allocation, resource conflict, public land policy, natural hazards, environmental management, energy and biogeography. May be repeated to a maximum of nine credits under different subtitles. Prereq: Consent of instructor.

GEO 722 TOPICAL SEMINAR IN SOCIAL AND POLITICAL GEOGRAPHY (Subtitle required). (3)
Examination of selected topics on diffusion of diseases, health care delivery, the elderly, geopolitics, the nation-state, elections, squatters, suburbs, and impacts of technological hazards. May be repeated to a maximum of nine credits under different subtitles. Prereq: Consent of instructor.

GEO 723 TOPICAL SEMINAR IN GEOGRAPHY OF THE THIRD WORLD (Subtitle required). (3)
Study of selected topics on the cultural, economic, social, urban, political and environmental geography of Latin America, Middle East, Africa, South Asia, and Southeast Asia. May be repeated to a maximum of nine credits under different subtitles. Prereq: Consent of instructor.

GEO 740 INTERNSHIP IN APPLIED GEOGRAPHY. (3)
Academically and professionally supervised field experience in specific areas of planning and applied geography, for example, in private industry and government. May be repeated to a maximum of nine credits. Prereq: Consent of instructor.

GEO 748 MASTER’S THESIS RESEARCH. (0)
Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

GEO 749 DISSERTATION RESEARCH. (0)
Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

GEO 768 RESIDENCE CREDIT FOR THE MASTER’S DEGREE. (1-6)
May be repeated to a maximum of 12 hours.

GEO 769 RESIDENCE CREDIT FOR THE DOCTOR’S DEGREE. (0-12)
May be repeated indefinitely.

GEO 772 SPECIAL RESEARCH PROBLEMS IN GEOGRAPHY. (1-6)
Open to doctoral candidates who have the necessary training and ability to conduct research on a selected problem. May be repeated to a maximum of 12 credits. Prereq: Approval of the director of graduate studies.

GER Germanic Languages and Literatures

*GER 011 GERMAN FOR READING KNOWLEDGE. (3)
This course is designed to meet the needs of upper division and graduate students who are preparing for the graduate reading examination, who need a reading knowledge of German in their minor, or who require a review of German grammar.

GER 101 BASIC GERMAN. (4)
Fundamentals of German with development of the four basic skills: reading, writing, listening, and speaking.

GER 102 BASIC GERMAN. (4)
Continuation of GER 101. Prereq: GER 101, or one year of high school German, or equivalent.

GER 111 ELEMENTARY GERMAN. (3)
The essentials of grammar with practice in reading and writing German (correspondence course).

GER 112 ELEMENTARY GERMAN. (3)
Continuation of GER 111 (correspondence course). Prereq: GER 111 or one year of high school German.

GER 201 INTERMEDIATE GERMAN. (3)
Systematic review of grammar and furthering of reading, writing, listening, and speaking skills based upon cultural and literary materials. Prereq: GER 102, or two years of high school German, or equivalent.

GER 202 INTERMEDIATE GERMAN. (3)
Continuation of GER 201. Prereq: GER 201 or three years of high school German, or equivalent.

GER 205 READING AND WRITING PRACTICE. (2)
This course concentrates on the development of reading and writing skills. Students learn to build vocabulary systematically and develop strategies for reading texts of varying kinds and levels of difficulty. Writing assignments ranging from brief descriptions and reports to translations and original compositions enable students to develop and sharpen writing skills. Prerequisite for upper division courses. Prereq or concur: GER 202 or equivalent.

GER 206 ORAL PRACTICE. (2)
This course concentrates on the development of speaking and listening skills. Students learn to negotiate everyday communication situations by acquiring verbal strategies and idiomatic expressions needed for meaningful interaction in a German-speaking environment. Prereq or concur: GER 202 or equivalent.

GER 211 GERMAN FOR READING KNOWLEDGE I. (3)
This is the first of a two-course sequence in German that will enable students to read any German texts they wish, from daily newspapers and magazines, to literary works, to scholarly prose in any discipline.
GER 212 GERMAN FOR READING KNOWLEDGE II. (3)
The course will confront students with a variety of texts of ever increasing difficulty. Students will be provided with the foundation necessary both for understanding the evolution of German literature, history, and culture, and with the reading skills necessary for them to use the language in their course work. Completion of the two-semester sequence will enable undergraduates to pursue a course of study leading to the proposed certificate in German studies. Prereq: GER 211, or GER 201 and permission of instructor or GER 202.

