

GEOSCIENCES

Department website (<https://www.uwp.edu/learn/departments/geosciences/>)

College: College of Natural & Health Sciences

Student Organizations/Clubs:

Geosciences Club; Sigma Gamma Epsilon.

Career Possibilities:

Students in the Geosciences Department select between two concentrations: environmental geosciences or earth science, depending on their career goals.

The environmental geosciences concentration will prepare students for employment in private sector and various governmental agencies. Students completing this concentration will also have appropriate course work to be eligible for the certification exam as a professional geologist and/or professional hydrogeologist in Wisconsin. The expertise in hydrogeology and contaminant fate and transport afforded by this concentration can lead to employment as an environmental geoscientist in a variety of governmental and private organizations. Students interested in taking certification exams as professional soil scientists in Wisconsin may choose electives in soil science. Graduates with this background may work with governmental and private agencies in such applied fields as water resource management, soil conservation, and land-use planning.

The earth science concentration is extraordinarily flexible, as 15 credits of support courses are built into the major. These courses will be selected by the students and their advisors in order to develop a focal point related to their geosciences curriculum. The 15 credits are part of the major; therefore, a student electing to complete a minor cannot use these credits for that minor. Typical uses for the support courses include preparation for teacher licensure, law school, M.B.A. or M.P.A. programs.

Department Overview

The department's primary activities center around providing UW-Parkside students with a high-quality major program that will enable them to satisfy their specialized employment objectives. Toward this end, the Geosciences Department provides a core curriculum plus concentrations in environmental geosciences and earth science. Students electing the first concentration may choose to fulfill curricular requirements preparatory to professional certification by the state of Wisconsin as a geologist, hydrogeologist, or soil scientist. The earth science concentration provides a broad and flexible foundation for students with wide-ranging interests in the sciences, education, and the liberal arts. Furthermore, upper-level courses are intensively hands-on, enabling students to generate and analyze real-time data while gaining experience with innovative methods and instrumentation used by environmental professionals. The department has installed and maintains a network of ground water monitoring wells on campus and at other university properties in the community. These sites will serve students as hands-on learning sites, through which they can provide environmental quality assessment data that will assist surrounding communities in recognizing and interpreting long-term effects of land use changes.

It is the purpose of the Geosciences Department to become a key resource for environmental earth-system science at UW-Parkside, and in Kenosha and Racine counties. To this end, the department fosters faculty,

student, and staff involvement and investment in local and regional environmental issues. Geosciences faculty are also taking leadership roles in the establishment of the Root River Environmental Education Community Center (REC) in Racine, and the Center for Environmental Education and Research (CEDAR) in Kenosha.

The Geosciences Department encourages and supports research and publication by students in cooperation with faculty. The department also supports a program of student research projects on local environmental problems as part of the introductory and advanced courses. The department encourages and aids advanced students to attend professional society meetings at national, regional, and local levels. Departmental faculty members are actively engaged in research and continue to seek and obtain research support from appropriate federal, state, University of Wisconsin System, and campus sources.

Preparation for Graduate School

The environmental geosciences curriculum provides a strong background in mathematics and the physical sciences that prepares students for graduate work in the natural and environmental sciences. The earth science concentration—with an appropriate support course plan—is good preparation for advanced degree programs in law, public administration, education, and library science. The Geosciences Department has established an articulation agreement with the School of Freshwater Sciences, University of Wisconsin – Milwaukee for a 3+2 program to earn a B.S. from UW-Parkside and an M.S. or M.A. from School of Freshwater Sciences, UW-Milwaukee.

Program Level Outcomes

1. To prepare students for professional certification and employment in areas of environmental and earth sciences. The program satisfies requirements for Wisconsin Professional Geologist and Professional Hydrogeologist.
2. To promote scientific literacy on the campus and in the community, particularly with respect to principles and issues involving environmental awareness, quality, and protection.
3. To contribute fundamental scientific research that enhances environmental quality and quality-of-life for members of the regional, state, local and campus communities.
4. Contribute to the diversity of the university community by working toward the goals of Plan 2017-2020.

Programs Offered

- Geosciences Major (BS) (<https://catalog.uwp.edu/programs/geosciences/geosciences-major/>)
- Geosciences Minor (<https://catalog.uwp.edu/programs/geosciences/geosciences-minor/>)

Geosciences Major Concentrations

- Environmental Geosciences
- Earth Science

Courses in Geosciences

GEOS 100 | Earth in Perspective | 3 cr

Surveys the physical environment, including Earth's place in space, atmospheric processes, the oceans, and the solid earth; humanity's place in the system. Three-hour lecture.

