



DEPARTMENT OF SCIENCE  
COURSE INFORMATION SHEET FOR  
**GEL101 – PHYSICAL GEOLOGY**

*All members of the Science Department at Clinton Community College use the respective course templates as a basis for their course syllabi. Faculty may, at their discretion, change the order of the course content or add course content.*

**COURSE NUMBER AND TITLE:** GEL101 – PHYSICAL GEOLOGY

**COURSE SECTION:** *TBA*

**CONTACT HOURS:** 5      **CREDIT HOURS:** 4

**SEMESTER AND YEAR:** *TBA*

**INSTRUCTOR'S NAME, TELEPHONE NUMBER, EMAIL ADDRESS, OFFICE NUMBER, AND OFFICE HOURS:** *TBA*

**I. COURSE DESCRIPTION:**

This is an introductory course that covers Earth materials and the processes that develop and modify the composition, structure, and topography of the earth. Included is an overview of minerals, rocks, volcanoes, earthquakes, plate tectonics, geologic time, water resources, glaciation, structural geology, and energy and mineral resources. There are three hours of lecture and one two-hour laboratory per week.

This course meets the SUNY General Education course requirements for natural sciences.

**II. PREREQUISITE AND COREQUISITE:** MAT 100 or the equivalent. Students receiving credit for GEL101 – Physical Geology cannot receive credit for GEL100 – Earth Science.

**III. COURSE OBJECTIVES, SUNY GENERAL EDUCATION KNOWLEDGE AREA LEARNING OUTCOMES AND ASSESSMENT:**

**COURSE OBJECTIVES:**

As the result of instructional activities, students will be able to:

1. Understand the different branches of geology and the major theories and cycles involved.
  - Define and understand catastrophism and uniformitarianism.
  - Describe the rock cycle.
  - Discuss the origin of Earth.
2. Read and interpret a topographic map.
3. Understand and describe the formation and physical properties minerals and rocks and use that knowledge to identify them.
  - Describe the structure and physical properties of minerals.

- Use proper methods to identify common minerals.
  - Define and describe crystallization and Bowen's reaction series.
  - Use proper terminology and physical properties to identify igneous rocks.
  - Describe the process involved in creating sedimentary rocks.
  - Use proper terminology and physical properties to identify sedimentary rocks.
  - Describe sedimentary environments and structures.
  - Describe metamorphism and metamorphic agents.
  - Use proper terminology and physical properties to identify metamorphic rocks.
  - List the three major metamorphic environments.
4. Understand and describe the causes, types, and effects of volcanoes.
    - Discuss how volcanic eruptions can affect the Earth's climate.
    - Name the three types of volcanoes and how the composition, temperature, and other properties of magma affect the type of eruptions each can produce.
  5. Understand and describe the causes and types of weathering and soil formation.
    - Define mechanical and chemical weathering.
    - Describe soil and list the different horizons.
  6. Understand geologic time including relative and absolute dating and the techniques, principles, and laws involved.
    - Explain the difference between relative and absolute dating.
    - Define and understand how to use the major principles and laws for relative dating.
    - Define the three types of unconformities.
    - Describe correlation and fossil succession.
    - Understand radioactivity and radiometric dating.
    - List the major Eons, Eras, and Periods of the geologic time scale in chronological order.
  7. Understand mass wasting, its causes, classifications, and relation to people.
  8. Understand the hydrologic cycle including defining all stream and groundwater processes.
    - Explain the hydrologic cycle, including the distribution of Earth's water.
    - Understand stream flow, erosion, transport, and deposition.
    - Describe drainage valleys and stream networks.
    - Understand types, causes, and controls of flooding.
    - Define and understand water tables, aquifers, and wells.
    - Discuss groundwater withdrawal and contamination.
  9. Describe and define different kinds of glaciation, features, erosional features, landforms, deposits, and relationship to climate, past and present.
    - Understand the difference between continental and mountain glaciation.
    - List the landforms and deposits caused by glaciers.
    - Understand glacial and interglacial periods and possible causes.
    - Understand the connection between glaciation and climate.
  10. Describe the distribution, causes, processes, and deposits in arid climates.
  11. Describe and define all shoreline features and processes.
    - Describe the characteristics of waves and how they erode.
    - Understand coastal processes, shoreline features, and erosion.
    - Explain the causes and types of tides.

