NORTHWEST

missouri / state / university / maryville

GEOLOGY AND GEOGRAPHY

College of Arts and Sciences

GEOLOGY AND GEOGRAPHY

MAJORS

- Geology
- Environmental Geology Concentration
- Unified Science in Earth Science
- Geography (minor required)
- Geographic Information Science (GIS)

MINORS

- Geology
- Earth Science Education
- Environmental Science
- Geography
- Geographic Information Systems (GIS)

THE DEPARTMENT

The Department of Geology and Geography is a combined department that is attractive to students who are interested in science, the earth and its people. Often, because the fields are so closely related, students choose to major in one area and minor in the other.

The Geography curriculum teaches an understanding of geographical data both physical and cultural and GIS. This involves making computerized maps that can be cross-referenced to answer questions. These map data are powerful tools for problem solving. GIS can be used in any situation that requires organizing data relating to a given place. Career possibilities are endless.

Geology majors study the Earth's physical makeup and history. Geology is the science that provides the key to finding new sources of useful earth materials and to understanding Earth processes that affect our lives. Geologists are concerned about natural resources, as well as their location, quality and process that affects these resources.

State-of-the-art equipment is available to students in the Geology and Geography program at Northwest. The Department has two computer laboratory classrooms. This allows them to become familiar with both systems — something employers consider an asset. Department laboratory facilities, field equipment and specialized trips provide opportunities to carry out a variety of geologic and geographic investigations. Students may gain professional job experience and enhance their education through internships.

DEGREE PROGRAMS

The Department of Geology and Geography offers programs leading to the Bachelor of Arts and Bachelor of Science degrees. The difference between these two degrees is that the B.A. has more requirements in the liberal arts area, while the B.S. has more requirements in the sciences. Geography majors are required to have a minor for either degree. The Geographic Information Science major does not require a minor. A major in Geology for a B.A. degree requires a minor. Geology majors are not required to have a minor for a B.S. degree and may choose an area of concentration in General Geology or Environmental Geology. A program may also be selected for a Bachelor of Science in Education, Secondary Program, in Earth Science. The Geographic Information Science major is comprehensive and therefore needs no minor.

Minors in Geography, Geology and Geographic Information Systems (GIS) also are available.

NORTHWEST
MISSOURI STATE UNIVERSITY

MAJORS

GEOLOGY

Core Requirements
- General Geology and Laboratory OR
  - General Earth Science and Laboratory
- Historical Geology
- Mineralogy
- Petrology
- Senior Seminar

B.A. – minor required

Required Courses
- Geology Core Requirements
- Environmental Geology
- Geology electives
  - (no more than two field trips)

Directed General Education Course
- General Chemistry and Laboratory OR
  - General Chemistry I and Laboratory

B.S. – no minor required; choose one area of concentration

General Geology Concentration

- Geology Core Requirements
- Structural Geology
- Stratigraphy OR Sedimentology
- Paleontology
- Geology Summer Field Camp

Required Geology Electives
(Choose one from each group)

Group I
- Economic Geology
- Geochemistry
- Geomorphology
- X-Ray Analysis
- Optical Mineralogy

Group II
- Physical Oceanography
- Introduction to Hydrogeology
- Environmental Geology
- Environmental Regulations
- Climatology
- Remote Sensing

Required Collateral Courses
- Trigonometry or any calculus course
- General Chemistry I and Laboratory OR
  - General Chemistry II and Laboratory
- General Physics I and II and Laboratory
  - OR Classical Physics I and II and Laboratory

Directed General Education Courses
- College Algebra or any calculus course
- General Chemistry and Laboratory OR
  - General Chemistry I and Laboratory
- General Biology and Laboratory OR
  - General Botany and Laboratory OR
  - General Zoology and Laboratory OR
  - Invertebrate Zoology

Environmental Geology Concentration

B.S. – no minor required
- Geology Core Requirements
- Introduction to Hydrogeology
- Environmental Geology
- Geologic Field Methods OR Field Camp in Geology, Hydrogeology or Environmental Geology

