

DEPARTMENT OF GEOLOGY

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Website: <http://www.marshall.edu/geology> (<http://www.marshall.edu/geology/>)

Geology (or Geoscience) is the study of the earth's composition, internal structure, processes, and history. Geoscientists perform three vitally important roles in our society by

1. supplying the things we need (energy resources, metals, building materials, water),
2. protecting the environment (preventing or mitigating contamination of water, soil or air, or adverse impacts on ecosystems), and
3. minimizing the impact of geologic hazards (floods, landslides, earthquakes, volcanic eruptions, tsunamis) on people and property.

The Earth's expanding population and increased use of natural resources along with our need for energy, environmental protection, and responsible land and resource management are likely to fuel a demand for geoscientists well into the future. Demand for geoscientists is predicted to increase over the next decade. The median annual wage for geoscientists was \$83,680 in 2021 (U.S. Bureau of Labor Statistics).

Marshall University's location in southern West Virginia provides students with a wealth of opportunities for field-based studies in environmental geology, engineering geology, and energy resources. The Department of Geology offers a B.S. degree in Geology, a B.A. degree in Geology, and a B.A. degree in Earth Science. The B.S. in Geology degree consists of an interdisciplinary curriculum that provides a sound foundation in both fundamental and applied aspects of geology and is the more appropriate option for students considering graduate studies in Geology. Graduates are typically employed by environmental and engineering companies, natural resource industries, and government agencies, or pursue more advanced degrees. The curriculum for the B.A. degree in Geology has greater flexibility, less rigorous mathematics and physics, and less comprehensive geology requirements than the B.S. in Geology. The B.A. Geology degree provides a basis for science-related careers such as environmental law, pre-college teaching, science journalism, and resource management and marketing.


The B.A. in Earth Science degree integrates all the earth sciences in a systems approach to understanding the Earth. The curriculum incorporates a broader range of natural sciences such as oceanography, meteorology and astronomy, which are not included in the geology major. The emphasis is on the preparation of individuals to work in a wide range of public sector service careers where a background in earth science and effective communication of science to nonscientific audiences are requirements or assets. The major also provides a solid foundation for those wishing to pursue a career as an earth science teacher.

Programs

- Geology, B.A. (<http://catalog.marshall.edu/undergraduate/programs-az/science/geology/geology-ba/>)

- Geology, B.S. (<http://catalog.marshall.edu/undergraduate/programs-az/science/geology/geology-bs/>)
- Geology, Minor (<http://catalog.marshall.edu/undergraduate/programs-az/science/geology/geology-minor/>)

Courses

 - General Education Course

GLY 100 Geologic Hazards & Resources 3 Credit hours

Introductory course for non-science majors focusing on (i) Earth Hazards; and mitigation, (ii) Climate change and its impacts; and (iii) Earth and Energy resources, their origin, development, and environmental impacts.

Attributes: Natural Sciences, Core II Natural Sciences

Grade Mode: Normal Grading Mode

GLY 150 Intro Oceanography 3 Credit hours

Origin of the seas and ocean basins. Processes of marine sedimentation and seawater chemistry. Dynamics of air/sea interaction, circulation, waves and tides. Description of coastal and other marine environments.

Attributes: Natural Sciences, Core II Natural Sciences

Grade Mode: Normal Grading Mode

GLY 150L Intro Oceanography Lab 1 Credit hour

A complementary laboratory to Introductory Oceanography, GLY 150. A series of exercises relating to bathymetry, acoustic profiling, marine charts, properties of seawater, sea floor sediments, currents, waves and tides.

Co-req: GLY 150

Attributes: Natural Sciences, Core II Natural Sciences

Grade Mode: Normal Grading Mode

GLY 170 Geology of the National Parks 3 Credit hours

An introduction to U.S. Parks and Monuments including earth materials, plate tectonic setting, formative geologic processes, and natural history; brief overview of history and purpose of the National Park Service.

Grade Mode: Normal Grading Mode

GLY 200 The Dynamic Earth 3 Credit hours

An elementary but comprehensive physical geology course that deals with the earth's origin, composition, structures, tectonics and processes. Intended primarily for, but not limited to, the science major. 3 lec.

Attributes: Natural Sciences, Core II Natural Sciences

Grade Mode: Normal Grading Mode

GLY 201 The Earth Through Time 3 Credit hours

Introduction to 1) the principles used to interpret past physical, biologic, and chemical events archived in rock record, and 2) the history and development of the earth's lithosphere, biosphere, hydrosphere, and atmosphere.