12. Define and describe causes, features, processes, and formation of the ocean floor, continents, and mountains.
  - Define and describe active and passive continental margins.
  - Define submarine canyons and turbidity currents.
  - Understand the major features of a deep-ocean basin.
13. Describe and define plate tectonics, the evidence to support it, the types of boundaries, and causes.
  - Define continental drift and cite the evidence to support it.
  - Explain how paleomagnetism relates to plate tectonics.
  - Define and understand divergent, convergent, and transform plate boundaries.
  - Explain ways to test the model of plate tectonics and measure the rate of movement.
  - Explain the driving mechanism and importance of plate tectonics.
14. Describe and define deformation, folds and faults, and techniques used in structural geology.
  - Define deformation, including force, tensional stress, compressional stress, shear stress, and strain.
  - Be able to define and find the strike and dip of a rock layer.
  - Define the different kinds of folds and faults.
15. Describe the causes and effects of earthquakes, including seismology, detection, and classifications.
  - Understand what causes earthquakes
  - Define epicenter and focus.
  - Understand aspects of seismology, including being able to define surface waves and the main types of body waves.
  - Understand how plate tectonics relate to earthquakes.
  - Explain and understand the Richter scale.
  - Discuss the destruction caused by earthquakes, including landslides and tsunamis.
16. Describe the earth's interior, including the structure, composition, and magnetic field.
  - Describe the Earth's core, mantle, and crust.
  - Describe the lithosphere, asthenosphere, and mesosphere.
  - Discuss the Earth's magnetic field and internal heat engine.
17. Understand and describe energy and mineral resources, including origin, uses, and environmental consequences.
  - Explain the difference between renewable and nonrenewable resources.
  - Understand the origin, use, and environmental effects of fossil fuels, including the topic of global warming.
  - Discuss alternate energy sources.
  - Understand the difference between mineral resources, reserves, and ores and their importance to society.

**SUNY GENERAL EDUCATION KNOWLEDGE AREA LEARNING OUTCOMES:**

Students will demonstrate the ability to:

1. understand the methods scientists use to explore natural phenomena, including:
  - observation
  - hypothesis development

- measurement and data collection
  - experimentation
  - evaluation of evidence
  - employment of mathematical analysis
2. apply scientific data, concepts and models in one of the natural sciences

#### **IV. REQUIRED TEXTBOOK AND MATERIALS:**

##### **REQUIRED TEXTBOOK:**

1. Earth: An Introduction to Physical Geology, 8<sup>th</sup> edition; Tarbuck and Lutgens. Prentice Hall.  
ISBN# 0-13-114865-6
2. Lab Manual: Laboratory Manual In Physical Geology, 7<sup>th</sup> edition, Bush and Tasa-AGI/NAGT. Prentice Hall.  
ISBN# 0-13-149745-6

##### **REQUIRED MATERIALS:**

Safety glasses are required for all on-campus sections

**V. METHODS OF INSTRUCTION/COURSE ORGANIZATION:** *To be determined by the respective instructor.*

**VI. ATTENDANCE PROCEDURE (INCLUDING MAKEUP POLICY):** *To be determined by the respective instructor.*

**VII. BIBLIOGRAPHY OF READINGS (IF APPLICABLE):** *To be determined by the respective instructor.*

**VIII. METHODS OF EVALUATION (INCLUDING THE CALCULATION OF COURSE GRADE):** *To be determined by the respective instructor. The methods of evaluation shall include tests (test types, length and weight of each), papers (weight of each), projects (weight of each), and other forms of evaluation (weight of each).*

**IX. GRADING SCALE:** *To be determined by the respective instructor. The grading scale shall indicate what numerical scores correspond to the following grades: A, A-, B+, B, B-, C+, C, C-, D+, D, and F.*

*Please Include:* If you have, or suspect you may have, any type of disability or learning problem that may require extra assistance or special accommodations, please speak to me privately after class or during my office hours as soon as possible so I can help you obtain any assistance you may need to successfully complete this course. You should also contact Laurie Bethka, Room 420M in the Academic Assistance Center, for further assistance.

##### **X. GENERAL TOPICS OUTLINE:**

1. Introduction to Geology
2. Matter and Minerals
3. Igneous Rocks
4. Sedimentary Rocks
5. Metamorphic Rocks
6. Volcanic and Plutonic Activity
7. Plate Tectonics
8. Geologic Time
9. Weathering and Soil
10. Groundwater/Rivers
11. Glaciers/Deserts
12. Shorelines/Ocean Floor
13. Structural Geology/Earthquakes
14. Earth's Interior
15. Energy and Mineral Resources

**XI. ACADEMIC INTEGRITY:** Academic honesty is expected of all Clinton Community College students. It is academically dishonest, for example, to misrepresent another person's work as one's own, to take credit for someone else's work or ideas, to accept help on a test, to obtain advanced information on confidential test materials, or to intentionally harm another student's chances for academic success.

**XII. COURSE CONTINUITY PLAN:** In the case that the college officially closes because of an emergency which causes a short term disruption of this course, we will utilize e-mail to continue this course in the short term (1-3 weeks). All students need to utilize their campus e-mail to receive course related information.