Required Geology Electives
(choose a combination to total 15 hours)
- National Parks, Physical Oceanography, Economic Geology, Geochemistry, Stratigraphy, Structural Geology, Geomorphology, Sedimentology, Paleontology, X-Ray Analysis, Optical Mineralogy

Required Collateral Courses
(choose a combination to total 12 hours)
- Environmental Issues, Soils, Organic Chemistry and Laboratory, Environmental Regulations, Maps and Map Interpretation, GPS Fundamentals, Economic Geography, Climatology, Cartography, Remote Sensing, Geographic Information Systems, Conservation of Natural Resources, Urban Geography, Digital Cartography and Geo Visualization, Digital Image Processing, Advanced Geographic Information Systems, General Statistics I

Directed General Education Courses
- General Chemistry and Laboratory OR
  - General Chemistry I and Laboratory

UNIFIED SCIENCE MAJOR IN EARTH SCIENCE

B.S. Ed. – no minor required, secondary program, (certifies grades 9-12, endorsement area: Earth Science)

Required Courses
- General Earth Science and Laboratory
- Historical Geology
- Mineralogy
- Practicum in Teaching Laboratory
- Physical Oceanography
- Environmental Geology
- Petrology
- Senior Seminar
- Paleontology
- Dynamic and Synoptic Meteorology

Required Collateral Courses
- History of Science and Technology
- General Botany and Laboratory
- General Chemistry II and Laboratory
- General Physics I and Laboratory
- General Physics II and Laboratory
- Descriptive Astronomy and Laboratory
- Trigonometry

Directed General Education Courses
- College Algebra
- General Chemistry I and Laboratory
- General Zoology and Laboratory

Professional Education Course
- Methods in Secondary School Science

GEOGRAPHY

Core Requirements
- Maps and Map Interpretation
- Economic Geography
- Geography of North America
- Geographic Thought and Research Methods
- Senior Seminar

B.A. – minor required

Required Courses
- Geography Core Requirements

Electives in Regional Geography
(choose two):
- Geography of Europe
- Geography of Asia
- Geography of the Middle East
- Geography of Africa
- Geography of Latin America
- Special Topics in Geography

Electives in Systematic Geography
(total of 11 hours):
- People and Cultures of the World, GPS Fundamentals, Special Topics in Geography, Cadastral Mapping, Dynamic and Synoptic Meteorology, Climatology, Cartography, Remote Sensing, Geographic Information Systems, Natural Disasters, Internship in Geography, Introduction to Customized GIS, Conservation of Natural Resources, Geographic Education: Themes and Materials, Special Topics in Geography, Military Geography, Political Geography, Urban Geography, Digital Cartography and Geo Visualization, Digital Image Processing, Advanced Geographic Information Systems, Geology of

the National Parks, Environmental Geology, Geologic Field Methods, Geomorphology, Environmental Regulations

B.S. – minor required

Required Courses

Geography Core Requirements

Electives in Regional Geography (choose one or two):

Geography of Europe
Geography of Asia
Geography of the Middle Eat
Geography of Africa
Geography of Latin America

Electives in Systematic Geography (total of 18-21 hours):

People and Cultures of the World, GPS Fundamentals, Special Topics in Geography, Cadastral Mapping, Dynamic and Synoptic Meteorology, Climatology, Cartography, Remote Sensing, Geographic Information Systems, Natural Disasters, Independent Study in Geography, Internship in Geography, Introduction to Customized GIS, Conservation of Natural Resources, Geographic Education: Themes and Materials, Military Geography, Political Geography, Urban Geography, Digital Cartography and Geo Visualization, Digital Image Processing, Advanced Geographic Information Systems, Geology of the National Parks, Environmental Geology, Geologic Field Methods, Geomorphology, Environmental Regulations

GEOGRAPHIC INFORMATION SCIENCE

B.S. – no minor required

Required Courses

Maps and Map Interpretation
GPS Fundamentals
Economic Geography
Cartography
Remote Sensing
Geographic Information Systems
Geographic Thought and Research Methods
Introduction to Customized GIS
Senior Seminar
Advanced Geographic Information Systems
Introduction to Programming Using Visual Basic
Database Applications

Electives in GIS (choose six hours):

