

# DEPARTMENT OF GEOGRAPHY, GEOLOGY AND ENVIRONMENTAL SCIENCE

## GEOGRAPHY

Geography, geology, and environmental science are broad disciplines that provide students with important knowledge and vital skills that contribute to analyzing and addressing issues in both society and the natural world.

Geography studies not only where human and natural processes occur, but why and how these processes affect the planet. Areas of study include the formation and growth of cities, weather hazards and climate patterns, economic development and change, interaction of cultures, and how humans use/impact the environment. Geographers develop ideas and recommendations for placing businesses, health care facilities, political boundaries, pollution monitoring stations, public services, and other institutions/infrastructure to better address societal issues. Geographers do these things in a variety of ways, including quantitative, qualitative, and using geographic information systems (GIS) mapping techniques.

The discipline trains students to think across both natural and social sciences. The emphasis of study will depend on a student's individual interest, with the ability to select between two tracks of study:

- General – a broad survey of the discipline including physical and human geography along with GIS and other techniques
- Geology – catering to students interested in rocks, minerals, and paleontology

Students have found both private and public employment after graduation. These students are engaged in location analysis, transportation planning, urban and regional planning, real estate development, and resource management and find employment with business, non-profits, and the public sector. Some students continue studies in graduate school to find positions in teaching, or to qualify for high-level positions. GIS skills are of growing importance to the discipline and prepare students for various careers in business, the public sector and graduate school. Many students engage with internships or undergraduate research to enhance their college experience.

Additionally, the department is the home for Environmental Science majors with tracks in Natural Science, Geoscience, and Environmental Resource Management.

Fischer Scholarships are available each term for eligible, competitive students. Fischer Scholars are either enrolled in a College of Education program and majoring or minoring in geography, or are selected geography majors are actively involved in teaching other students. Interested students should contact the Department of Geography, Geology, & Environmental Science to learn more about classes and opportunities.

## Majors in Geography, Geology and Environmental Sciences

- Environmental Science BA/BS (<http://uww-public.courseleaf.com/undergraduate/letters-sciences/geography-geology/environmental-science-ba-bs>)

- Environmental Science - Environmental Resource Management Emphasis (<http://uww-public.courseleaf.com/undergraduate/letters-sciences/geography-geology/environmental-science-environmental-resource-management-emphasis>)
- Environmental Science - Geosciences Emphasis (<http://uww-public.courseleaf.com/undergraduate/letters-sciences/geography-geology/environmental-science-geosciences>)
- Environmental Science - Natural Science Emphasis (<http://uww-public.courseleaf.com/undergraduate/letters-sciences/geography-geology/environmental-science-natural-science-emphasis>)
- Geography General BA/BS (<http://uww-public.courseleaf.com/undergraduate/letters-sciences/geography-geology/geography-general-ba-bs>)
- Geography - Geology Emphasis BA/BS (<http://uww-public.courseleaf.com/undergraduate/letters-sciences/geography-geology/geography-geology-emphasis-ba-bs>)
- Geography BSE (<http://uww-public.courseleaf.com/undergraduate/letters-sciences/geography-geology/geography-bse>)
- Social Studies Broadfield Major - Geography Emphasis BSE ([http://uww-public.courseleaf.com/undergraduate/letters-sciences/geography-geology/social\\_studies\\_broadfield-major-bse-geography-emphasis](http://uww-public.courseleaf.com/undergraduate/letters-sciences/geography-geology/social_studies_broadfield-major-bse-geography-emphasis))

## Minors in Geography, Geology and Environmental Science

- Environmental Studies (<http://uww-public.courseleaf.com/undergraduate/letters-sciences/geography-geology/environmental-studies-minor>)
- Geography (<http://uww-public.courseleaf.com/undergraduate/letters-sciences/geography-geology/geography-minor>)
- Geography - Elementary Education Emphasis (<http://uww-public.courseleaf.com/undergraduate/letters-sciences/geography-geology/geography-minor-elementary-education-emphasis>)
- Geology (<http://uww-public.courseleaf.com/undergraduate/letters-sciences/geography-geology/geology-minor>)
- GIS (<http://uww-public.courseleaf.com/undergraduate/letters-sciences/geography-geology/gis-minor>)

## Certificate in Geography, Geology and Environmental Science

- GIS (<http://uww-public.courseleaf.com/undergraduate/letters-sciences/geography-geology/gis-certificate>)

## Environmental Science Courses

### ENVSCI 100 EXPLORATION OF THE ENVIRONMENTAL SCIENCE MAJOR 1 Units

This course provides information about environmental science to recently declared majors. Students will be introduced to the requirements of the major, curricular and co-curricular activities, academic advising, emphasis areas, and internship and employment opportunities.