Prerequisites: None.

Offered: Fall, Summer.

Meets: Natural Science: GEOS

GEOS 101 | Introductory Geology | 3 cr

Explores the origin, age, and structure of the Earth; mountain building, volcanism, and continental drift; earth materials; rocks, minerals, and mineral and fossil fuel resources. Three-hour lecture.

Prerequisites: None.

Offered: Fall.

Meets: Natural Science: GEOS

GEOS 102 | Origin and History of the Earth | 3 cr

Investigates the origin of the solar system and Earth; age of the Earth; origin of the oceans, atmosphere and life; geologic and life history. May require field trips.

Prerequisites: A 3 credit college-level geosciences course.

Offered: Spring.

GEOS 104 | Introductory Geology Laboratory | 4 cr

Explores rock, mineral, and fossil identification; topographic and geologic map interpretation; aerial photographs; and hydrology, soils, and environmental geology. Six-hour lab. Requires fees.

Prerequisites: GEOS 101 or equivalent.

Offered: Spring.

GEOS 105 | Oceanography | 3 cr

Explains the origin of ocean basins; nature of seawater; ocean circulation; waves and tides; life in the sea and marine resources. Intended for non-majors.

Prerequisites: None.

Offered: Summer, Winterim.

Meets: Natural Science: GEOS

GEOS 106 | Great Lakes Water Resources | 3 cr

Physical and geologic history and description of Great Lakes region. Emphasis on hydrologic cycle, economic resources of the Great Lakes, pollution and other environmental issues. Three-hour lecture.

Prerequisites: None.

Offered: Spring.

Meets: Natural Science: GEOS

GEOS 107 | Geology of National Parklands | 3 cr

Introduces fundamentals of geology as they relate to national parklands, including geological setting, geological features, and significance of designation.

Prerequisites: None.

Offered: Fall, Spring, Summer, Winterim.

Meets: Natural Science: GEOS

GEOS 200 | Minerals and Rocks | 5 cr

Explores internal order of crystals; physical, chemical, and optical properties of minerals; mineral identification; mineral associations and the classification of igneous, metamorphic, and sedimentary rocks; and ore deposits. Requires field trips and lab fee. Three-hour lecture, three-hour lab.

Prerequisites: GEOS 104.

Offered: Fall.

GEOS 301 | Geomorphology | 5 cr

Covers analysis and description of landforms. Emphasizes genesis, surficial processes, and relation to geologic structure. Includes regional treatment of landscapes. Requires field trips. Three-hour lecture; three-hour lab. Community-based learning designation.

Prerequisites: GEOS 102, GEOS 200; or consent of instructor.

Offered: Fall (even years).

Meets: Community Based Learning

GEOS 309 | Paleontology | 3 cr

Applies principles, practices, and procedures to important fossil invertebrate groups; generalized discussion of plants and vertebrates; elements of biostratigraphy; paleoenvironmental interpretations. Field trips. Two-hour lecture; two-hour lab. Cross-listed with: BIOS 329.

Prerequisites: GEOS 102 or BIOS 102.

Offered: Spring.

GEOS 320 | Soils, Weathering and Surficial Processes | 5 cr

Describes soils as natural entities in a process-based context. Covers methods and terminology of soil description and classification. Digs into environmental capacity of soils on a quantitative basis. Three-hour lecture; three-hour lab.

Prerequisites: GEOS 104; CHEM 101, CHEM 103.

Offered: Occasionally.

GEOS 330 | Environmental Geology | 5 cr

Addresses application of basic geologic concepts to environmental problems. Emphasizes geologic hazards, waste disposal, urban planning, resource policy issues, and environmental trends and programs. Three-hour lecture; three-hour lab.

Prerequisites: GEOS 104 or consent of instructor.

Offered: Spring.

GEOS 331 | Introduction to Geochemistry | 3 cr

Investigates chemical principles and their application to various geologic environments, chemical weathering, geochemical prospecting, phase equilibria, and geochronology. Requires field trip.

Prerequisites: CHEM 102, CHEM 104.

Offered: Spring (odd years).