GER 261 MASTERPIECES OF GERMAN LITERATURE IN TRANSLATION. (3)
Focusing on major authors, the course traces the development of German literature along thematic lines. Representative works are read and discussed against the backdrop of German society, culture and intellectual history.

GER 263 THE GERMAN CULTURAL TRADITION I. (3)
An introduction to the social, intellectual and aesthetic traditions of German-speaking cultures from the Germanic past to the Enlightenment. Texts in English translation. Films with English subtitles to be viewed outside of regular class time.

GER 264 THE GERMAN CULTURAL TRADITION II. (3)
An introduction to the social, intellectual and aesthetic tradition of German-speaking cultures from the Enlightenment to the present. Texts in English translation. Films with English subtitles to be viewed outside of regular class time.

GER 307 INTERMEDIATE GERMAN COMPOSITION AND CONVERSATION I. (3)
This course develops listening, speaking and writing skills in German with emphasis on practical communicative needs. It includes a review of grammar, special oral and written projects, class discussion, and practice in a variety of written forms. Prereq: GER 205 or 206 or equivalent.

GER 308 INTERMEDIATE GERMAN COMPOSITION AND CONVERSATION II. (3)
Continuation of GER 307. Prereq: GER 307, or equivalent.

GER 310 GERMAN FOR INTERNATIONAL BUSINESS AND PROFESSIONS. (3)
This course will develop written and conversational skills based on communicative needs of international business and professions in German-speaking countries, using materials from banking, computer science, export-import, journalism, government and the public sphere. Prereq: GER 307 or permission of the instructor.

GER 311 INTRODUCTION TO GERMAN LITERATURE: THEMES (Subtitle required). (3)
An introductory course that explores such themes in German literature as Fathers and Daughters, Fathers and Sons, Trials, Judgments and Justice, and Conceptions of the Self. Readings will be drawn from various periods and major genres. Themes vary and will be announced. May be repeated once for a total of six credits by nonmajors if theme changes. Prereq: GER 205 or GER 206 or equivalent.

GER 312 INTRODUCTION TO GERMAN LITERATURE: POPULAR FORMS. (3)
An introductory course that focuses on social, political, anthropological and aesthetic aspects of popular forms of German literature. Readings include fairy tales, folk songs and legends, children’s literature, detective stories, comics and other popular literary forms. Prereq: GER 205 or 206 or equivalent.

GER 316 MASTERPIECES OF GERMAN LITERATURE II. (3)
Continuation of GER 315. Taught in German. Prereq: GER 311 or 312 or equivalent.

GER 317 HISTORY OF GERMAN CULTURE. (3)
An introduction to German culture with emphasis on the epochs important to the development of modern German-speaking countries. Readings in German from philosophy, the sciences, the arts, history, politics and literature. Visual materials documenting high culture and everyday life. Taught in German. Prereq: GER 205 or 206 or equivalent.

GER 319 CONTEMPORARY GERMAN LITERATURE AND CULTURE. (3)
Selected works of post-war German literature by Austrian, East and West German, and Swiss authors are read relative to the economic, social, political, artistic and ideological developments in the four countries of the German-speaking world. Taught in German. Prereq: GER 205 or 206 or equivalent.

GER 361 GERMAN CINEMA. (3)
A history of the cinema in the German-speaking world from its beginnings to the present, emphasizing the evolution of the production, distribution and reception of film in relation to changing political, social, economic, ideological and literary/artistic contexts. Some consideration of film theory and criticism in conjunction with class discussion of individual films. Viewing of films (silent or German dialogue with English subtitles) outside of class is required. Class taught in English.

GER 395 INDEPENDENT WORK IN GERMAN. (3)
This course is designed for students who wish to do advanced work in German on any subject. May be repeated once. Prereq: Major and a standing of 3.0 in the department.

GER 415G MAJOR GERMAN AUTHORS (Subtitle required). (3)
The study of a single author or combination of authors in the social, political and cultural context of their day. Special concerns include the interrelationship between literary production and biography, and author’s relation to literary tradition, and his or her historical as well as current relevance. May be repeated once to a maximum of six credits with a new author or complex of authors. Taught in German. Prereq: GER 311 or 312 or equivalent.

GER 416G GENRES OF GERMAN LITERATURE. (3)
The study of a particular genre in German literature with readings of representative examples and with inquiry into concepts of genre in general. May be repeated once to a maximum of six credits with emphasis on a different genre. Taught in German. Prereq: GER 311 or 312 or equivalent.