PREREQ: MUST BE A DECLARED ENVIRONMENTAL SCIENCE MAJOR

**ENVSCI 200 INTRODUCTION TO ENVIRONMENTAL SCIENCE (GM) 4 Units**

The introductory course for the environmental sciences major introduces students to the complexity of topics included in environmental sciences and is the important first step in the major. A one hour discussion section allows students and instructors to explore current topics and issues that fall within environmental science.

PREREQ: MATH 139, OR MATH 141, OR WAIVER. ENVIRONMENTAL SCIENCE MAJORS SHOULD COMPLETE MATH 141.

**ENVSCI 400 ENVIRONMENTAL SCIENCE CAPSTONE 3 Units**

This course enables students to utilize the wide range of knowledge and skills acquired in other courses to complete an original, interdisciplinary environmental science research project while acquiring and refining crucial skills such as research design, analysis, presentation, and teamwork that will prepare them for a career in environmental sciences.

PREREQ: ENVIRONMENT SCIENCE MAJOR, SENIOR STANDING OR CONSENT OF INSTRUCTOR

**ENVSCI 491 TRAVEL STUDY *Repeatable* 1-3 Units**

Variable topics. Faculty-led field courses.

**ENVSCI 493 INTERNSHIP IN ENVIRONMENTAL SCIENCE *Repeatable* 1-3 Units****ENVSCI 497 EXCHANGE STUDY *Repeatable* 1-12 Units****ENVSCI 498 INDEPENDENT STUDY IN ENVIRONMENTAL SCIENCE *Repeatable* 1-3 Units**

Study of a selected topic or topics under the direction of a faculty member. Repeatable one time for a maximum of 6 credits in major/degree.

**ENVSCI 498R INDEPENDENT STUDY - UNDERGRADUATE RESEARCH *Repeatable* 1-3 Units**

Study of a selected topic or topics under the direction of a faculty member. Repeatable one time for a maximum of 6 credits in major/degree.

**Geography Courses****GEOGRPY 100 INTRODUCTION TO GEOGRAPHY 1 Units**

Introduction to Geography introduces students to the specialties within geography, outlines the academic tracks within the major and associated requirements, and explores public and private career opportunities in the field of geography. Required of all majors at earliest opportunity.

PREREQ: DECLARED GEOGRAPHY MAJOR

**GEOGRPY 120 INTRODUCTION TO WEATHER AND CLIMATE (GL) 4 Units**

This course introduces students to the processes controlling and distinguishing weather and climate. Particular emphasis is on data selection, interpretation, and analysis. The impacts of severe weather and climate change on humans is also emphasized. The labs expose students to the wide range of weather and climate information currently available on the Internet.

COREQ: MATH 139 OR MATH 141 OR WAIVER

**GEOGRPY 210 PHYSICAL GEOGRAPHY (GL) 5 Units**

A study of selected physical aspects of our geographic environment. Emphasis is given to the origin and characteristic features of topographic, climatic, vegetative and soil regions of the earth and to their interrelationships. The ultimate objective is to provide a foundation upon which to build a better understanding of human interrelationships with the physical environment. Field trips are normally taken.

COREQ: MATH 139 OR MATH 141 OR WAIVER

**GEOGRPY 230 HUMAN GEOGRAPHY (GS) 3 Units**

A systematic study of human land relationships highlighting the diversity of the elements that make up the cultural landscape in various regions.

**GEOGRPY 232 GEOGRAPHY OF RACE AND ETHNICITY IN THE UNITED STATES (DV) (GS) 3 Units**

The course takes a geographical approach to the study of ethnic and racial groups in the United States. Native American, African American, Hispanic American, and Asian American groups are studied systematically. Major topics include mobility, culture regions, the cultural landscape created by the various ethnic and racial groups, immigration, segregation, and their associated politics.

PREREQ: SOPHOMORE STANDING

**GEOGRPY 245 GENDER AND GEOGRAPHY (GS) 3 Units**

Human geographies will be studied through the lens of gender along with gender relations at home and abroad. Content is organized according to a variety of spatial scales including the body, home, city, and world. Cases investigated at the global scale include gendered livelihoods and migration, nationalism and war, and environmental issues.

