

**COURSE OUTLINE**  
**GEOL-107**  
**Introduction to Physical Geology**  
**3 Credits**  
**Science Core Course**

**HOWARD COMMUNITY COLLEGE**

**Description**

This course is designed as an introduction to the composition and structure of the earth, its rocks and minerals, surface erosional and depositional features, and the agents that form them. Topics include plate tectonics, volcanoes, weathering and erosion, earthquakes, streams and groundwater, glaciers, shorelines, faults and geologic structures. For Introduction to Physical Geology Laboratory, see GEOL-117. (3 hours lecture)

**Statement on General Education and Liberal Learning**

A liberal education prepares students to lead ethical, productive, and creative lives and to understand how the pursuit of lifelong learning and critical thinking fosters good citizenship. General education courses form the core of a liberal education within the higher education curriculum and provide a coherent intellectual experience for all students by introducing the fundamental concepts and methods of inquiry in the areas of mathematics, the physical and natural sciences, the social sciences, the arts and the humanities, and composition. This course is part of the general education core experience at Howard Community College.

**Overall Course Objectives**

Upon completion of this course, the student will be able to:

1. Explain the basic divisions of the earth, their compositions, and their role in plate tectonics.
2. Build a silicon-oxygen tetrahedron for silicate minerals.
3. Discuss physical properties used to identify common minerals.
4. Demonstrate an understanding of Bowen's Reaction Series and the mineralogy of magma.
5. Describe the relationship between cooling rates and mineral crystal sizes in igneous rocks.
6. Describe the processes and pathways of the Rock Cycle.
7. Describe types of volcanoes, lava viscosity and compositions and their relation to global plate tectonics and volcano volatility.
8. Given a basic explanation of the effects of physical and chemical weathering.
9. Explain how sedimentary rock composition, textures, sedimentary structures and fossils indicate specific environments of deposition.
10. Discuss the process and grades of metamorphism.
11. Demonstrate an understanding of the earth's history as related to the fossil record worldwide and to geologic time.
12. Describe the geologic provinces comprising the State of Maryland.
13. Construct models illustrating how basic geologic laws relate to the juxtaposition of rock structures.
14. Relate the concepts of plate tectonics to seismology, the Rock Cycle, and structural geology.
15. Explain the relationship between sea-floor physiographic features, sea floor core data, sediments, and paleomagnetism as supportive evidence for plate behavior.

16. Recognize the types of plate boundaries and explain their relationship to crustal movement and major mountain ranges worldwide.
17. Discuss an earthquake prediction system.
18. Demonstrate an understanding of stream dynamics with regard to the transport and deposition of sediments.
19. Working in cooperative groups, identify major surface landform features and relate them to the geologic agents that formed them, including stream, groundwater, glacial, and marine processes.
20. Explain groundwater pollution problems.
21. Analyze the possible causes of global warming and examine sustainable remediation possibilities.
22. Demonstrate a knowledge of crustal deformation and recognition of geologic faults and structures.
23. Discuss geologic natural resources and explain where and how to explore nationally and internationally for coal, oil and natural gas.

### **Major Topics**

- I. Introduction to Plate Tectonics
- II. Earth's Interior
- III. Minerals: The Materials of Earth
- IV. Volcanism and Extrusive Igneous Rocks
- V. Intrusive Igneous Rocks
- VI. Weathering and Soils
- VII. Sedimentary Rocks
- VIII. Metamorphic Rocks
- IX. Geologic Time
- X. The History of Plate Tectonics
- XI. Paleomagnetism and Plate Dynamics
- XII. The Sea Floor
- XIII. Earthquakes
- XIV. Streams
- XV. Groundwater
- XVI. Deserts
- XVII. Glaciers
- XVIII. Waves, Beaches, and Coasts
- XIX. Structural Geology
- XX. Natural Resources

### **Course Requirements**

Grading/exams: Grading procedures will be determined by the individual faculty member but will be calculated on the basis of quizzes, exams, projects, and a final exam.

Writing: Specific writing assignments will be determined by the individual faculty member.

### **Other Course Information**

This course is a Science core course, Science elective, and an Arts and Sciences elective.