GER 420G SPECIAL STUDIES IN GERMAN LITERARY AND CULTURAL HISTORY. (3)
Intensive study of selected topics in German literary and cultural history, such as Fascism, War and Literature, Expressionism in Art and Literature, and German Women Authors: Behnd Kinder, Kuche, Kirche. Students are encouraged to propose topics. May be repeated once for a maximum of six credits. Taught in German. Prereq: Senior standing or consent of instructor.

GER 507 ADVANCED GERMAN COMPOSITION AND CONVERSATION. (3)
Further development of conversational skill and practice in writing stylistically appropriate German. Study of finer points of grammar. Discussion of special topics and theme writing. Prereq: GER 308 or equivalent.

GER 520 SPECIAL TOPICS SEMINAR. (3)
Investigation of a topic pertinent to the advanced study of German language, literature and culture. May be repeated once with new topic. Prereq: GER 415G, 416G, 420G or equivalent.

GER 532 HISTORY OF THE GERMAN LANGUAGE. (3)
A survey tracing the development of German from its earliest stages to the present, with introduction to basic concepts of historical linguistics. Prereq: GER 308 or equivalent.

GER 553 THE TEACHING OF GERMAN. (3)
The course is designed for teachers and prospective teachers of modern foreign languages, with emphasis on German. Modern methodology, theory and practice of language pedagogy.

GER 612 STUDIES IN LITERARY THEORY. (3)
Course will explore such fundamental issues as the definition of literature, interpretation and evaluation, the reading process, and literary life from the perspective of competing theoretical systems.

GER 615 STUDIES IN MAJOR AUTHORS. (3)
Explorations into one or several major figures of German literature. Reading of primary texts and pertinent scholarship together with an investigation of the authors’ literary, social, or political significance during contemporary or later periods. May be repeated to a maximum of 12 credits.

GER 616 STUDIES IN GENRE. (3)
One major genre or a group of related genres. Readings in genre theory and in the key texts from various periods; study of the development of forms, techniques, and ideas. May be repeated to a maximum of nine credits.
### SCANDINAVIAN

(Offered as required)

**GER 141 SWEDISH I.**  
Introduction to Swedish with emphasis on grammar, pronunciation, reading and writing. Basic information on Swedish customs, history, geography, folklore. Students planning to fulfill part of a language requirement should be aware that the scheduling of Swedish III and IV will be subject to student demand and the availability of a qualified instructor.  
(3)

**GER 142 SWEDISH II.**  
Continuation of Swedish I with additional emphasis on conversation. Prereq: GER 141 or equivalent.  
(3)

**GER 610 OLD ICELANDIC.**  
Rapid coverage of morphology, phonology and syntax of Old Icelandic, with some attention to linguistic affinities within the Indo-European and Germanic groups of languages. Prereq: Reading knowledge of German; consent of instructor.  
(3)

### GLY Geological Sciences

#### GLY 101 PHYSICAL GEOLOGY.  
A first course in the principles of physical geology, including study of minerals and rocks, volcanoes and earthquakes, plate tectonics and the landforms of Earth’s surface. Concur: GLY 111.  
(3)

#### GLY 102 HISTORICAL GEOLOGY.  
The history of Earth: its origin as part of the solar system, and the subsequent evolution of its atmosphere, continents, seas, and life as interpreted from the rock record. In addition to lecture illustrations, examples are presented by a three-hour field trip and several out-of-class exercises. Attention is given to the development of the basic principles used in interpretation. Prereq: GLY 101 and 111.  
(3)

#### GLY 110 ENDANGERED PLANET: AN INTRODUCTION TO ENVIRONMENTAL GEOLOGY.  
An introductory course that applies basic geological concepts to current environmental issues including the availability and use of water and soil resources, pollution causes, effects and solutions, and causes and prediction of environmental hazards including floods, landslides, subsidence, earthquakes and volcanoes.  
(3)

#### GLY 111 LABORATORY FOR PHYSICAL GEOLOGY.  
Identification of minerals and rocks in hand specimens, interpretation of landscape features as shown on topographic maps, and an introduction to geologic maps. Laboratory, two hours per week. Concur: GLY 101.  
(1)

#### GLY 112 LABORATORY FOR HISTORICAL GEOLOGY.  
Interpretation of geological maps and cross-sections, and elementary study of important invertebrate fossil groups. One three-hour field trip required. Laboratory, two hours per week. Concur or concur: GLY 102.  
(1)

#### GLY 115 INTRODUCTORY GEOLOGY LABORATORY.  
This course is designed to cover essential elements of the field of geology through hands-on, laboratory exercises. Starting with basic earth materials, we emphasize observation and data collection to understand the formation of rocks and minerals, and put them in perspective of their plate tectonic origins. Emphasis on application of this knowledge to society (use of geologic resources, geological hazards) is woven throughout the course materials. Laboratory, two hours per week.  
(1)