CROSS-LISTED: GEOGRPY 245 AND WOMENST 245

**GEOGRPY 250 GEOGRAPHY OF WISCONSIN (GS) 3 Units**

A systematic treatment of physical and cultural geographic phenomena. Emphasis is placed on the interrelationships and interactions of these phenomena from place to place within the state.

**GEOGRPY 252 GLOBAL ENVIRONMENTAL CHALLENGES (GS) 3 Units**

An introduction to environmental problems and their complexities. Attention is given to alternative solutions to such problems and the implications these alternatives have for the total environment. The course emphasizes the evaluation of the interrelationships between the environmental resource demands of people and the actual resource base of the earth.

**GEOGRPY 261 GEOGRAPHY OF CANADA AND THE UNITED STATES OF AMERICA (GS) 3 Units**

A regional survey of the United States and Canada. Special attention is given to the physical, cultural and economic geography of the two countries.

**GEOGRPY 270 GIS I: INTRODUCTION TO GIS AND MAPPING 3 Units**

An introduction to the quantitative and qualitative mapping techniques applicable to the physical and social sciences. Included are the skills required to create clear, concise and aesthetically pleasing maps, as well as how to derive information from them. Both graphic and cartographic software packages will be utilized to create and evaluate maps. Field trips are normally taken.

**GEOGRPY 290 SPATIAL ANALYSIS 3 Units**

Presentation and interpretation of data, use descriptive statistics and measures of spatial patterns, introduction to statistical inference and measures of association, with particular reference to geographic examples. Students will become proficient in using computers to achieve these skills.

PREREQ: MATH 141

**GEOGRPY 300 SOIL SCIENCE 3 Units**

Soil science deals with the systematic description, analysis, and understanding of soils and how they interact with and drive environmental processes and ecosystems. This course will examine the properties, formation, classification, and distribution of soil, stressing the connections between environmental controls on their formation and distribution. Field trips required.

PREREQ: GEOGRPY 210 OR GEOLGY 100 OR GEOLGY 101 OR BIOLOGY 142 OR CONSENT OF INSTRUCTOR

**GEOGRPY 310 GEOMORPHOLOGY (LANDFORMS) 3 Units**

A study of topographic landscapes and their evolution. Two hours per week of lecture and map study. Field trips are normally taken.

PREREQ: GEOGRPY 210 OR GEOLGY 100 OR CONSENT OF INSTRUCTOR

**GEOGRPY 320 METEOROLOGY AND CLIMATE 3 Units**

Begins with fundamental relationships among earth, sun and air.

Common myths concerning weather phenomena are dispelled through in-depth explanation in everyday language of the physical laws that govern atmospheric functioning. The course terminates with a survey of world climate regions.

PREREQ: GEOGRPY 210 OR CONSENT OF INSTRUCTOR

**GEOGRPY 323 WATER RESOURCES 3 Units**

Class will investigate the pathways and processes of water transfer and storage in the many reservoirs on earth, along with the impact of human activities on water quality and fluxes. Detail is given to shallow groundwater monitoring and soil indicators of saturation for wetland delineation, anthropogenic effects on streams, and land use issues related to water quality. Field trips normally taken.

PREREQ: GEOGRPY 210 OR GEOLGY 100 OR GEOLGY 101 OR BIOLOGY 142 OR CONSENT OF INSTRUCTOR

**GEOGRPY 330 BIOGEOGRAPHY 3 Units**

This course provides an introduction to biogeography, the study of distributions of organisms. This course will combine both historical and ecological perspectives in analyzing plant and animal distributions. Human impacts on biotic distributions will also be discussed in some detail.

PREREQ: GEOGRPY 210 OR BIOLOGY 120

**GEOGRPY 332 POLITICAL GEOGRAPHY 3 Units**

A geographical study of international conflicts and relations, geopolitical strategies and processes, and the variation of political phenomena from place to place in relation to changing economic and cultural environments in the national as well as global contexts.

**GEOGRPY 333 GEOGRAPHY OF RELIGION (GI) 3 Units**

This course examines the role of religion in contemporary American society and in communities around the globe from a geographic perspective. Significant places and spatial patterns associated with religions will be investigated along with the relationship between religion and the political landscape. Students will be expected to identify, visit, and analyze two religious sites in their community.

CROSS-LISTED: GEOGRPY 333 AND RELIGST 333

**GEOGRPY 334 HISTORICAL GEOGRAPHY 3 Units**

An analysis of the evolution of the historical-geographic patterns of population and human activities in major United States regions. Emphasis is placed upon the identification and preservation of historical landscapes.

