

GEOLOGY

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Location: Science Hall 113

Web address: www.newpaltz.edu/geology

The Department of Geology offers three undergraduate degree programs: Bachelor of Arts (BA) and Bachelor of Science (BS) programs in Geology and a BS degree program in Environmental Science¹. Through coursework, fieldwork, and research projects, students in all Geology programs develop an awareness of the geological processes that shape planet Earth and their impact on society and the environment. Furthermore, the BS degree in Geology is licensure qualifying: its coursework meets the education requirements for Professional Geologist licensure in New York State. (For more information about eligibility for Professional Geologist licensure, visit the [New York State Education Department's Office of the Professions](#).)

Two concentrations are available to students majoring in Geology. The general geology concentration is recommended for those contemplating graduate or professional work in geology. The environmental geoscience concentration offers a strong geology background with an environmental emphasis, suitable for environmental consulting or positions in environment-related governmental agencies. The Geology major is interdisciplinary and requires courses in geology and cognate areas². It is important that all students seek advising early so they can complete the major on time. Students are responsible for familiarizing themselves with the Geology program's requirements, working out the details of their plan of study with their advisor's aid and seeking the advisor's approval of elective courses before taking the courses. Additional advising information is available in the department office.

Elementary education (B-6) and secondary education (7-12) concentrations in Earth Science are offered at both the undergraduate and graduate levels. In addition, an accelerated [BA Geology/MAT Adolescence Education: Earth Science](#) program enables students to earn two degrees and initial teaching certification in five years. The undergraduate B-6 and 7-12 Earth Science programs are described in the [School of Education section of this catalog](#). A minor in geology is available for those majoring in other fields³.

Students must earn a grade of C- or better in all courses required for the geology major or minor.

¹ The [BS program in Environmental Science](#) is an interdisciplinary major that emphasizes the environmental aspects of geology, chemistry and biology. The Environmental Science major is described in greater detail elsewhere in this catalog.

² For any of the geology programs, first-year students should take GLG201 Physical Geology and GLG211 Physical Geology Laboratory in the fall semester, followed by GLG202 Historical Geology in the spring. CHE201 General Chemistry I and CHE211 General Chemistry I Lab, CHE202 General Chemistry II and CHE212 General Chemistry II Lab and MAT251 Calculus I should also be taken in the freshman year. It is also possible to begin the major in the sophomore year with proper advising. Transfer students should complete as many of the cognate requirements as possible before entering New Paltz. Ideally, one year each of college chemistry, physics, and calculus should be completed in addition to a one-year laboratory sequence in geology (physical and historical geology).

³ For non-majors interested in geology, or those considering a geology minor, the recommended sequence is GLG201 Physical Geology and

GLG211 Physical Geology Laboratory, followed by GLG202 Historical Geology.

Honor's Research

Honor's Research is for students who wish to conduct a specialized research project at the undergraduate level. Students who plan on obtaining an M.A. or Ph.D. are advised to enroll in this course if they satisfy the prerequisites. Honor's Research is a very good means of letting the student, as well as faculty at New Paltz and other schools, identify whether or not he or she is suited for graduate work.

In order to enroll in GLG491 Honor's Research a student must maintain a cumulative average of at least 3.00 and be recommended by a geology faculty sponsor and the department chair. Guidelines for research projects are available in the department office and should be carefully read prior to meeting with the department chair to discuss the program.

Sigma Gamma Epsilon

[Sigma Gamma Epsilon](#) is the National Honor Society for the Earth Sciences. The Theta Beta Chapter was established at SUNY New Paltz by the students and faculty of the Department of Geology in 2012. Membership in SGE recognizes scholarship and professionalism in the Earth Sciences. Its objectives are the scholastic, scientific, and professional 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. Any New Paltz student who has completed at least 10 units in Earth Science courses and has maintained a minimum GPA (3.0 in GLG courses and 2.7 overall) is qualified for membership.

For more information, contact Chapter Advisor Dr. Frederick W. Vollmer at vollmerf@newpaltz.edu. (vollmerf@newpaltz.edu.)

Geology (BA, BS) Program Learning Outcomes

Students who successfully complete the Geology program will be able to:

- Demonstrate mastery of the fundamental knowledge areas in the geological sciences.
- Read and interpret topographic, geologic, and other maps, and demonstrate map-making skills.
- Acquire competency in the supporting fields of physics, chemistry and mathematics, particularly as related to the geological sciences.

