



BROWARD COLLEGE COURSE OUTLINE

LAST REVIEW: 2010-11

(i.e. 2006-2007)

NEXT REVIEW: 2015-2016

(i.e. 2011-2012)

STATUS: A

(A, I, D)

COURSE TITLE: Physical Geology

COMMON COURSE NUMBER: GLY1010

CREDIT HOURS: 3

CONTACT HOUR BREAKDOWN

(Per 16 week term)

CLOCK HOURS:

(Voc. Course ONLY)

Lecture: **48**

Lab:

Clinic:

Other:

PREREQUISITE(S): None

COREQUISITE(S): None

PRE/COREQUISITE(S):

COURSE DESCRIPTION *(750 characters, maximum):*

Study of geologic agents, minerals, rocks, structure, and land forms. The effects of geologic events upon life and human relations are discussed. Students registering in GLY 1010 are strongly urged to register in the companion laboratory GLY 1010L. Some senior institutions require a 4-credit geology course.

General Education Requirements – Associate of Arts Degree (AA), meets Area(s): Area 4B

General Education Requirements – Associate in Science Degree (AS), meets Area(s): Area 4B

General Education Requirements – Associate in Applied Science Degree (AAS), meets Area(s): Area 4

UNIT TITLES

- 1. Reading and Writing in the Geological Sciences**
- 2. Introduction**
- 3. Earth Materials**
- 4. Surface Processes**
- 5. Earth's Structure**
- 6. Earth through Time**

*** Complete the following only if course is seeking general education status ***

GENERAL EDUCATION Competencies and Skills *:

In the box to the right of the Competency/Skill, enter all specific **student learning outcome** unit numbers, as indicated in the course outline (i.e. 1.1, 2.7, 4.2, 4.0 and 5.12) that apply.

Course must include <u>all</u> of the following:	
1. Read with critical comprehension**	1.0
2. Write clearly and coherently**	1.0 , 2.10, 3.1, 3.3, 3.4, 5.9
3. Demonstrate literacy as appropriate within a given discipline** a) Information b) Technology c) Workplace d) Cultural e) Quantitative f) Scientific g) Environmental	b. 5.7 d. 2.3, 2.6, 2.8 e. 6.4-6.5 f. 1.0-6.6 g.2.3, 4.4, 4.7, 4.14-4.18, 5.6
4. Apply problem solving skills or methods to make informed decisions in a variety of contexts**	4.6, 4.15-4.18, 5.4, 5.6, 6.5,
Course must include at least <u>one</u> of the following:	
5. Differentiate between ethical and unethical behavior	4.15-4.18
6. Demonstrate an understanding of the physical, biological, and social environments and how individual behaviors impact this complex system.	4.7, 4.12, 4.14-4.18
7. Demonstrate an understanding of and appreciation for human diversities and commonalities.	2.6
8. Speak and listen effectively.	

**General Education Competencies and Skills endorsed by 2010-2011 General Education Task Force*

**Required Competencies

1) Read with critical comprehension.

The student will be introduced to the basic texts, concepts, vocabulary, and methods necessary for developing an understanding of the discipline and meeting the required benchmarks as stated in the course outline.

2) Write clearly and coherently.

The student will demonstrate an understanding and mastery of subject matter in a variety of ways, including writing. Writing activities may include both graded and ungraded essays, short answer quizzes, summaries, reactions, journals, and various other reports.

3) Demonstrate and apply literacy across all the disciplines (indicate which ones apply).

- a) **Information literacy** means understanding how to locate needed information, using the appropriate technology for the task, managing and evaluating the extracted information and using it effectively and ethically.
- b) **Technology literacy** is the ability to responsibly and effectively use appropriate technology to access, manage, integrate, or create information, and/or use technology to accomplish a given task.
- c) **Workplace literacy** is having the appropriate knowledge and skills to communicate and work with others effectively and perform job duties, whether it is through the use of computers and/or other technology.
- d) **Cultural literacy** is recognizing, understanding, and appreciating the similarities and differences between one's own culture and the cultures of others through a study of the arts, customs, beliefs, values, and history that define a culture.
- e) **Quantitative literacy** is having the ability to formulate, solve and interpret mathematical/statistical operations and graphical/tabular representations to make informed decisions.