PREREQ: GEOGRPY 230 OR JUNIOR STANDING OR CONSENT OF INSTRUCTOR

**GEOGRPY 335 GEOGRAPHY OF POPULATION AND MIGRATION (GS) 3 Units**

This course examines the economic, social, and political processes that contribute to spatial patterns of population and migration throughout the world. Case studies are used to understand contemporary issues of population growth, labor migration, refugee resettlement, immigration policy, and transnational identity.

**GEOGRPY 340 ECONOMIC GEOGRAPHY 3 Units**

The study of the spatial organization of economic activities, including patterns of production, exchange and consumption. A broad introduction to locational behavior is presented and applied examples are stressed.

PREREQ: GEOGRPY 230 OR JUNIOR STANDING OR CONSENT OF INSTRUCTOR

**GEOGRPY 344 URBAN GEOGRAPHY 3 Units**

The intraurban consideration of various land-use and population characteristics of cities, their patterns, interrelations and changes is followed by the interurban study of locations, size, spacing, types and functions of urban settlements. Field trips are normally taken.

PREREQ: GEOGRPY 230 OR JUNIOR STANDING OR CONSENT OF INSTRUCTOR

**GEOGRPY 346 GLOBALIZATION AND THE CITY 3 Units**

This course will focus on understanding the processes of globalization, urban and regional development theories, emergence of the global city, and influence of globalization on urban development. This course will examine the role of cities across the world and the relationship between urban change and economic, political, and cultural globalization.

PREREQ: GEOGRPY 230

**GEOGRPY 352 GEOHAZARDS 3 Units**

The course will focus on the physical processes that create environmental hazards (e.g. earthquakes, volcanoes, severe weather), the primary controls on their frequency and intensity, and how human decision-making can influence the magnitude of impact that they have when they inevitably occur. Comparisons are made between impacts of hazards on developing versus developed countries.

PREREQ: GEOGRPY 210 OR GEOLGY 100 OR GEOLGY 101

**GEOGRPY 361 GEOGRAPHY OF SOUTH AND SOUTHEAST ASIA (GS) 3 Units**

A study of contemporary and historical interrelationships between the natural environment and the economic, political and cultural activities in South and Southeast Asia. Countries studied include: Pakistan, Bangladesh, Sri Lanka, Burma, Thailand, Vietnam, Laos, Cambodia, Indonesia, and the Phillipines.

PREREQ: GENED 140 OR GEOGRPY 230 OR CONSENT OF INSTRUCTOR  
CROSS-LISTED: GEOGRPY 361 AND ASIANSTD 361

**GEOGRPY 362 GEOGRAPHY OF EUROPE 3 Units**

A study of the nations, regions, cultures, and traditional and emerging spatial relationships in Europe. Physical and cultural patterns and processes are considered as they relate to the distribution of population and industrial and commercial activities. The European Community and Europe's international role and linkages are investigated.

PREREQ: GENED 140 OR GEOGRPY 230 OR JUNIOR STANDING OR CONSENT OF INSTRUCTOR

**GEOGRPY 364 GEOGRAPHY OF EAST ASIA (GS) 3 Units**

A study of contemporary and historical interrelationships between the natural environment and economic, political and cultural activities in East Asia. Countries studied include: China, Taiwan, Mongolia, Japan, and North and South Korea.

PREREQ: GENED 140 OR GEOGRPY 230 OR JUNIOR STANDING OR CONSENT OF INSTRUCTOR

CROSS-LISTED: GEOGRPY 365 AND ASIANSTD 364

**GEOGRPY 365 GEOGRAPHY OF LATIN AMERICA 3 Units**

A study of the activities of the peoples of Mexico, Central America, South America and the West Indies, including means of addressing historical and contemporary issues of economic, social, cultural and political development across the Americas.

PREREQ: GENED 140 OR GEOGRPY 230 OR JUNIOR STANDING OR CONSENT OF INSTRUCTOR

**GEOGRPY 370 GIS II: SPATIAL DATA AND ANALYSIS 3 Units**

The basic principles and operations of geographic information systems (GIS) are presented, including the capture, storage, management, analysis and display of geographic referenced data and their attributes. Laboratory exercises provide extensive hands-on experiences with a number of GIS software packages, including both raster and vector systems. Field trips are normally taken.

COREQ: GEOGRPY 270 OR CONSENT OF INSTRUCTOR

**GEOGRPY 377 REMOTE SENSING OF THE ENVIRONMENT 3 Units**

An introduction to the images, sensors, and techniques used to gather and process data on the Earth, including aerial photography, electro-optical scanners, and radar systems. The course will focus on the fundamentals of utilizing remotely sensed data in studying both natural and human induced processes impacting the Earth's surface. Computer applications will be extensively utilized.