Successful students develop skills in the following areas:

Research

- Understand and use the scientific method to conduct research; critically evaluate scientific work.
- Observe, describe and interpret geologic samples, outcrops and regions using field data collection techniques and scientific methodologies.
- Acquire information resources from scientific journals, geologic databases, internet resources, and other primary sources.
- Apply quantitative methods for problem solving, data analysis, and model formulation.
- Work independently and collaboratively on scientific problems.

Technical skills

- Use a variety of geological field equipment for data collection.
- Use common geological laboratory instruments and techniques.
- Perform quantitative data analysis and interpretation using computers.

Communication

- Effectively communicate technical findings and conclusions through written reports using formats and styles required for scientific writing.
- Give oral presentations in a professional style.
- Use maps, three-dimensional diagrams, and other imagery to communicate factual information and concepts.

Learning

- Demonstrate a regional and global understanding of the earth, including tectonic, historical, environmental, and resource management aspects and their relationship to the human experience.
- Describe and interpret a geologic outcrop, demonstrating facility in applying scientific knowledge, observational techniques, the ability to synthesize, and the ability to communicate effectively.
- Engage in group field excursions involving the scientific study and aesthetic appreciation of the geological aspects of our world.

- [Major in Geology](#)
- [Minor in Geology](#)
- [Environmental Science](#)

GLG120. Weather and Environment. 4 Credits.

A non-mathematical introduction to the basic principles of weather and weather forecasting and their effect on man. Laboratory studies of weather maps and related charts.

Attributes:

- Civic Engagement
- Liberal Arts
- GE4: Natural Science Lecture
- GE4: Natural Science Lab
- GE5: Natural Science Lecture
- GE5: Natural Science Lab
- GE3: NSCI
- Systematic Inquiry

May not be repeated for credit

GLG193. Geological Selected Topic. 3-12 Credits.

Selected topics courses are regularly scheduled courses that focus on a particular topic of interest. Descriptions are printed in the Schedule of Classes each semester. Selected topics courses may be used as elective credit and may be repeated for credit, provided that the topic of the course changes.

May be repeated for credit

GLG199. Modular Course. 0 Credits.

May not be repeated for credit

GLG201. Physical Geology. 3 Credits.

Basic concepts of geology. Minerals, rocks, and rock-forming processes. Geologic time and age dating. Erosion, streams, groundwater, and glaciers. Geologic structures, earthquakes, volcanoes, plate tectonics, and other geologic processes. COURSE FEE.

Attributes:

- Field Study
- Civic Engagement
- Critical Thinking Introductory
- Critical Think Reason Intro
- Information Literacy Intro
- Information Mgmt Intro
- Liberal Arts
- GE4: Natural Science Lecture
- GE5: Natural Science Lecture
- GE3: NSCI
- Systematic Inquiry

Restrictions:

- Must have the following level: Undergraduate

Corequisites:

- GLG211

May not be repeated for credit

GLG202. Historical Geology. 4 Credits.

Geological and geographic developments of the continents throughout the earth's history, with emphasis on North America. Methods used in calculating the age of our planet, and interpreting the history of its rocks. Evolution of plants and animals through geologic time. In the laboratory, geologic maps and a few common fossils are studied. Local and regional field trips. COURSE FEE.

Attributes:

- Field Study
- Civic Engagement
- Liberal Arts
- GE4: Natural Science Lecture
- GE4: Natural Science Lab
- GE3: NSCI

Restrictions:

- Must have the following level: Undergraduate

Prerequisites:

- GLG201 Minimum Grade of C-

May not be repeated for credit

GLG205. Environmental Geology. 4 Credits.

The geological system as a framework for understanding environmental problems; man and his interactions with geological systems.

Conservation, utilization, and management of natural resources. Field trips. COURSE FEE.

Attributes:

- Field Study
- Civic Engagement
- Liberal Arts
- GE4: Natural Science Lecture
- GE4: Natural Science Lab
- GE5: Natural Science Lecture
- GE5: Natural Science Lab
- GE3: NSCI
- Systematic Inquiry

May not be repeated for credit

GLG211. Physical Geology Laboratory. 1 Credit.