#### GLY 120 SUSTAINABLE PLANET: THE GEOLOGY OF NATURAL RESOURCES.  
An introduction to the geologic and societal controls that govern the distribution and cost of using geologic resources: minerals, soils, and energy and industrial materials. Topics include the geological processes responsible for forming these resources, controls on their distribution, quality and abundance, economic factors that drive their recovery, and the legal/political arena in which we attempt to utilize them.  
(3)

#### GLY 130 DINOSAURS AND DISASTERS.  
More than 65 million years ago, dinosaurs and their kin dominated the earth and relegated our mammalian ancestors to positions of unimportance for nearly 155 million years. This course traces the history of dinosaurs from early vertebrate ancestors to their final extinction and surveys the evolutionary, paleogeographic, environmental, and possible extraterrestrial causes for the rise to dominance and sudden fall. Along the way and afterwards, dinosaur interactions with other organisms and the environment, as well as their indirect influence on mammals, particularly on the much later evolution of humankind, will be examined.  
(3)

#### GLY 140 GENERAL PHYSICAL GEOLOGY.  
A first course in the principles of physical geology, including topics from mineralogy, geochemistry, and geophysics. High school chemistry recommended. Lecture, three hours; laboratory, two hours. (Offered in Community College System only.)  
(4)

#### GLY 142 GENERAL HISTORICAL GEOLOGY.  
A first course in historical geology, including a study of the development of earth’s fundamental features and a review of the history of life. Lecture, three hours; laboratory, two hours per week. Prereq: GLY 140 or 144. (Offered in Community College System only.)  
(4)
*GLY 160 GEOLOGY FOR ELEMENTARY TEACHERS. (3)
The basic principles of geologic processes, materials, and history with primary emphasis on inquiry-based laboratory and field activities. The course is designed in conjunction with PHY 160 to provide basic concepts of earth science, astronomy and physics appropriate for elementary school teachers. Lecture, two hours per week; laboratory, three hours per week. Credit may not be received for both GLY 101 and GLY 160. Not available for credit to students who have received credit for GLY 220.

#GLY 220 PRINCIPLES OF PHYSICAL GEOLOGY. (4)
How the Earth Works: an integrated course in physical geology, covering the physical, chemical and biological processes that combine to produce geological processes. Attention is focused on plate tectonics, earth surface processes, and properties and formation of earth materials. Lab exercises emphasize identification and interpretation of geologic materials and maps. Lecture/Discussion, three hours per week; laboratory, three hours per week.

#GLY 223 INTRODUCTION TO GEOLOGY IN THE ROCKY MOUNTAINS. (6)
An integrated course in physical geology and historical geology, taught as a field-based course in the Rocky Mountains. Attention is focused on properties and formation of earth materials, plate tectonics, earth surface processes and understanding geologic time. Lab and field exercises emphasize identification and interpretation of geologic materials, maps and history. Offered only during the summer session, this course involves daily field trips, laboratory and lecture activities, with at least 40 hours of field-related class time per week. Medical release required.

†GLY 225 FIELD METHODS IN GEOLOGY.

#GLY 230 FUNDAMENTALS OF GEOLOGY I. (3)
Field and laboratory methods for identification and description of rocks and minerals with emphasis on sedimentary rocks and rock-forming minerals. Field study of geologic structures. Interpretation of geologic maps. Laboratory, three hours per week. Eight days in the field. Prereq: GLY 220.

#GLY 235 FUNDAMENTALS OF GEOLOGY II. (3)
Laboratory and field methods for identification and description of rocks and minerals with emphasis on igneous and metamorphic rocks and rock-forming minerals. Field study of geologic structures. Interpretation of geologic maps. Laboratory, four hours per week. Four days in the field. Prereq: GLY 220.

GLY 240 ELEMENTARY GEOLOGY FOR ENGINEERS. (3)
An introduction to geologic materials and processes with emphasis on their application to engineering practice. Lecture, two hours; laboratory, three hours; one field trip required. Prereq or concur: CE 106.

*GLY 323 FIELD WORK IN REGIONAL GEOLOGY. (6)
Geologic mapping in the field for a six-week period. Description, measurement, and mapping of a wide variety of rocks and structures, and analysis of geologic events in mountainous regions of the Rockies or Appalachians. Includes practice in writing geologic field reports. Offered only during the summer session. At least 40 hours of field-related work per week. Special fee. Prereq: GLY 230 and GLY 235.