Cadastral Mapping
Internship in Geography
Digital Cartography and Geo Visualization
Digital Image Processing
Other advisor-approved electives

Electives in Regional Geography (choose one course):

Geography of North America
Geography of Europe
Geography of Asia
Geography of the Middle East
Geography of Africa
Geography of Latin America

Area of Emphasis:

Choose one area of emphasis from the following options:

Data and Technology Emphasis

Required Courses

Computer Programming I
Computer Programming II
Database Systems

Electives (choose one course):

Visual Application Development
Advanced Topics in Database Systems
Web Services Technology

Geographic Emphasis

Required Course

Urban Geography

Electives (choose three courses):

Dynamic and Synoptic Meteorology
Climatology
Conservation of Natural Resources
Military Geography
Political Geography
Geomorphology

Earth Technology Emphasis

Required Courses

Environmental Geology
Environmental Regulations

Electives (choose six hours):

Physical Oceanography
Introduction to Hydrogeology
Geomorphology
Natural Disasters
Conservation of Natural Resources
Environmental Issues
Wildlife Management and Conservation

Civil/Public Emphasis

Required Courses

Urban Geography
Economic Development

Electives (choose two courses):

State and Local Government
Principles of Public Administration
Public Policy
Urban Sociology
Technical Writing

Directed General Education Courses

Introduction to Geography
General Earth Science and Laboratory OR General Geology and Laboratory
General Statistics I

MINORS

GEOLOGY

Required Courses

General Geology and Laboratory OR General Earth Science and Laboratory
Historical Geology
Mineralogy
Geology electives (13 credit hours)

Directed General Education Courses

General Chemistry and Laboratory OR General Chemistry I and Laboratory

INTERDISCIPLINARY MINOR IN ENVIRONMENTAL SCIENCE

Required Courses

General Chemistry I and Laboratory
General Zoology and Laboratory
Basic Ecology
Environmental Geology OR Environmental Issues
Hydrogeology
Conservation of Natural Resources

Electives (choose four hours)

Soils
General Microbiology
Environmental Internship
Wildlife Management & Conservation
Methods in Plant Ecology
Methods in Animal Ecology
Geochemistry
Environmental Regulations
Sedimentology
Climatology

Directed General Education Courses

General Botany and Laboratory
General Earth Science and Laboratory

GEOGRAPHY

Required Courses

- Maps and Map Interpretation
- Economic Geography
- Geography of North America
- Geographic Thought and Research Methods
- Geography electives (12 credit hours)

GEOGRAPHIC INFORMATION SYSTEMS

This is an interdisciplinary minor in conjunction with the Department of Computer Science/Information Systems.

Directed Institutional Requirement

- Computers and Information Technology

Required Courses

- Maps and Map Interpretation
- Geographic Information Systems
- Advanced Geographic Information Systems
- Introduction to Programming Using Visual Basic
- Computer Programming I
- Computer Programming II
- Database Applications
- Database Systems

Choose two of the following:

- Cartography
- Remote Sensing
- Digital Cartography and Geo Visualization
- Digital Image Processing
- Data and File Structures
- Advanced Word Processing
- Presentation Graphics
- Digital Media
- Visual Application Development
- Current Topics in Computer Science

EARTH SCIENCE EDUCATION

This minor may be paired with a degree in Geography, but not a minor in Geology. This minor will not be certified to teach unless taken on a B.S. Ed. degree.

Required Courses

- General Earth Science and Laboratory
- Historical Geology
- Practicum in Teaching Laboratory
- Physical Oceanography
- Dynamic and Synoptic Meteorology
- Environmental Geology OR Conservation of Natural Resources
- Descriptive Astronomy and Laboratory

COURSE DESCRIPTIONS

GEOGRAPHY

Introduction to Geography
Survey course introducing students to the geographical study of the relationship of humans to the environment and the spatial patterns of human activities.

People and Cultures of the World
A regional perspective on the distribution of languages, religions, laws and customs around the globe.

Maps and Map Interpretation
Designed to teach students how to analyze and interpret map information based on a knowledge of map projections, map distortion, coordinate systems and map measurement techniques. The basics of air photo interpretation are also covered.

