

Geoscience

(Bachelor of Science)

Geoscience is the study of Earth materials (e.g., rocks, minerals, soil, water, and air), the processes that shape and alter those components, and the interplay between the biosphere and the Earth. The program strongly emphasizes the fundamentals of geoscience, but also places special emphasis on groundwater management, soils, and other earth system processes.

The Geoscience program takes an application-focused, interdisciplinary approach, known as earth system science, in which the physical environment is investigated as many interacting systems. Earth system science emphasizes the interactions between the different systems that make up the Earth. Although earth system science is considered a new approach at many institutions, it has been an integral part of the Geoscience program since the very founding of UW-Green Bay. Interested students should also check Environmental Science course listings for several courses on soils, field geology, and ground water.

Geoscientists can find career opportunities in state and federal government agencies, consulting firms, and private industry. Demand for geoscientists will continue into the future, as demand for resources and energy grow with increasing population. Furthermore, responsible mining practices, remediation of contaminated sites, and forecasting the evolution of Earth conditions requires well-trained geoscientists with a broad understanding of how the Earth works.

Students interested in planning, natural resource or land management, or environmental policy issues typically select interdisciplinary minors in Environmental Science, Public and Environmental Affairs, or Urban and Regional Studies. For those interested in an earth system science perspective in business, Geoscience may also be combined with Business Administration. Many states and localities now require geoscience in their curricula, and high schools offering geoscience courses, in addition to the traditional science courses, is becoming the norm. Geoscience education includes geology, astronomy, oceanography, and weather and climate — with the goal of fostering a better understanding of our home, and encouraging responsible stewardship of our planet. Those seeking teacher certification can pursue several options:

- They can pursue a broad-field science certification in Education and take Geoscience courses to match their interests and employment goals.
- Students interested in elementary and middle school teaching can take an Education major and Geoscience minor.
- Students interested in teaching at the secondary level can take a Geoscience major and Education minor.

All Education students should consult with advisers in Geoscience and Education early in their studies to make sure that their academic program meets all state requirements for certification. Careful planning is essential since the Education course requirements are substantial and state requirements change periodically. Students seeking teacher certification in Geoscience should seriously consider satisfying the certification requirements in another discipline as well, because certification in additional fields will increase their employment opportunities.

Area of Emphasis

Students must complete requirements in one of the following areas of emphasis:

- General Emphasis (<http://catalog.uwgb.edu/archive/2018-2019/undergraduate/programs/geoscience/major/disciplinary-emphasis>)
- Emphasis for Students Seeking Teaching Certification (<http://catalog.uwgb.edu/archive/2018-2019/undergraduate/programs/geoscience/major/teaching-emphasis>)

Area of Emphasis

Students must complete requirements in one of the following areas of emphasis:

- Geoscience Emphasis (<http://catalog.uwgb.edu/archive/2018-2019/undergraduate/programs/geoscience/minor/disciplinary-emphasis>)
- Geoscience Emphasis for Students Seeking Teaching Certification (<http://catalog.uwgb.edu/archive/2018-2019/undergraduate/programs/geoscience/minor/teaching-emphasis>)

An example: Four year plan for **Geoscience Major**

120 credits necessary to graduate. Participation in field courses, the Geology Club, internships, and/or independent studies are highly recommended.

Plan is a representation and categories of classes can be switched. Check with your advisor.

Geoscience Curriculum Guide (<http://catalog.uwgb.edu/archive/2018-2019/undergraduate/programs/geoscience/cg>)

Kevin J Fermanich; Professor; Ph.D., University of Wisconsin - Madison, chair*

John A Luczaj; Professor; Ph.D., Johns Hopkins University*

Ryan M Currier; Associate Professor; Ph.D., Johns Hopkins University*

Steven J Meyer; Associate Professor; Ph.D., University of Nebraska - Lincoln*

Keith West; Associate Professor; Ph.D., University of Wisconsin-Milwaukee

Melvin Johnson; Assistant Professor; Ph.D., University of Nebraska-Lincoln

Courses

GEOSCI 102. Natural Hazards. 3 Credits.

Explores the dynamic character of the Earth System by characterizing and understanding the causes and consequences of natural hazards. Hazards considered will include earthquakes, tsunamis, volcanic hazards (local, regional, global scales), meteorological hazards (hurricanes, tornadoes, flooding, coastal erosion), and landslides.

Fall and Spring.

GEOSCI 198. First Year Seminar. 3 Credits.

Reserved for New Incoming Freshman.

GEOSCI 202. Physical Geology. 4 Credits.

Description and analysis of the geological processes that shape the earth's major internal and external features. Origins, properties and use of the earth's rock and mineral resources. Students will not receive credit for both Geosci 202 and Geosci 102.

Fall and Spring.

GEOSCI 203. Earth System History. 3 Credits.

The physical history of the Earth through geologic time and the attendant evolution of biological organisms; principles governing interpretation of the rock and fossil record; unraveling of events culminating in modern landscape and life forms.

P: Geosci 202 with at least a C grade.

Spring.

GEOSCI 204. Earth System History Laboratory. 1 Credit.

Practical application of geologic principles and techniques to interpretation of Earth history. Introduction to stratigraphic principles, sedimentary environments, and fossil identification.