#GLY 350 REGIONAL HISTORICAL GEOLOGY. (3)

*GLY 360 MINERALOGY. (4)
The study of mineral structure and composition, and mineral classification through crystallography and crystal chemical techniques. Laboratory work includes study of minerals via crystallography, X-ray diffraction, mineral chemical analysis, and optical petrographic techniques. Lecture, three hours per week; laboratory, three hours per week. Prereq: CHE 105 and GLY 220. Prereq or concur: GLY 230 or GLY 235.

GLY 395 SPECIAL PROBLEMS IN GEOLOGY. (1-3)
Individual work on a special problem in geology. Report required. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

GLY 399 WORK EXPERIENCE IN GEOLOGICAL SCIENCES. (1-6)
Professional-level, pre-planned learning experience in geological sciences in the work place under the supervision of a faculty member. The student will complete work of the type done by professional geoscientists in the same setting. May be repeated to a maximum of six credits. Pass/fail only. Prereq: Approval of learning contract by faculty supervisor, director of undergraduate studies, and department chair.

GLY 401G INVERTEBRATE PALEONTOLOGY AND EVOLUTION. (3)
Basic ecologic and evolutionary framework of common fossil invertebrate taxa. Major principles of paleontology, ecology, systematics, and evolution; and the use of fossils in paleoecology and biostatigraphy. Laboratory work in classification of common fossils. Lecture, two hours; laboratory, three hours per week. Prereq: GLY 102/112.

#GLY 420G STRUCTURAL GEOLOGY. (4)
An introduction to earth structures. Advanced geologic map interpretation. Prereq: GLY 225 or GLY 240, and PHY 201 or PHY 211 or PHY 213, or consent of instructor.

*GLY 450G SEDIMENTARY GEOLOGY. (4)
Basic principles and concepts of stratigraphy and sedimentation. Lithologic correlation and the interpretation of geologic history and paleogeography. Field and laboratory analysis of sedimentary rocks including megascopic and microscopic methods. Lecture, three hours per week; laboratory, three hours per week. Prereq: GLY 230 and GLY 360.

GLY 461 IGNEOUS AND METAMORPHIC PETROLOGY. (4)
Classification and origins of the common igneous and metamorphic rocks. Lecture material will emphasize the mineralogical, chemical, and physical equilibria within the earth. Laboratory topics will stress hand-specimen and microscopic petrography. Lecture, three hours; laboratory, three hours per week. Prereq: GLY 260.

†GLY 470 SENIOR SEMINAR (Subtitle required).

#GLY 480 ADVANCED TOPICS IN GEOLOGICAL SCIENCES (Subtitle Required). (1-6)
Advanced topical course in the geological sciences. May be repeated to a maximum of six credits under different subtitles. Prereq: Consent of instructor.

#GLY 490 EARTH DYNAMICS. (3)
Basic planetary changes through geological time, including continental drift, formation of supercontinents, paleoclimate, the growth of the earth’s crust. Prereq: Senior standing in a Geological Sciences curriculum.

#GLY 495 SENIOR THESIS SEMINAR. (3)
The course focuses on the development and refinement of independent research projects in the geological sciences. We will cover: critical reading of primary literature, quantitative computer techniques, effective library techniques, experimental design, and the art of effective scientific presentations. Students develop plans for individual research projects. Prereq: Major in Geological Sciences, consent of instructor.

#GLY 496 SENIOR THESIS RESEARCH. (3)
The course focuses on the completion and presentation of independent research projects in the geological sciences. The course meets in a seminar format where students will present and discuss results of their research projects. Students complete their individual research projects, including both written and oral presentations. Prereq: GLY 495.

†GLY 511 PETROLEUM GEOLOGY.

GLY 513 REMOTE SENSING AND AERIAL PHOTOGRAPHY. (3)
Geological applications of remote sensing methods including aerial photography and satellite imagery in the visible and infrared wavelengths to geologic structure, mapping, mineral exploration and mine reclamation. Principles of aerial photography, structural and false color enhancement systems, side looking radar, the production of photo mosaics and photo maps and the planning of exploration programs using remote sensing. Lecture, two hours; laboratory, two hours per week. Prereq: GLY 144, GLY 420G, or consent of instructor.

GLY 530 LOW TEMPERATURE GEOCHEMISTRY. (3)
An introduction to sedimentary and environmental geochemistry, including carbonate equilibria, coal and petroleum geochemistry, and the geochemistry of aqueous contaminants. Prereq: GLY 260 and MA 114 or consent of instructor.