PREREQ: SOPHOMORE STATUS OR CONSENT OF INSTRUCTOR

**GEOGRPY 380 CARTOGRAPHY AND GEOVISUALIZATION 3 Units**

With the growing use of maps on the web, cartography is experiencing a modern-day renaissance. Our class goals are to learn the principles of map design and apply them to create production-quality maps. We'll also explore advanced techniques for thematic maps and experiment with tools to create interactive web maps. By the course's end, students will have a portfolio of professional maps to share with employers and friends.

PREREQ: GEOGRPY 270

**GEOGRPY 400 CAPSTONE IN GEOGRAPHY 1 Units**

Capstone in Geography prepares students for future options within the various fields of Geography/Geology. Portfolio preparation and presentation is emphasized as an essential element of making the transition to careers in both the public and private sector, as well as graduate studies.

PREREQ: GEOGRPY 100, GEOGRPY 210, GEOGRPY 230 OR GEOGRPY 252, GEOGRPY 270 AND SENIOR STATUS OR CONSENT OF INSTRUCTOR

**GEOGRPY 420 HUMAN AND CLIMATE INTERACTIONS 3 Units**

The course objective is to distinguish between natural climate change and change induced by human activities. Topics covered include human modifications to cloud cover, global warming, and ozone problems. Another emphasis is to better understand the impacts of severe weather on human activities and the potential threats of future climate change. At least one field trip is usually taken.

PREREQ: JUNIOR STATUS OR CONSENT OF INSTRUCTOR

**GEOGRPY 423 RIVERS AND FLOODS 3 Units**

Streams and rivers are nested into a hierarchy that is organized by landscape characteristics. This course addresses how watersheds and stream processes influence channel form, the linkages among geomorphology and ecology, and flood magnitude and river management. Inferences are made using spatial and temporal scales.

PREREQ: GEOGRPY 210 OR GEOGRPY 323 OR GEOLGY 101 OR GEOLGY 100

**GEOGRPY 440 APPLIED GIS: APPLICATIONS FOR BUSINESS AND INDUSTRY 3 Units**

This course will provide the background necessary to apply Geographic Information Systems software to solve applied business problems.

The specific educational objectives of this course are: 1) To provide the student with "hands on" problem solving skills emphasizing, site location, target marketing, sales territory development and network routing; 2) To work with the most widely used Business GIS software package, ArcView GIS and its major extensions.

PREREQ: GEOGRPY 270, GEOGRPY 370 AND GEOGRPY 340 OR CONSENT OF INSTRUCTOR

**GEOGRPY 444 URBAN LAND USE PLANNING 3 Units**

A study of the historical, social and political framework of the urban land planning process with primary emphasis on the United States. Exposure to professional planning approaches and techniques and a critical analysis of plans and planners are stressed. Field trips are normally taken.

PREREQ: GEOGRPY 344 OR SOCIOLOGY 352 OR POLISCI 446 OR ECON 438 OR CONSENT OF INSTRUCTOR

**GEOGRPY 450 ADVANCED METHODS IN PHYSICAL GEOGRAPHY 4 Units**

Advanced Methods in Physical Geography focuses on data collection and analysis techniques used by physical geographers. Students will conduct an integrated analysis of a local landscape, including site selection, sample collection, lab analysis, and data assimilation and interpretation for report writing. Roughly one-half of course is taught outdoors, regardless of weather. Four consecutive hours per week.

PREREQ: GEOGRPY 300 OR GEOGRPY 310 OR GEOGRPY 330 OR GEOLGY 301

**GEOGRPY 452 CULTURAL ECOLOGY AND SUSTAINABLE DEVELOPMENT 3 Units**

This course will discuss the history of the subdiscipline of cultural ecology within geography and teach about indigenous and traditional societies' knowledge systems from a variety of world cultures. It will use ancient and modern examples of indigenous methods of natural resource management and show how these are being applied internationally to present day environmental problems and to sustainable development approaches.