GPS Fundamentals
An introductory course to the Global Positioning System and the integration with other spatial data-related technologies, such as GIS and remote sensing, for field or in-office work.

Special Topics in Geography
A course designed to employ geographic tools and methods in the analysis of pertinent topics relating to the human spatial organization of the earth. Topics include: natural disasters, disease and health care, scribing, etc.

Economic Geography
Survey course dealing with the interrelationships of geography and the human attempt to make a living. Such topics as agricultural regions of the world, industry, mining and forestry will be considered.

Cadastral Mapping
A course designed to employ geographic tools and methods in the analysis of pertinent topics relating to the human spatial organization of the earth.

Geography of North America
An advanced course examining regional variations in the United States and Canada with numerous case studies.

Dynamic and Synoptic Meteorology
A study of the physical characteristics of the atmosphere and the variables that control both day-to-day weather and severe weather.

Climatology
Climate types and their significance to ecosystems and human activities are discussed. Emphasis is placed on applied climatology, paleoclimatology and the significance of climate change.

Cartography
Map compilation, design and construction.

Remote Sensing
Use of aerial photography and satellite imagery in geological and geographic research.

Geographic Information Systems
An introduction to geographic information systems encompassing the theoretical and applied aspects of the collection, storage, analysis and display of spatial (geographical) data.

Natural Disasters
A course designed to employ geographic tools and methods in the analysis of pertinent topics relating to man's spatial organization of the earth. The topic of natural disasters will be the subject of this session.

Independent Study in Geography
Offered only by special arrangement and with the consent of the instructor involved and the department chairperson. Requires written proposal at time of registration.

Geographic Thought and Research Methods
An advanced course in geographic research, emphasizing data collection, analysis and presentation. The course will also examine the history of geographic thought in the U.S.

Internship in Geography
As internships (paid and unpaid) become available, they will be offered. They require permission of the instructor, department chairperson and a written proposal at the time of registration.

Geography of Europe
An advanced course in geography dealing with the continent of Europe. The major regions and nations of Europe are studied in detail.

Geography of Asia
An advanced course in the geography of Asia with a regional approach. Special emphasis is placed on the Chinese Realm, Southeast Asia, the Indian subcontinent, Japan and Korea.

Geography of the Middle East
An advanced regional course focused on the physical and human geography of the Middle East (North Africa and Southwest Asia).

Geography of Africa
A comprehensive course study of the physical and cultural geography of the African continent.

Geography of Latin America
Provides the student with sufficient information about the physical and cultural aspects of Latin America to allow the application of general concepts of regional geography of this particular area.

Introduction to Customized GIS
An introduction to GIS customization for personalized graphic user interface and specialized functions. The GIS function library provided by the current GIS software will be used to facilitate such customization.

Senior Seminar
A capstone course in geography. Course is designed to assess the student's ability to synthesize and evaluate geographic knowledge as it applies toward professional enhancement and/or further professional development in higher education.

Conservation of Natural Resources
A study of the earth's environment and resource limits as related to population growth and humankind's need to provide food, water, mineral resources and energy in order to survive and prosper. Emphasis is placed on developing an appreciation for the interconnectedness of the natural world and the potential consequences of disrupting those connections.

Geographic Education: Themes and Materials
Designed for elementary or secondary teachers wishing to incorporate an instructional unit in geography in either the social science or science curriculum.

Special Topics in Geography
Will be offered according to student needs and interest. Each offering will be designed to incorporate the latest information pertaining to a timely topic in geography. May be repeated once to earn no more than six credits total. Topics may include: applied geographic information systems, urban and regional planning, location analysis, geography of sport, etc.

Military Geography
An advanced course in geography that applies both physical and human spatial approaches to the study of military issues across the spectrum of conflict.

Political Geography
An advanced course in geopolitics with emphasis on fundamental principles and their application to the major regions and nations of the world today.

Urban Geography
An advanced course offering an in-depth study of the physical characteristics of cities and some of the problems man is faced with in a world where urbanism is a rapidly increasing phenomenon.