Attributes: Natural Sciences, Core II Natural Sciences

Grade Mode: Normal Grading Mode

GLY 210L Earth Materials Lab 1 Credit hour

An introduction to laboratory methods and materials as applied to the identification, classification, recovery and uses of earth resources. 2 lab.

Attributes: Natural Sciences, Core II Natural Sciences

Grade Mode: Normal Grading Mode

- GLY 211L 🌿 Earth Through Time Lab** **1 Credit hour**
 Reconstruction of events in earth history based on physical characteristics and arrangement of rock layers and their fossil contents. 2 hr lab (PR: 210L; CR: GLY 201)
Attributes: No Textbook Required, Natural Sciences, Core II Natural Sciences
Grade Mode: Normal Grading Mode
- GLY 212 Geologic Field Methods** **3 Credit hours**
 Introduction to geologic map interpretation, qualitative and quantitative methods of geologic map and cross-section preparation, and basic ArcGIS mapping methods. 2 lec 1 lab. (Field Work).
Pre-req: (GLY 200 with a minimum grade of D or GLY 201 with a minimum grade of D) and (GLY 210L with a minimum grade of D or GLY 211L with a minimum grade of D).
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode
- GLY 280 Special Topics** **1-4 Credit hours**
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode
- GLY 281 Special Topics** **1-4 Credit hours**
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode
- GLY 282 Special Topics** **1-4 Credit hours**
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode
- GLY 283 Special Topics** **1-4 Credit hours**
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode
- GLY 313 Structural Geology** **4 Credit hours**
 Analysis, classification and origin of depositional and deformational structures common to all classes of rocks; their structural history, relationships, and stresses which caused them. 3 lec-2 lab.
Pre-req: GLY 110 or GLY 200.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode
- GLY 314 Mineralogy** **4 Credit hours**
 Identification, classification, origin, occurrences, and economic uses of minerals and their crystallographic forms. 3 lec-2 lab.
Pre-req: GLY 200 with a minimum grade of D and CHM 211 with a minimum grade of D.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode
- GLY 320L Geology Lab Techniques** **2 Credit hours**
 Techniques of collection, preparation and analysis of mineral, rock and water samples, and the use of different instruments for obtaining quality data. Will also cover tools used for data interpretation.
Pre-req: GLY 200 (may be taken concurrently) with a minimum grade of D and GLY 210L (may be taken concurrently) with a minimum grade of D.
Concurrent PR: GLY 200 and GLY 210L
Grade Mode: Normal Grading Mode
- GLY 325 Stratigraphy & Sediment** **4 Credit hours**
 Formation, organization, sequence, and correlation of sedimentary rocks; study of the origin, transportation and deposition of rock-forming sediments. 3 lec-2 lab.
Pre-req: GLY 201 with a minimum grade of D and GLY 211L with a minimum grade of D.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode
- GLY 330 Tectonics** **3 Credit hours**
 Overview of tectonic processes at plate boundaries, orogenic systems, formation of continents and ocean basins, and tectonic analytical methods.
Pre-req: GLY 200 and GLY 201 and GLY 210L and GLY 211L.
Grade Mode: Normal Grading Mode
- GLY 410 Big Bend Field Excursion** **2 Credit hours**
 Field trip to Big Bend National Park, Texas to study the structure, stratigraphy, igneous geology, metamorphic geology, paleontology and natural history of this national park.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode
- GLY 418 Invertebrate Paleontology** **4 Credit hours**
 Taxonomy, morphology, and paleoecology of body and trace fossils representing the major invertebrate phyla; analysis and interpretation of faunal assemblages; evolution and extinction of species. (PR: GLY 201)
Pre-req: GLY 201 with a minimum grade of D and GLY 211L with a minimum grade of D.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode
- GLY 420 Principles of Geochemistry** **3 Credit hours**
 Application of chemical principles to geology. Topics include cosmochemistry; distribution of elements in minerals and rocks; aqueous solutions and water-rock interaction; radiometric age dating and stable isotope geology.
Pre-req: CHM 211 with a minimum grade of D and GLY 200 with a minimum grade of D.
Grade Mode: Normal Grading Mode
- GLY 421 Igneous & Metamorphic Petrology** **4 Credit hours**
 Identification and classification of igneous, and metamorphic rocks, their origin and occurrence; their geologic and economic importance. 3 lec-2 lab.
Pre-req: GLY 200 with a minimum grade of D and GLY 314 with a minimum grade of D.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode
- GLY 423 Sedimentary Petrology** **4 Credit hours**
 Microscopic description of minerals, textures, and fossils in sedimentary rocks, their classification, and interpretation of source area, depositional environment and post-depositional history. 3 lec-2 lab.
Pre-req: GLY 201.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