Laboratory study of minerals, rocks, topographic maps, and geologic maps. Field trips.

Attributes:

- Field Study
- Civic Engagement
- Liberal Arts
- GE4: Natural Science Lab
- GE5: Natural Science Lab

Restrictions:

- Must have the following level: Undergraduate

Corequisites:

- GLG201

May not be repeated for credit

GLG293. Geological Selected Topic. 2-12 Credits.

Selected topics courses are regularly scheduled courses that focus on a particular topic of interest. Descriptions are printed in the Schedule of Classes each semester. Selected topics courses may be used as elective credit and may be repeated for credit, provided that the topic of the course changes.

May be repeated for credit

GLG295. Indep Study Geology. 1-12 Credits.

May be repeated for credit

GLG299. Phys Glg-Fld Excur. 1 Credit.**Corequisites:**

- GLG201

May not be repeated for credit

GLG303. Geomorphology. 4 Credits.

Overview of surficial geological processes and how they control landscapes evolution. A geological investigation of hillslopes, rivers, deserts, glaciers, coasts, and oceans with an emphasis on local and regional landscapes and environmental implications. COURSE FEE.

Attributes:

- Field Study
- Civic Engagement
- Practicum - Non-Clinical
- Information Literacy Intermed
- Information Mgmt Intrmd
- Liberal Arts

Restrictions:

- Must not be enrolled in the following class: Freshman

Prerequisites:

- GLG201 Minimum Grade of C- or GLG 220 Minimum Grade of C-
- Math Placement Level Minimum Score of 5 or MAT181 Minimum Grade of C-

May not be repeated for credit

GLG305. Paleontology. 4 Credits.

Principles and methods in the study of fossils; morphology, classification and evolution, ecologic relationships between organisms and sedimentary systems, geographic distribution, and stratigraphic range. Field trips.

Attributes:

- Field Study
- Practicum - Non-Clinical
- Liberal Arts

Restrictions:

- Must not be enrolled in the following class: Freshman

Prerequisites:

- GLG 301 Minimum Grade of C- or GLG202 Minimum Grade of C-

May not be repeated for credit

GLG311. Mineralogy and Crystallography. 4 Credits.

Basic elements of solid internal and external crystallography and principles of crystal chemistry and geochemistry. Properties, occurrence, geochemistry, and hand specimen identification of the more common economic and rock-forming minerals. Field trips. COURSE FEE.

Attributes:

- Field Study
- Practicum - Non-Clinical
- Liberal Arts

Restrictions:

- Must not be enrolled in the following class: Freshman

Prerequisites:

- CHE201 Minimum Grade of C-
- GLG201 Minimum Grade of C- or GLG 220 Minimum Grade of C-

May not be repeated for credit

GLG313. Optical Mineralogy. 3 Credits.

Theory of the transmission of polarized light through crystalline solids. Use of the polarizing microscope in mineral identification. Optical properties of the common rock-forming minerals.

Attributes:

- Liberal Arts

Restrictions:

- Must not be enrolled in the following class: Freshman

Corequisites:

- GLG311

May not be repeated for credit

GLG314. Petrology. 4 Credits.

Study of the igneous, metamorphic and sedimentary rocks that form the solid earth. Rock composition, classification, distribution and origin. Volcanic, tectonic and other environments of rock formation. Phase diagrams, age dating, and rock chemistry. Laboratory microscope study of thin sections. Field trips. COURSE FEE.

Attributes:

- Field Study
- Practicum - Non-Clinical
- Liberal Arts

Restrictions:

- Must not be enrolled in the following class: Freshman

Prerequisites:

- CHE202 Minimum Grade of C-
- GLG311 Minimum Grade of C-

May not be repeated for credit

GLG331. Stratigraphy-Sedimentation. 4 Credits.

Stratified rocks, their formation today as clues to the formation of similar rocks in the past, their local descriptions, their correlation in a regional and world-wide framework, and the principles and methods used in interpreting the geologic history they record. Laboratory and field methods in the study of sedimentation, sedimentary rocks and stratigraphic successions found in outcrops. COURSE FEE.