P: Geosci 203 with at least a C grade or conc enr.

Spring.

GEOSCI 222. Ocean of Air: Weather and Climate. 3 Credits.

Fundamental processes of the atmosphere, the resulting weather and climate, and the effects of the atmosphere on other aspects of the earth's environments and on humans.

Fall and Spring.

GEOSCI 298. Independent Study. 1-4 Credits.

Independent study is offered on an individual basis at the student's request and consists of a program of learning activities planned in consultation with a faculty member. A student wishing to study or conduct research in an area not represented in available scheduled courses should develop a preliminary proposal and seek the sponsorship of a faculty member. The student's advisor can direct him or her to instructors with appropriate interests. A written report or equivalent is required for evaluation, and a short title describing the program must be sent early in the semester to the registrar for entry on the student's transcript.

P: fr or so st with cum gpa > or = 2.50; or jr or sr st with cum gpa > or = 2.00.

Fall and Spring.

GEOSCI 299. Travel Course. 1-4 Credits.

Travel courses are conducted to various parts of the world and are led by one or more faculty members. May be repeated to different locations.

P: cons of instr & prior trip arr & financial deposit.

GEOSCI 301. Introduction to Geoscience Field Methods. 2 Credits.

A survey of methods of field investigations including description and measurement of rock sequences, introduction to geological mapping, surveying, and writing geological reports.

P: Geosci 202.

Spring Odd.

GEOSCI 325. Regional Climatology. 3 Credits.

The elements, controls, and classification of climates; the distribution of climate types over the earth; world patterns of climate.

REC: Geosci 222.

Fall Even.

GEOSCI 340. Introduction to Mineralogy & Petrology. 4 Credits.

Explores mineral chemistry and structures, identification, association, and occurrence. Surveys the distribution, chemistry, and mineral associations in relation to tectonic environment to interpret rock forming processes.

P: Geosci 202 with at least a C grade.

Fall Even.

GEOSCI 350. Structural Geology and Geodynamics. 3 Credits.

How do rocks fracture? How do rocks flow? How is heat transmitted from the core to the crust? This class is a survey of the deformation and dynamics of Earth. We will focus on the stress-strain relationship and deformation styles of Earth materials, as well as the transport of heat and mass by Earth processes.

P: GEOSCI 202. REC: MATH 202

Fall Odd.

GEOSCI 402. Sedimentology & Stratigraphy. 3 Credits.

Modern concepts and techniques used to study and interpret the origins and distribution of sediments and sedimentary rocks; principles of biostratigraphy and physical stratigraphy and sedimentology.

P: Geosci 202 with at least a C grade and 203 with at least a C grade.

Fall Odd.

GEOSCI 432. Hydrogeology. 3 Credits.

Introduction to the geological and physical principles governing ground water flow. Description of aquifer properties, chemical processes, equation of flow, well hydraulics, and environmental concerns.

P: Geosci 202 with at least a C grade; REC: Env Sci 330 with at least a C grade; Math 202.

Spring.

GEOSCI 450. Ore Deposits. 3 Credits.

This course is a survey of economically important Earth materials. How do ore bodies form? What are they used for? What strategies can we use to extract the ore? Additionally, we will also focus on the environmental impacts from extraction and what can be done as possible remediation strategies.

P: GEOSCI 202. REC: GEOSCI 340

Spring Even.

GEOSCI 470. Quaternary Geology. 3 Credits.

Understanding the extremes in environmental behavior which characterize Pleistocene time. Principles of glaciology and the impact of glaciation on the landscape.

P: Geosci 202 with at least a C grade; REC: Geosci 203.

Spring Even.

GEOSCI 478. Honors in the Major. 3 Credits.

Honors in the Major is designed to recognize student excellence within interdisciplinary and disciplinary academic programs.

P: min 3.50 all cses req for major and min gpa 3.75 all UL cses req for major.

GEOSCI 492. Special Topics in Geoscience. 1-4 Credits.

Topics not covered by regular courses, such as crustal movements, stable isotopes in the environment, geology of Wisconsin, and others. Offerings of different topics can be repeated for credit.

Spring.

GEOSCI 497. Internship. 1-12 Credits.

Supervised practical experience in an organization or activity appropriate to a student's career and educational interests. Internships are supervised by faculty members and require periodic student/faculty meetings.

P: jr st.

Fall and Spring.

GEOSCI 498. Independent Study. 1-4 Credits.

Independent study is offered on an individual basis at the student's request and consists of a program of learning activities planned in consultation with a faculty member. A student wishing to study or conduct research in an area not represented in available scheduled courses should develop a preliminary proposal and seek the sponsorship of a faculty member. The student's advisor can direct him or her to instructors with appropriate interests. A written report or equivalent is required for evaluation, and a short title describing the program must be sent early in the semester to the registrar for entry on the student's transcript.

P: fr or so st with cum gpa > or = 2.50; or jr or sr st with cum gpa > or = 2.00.

Fall and Spring.

GEOSCI 499. Travel Course. 1-6 Credits.

Travel courses are conducted to various parts of the world and are led by one or more faculty members. May be repeated to different locations.

P: cons of instr & prior trip arr & financial deposit.