Applications of Remotely Sensed Data
Covers the use of remotely-sensed information in a geographic information system environment. Emphasis is placed on understanding different data sources, tools and techniques used in remote sensing.

Principles of GIS
A rigorous study of fundamental GIS principles, including the nature of spatial data, vector and raster data models, and key GIS analysis operations.

Digital Cartography and Geo Visualization
An advanced cartography course utilizing computer assisted cartography and advanced techniques of map construction.

Digital Image Processing
Further explores the techniques and concepts learned in Remote Sensing. Explores advanced techniques in image analysis and processing not covered in Remote Sensing.

Advanced Geographic Information Systems
Builds on the techniques and concepts learned in Geographic Information Systems. Stresses research and project design strategies and advanced analytical techniques using geographic information systems to solve spatial problems.

Spatial Analysis and Geostatistics
Designed to make the student familiar with the analysis and statistical tools used by geographers. Covers the fundamental aspects of geostatistics that are used in research and business environments.

GEOLOGY

General Geology and Laboratory
A study of the minerals, surface features, geologic processes and history of the earth.

General Earth Science and Laboratory
A general introductory survey of the earth sciences of physical geography, geology, oceanography, climatology and meteorology.

Information Technology and Science
An introduction into the basics of computer systems and software that are typically used at Northwest and in the professional world. Topics reviewed will include studies of PC-based computer systems, use of the school's network system, effective use of internet resources and the World Wide Web (WWW), common productivity software (such as office programs, suites, e-mail, Web-course) with particular emphasis on applications to the sciences.

Historical Geology
A study of the geological history of the earth including the geological time scale, rock units and fossil records.

Gemology
An introduction to gemology including description, identification, grading of gems and their substitutes.

Mineralogy
A survey of physical mineralogy, identification of minerals, types of formation, and deposits of metallic ores, gemstones, industrial minerals and other economically useful minerals and rocks.

Practicum in Teaching Laboratory
To assist faculty in beginning level laboratory situations in classes like General Geology Laboratory, General Earth Science Laboratory, Mineralogy and for preparation for teaching positions in graduate school.

Geology Field Trip
Field trip to selected localities of geologic interest.

Geology of the National Parks
A study of the geologic features of the 38 U.S. National Parks including consideration of their causes and changes.

Physical Oceanography
A study of the oceans including the physical properties of the oceans and marine geology.

Introduction to Hydrogeology
An introduction to the occurrence, movement, quality, contamination and management of groundwater.

Environmental Geology
The relation of geology to man and his environment, including the study of population, earth resources and natural phenomena.

Internship in Geology
As internships (paid and unpaid) become available, they will be offered. They require permission of the instructor, department chairperson and a written proposal at the time of registration. Student enrolls in the appropriate number of credit hours for the work load of the internship. As a guideline, 160 work hours are worth 3 credit hours.

Petrology
Hand specimen study of igneous, sedimentary and metamorphic rocks including identification, mineral compositions, fabrics, textures, occurrences, genesis and classifications.

Economic Geology
A survey of metallic and nonmetallic (petroleum, coal) mineral deposits.

Geochemistry
Basic principles governing the origin, distribution and migration of elements in the earth.

Stratigraphy
A study of the principles and concepts used to study the stratigraphic sequence of rocks, including sedimentary environments, biostratigraphy and time-stratigraphic correlation.

Structural Geology
The study of the architecture of rock units of the crust of the earth insofar as it has resulted from deformation and the tectonic forces which produce them. Subject matter includes folds, faults, unconformities, rock fabric, geosynclines, continental drift and plate tectonics. Laboratory techniques utilize structure cross sections, projections, structure contour maps, geologic maps, isopach maps, strike and dip, stero nets, construction techniques, etc.

Geologic Field Methods
Basic geological surveying techniques will be studied in the field. Notebook procedures and format will be stressed.

Senior Seminar
A capstone course in Geology. A student will examine current geologic research results and techniques, write a research paper, present the paper orally to a forum in the department or elsewhere, investigate employment opportunities, and assess his/her fundamental understanding of geology.