Attributes:

- Field Study
- Creative Works
- Critical Thinking Intermediate
- Critical Think Reason Interm
- Liberal Arts
- Writing Intensive

Restrictions:

- Must not be enrolled in the following class: Freshman

Prerequisites:

- GLG 301 Minimum Grade of C- or GLG202 Minimum Grade of C-
- Math Placement Level Minimum Score of 5 or MAT181 Minimum Grade of C-

May not be repeated for credit

GLG334. Principles of Oceanography. 4 Credits.

The physical, chemical, geological, biological, and economic aspects of the science of oceanography; properties of seawater, ocean dynamics, coastal processes, marine sediments, sea-floor spreading, and continental drift, sea life fisheries, petroleum and the sea, marine technology, etc. Field trips. Laboratory.

Attributes:

- Liberal Arts

Restrictions:

- Must not be enrolled in the following class: Freshman

May not be repeated for credit

GLG339. Natural Resources and Energy. 3 Credits.

Relation of the production of energy and its environmental impact on the finite nature of our natural resources. Review and critical evaluation of past, present, and future energy technologies.

Attributes:

- Liberal Arts

Restrictions:

- Must not be enrolled in the following class: Freshman

Prerequisites:

- GLG201 Minimum Grade of C-
- CHE201 Minimum Grade of C-
- Math Placement Level Minimum Score of 5 or MAT171 Minimum Grade of C- or MAT181 Minimum Grade of C- or MAT241 Minimum Grade of C-

May not be repeated for credit

GLG346. Environmental Impact Assessment. 3 Credits.

Study of the ways by which man's impact on nature and the environment is assessed and evaluated. Aspects of Environmental Impact Statements that are of significance to environmental geology, including air quality, meteorology, water quality, hydrogeology, land use, waste management, energy use and conservation.

Attributes:

- Civic Engagement
- Creative Works
- Liberal Arts
- Writing Intensive

Restrictions:

- Must not be enrolled in the following class: Freshman

Prerequisites:

- GLG205 Minimum Grade of C- or (GLG201 Minimum Grade of C- or GLG 220 Minimum Grade of C-)

May not be repeated for credit

GLG393. Geological Selected Topic. 2-12 Credits.

Selected topics courses are regularly scheduled courses that focus on a particular topic of interest. Descriptions are printed in the Schedule of Classes each semester. Selected topics courses may be used as elective credit and may be repeated for credit, provided that the topic of the course changes.

May be repeated for credit

GLG399. Modular Course. 0 Credits.

May be repeated for credit

GLG405. Structure and Tectonics. 4 Credits.

Study of the structure and deformation of the Earth's crust. Includes rock mechanics, faulting, fabric, geometric analysis, diapirism, and tectonics. Laboratories cover geologic map interpretation, use of spherical projections, and field work. Field trips. COURSE FEE.

Attributes:

- Field Study
- Practicum - Non-Clinical
- Information Literacy Advanced
- Information Mgmt Advanced
- Liberal Arts
- Writing Intensive

Restrictions:

- Must not be enrolled in the following class: Freshman

Prerequisites:

- GLG201 Minimum Grade of C- or GLG 220 Minimum Grade of C-
- GLG331 Minimum Grade of C-
- PHY201 Minimum Grade of C-
- Math Placement Level Minimum Score of 5 or MAT181 Minimum Grade of C-

May not be repeated for credit

GLG407. Hydrogeology. 4 Credits.

Physical properties of groundwater flow, well hydraulics, water quality, the occurrences and distribution of groundwater, and to refine general quantitative and computer skills. COURSE FEE.

Attributes:

- Field Study
- Civic Engagement
- Liberal Arts

Restrictions:

- Must not be enrolled in the following class: Freshman

Prerequisites:

- GLG201 Minimum Grade of C- or GLG 220 Minimum Grade of C-
- PHY201 Minimum Grade of C-
- CHE201 Minimum Grade of C-
- Math Placement Level Minimum Score of 5 or MAT181 Minimum Grade of C-

May not be repeated for credit

GLG435. Field Geology. 4 Credits.

Problems and methods of geologic field study. Use Brunton and Silva compasses, GPS units, field data collection and analysis, solving of geologic field problems, construction of a geologic map, and report writing. Primarily taught in the field.