- f) **Scientific literacy** means understanding the methodology and application of the scientific process, the physical and biological worlds, and recognizing that scientific knowledge is continuously updated or revised as new information is discovered.
- g) **Environmental literacy** is creating a context within which environmental issues can be viewed, imparting knowledge to enhance one's ability to analyze the issues, make the connections between humans' decisions and actions and the challenges facing the environment, and instilling the desire to sustain the environment through ethical practices in both one's professional and personal lives.

4. Apply problem-solving skills or methods to make informed decisions in a variety of contexts.

The student will use acquired skills or methods to recognize, analyze, adapt, and apply critical thinking to solve problems and make informed decisions.

EVALUATION:

In the box to the right of the Methods of Assessment, enter all specific learning outcome numbers (i.e. 1.1, 2.7, 4.0, 4.2 and 5.12) that apply.

1. Portfolio	
2. Short essays	
3. Research Papers	
4. Group projects	
5. Discussions (In class and online)	1.0-6.0
6. Multiple Choice tests	2.2, 2.4-2.8, 3.1-3.7, 4.1-4.3, 4.5, 4.8-4.12, 5.1-5.2, 5.4-5.9, 6.1-6.2, 6.6
7. Presentations	
8. Service Learning Projects	
9. Quizzes (pop, announced, etc.)	2.2, 2.4-2.8, 3.1-3.3, 3.5, 4.1-4.3, 4.5, 4.8-4.12, 5.1-5.2, 5.4-5.9, 6.1-6.2, 6.6
10. Take-home tests	
11. Summaries, critiques, and analyses	4.15-4.18
12. Reaction papers	
13. Surveys	
14. Performance	
15. Short answer tests	2.3, 2.5-2.8, 4.2, 4.4-4.8, 4.12, 4.14, 5.1-5.2, 5.4-5.6, 5.7, 5.9, 6.1, 6.3-6.6
16. Classroom debates and colloquia	
17. Blogs, wikis, web pages	
18. Other (Please explain)	Demonstrations: 5.3, 6.2

UNITS**Unit 1: Reading and Writing in the Geological Sciences****General Outcome:**

- 1.0 The students shall be able to clearly communicate in writing information derived from course related readings the major concepts and themes in the geological sciences.**

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the students shall be able to:

- 1.1 Demonstrate in writing the ability to analyze, evaluate, compare, and/or extract data relevant to geology from course related readings.
- 1.2 Evaluate the validity of information from a variety of sources, including electronic/print sources and data bases.
- 1.3 Illustrate using diagrams, drawings, outlines, concept maps, and/or other methods connections among geological concepts.
- 1.4 Demonstrate the ability to use the appropriate technology to carry out course requirements.

Common Course Number: GLY1010

Unit 2: Introduction

General Outcome:

- 2.0 The students shall be able to describe the scientific process and recognize geology as the study of interactions between Earth's many systems.**

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the students shall be able to:

- 2.1 Examine the nature of scientific inquiry via the scientific method.
- 2.2 Differentiate between the various sub-disciplines of geology.
- 2.3 Evaluate the ways in which geologic processes affect our daily lives.
- 2.4 Distinguish between the various layers of the earth based on composition and physical behavior.
- 2.5 Understand the geologic origin of several types of natural disasters (volcanism, earthquakes, tsunamis, etc).
- 2.6 Evaluate how local geology and geography play large roles in development of human culture (including social structure, diet, agriculture, etc.)
- 2.7 Recognize that earth operates as a complex system of 4 linked systems (geosphere, atmosphere, hydrosphere, and biosphere).
- 2.8 Explain the development of geology as a science throughout the past 300 years and understand its initial social and cultural implications.
- 2.9 Critically read and evaluate selected assigned readings and experimental data to solve problems involving stream discharge, groundwater movement, earthquake frequency, etc.
- 2.10 Demonstrate in writing the ability to analyze, evaluate, and compare data relevant to geology from course related readings.

Unit 3: Earth Materials

General Outcome:

- 3.0 The students shall be able to explain the structure of atoms, chemical bonding, and the formation minerals and rocks.**

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the students shall be able to:

- 3.1 Identify and sketch subatomic particles based on their charges and locations within the structure of an atom.
- 3.2 Differentiate between the three main types of chemical bonding (ionic, covalent, and hydrogen).
- 3.3 Recognize and write the formulas of the 8 elements that make up the most common minerals in the Earth's crust.
- 3.4 Write the name, formula, and charge of important mono- and polyatomic ions that bond to form important minerals.
- 3.5 Classify and visually identify minerals based on their physical properties and chemical composition and structure.
- 3.6 Evaluate the various types of minerals that are mined, particularly in regard to human health and safety.
- 3.7 Categorize igneous, sedimentary and metamorphic rock types based on their origin, composition, and texture.