GLY 426 Geophysics	3 Credit hours	GLY 481 Special Topics	1-4 Credit hours
Development of seismic, gravity, magnetism, electrical and thermal methods of studying the structure and dynamics of the earth. 3-lec		Attributes: Natural Sciences	
Pre-req: GLY 200 with a minimum grade of D and GLY 210L with a minimum grade of D and (PHY 201 with a minimum grade of D or PHY 211 with a minimum grade of D) and MTH 229 with a minimum grade of D.		Grade Mode: Normal Grading Mode	
Attributes: Natural Sciences		GLY 482 Special Topics	1-4 Credit hours
Grade Mode: Normal Grading Mode		Attributes: Natural Sciences	
GLY 427 Fossil Fuels	4 Credit hours	Grade Mode: Normal Grading Mode	
Origin and distribution of coal, oil and gas, and methods of exploration and reserve evaluation. 3 lec-2 lab.		GLY 483 Special Topics	1-4 Credit hours
Pre-req: GLY 200.		Attributes: Natural Sciences	
Attributes: Natural Sciences		Grade Mode: Normal Grading Mode	
Grade Mode: Normal Grading Mode		GLY 485 Independent Study	1-4 Credit hours
GLY 451 Principles Geomorphology	4 Credit hours	Attributes: No Textbook Required, Natural Sciences	
Principles of identification and analysis of the world's surficial features in terms of stratigraphy, structure, processes, tectonics and time. 3 lec. 2 lab.		Grade Mode: Normal Grading Mode	
Pre-req: GLY 200 and GLY 210L.		GLY 486 Independent Study	1-4 Credit hours
Attributes: Natural Sciences		Attributes: Natural Sciences	
Grade Mode: Normal Grading Mode		Grade Mode: Normal Grading Mode	
GLY 455 Hydrogeology	3 Credit hours	GLY 487 Independent Study	1-4 Credit hours
The properties of water, the hydrologic cycle with emphasis on surface and groundwater processes, the uses, needs and problems associated with water resources. 3 lec.		Attributes: Natural Sciences	
Pre-req: GLY 200 with a minimum grade of D and (MTH 132 with a minimum grade of D or MTH 229 with a minimum grade of D or MTH 229H with a minimum grade of D).		Grade Mode: Normal Grading Mode	
Attributes: Natural Sciences		GLY 488 Independent Study	1-4 Credit hours
Grade Mode: Normal Grading Mode		Attributes: Natural Sciences	
GLY 455L Hydrogeology Laboratory	1 Credit hour	Grade Mode: Normal Grading Mode	
A two-hour laboratory of practical hydrogeologic problem solving. For non-majors, elective.		GLY 491  Capstone Experience	2-4 Credit hours
Pre-req: GLY 455 (may be taken concurrently) with a minimum grade of D.		An independent study involving a research project or internship. Must be approved by Geology faculty. (PR: 20 hours of Geology coursework).	
Concurrent PR: GLY 455		Attributes: Capstone Course, Natural Sciences	
Attributes: Natural Sciences		Grade Mode: Normal Grading Mode	
Grade Mode: Normal Grading Mode		GLY 492  Capstone Experience	2-4 Credit hours
GLY 456 Environmental Geology	4 Credit hours	An independent study involving a research project or internship. Must be approved by Geology faculty. (PR: 20 hours of Geology coursework).	
Consideration of risks posed by natural geo-hazards and from physical/chemical contamination of geologic media. (PR: GLY 200, GLY 210L or equivalent; Recommended: GLY 451)		Attributes: Capstone Course, Natural Sciences	
Pre-req: GLY 200 with a minimum grade of D and GLY 210L with a minimum grade of D.		Grade Mode: Normal Grading Mode	
Attributes: Natural Sciences			
Grade Mode: Normal Grading Mode			
GLY 457 Engineering Geology	4 Credit hours		
Consideration of geotechnical problems faced by geologists and engineers. Major topics include mechanics and classification of soil and rock, and geotechnical aspects of groundwater.			
Pre-req: GLY 200 with a minimum grade of D and GLY 210L with a minimum grade of D and (MTH 132 with a minimum grade of D or MTH 229 with a minimum grade of D).			
Attributes: Natural Sciences			
Grade Mode: Normal Grading Mode			
GLY 480 Special Topics	1-4 Credit hours		
Attributes: Natural Sciences			
Grade Mode: Normal Grading Mode			

Faculty

Professors

Caudill, El-Shazly

Assistant Professor

Brink-Roby