Attributes:

- Field Study
- Practicum - Non-Clinical
- Creative Works
- Research
- Critical Thinking Advanced
- Critical Think Reasoning Adv
- Liberal Arts

Restrictions:

- Must not be enrolled in the following class: Freshman

Prerequisites:

- GLG 338 Minimum Grade of C-* or GLG405 Minimum Grade of C-*

* May be taken at the same time

May not be repeated for credit

GLG446. Paleoclimatology. 3 Credits.

Earth's climate change history from the records of ocean sediments, glacial ice, and other sources. Investigation will include geochronology techniques, mechanisms for gradual and abrupt climate changes, and implications for future climate variability.

Attributes:

- Field Study
- Civic Engagement
- Practicum - Non-Clinical
- Creative Works
- Liberal Arts

Restrictions:

- Must be enrolled in the following field(s) of study (major, minor or concentration):
 - Adolescence Ed: Earth Science (442)
 - Earth Science B-6 (601T)
 - Environmental Geochem Science (519)
 - Environmental Geochem Science (EGS)
 - Environmental Science (526)
 - Geology (510)
 - Geology (GLG)

Prerequisites:

- GLG303 Minimum Grade of C- or GLG331 Minimum Grade of C- or EGS370 Minimum Grade of C-

May not be repeated for credit

GLG475. Geology Research Project 1. 3 Credits.

Students will undertake a two semester research project, under the guidance of a faculty mentor, focusing on a detailed examination of a real world environmental problem. The project will culminate in a written document and an oral presentation in the Senior Seminar.

Attributes:

- Liberal Arts

Restrictions:

- Must have the following level: Undergraduate
- Must be enrolled in the following class: Senior
- Must be enrolled in the following field(s) of study (major, minor or concentration):
 - Environmental Geochem Science (519)
 - Environmental Science (526)
 - Geology (510)

May not be repeated for credit

GLG476. Geology Research Project 2. 3 Credits.

Continuation of GLG475.

Attributes:

- Liberal Arts

Restrictions:

- Must be enrolled in the following class: Senior
- Must be enrolled in the following field(s) of study (major, minor or concentration):
 - Environmental Geochem Science (519)
 - Environmental Science (526)
 - Geology (510)

Prerequisites:

- GLG475 Minimum Grade of C-

May not be repeated for credit

GLG481. Field Excursion (1-3). 1-12 Credits.

Geology of a selected area of North America. Readings and discussions of the detailed tectonic and petrological evolution of selected classical geologic areas. Field excursions to type areas. May be repeated for credit provided listed topic changes. COURSE FEE APPLIES TO SOME SECTIONS.

Attributes:

- Field Study
- Int Domest Travel Exchange
- Liberal Arts

Restrictions:

- Must not be enrolled in the following class: Freshman

May be repeated for credit

GLG490. Seminar in Geology (2-4). 0 Credits.

Current problems and projects in geology. Developing ability to evaluate evidence critically and to understand current geological literature.

Attributes:

- Liberal Arts

Restrictions:

- Must not be enrolled in the following class: Freshman

May be repeated for credit

GLG491. Honor's Research. 4 Credits.

Individual advanced research in geology. Students are expected to complete a research thesis in consultation with instructor and chair.

Attributes:

- Liberal Arts

Restrictions:

- Must not be enrolled in the following class: Freshman

May be repeated for credit

GLG492. Research in Geology (1-4). 1-12 Credits.

Laboratory or field research project to be completed in consultation with a geology faculty member in accord with the department guidelines for research.

Attributes:

- Field Study
- Creative Works
- Research
- Liberal Arts

Restrictions:

- Must not be enrolled in the following class: Freshman

May be repeated for credit

GLG493. Geological Selected Topic. 3-12 Credits.

Selected topics courses are regularly scheduled courses that focus on a particular topic of interest. Descriptions are printed in the Schedule of Classes each semester. Selected topics courses may be used as elective credit and may be repeated for credit, provided that the topic of the course changes.

Restrictions:

- Must not be enrolled in the following class: Freshman

May be repeated for credit

GLG494. Fieldwork In Geology. 1-12 Credits.**Restrictions:**

- Must not be enrolled in the following class: Freshman

May be repeated for credit

GLG495. Indep Study Geology. 1-12 Credits.**Restrictions:**

- Must not be enrolled in the following class: Freshman

May be repeated for credit

GLG499. Modular Course. 0 Credits.**Restrictions:**

- Must not be enrolled in the following class: Freshman

May not be repeated for credit

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