Common Course Number: GLY1010

Unit 4: Surface Processes

General Outcome:

- 4.0 The students shall be able to identify various surficial earth processes as weather-, water- and gravity-driven and recognize geomorphic and physiographic features associated with them.**

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the students shall be able to:

- 4.1 Classify types of mechanical and physical weathering.
- 4.2 Examine the various factors that contribute to soil formation.
- 4.3 Describe the horizons of the soil profile.
- 4.4 Recognize the value of adequate soil quantity and quality in terms of the food supply and understand that soil erosion/degradation is a grave threat to mankind.
- 4.5 Compare the various types of gravity-driven mass movement (e.g., landslides, rock falls, debris flows).
- 4.6 Evaluate the vulnerability of specific locations to large scale mass movements.
- 4.7 Evaluate ways in which humans have exacerbated the problem of mass movement and what can be done to stabilize vulnerable areas.
- 4.8 Indicate factors that affect the flow of water in streams and in groundwater
- 4.8 Classify features associated with streams, groundwater, glaciers, and nearshore oceanic processes.
- 4.9 Recognize that drinking water supply from both surface and groundwater sources is an important resource.
- 4.10 Evaluate the ways in which stream processes result in various depositional features.
- 4.11 Interpret the patterns developed by various stream types in the landscape.
- 4.12 Differentiate between types of glaciers based on their morphologies and locations.
- 4.13 Evaluate the climate's effects on size and location of glaciers.
- 4.14 Classify arid landscape features and discuss their development.
- 4.15 Identify how shorelines change over time as a result of onshore, offshore, and anthropogenic processes (such as terrestrial input, currents, waves, dredging, and construction of erosional control structures.)
- 4.16 Discuss how anthropogenic land use can alter local geomorphology.

4.17 Evaluate the advantages and drawbacks of erosion control structures (e.g., windbreaks, breakwaters, groins).

4.18 Evaluate the advantages and drawbacks of flood control structures (e.g., dams, dikes, artificial levees).

Common Course Number: GLY1010

Unit 5: Earth's Structure

General Outcome:

- 5.0 The students shall be able to identify and define geologic structures present in the crustal rocks of the earth and associate them with the movement of earth's tectonic plates.**

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the students shall be able to:

- 5.1 Recognize that plate tectonics is the driving force behind most geologic phenomena (including volcanoes, earthquakes, mountain building) as well as the ever-changing distribution of continental landmasses and most features of the seafloor.
- 5.2 Identify the forces directed at the earth's crust due to convection of heat.
- 5.3 Interpret and visually identify the various types of deformational features on the Earth's surface (e.g., folds and faults).
- 5.4 Use block diagrams and geologic maps to identify structural and deformational features.
- 5.4 Categorize volcanism based on magma composition and location relative to plate boundaries.
- 5.5 Evaluate the risks of living in areas with high occurrences of earthquakes and volcanoes.
- 5.6 Understand the basic technology used in tracking earthquakes and volcanoes.
- 5.7 Classify earthquakes in terms of their depth of focus, magnitude, and isoseismal pattern.
- 5.8 Discuss the origin of shock waves associated with earthquakes
- 5.9 Evaluate the various processes that contribute to mountain building.
- 5.10 Categorize and sketch physiographic provinces and features associated with oceanic crust.
- 5.11 Differentiate between Atlantic and Pacific type continental margins.

Common Course Number: GLY1010

Unit 6: Earth through Time**General Outcome:**

- 6.0 The students shall recognize earth as an ancient planet which has undergone significant amounts of change throughout its history, as well as understand how rock strata, fossils and other age-dating techniques have led to a detailed earth history.**

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the students shall be able to:

- 6.1 Differentiate between relative and absolute age dating and categorize the techniques used for each.
- 6.2 Interpret the relative ages of rock formations in block diagrams using the principles of superposition, cross-cutting relationships, and the law of original horizontality.
- 6.3 Evaluate evidence that has led to the development of the Geologic Time Scale.
- 6.4 Discuss the process of radiometric dating and identify some important parent/daughter combinations.
- 6.5 Determine the age of a sample rock given the ratio of parent to daughter isotopes and the half-life.
- 6.6 Recognize the major features, processes, and major forms of life associated with the eons, eras and periods of the Geologic Time Scale.