GLY 552 SEDIMENTARY PETROLOGY. (3)
Detailed description of sedimentary rock types, their origin and classification. Megascopic and microscopic examination of textures and structures of sediments. Mineralogy of sediments and the significance of sedimentary environments. Lecture, two hours; laboratory, two hours. Prereq: GLY 260 and STA 291 or STA 370.

GLY 555 STRATIGRAPHY. (3)
Principles of stratigraphy, depositional systems, sequence stratigraphy, and tectonic framework of sedimentation. Prereq: GLY 552.

GLY 570 SEMINAR IN GEOLOGICAL SCIENCES (Subtitle required). (1)
A general seminar in a broad range of topics in the geological sciences. May be repeated to a maximum of six credits under different subtitles. Prereq: GLY 470 or graduate standing in Geological Sciences.
GLY 571 APPLICATION OF POTENTIAL METHODS IN APPLIED GEOPHYSICS.

GLY 572 EXPLORATION SEISMOLOGY.

GLY 575 GEODYNAMICS. (3)
A quantitative review of deformation and heat transfer processes encountered in the study of the earth’s crust and upper mantle. Prereq: PHY 211 or 201, MA 114 and GLY 420G.

GLY 579 GROUNDWIOLD GEOPHYSICS. (3)
Application of geophysical methods to groundwater exploration, emphasis is placed on the use of potential fields in the analysis of groundwater aquifers. Lecture, two hours; laboratory, three hours per week. Prereq: GLY 365 or consent of instructor.

GLY 585 HYDROGEOLOGY. (3)
A study of the physical aspects of groundwater, including regional flow, well hydraulics, and computer simulation. Prereq: GLY 101 and MA 114.

GLY 617 ORGANIC PETROLOGY.

GLY 620 TECTONICS. (3)
A study of the structural features of the earth’s crust with an analysis of the mechanisms involved. Prereq: PHY 211, 213; GLY 420G.

GLY 624 MESOSCOPIC STRUCTURES. (3)
The analysis of structures of mesoscopic and microscopic scales in deformed rocks and their extrapolation to large scale structures. Emphasis is placed on mechanisms, kinematics, and processes. Topics include: strain analysis in shear zones; microstructural evolution of mylonites; rock rheology; deformation mechanisms in the continental crust. One four-day field trip required. Prereq: GLY 420G.

GLY 628 BASIN ANALYSIS SEMINAR. (3)
Methods of analysis of large sedimentary volumes from the point of view of mineral exploration. Prereq: Consent of instructor.

GLY 654 PETROLOGY OF CARBONATE ROCKS. (3)
The composition, classification, and interpretation of environments of deposition and diagenesis of carbonate rocks and modern carbonate sediments. Lecture, two hours; laboratory, three hours. Prereq: GLY 450G.

GLY 670 SELECTED TOPICS IN GEOPHYSICS. (3)
Study of topics of current interest in geophysics. Subject matter will vary from term to term. May be repeated to a maximum of 12 credits. Lecture, two hours; laboratory, two hours. Prereq: GLY 571 or 572.

GLY 671 EARTHQUAKE SEISMOLOGY.

GLY 703 PALEOECOLOGY/PALEONTOLOGY SEMINAR (Subtitle required). (1-3)
Discussion and study of advanced topics in paleoecology or paleontology and related fields. One or more field trips required. May be repeated to a maximum of six credits. Prereq: GLY 602 or equivalent or consent of instructor.

GLY 715 COAL GEOLOGY SEMINAR. (2)
Seminar discussion and presentation of current work in coal geology from current literature or ongoing research. May be repeated to a maximum of eight credits. Prereq: GLY 515 or 617 or consent of instructor.

GLY 720 GRADUATE TECTONICS SEMINAR. (3)
Discussion and study of advanced topics in tectonics. May be repeated to a maximum of 12 hours. Prereq: GLY 620 or consent of instructor.

GLY 741 CLAY MINERALOGY. (3)
A comprehensive study of the crystal structures of clay minerals commonly found in soils and sediments. Lecture and discussion, three hours. Prereq: GLY 260 or consent of instructor. (Same as PLS 741.)

GLY 748 MASTER’S THESIS RESEARCH. (0)
Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

GLY 749 DISSERTATION RESEARCH. (0)
Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

GLY 750 SEDIMENTOLOGY/STRATIGRAPHY SEMINAR (Subtitle required). (1-3)
Discussion and study of advanced topics in sedimentology or stratigraphy emphasizing current problems or topics pertinent to the sedimentology or stratigraphy of Kentucky and adjacent areas. One or more field trips required. May be repeated to a maximum of six credits. Prereq: GLY 450G, 552, or consent of instructor.