PREREQ: GEOGRPY 230 OR GEOGRPY 252 OR CONSENT OF INSTRUCTOR

**GEOGRPY 455 TOPICS IN HUMAN GEOGRAPHY *Repeatable* 3 Units**

In-depth examination of a specific issue or theme in human geography. Topics covered will typically focus on emerging national and global issues with a particular emphasis on current research. May be repeated for a maximum of six credit hours (under different subtitles)

PREREQ: GEOGRPY 230, GEOGRPY 252 OR CONSENT OF INSTRUCTOR

**GEOGRPY 460 GIS IN WATER RESOURCES *Repeatable* 3 Units**

The course focuses on the use of GIS to develop solutions to problems associated with water resources. Practical applications will include using GIS to spatially and temporally examine the relationship of watershed characteristics on soil erosion, wetlands, water quality, streamflow, and in-stream habitat. The course combines traditional lectures with computer time in labs equipped with the latest GIS software. Grading is heavily based on completion of projects/technical reports and the quality of GIS outputs.

PREREQ: GEOGRPY 270, GEOGRPY 370, AND (GEOGRPY 210 OR GEOGRPY 323)

**GEOGRPY 470 APPLIED ENVIRONMENTAL AND NATURAL RESOURCE GIS 3 Units**

This course will provide the knowledge and skills necessary to utilize GIS for solving applied environmental analysis problems. Specifically, the course is designed to 1) identify and resolve environmental and natural resource problems in terms of spatial analysis, 2) explore a conceptual understanding of GIS, 3) provide students with technical instruction in current GIS software.

PREREQ: GEOGRPY 270 AND GEOGRPY 370 OR CONSENT OF INSTRUCTOR

**GEOGRPY 477 ADVANCED GEOGRAPHIC INFORMATION SYSTEMS (GIS) 3 Units**

Students will learn a variety of skills needed in professional GIS careers including field techniques (unmanned aerial vehicles and differential GPS), web-based GIS (servers and interactive cartography), and GIS automation through scripting (Python and JavaScript). Practical skills are developed through both field and lab work including applied real-world projects.

PREREQ: GEOGRPY 370

**GEOGRPY 490 WORKSHOP *Repeatable* 1-8 Units**

Variable topics. Group activity oriented presentations emphasizing `hands on` and participatory instructional techniques. Repeatable. Prereq: Consent of instructor.

**GEOGRPY 491 TRAVEL STUDY *Repeatable* 1-3 Units**

Variable topics. Faculty-led field courses.

**GEOGRPY 492 FIELD COURSE *Repeatable* 4-6 Units**

An introduction to field methods and techniques and their application in the study of a part of the United States or a foreign area. For information about a particular offering, write to the Department of Geography and Geology, University of Wisconsin-Whitewater. Repeatable.

**GEOGRPY 493 INTERNSHIP IN GEOGRAPHY *Repeatable* 1-3 Units**

Students will be placed in an outside private or governmental agency where they will utilize geographic techniques in approaching practical problems relevant to the agency's mission. An on-campus seminar with fellow interns and the supervisory instructor is required.

**GEOGRPY 494 SEMINAR *Repeatable* 1-3 Units**

Variable topics. Group activity. An advanced course of study in a defined subject matter area emphasizing a small group in intense study with a faculty member. Repeatable one time for a maximum of 6 credits in major/degree.

**GEOGRPY 496 SPECIAL STUDIES *Repeatable* 1-3 Units**

Variable topics. Group activity. Not offered regularly in the curriculum but offered on topics selected on the basis of timeliness, need, and interest, and generally in the format of regularly scheduled Catalog offerings. Repeatable one time for a maximum of 6 credits in major/degree.

**GEOGRPY 497 EXCHANGE STUDY *Repeatable* 1-12 Units**

Variable topics.

**GEOGRPY 498 INDEPENDENT STUDY IN GEOGRAPHY *Repeatable* 1-3 Units**

Study of a selected topic or topics under the direction of a faculty member. Repeatable one time for a maximum of 6 credits in major/degree.

PREREQ: 12 CREDITS IN GEOGRAPHY, 2.75 GPA IN GEOGRAPHY AND CONSENT OF INSTRUCTOR

**GEOGRPY 498R INDEPENDENT STUDY - UNDERGRADUATE RESEARCH *Repeatable* 1-3 Units**

Study of a selected topic or topics under the direction of a faculty member. Repeatable one time for a maximum of 6 credits in major/degree.

**GEOGRPY 499 GEOGRAPHY THESIS *Repeatable* 2-3 Units**

A substantial research project written as a thesis. Two credits are taken in the first semester and three in the second semester. A proposal must be submitted at the midpoint of the first term and an oral defense takes place at the end of the second term. Available only for senior students.