GEOS 345 | Geophysics | 3 cr

Surface and subsurface geophysics; principles and procedures of magnetics, gravity, seismology, electromagnetics, ground penetrating radar; applications in hydrogeology, petroleum and mineral exploration, environmental and water resource investigations. Field trips. Three-hour lecture.

Prerequisites: GEOS 102, MATH 114 or consent of instructor.

Offered: Spring (odd years).

GEOS 355 | Stratigraphy and Sedimentation | 5 cr

Explores the sedimentary rock record, correlation, nomenclature, paleotectonics, subsurface techniques, sedimentary processes and environments, and recent sediments. Three-hour lecture; three-hour lab.

Prerequisites: GEOS 104, GEOS 200 or consent of instructor.

Offered: Spring.

GEOS 361 | Hydrogeology | 3 cr

Examines surface water hydrogeology; runoff and stream flow; groundwater hydrogeology: distribution of ground water, aquifer properties, local and regional ground water flow, geology of ground water occurrence; aqueous chemistry, and water quality. Three-hour lecture.

Prerequisites: GEOS 200; MATH 114 or MATH 112 and MATH 113; or consent of instructor.

Offered: Spring (even years).

GEOS 420 | Glacial Geology | 5 cr

Explores regimen and flow of glaciers, glacial erosion and deposition; glacial landforms; Pleistocene history in glaciated and non-glaciated regions; and stratigraphy and chronology of Pleistocene deposits in the Midwest and Great Lakes. Requires field trips. Three-hour lecture; three-hour lab.

Prerequisites: GEOS 104, GEOS 200; or consent of instructor.

Offered: Spring (even years).

GEOS 431 | Aqueous and Contaminant Geochemistry | 5 cr

Examines solution chemistry, aqueous chemical speciation, organic chemistry, contaminant-sediment interaction, and contaminant fate and transport. Requires field trips. Three-hour lecture; three-hour lab.

Prerequisites: GEOS 331.

Offered: Spring (odd years).

GEOS 445 | Environmental Sampling, Monitoring, and Assessment | 5 cr

Covers EPA-referenced field and laboratory methods for evaluating contaminant levels in terrestrial and groundwater systems. Provides opportunity to practice sampling and monitoring techniques and gain experience with chromatographic and spectroscopic techniques. Three-hour lecture; three-hour lab. Requires lab fee.

Prerequisites: GEOS 330.

Offered: Fall.

GEOS 465 | Applied Hydrogeology | 4 cr

Mass transport in vadose and saturated zones; origin and behavior of inorganic and organic contaminants; investigative techniques; groundwater models; site remediation; groundwater resource development and management; water law. Three-hour lecture, three-hour lab. Field trips. Lab fee.

Prerequisites: GEOS 361.

Offered: Fall (even years).

GEOS 470 | Remediation Science and Technology | 3 cr

Investigates methods and techniques for reducing, removing or immobilizing metals and radionuclides. Three-hour lecture.

Prerequisites: GEOS 331, 361.

Offered: Spring (even years).

GEOS 490 | Special Topics in Geosciences | 1-4 cr

Intensive treatment of specialized areas in geology.

Prerequisites: Consent of instructor.

Offered: Occasionally.

GEOS 495 | Senior Seminar | 1 cr

Individual student preparations and detailed oral and written presentations, in professional-style format, on knowledge of specialized topics acquired through library, laboratory, and/or field research.

Prerequisites: GEOS 355 and senior standing.

Offered: Spring.

GEOS 496 | Geoscience Applications | 3 cr

Course in which students apply their knowledge in service to the community. Project may involve teamwork on environmental assessment, land-use planning, etc., or individual internships with corporate or governmental agencies. Culminates in report/recommendation based on investigations.

Prerequisites: GEOS 355 and senior standing; or consent of instructor.

Offered: Fall.

GEOS 497 | Senior Thesis | 1-2 cr

Familiarization with the processes of research and scientific writing based upon laboratory, field, and literature study; oral defense of the thesis. May repeat for up to 4 credits.

Prerequisites: Senior standing and consent of instructor.

Offered: Fall, Spring.

GEOS 499 | Independent Study | 1-3 cr

Allows students to pursue independent field, laboratory, or library research interest under supervision of faculty members. May be repeated with different topic for a maximum of 6 credits.

Prerequisites: Consent of instructor and department chair.

Offered: Fall, Spring.