GLY 768 RESIDENCE CREDIT FOR THE MASTER’S DEGREE. (1-6)
May be repeated to a maximum of 12 hours.

GLY 769 RESIDENCE CREDIT FOR THE DOCTOR’S DEGREE. (0-12)
May be repeated indefinitely.

GLY 780 MODELING IN HYDROGEOLOGY.

GLY 782 INDIVIDUAL WORK IN GEOLOGY. (1-3)
Problems involving independent laboratory and/or library study conforming to the student’s special interest under the direction of an appropriate staff member having proficiency in the area selected. May be repeated to a maximum of nine credits. Prereq: Geology major with graduate standing.

GLY 787 RESEARCH IN HYDROGEOLOGY AND LOW-TEMPERATURE GECHEMISTRY. (3)
Laboratory and/or field research, literature study, discussion, and/or reports in one or both of these fields selected on the basis of the student’s needs. May be repeated to a maximum of nine credits. Prereq: GLY 530, GLY 655, and consent of instructor.

GLY 790 RESEARCH IN GEOLOGICAL SCIENCES. (0-6)
Research in the geological sciences. May be repeated to a maximum of twelve credits. Prereq: Approval of instructor and Director of Graduate Studies.

GRN Gerontology

GRN 513 GERIATRIC PHARMACY. (3)
A course designed to educate students in the basic knowledge of attitudes and skills required to meet the pharmaceutical needs of the elderly. Topics include discussions of the aging process, physiological and psychological changes in the elderly, how these changes influence patient compliance and the responses to drug and nondrug treatments, monitoring drug use in long-term care facilities, and special community services available to the elderly. Prereq: PHR 849, 852, 853, 854 and 856 or permission of instructor. (Same as PHR 813.)

GRN 585 AGING AND ENVIRONMENT. (3)
Explores the elderly person’s changing experience of environment. Physiological, psychological, and social changes are related to adjustment within urban and rural community environments, special housing for the elderly, and long-term care environments. Prereq: Graduate or advanced undergraduate standing and consent of instructor. (Same as FAM/GEO 585.)

GRN 600 A STUDY OF THE OLDER PERSON. (3)
This will be a didactic/experiential course designed to give the student an overview of the effects of the aging process on the individual person. Didactic lectures will focus on the psychological, social and biological impact of aging. The experiential component will consist of having the students interact with healthy elderly individuals from Donovan Scholars Program, the Sanders-Brown subject registry, and individuals suffering from diseases related to aging.

GRN 610 AGING AND BIOMEDICAL ETHICS. (3)
This seminar will address the dominant medico-ethical issues surrounding the elderly. The issues will include concerns for the autonomy of the elderly; competency and decisional impairment; surrogate health care decision making; the role of families and elderly relatives; ethical and legal issues regarding the use of life-sustaining procedures such as mechanical ventilation, resuscitation and DNR orders, and nutritional support and hydration; decisions to enter nursing home and rights of nursing home residents; costs of health care to the elderly and costs of long term care; and critical ethical issues in conducting research involving elderly persons.

GRN 612 BIOLOGY OF AGING. (3)
A multidisciplinary discussion of how the process of aging affects biological systems. Coverage will be quite broad and includes topics such as subcellular and cellular aging, genetics, immunology, anatomy and physiology, animal model of aging, etc. Prereq: Enrollment in a graduate program of a biomedical science department or consent of instructor. (Same as ANA/BIO 612.)
GRN 620 HUMAN AGING AND ADJUSTMENT. (6)
The second core course of the Gerontology Ph.D. program is designed to provide students with an holistic examination of human aging and health. Five broad focal themes, combining perspectives from the biomedical and the social and behavioral sciences, will provide the framework for this course. These themes include the historical context of aging, theories of aging, individual experience of aging, aging of societies, and aging and health. Prereq: GRN 600.

GRN 643 BIOMEDICAL ASPECTS OF AGING. (3)
A survey of the normal age-associated changes in biological function, the major disease entities found in the older population, and how the health care delivery system presently addresses these issues. Prereq: Graduate status or permission of the instructor. (Same as SW 643.)