PREREQ: SENIOR STATUS

**Geology Courses****GEOLOGY 100 PRINCIPLES OF GEOLOGY (GL) 5 Units**

An introduction to the concepts which describe the origin and evolution of the earth. Emphasis is on understanding (1) the material make-up of the earth, (2) the internal and external processes which affect the earth, (3) the scientific method as it applies to the study of the earth. One field trip is required.

COREQ: MATH 139 OR MATH 140 OR MATH 141 OR WAIVER UNREQ: GEOLOGY 101

UNREQ: GEOLOGY 100 AND GEOLOGY 101

**GEOLOGY 101 ELEMENTS OF GEOLOGY (GL) 4 Units**

An introduction to the study of the earth. Emphasis is place on: (1) the materials which make up the earth, (2) the internal and external processes which affect the earth, (3) the length of geologic time, and (4) the methods of science, especially as they apply to the study of the Earth. One field trip is required.

COREQ: MATH 139 OR MATH 140 OR MATH 141 OR WAIVER UNREQ: GEOLOGY 100

UNREQ: GEOLOGY 100 AND GEOLOGY 101

**GEOLOGY 203 VOLCANOES (GM) 3 Units**

The course examines the processes that lead to different types of volcanic activities, role of volcanism on development of continents, oceans, and atmosphere, and its various impacts on the biosphere on planet earth. Volcanism on other planets and satellites within the solar system will also be explored. Special emphasis will be placed on volcanoes as major economic resources.

**GEOLOGY 204 EARTH AND LIFE HISTORY (GM) 3 Units**

A study of the changes in the Earth's crust and life through geologic time and the methodology used in reconstructing Earth history, including plate tectonics, organic evolution and stratigraphy. A special fee will be assessed to cover transportation costs for those students selecting to participate on an optional field trip.

COREQ: MATH 139 OR MATH 140 OR MATH 141 OR WAIVER

**GEOLOGY 250 GEOLOGY & GEOLOGY OF YELLOWSTONE NATL. PARK & UPPER GRT PLAINS (GL) 4 Units**

An interdisciplinary introduction to field methods, geology, ecology and natural history. Involves on-line work with additional lectures and labs at Yellowstone National Park and locations en route. Additional course fees apply. Students with disabilities may be accommodated. Biology or Geology/Geography majors take Bio/Geo 451 or see Department Chair. Summers only.

COREQ: MATH 139 OR MATH 140 OR MATH 141

CROSS-LISTED: BIOLOGY 250 AND GEOLOGY 250

**GEOLGY 300 PRINCIPLES OF OCEANOGRAPHY (GM) 3 Units**

A study of the physical, chemical, geological and biological aspects of the major water masses of the world and human dependency on these water masses. One field trip to observe shoreline processes is required. A special fee will be assessed to students electing to participate in an optional field trip to cover the transportation costs.

COREQ: MATH 139 OR MATH 140 OR MATH 141 OR WAIVER

**GEOLGY 301 ENVIRONMENTAL GEOLOGY (GM) 3 Units**

A study of geological phenomena such as earthquakes, volcanism, mass movements, river processes, coastal processes etc. and their impacts on society and environment. Special emphasis will be placed on examining remedial measures against geological hazards and how human actions influence natural geological processes. Three lecture hours per week.

**GEOLGY 307 DINOSAURS (GM) 3 Units**

The course will examine all aspects of Dinosaurs from Earth System Science perspective. Who were the Dinosaurs? When, how and where did they live on earth? What is their relationship to birds? What were the circumstances of their extinction?

COREQ: MATH 139 OR MATH 140 OR MATH 141 OR WAIVER

**GEOLGY 310 ROCKS AND MINERALS 4 Units**

This course will study the formation processes of common rocks and minerals, their physical properties and their various uses will be covered in detail. Rock and mineral identification techniques will be especially emphasized during the laboratory sessions. Students will be expected to devote significant amounts of time towards the lab assignments.

PREREQ: GEOLGY 100 OR GEOLGY 101 OR GEOGRPY 210

**GEOLGY 317 PALEONTOLOGY 3 Units**

A detailed study of the history of life on Earth. Lectures focus on concepts in paleontology including paleoecology; evolution; paleobiogeography; and use of fossils in the solution of geologic problems. Characteristics of common fossils will be the focus of the exercises. One field trip is required; up to two optional field trips possible (fee assessed to cover transportation costs of optional trips).