Special Topics in Geology
Will be offered according to student needs and interest. Each offering will be designed to incorporate the latest information pertaining to a timely topic in geology. Topics may include rock and mineral origins and classifications, groundwater, energy, age of dinosaurs, fossils and the history of life, volcanoes and earthquakes and glacial geology.

Geomorphology
A study of landforms, their description, recognition and classification. The origin and nature of geomorphological processes which form and continually modify landforms. The influence of rock type, climate and other factors. Two lectures and one two-hour laboratory.

Environmental Regulations
An introduction to federal and state regulations and major issues associated with the environment including air quality, groundwater quality and the disposal of hazardous waste.

Geology Field Trip (Advanced Level)
Field trip to selected localities of geologic interest.

Sedimentology
A study of the production, transportation, deposition and lithification of sediments. To include comparison of classifications, techniques of using sediments in environmental interpretations and laboratory techniques in sediment study.

Paleontology
A general study of fossils including classification of plants and animals, development and evolution of prehistoric life, paleontological techniques and use of fossils as time and ecological guides. Lab includes study and identification of the major fossil groups. Emphasis is on invertebrate animals, with a general review also of microfossils, plants and vertebrates.

X-Ray Analysis
Theory and application of x-ray diffraction. Consideration will be given to sample preparation, American Society Testing Materials data file, laboratory procedures and analysis of data.

Optical Mineralogy

A study of the optical properties of nonopaque minerals through the use of the petrographic (polarizing) microscope utilizing both oil immersion and thin section methods.

Seminar in the Earth Sciences

Seminar and studies of advanced topics in selected fields in geology and other earth sciences.

Special Investigation in the Earth Sciences

Independent studies in the earth sciences including but not limited to research and library studies. Enroll only with consent of department chairperson. Requires written proposal at time of registration.

CAREER OPPORTUNITIES

GEOLOGY

- **Economic geologist** — These scientists study market trends for products that have profitable uses.
- **Engineering geologist** — These scientists investigate geologic factors that affect engineering structures such as bridges, buildings, airports and dams.
- **Environmental geologist** — Scientists in this field work to solve problems like flooding, pollution, solid waste and urban development.
- **Environmental consultry** — Characterization of project sites and clean up assessment of surface and shallow subsurface geology.
- **Geochemist** — A career in geochemistry involves studying the chemical elements of rocks and minerals.
- **Geophysicist** — Geophysicists decipher the earth's interior and magnetic, electric and gravitational fields.
- **Government agencies** — Work for NRCS, USGS and Department of Transportation.
- **Higher education** — Many geologists become academically involved in undergraduate research and continue that research as they obtain higher degrees and/or teach.
- **Hydrogeologist** — Hydrogeology is the study of the abundance, distribution and quality of ground and surface waters. Hydrogeologists are employed by governments and environmental companies.
- **Mining engineer** — Mining engineers primarily work in the planning, designing and operation of surface and subsurface mining operations.
- **Petroleum geologist** — Petroleum geologists are involved in the exploration and production of natural gas and petroleum products.
- **Seismologist** — Seismology is the study of earthquakes. Seismologists study the location and force of earthquakes and trace the behavior of earthquake waves to interpret the structure of the earth.

GEOGRAPHY

- **Cartographer** — Students who pursue this field will design, produce and interpret maps of all kinds. Private engineering and surveying firms employ students with cartography skills.
- **Climatologist** — Climatologists understand the climates, wind and ocean currents of the earth. Many work for television stations, large agri-businesses, the federal government and organizations that help in the development of Third World countries.
- **Geographic Information Systems analyst** — GIS is a system of storing information on computers so it can be retrieved and used by geographers, planners, land developers, real estate agents and city officials. For example, if a small city is considering building a highway bypass, planners will need information on population, distribution, traffic patterns, availability of land, land prices, flooding and other survey information.
- **Location expert** – One of the most important ways a business or industry assures success is to find the best location. Many companies employ their own location experts. This information indicates where stores, businesses, industries, recreation facilities, hospitals, hotels, etc., should be located to minimize costs and maximize profit.
- **Meteorologist** — Meteorologists analyze and interpret atmospheric conditions. Usually, they work for television stations or for the National Weather Service.
- **Urban and community planner** — Planners require geographic analysis skills as they work with zoning, traffic patterns and recreation facilities. Planners work closely with builders to ensure that cities remain pleasant. They organize traffic patterns and plan recreation development.