GRN 650 RESEARCH METHODS IN GERONTOLOGY. (3)
This course will provide training in research methods appropriate for the study of aging and the aged and will critically assess special considerations involved in studying this population. Topics to be covered will include: data sources for research on aging (including medical informatics and clinical epidemiology sources); the use of animal models in aging research; research designs for the study of aging [reconciling age, period, and cohort effects]; longitudinal research; measurement tools for assessing the elderly [functional assessment, ADLs, life satisfaction scales, etc.]; issues in interviewing older people; qualitative methods in aging research; the ethics of research on aging and the aged. Prereq: STA 570 or equivalent.

GRN 710 AGING OF THE NERVOUS SYSTEM. (3)
This course will examine the alterations in the brain that occur with aging and in neurodegenerative disorders such as Alzheimer’s disease. The emphasis will be on human aging although the relevance of animal models to studies of human aging will be a recurrent theme. The course will examine aging at several levels, including molecular, cellular, organismic, and behavioral. Prereq: GRN 620. A strong background in the basic sciences.

GRN 715 HEALTH POLICY AND AGING. (3)
This course will present an overview of health policy in the United States as it affects the older population. It will provide an overview of the health care system, allocation of health services across the population and projected impact of the increase in the aging population on health care delivery. Various health policy proposals will be analyzed with a focus on their impact on the older population. Prereq: GRN 600 and GRN 620.

GRN 749 DISSERTATION RESEARCH. (0)
Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

GRN 769 RESIDENCE CREDIT FOR THE DOCTOR’S DEGREE. (0-12)
May be repeated indefinitely.

#GRN 770 SPECIAL TOPICS IN GERONTOLOGY. (1-3)
This course is designed to present contemporary topics in gerontology in either a lecture or seminar format. It is intended to provide students with opportunities to be informed of current issues in gerontology as well as to explore in-depth studies of particular gerontological topics. May be repeated to a maximum of twelve credits.

GRN 780 APPLIED RESEARCH PRACTICUM I. (1)
This course is designed to provide students an opportunity to serve as an intern within a clinic, service agency or organization which provides services to older persons. The student will gain in-depth experience in the organization and an introduction to problems in applied research. The course will be taken in conjunction with GRN 790. Prereq: GRN 600, GRN 620, GRN 650.

GRN 781 APPLIED RESEARCH PRACTICUM II. (1)
The course provides an opportunity for students to serve as an intern in a clinic, service agency or organization which provides services to older persons. Students will identify a research problem within the organization and complete a research project. The course will be taken in conjunction with GRN 791. Prereq: GRN 780.

GRN 785 INDEPENDENT RESEARCH IN GERONTOLOGY. (3)
Independent research involving completion of a major research project resulting in a manuscript of publishable quality. Under the supervision of a Gerontology Program faculty member, this will involve review of appropriate literature, problem formulation, research design, data collection, data analysis and report writing on a topic in gerontology. Prereq: GRN 600 and GRN 620.

GRN 790 INTEGRATIVE RESEARCH SEMINAR I. (3)
This seminar will involve students and gerontology program faculty in in-depth exploration of major health and aging-related issues. The substantive focus will be a series of specific topical problems, such as health care access, housing, long-term care, preventive health care, etc. The problem areas will be explored from a variety of disciplinary research perspectives. Prereq: Extensive research methods background.

GRN 791 INTEGRATIVE RESEARCH SEMINAR II. (3)
This seminar is the second in a two-course sequence focusing on selected topics in aging. In this segment, students will participate in a research seminar team. A major gerontological issue with multidisciplinary implications (e.g. stroke, Alzheimer’s disease, etc.) will be identified. Each member of the seminar team will identify a particular aspect of the topic and conduct a research project. Each member’s findings will be integrated into a comprehensive research report on the topic. Prereq: GRN 790.

GS 600 SPECIAL TOPICAL GRADUATE COURSE. (1-3)
An interdisciplinary, topical or experimental course to be approved by the Dean of the Graduate School. A particular course can be offered no more than twice under the number GS 600. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

#GS 610 COLLEGE TEACHING. (1)
This one-credit-hour seminar addresses teaching and learning issues in the college classroom. It is intended for graduate students who want to prepare for future academic careers and enhance current teaching activities. The seminar will examine pedagogical issues in a general format with opportunities for discipline-specific applications. This course can serve to augment any department-based programs.

GS 650 PREPARING FUTURE FACULTY. (1)
Preparing Future Faculty is designed to introduce graduate students to the roles and responsibilities of the college teacher and to assist them in understanding the variety of institutions in which effective teaching takes place. Students will focus on the academic expectations, institutional identities, and particular policies and procedures which characterize different types of institutions of higher learning. Skills to help students apply for positions and achieve success in their appointments will also be addressed. Lecture, two hours per week.