PREREQ: GEOLGY 100 OR GEOLGY 101 AND GEOLGY 204 OR BIOLOGY 142 OR CONSENT OF INSTRUCTOR

**GEOLGY 318 GEOLOGIC STRUCTURES AND FIELD METHODS 4 Units**

Study of causes behind formation of major structural features of earth plus identification techniques and description of geologic structures in field. Emphasizes (1) Understanding and quantifying geologic deformation, (2) material response to conditions of deformation, (3) identification/description of geologic structures in multiple scales, and (4) geologic field/data analyses techniques such as stereographic projections and preparation and interpretation of geologic maps.

PREREQ: (GEOLGY 100 OR GEOLGY 101 OR GEOGRPY 210) AND MATH 152

**GEOLGY 319 STRATIGRAPHY AND SEDIMENTATION 3 Units**

Classification and description of the various kinds of sediments and sedimentary rock units; with emphasis on carbonates; cyclic sedimentation and sequence stratigraphy. Techniques of correlating sedimentary rocks will be the focus of the exercises. One field trip is required. A special fee will be assessed to cover transportation costs to those students electing to participate on any optional field trips.

PREREQ: GEOLGY 100 OR GEOLGY 101 OR GEOGRPY 210 OR GEOLGY 204 OR CONSENT OF INSTRUCTOR

**GEOLGY 352 GEOHAZARDS 3 Units**

The course will focus on the physical processes that create environmental hazards (e.g. earthquakes, volcanoes, severe weather), the primary controls on their frequency and intensity, and how human decision-making can influence the magnitude of impact that they have when they inevitably occur. Comparisons are made between impacts of hazards on developing versus developed countries. .

PREREQ: GEOGRPY 210 OR GEOLGY 100 OR GEOLGY 101

**GEOLGY 451 NATURAL HISTORY OF YELLOWSTONE NP AND THE UPPER GREAT PLAINS 3 Units**

This is an introductory, multi-disciplinary, summer field course open to all. It is held at Yellowstone National Park and locations in route. Students will learn field methods, geology, ecology and natural history. It is suitable for biology and geology majors and anyone interested in field science or natural history.

PREREQ: BIOLOGY 120 OR BIOLOGY 141 AND CONSENT OF INSTRUCTOR

**GEOLGY 490 WORKSHOP Repeatable 1-3 Units**

Variable topics. Group activity oriented presentations emphasizing 'hands on' and participatory instructional techniques. Repeatable.

**GEOLGY 491 TRAVEL STUDY Repeatable 1-3 Units**

Variable topics. Faculty-led field courses.

**GEOLGY 492 FIELD STUDIES IN GEOLOGY Repeatable 1-3 Units**

Field studies of classic geologic regions. Emphasis will be placed on training in the basic techniques and methods of field studies, recognition and interpretation of geologic structures, and the use of field observations to develop both geologic understanding of the region studied and geologic reasoning ability. Students will be responsible for the cost of the university van rental and other trip expenses. Repeatable 3 times in the major and degree, up to 9 credits total.

COREQ: GEOLGY 100 OR CONSENT OF INSTRUCTOR

**GEOLGY 493 INTERNSHIP IN GEOLOGY Repeatable 1-3 Units**

Students will be placed in an outside private or governmental agency where they will utilize geographic techniques in approaching practical problems relevant to the agency's mission. An on-campus seminar with fellow interns and the supervisory instructor is required.

**GEOLGY 494 SEMINAR 1-3 Units**

An intensive study of one or more philosophical issues that supplement the curriculum. Original research papers may be expected as partial fulfillment of the course requirements. Repeatable. Prereq: Consent of instructor.

**GEOLGY 496 SPECIAL STUDIES (GM) Repeatable 1-3 Units**

Variable topics. Group activity. Not offered regularly in the curriculum but offered on topics selected on the basis of timeliness, need, and interest, and generally in the format of regularly scheduled Catalog offerings. Repeatable. Prereq: Consent of instructor.

**GEOLGY 497 EXCHANGE STUDY Repeatable 1-12 Units**

Variable Topics

**GEOLGY 498 INDEPENDENT STUDY Repeatable 1-3 Units**

Study of a selected topic or topics under the direction of a faculty member. Repeatable.

PREREQ: EIGHT CREDITS IN GEOLOGY OR CONSENT OF INSTRUCTOR AND PROGRAM COORDINATOR

**GEOLGY 498R INDEPENDENT STUDY - UNDERGRADUATE RESEARCH Repeatable 1-3 Units**

Study of a selected topic or topics under the direction of a faculty member. Repeatable

**GEOLOGY 499 GEOLOGY THESIS *Repeatable* 2-3 Units**

Individual research for major writing a thesis under direct supervision of a member of the faculty. Available only for senior students.

PREREQ: SENIOR STATUS