Students with a geography major and a minor in another field have other career opportunities:

- **Area specialist** — These specialists are experts on specific regions of the world. For example, one could become an authority on Brazil or Russia.
- **Health services planner** — These specialists perform a variety of duties relating to the marketing and delivery of health care.
- **Higher education** — Many geographers take advantage of graduate school opportunities to augment their broad training in a variety of fields.
- **Historic site preservationist** — A combination of Geography and History with graduate level preparation prepares students for careers with government agencies that identify historic sites and develop plans to preserve them.
- **Market researcher** — By using geography to collect information about where people live and shop, market researchers determine where products can be sold. They collect information on traffic routes, bus transportation, buying habits, regional sales characteristics and customer sales.
- **Remote sensing specialist** — Remote sensing involves taking photographs of the earth via planes or satellites. The photos are then used to analyze things such as population, vegetation, flooding, soil conditions and land use. Then, they are used to produce computerized maps.

UNDERGRADUATE RESEARCH

Northwest is proud of its Undergraduate Research Program because at many colleges and universities, research opportunities are reserved for graduate students. The program has flourished, especially in the Department of Geology/ Geography. Since its inception in 1990, more than 100 students in Geology and Geography have participated.

Getting involved is simple. To do so, one must discuss a topic with a faculty member, which must then be approved by a committee. Research topics have been diverse in both geology and geography. Geological research has included such topics as groundwater quality in Nodaway County, cycles of limestone deposits, and classification and formation of pegmatites. Voting patterns in Missouri's presidential elections, the impact of deregulation of televised college football and the geography of NASCAR are examples of previous geographical topics.

Students present their research findings at local, state and national meetings.

INTERNSHIP OPPORTUNITIES

Geology/Geography students experience firsthand the professional circumstances and competencies required in career-related businesses through department-approved internships. Here is a partial list of internships:

- Cartographer
- Community Planner
- National Geographic Society Geography Intern
- Geo-Technical Assistant
- Database Development
- Environmental Protection Agency: Water, Wetlands & Pesticides Division Environmentalist
- GIS Analyst
- GIS Analyst/Surveyor
- GIS Developer
- Urban Planner
- Geologist

STUDENT ORGANIZATIONS

American Association of Petroleum Geologists (AAPG)

The local student chapter of AAPG is the department's newest student organization. This is an active group of geology students interested in the petroleum and other energy-related fields. The students and faculty advisor engage in activities such as field trips, guests speakers and student projects. There is also an annual grant for which members may apply.

Geo Club

This group is open to anyone who has a desire to learn about the geosciences. It is a forum that allows for active learning beyond the walls of the classroom. The group sponsors guest speakers, field activities, fundraisers and social events. Past activities of the group have included geological digs, spelunking (cave exploring), canoeing and camping, and visits to museums and rock and mineral shows.

Gamma Theta Upsilon

The Gamma Theta Upsilon is an international honor society in geography. Membership is earned through superior scholarship by students who indicate dedication and competency in the field of geography. Purposes of the organization are to further professional interest in geography, encourage student research/graduate study in the field of geography and strengthen student and professional training through a variety of academic experiences. Activities include the sponsoring of guest speaker forums, field trips and campus activities for National Geography Awareness Week.

Sigma Gamma Epsilon

This national honorary society was established to recognize scholarship and professionalism in the Earth Sciences. Objectives of the organization are the scholastic and scientific advancement of its members and the extension of relations of friendship and assistance among colleges and universities which are devoted to the advancement of the Earth Sciences. Membership qualifications include a grade point requirement in the completion of certain Earth Science courses as well as an overall grade point requirement for all college courses. Members serve the department in a number of ways, such as organizing field trips, tutoring, arranging displays and sponsoring fundraising activities for scholarships, awards and equipment/ materials to aid students studying the Earth Sciences.

DEPARTMENT OF GEOLOGY AND GEOGRAPHY

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