



BROWARD COLLEGE COURSE OUTLINE

LAST REVIEW: 2010-2011

(i.e. 2006-2007)

NEXT REVIEW: 2015-2016

(i.e. 2011-2012)

STATUS: A

(A, I, D)

COURSE TITLE: Earth Science

COMMON COURSE NUMBER: ESC 1000

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):*

An integration of the three classic disciplines of the earth sciences: geology, meteorology and oceanography. Course will focus on the basic principles governing these disciplines and the effect of each on man.

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 4

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

UNIT TITLES

- 1. Reading and Writing in the Earth sciences**
- 2. Solid Earth**
- 3. Oceans**
- 4. Atmosphere**

*** 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**	1.2, 1.3, 2.3.11
2. Write clearly and coherently**	1.1, 1.3, 2.1.2, 2.1.10, 2.2.5,
3. Demonstrate literacy as appropriate within a given discipline** a) Information b) Technology c) Workplace d) Cultural e) Quantitative f) Scientific g) Environmental	b: 1.4 f. 2.1; 2.2; 2.3; 2.4; 2.5; 3.1-3.15; 4.1-4.32 g. 2.2.12, 2.2.18; 2.3.6; 3.14
4. Apply problem solving skills or methods to make informed decisions in a variety of contexts**	1.2, 2.2.12; 2.3.6, 3.14
Course must include at least <u>one</u> of the following:	
5. Differentiate between ethical and unethical behavior	
6. Demonstrate an understanding of the physical, biological, and social environments and how individual behaviors impact this complex system.	2.1.6; 2.1.7; 2.2.10; 2.2.12; 2.2.19; 2.6
7. Demonstrate an understanding of and appreciation for human diversities and commonalities.	
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)	1.1-1.2, 2.1.4-2.1.9, 2.2.1-2.2.4, 2.2.6-2.2.20, 3.3-3.15, 4.1-4.3, 4.5-4.32
6. Multiple Choice tests	2.0-4.0
7. Presentations	
8. Service Learning Projects	
9. Quizzes (pop, announced, etc.)	
10. Take-home tests	
11. Summaries, critiques, and analyses	1.2, 2.2.19, 2.3.6
12. Reaction papers	
13. Surveys	
14. Performance	
15. Short answer tests	2.1.3, 2.1.6-9, 2.2.1-4, 2.2.6-14, 2.2.17-19, 2.3.1, 2.3.3-2.3.9, 2.3.12-13, 2.4.1-2.4.9, 2.5.1, 2.5.3, 3.1-3.5, 3.7-3.15, 4.1-4.3, 4.5-4.7, 4.9-4.14, 4.16-4.22, 4.24-4.32
16. Classroom debates and colloquia	
17. Blogs, wikis, web pages	
18. Other (Please explain)	

Common Course Number: ESC 1000

UNITS

Unit 1: Reading and Writing in the Earth Sciences

General Outcome:

- 1.0 The students shall be able to clearly communicate in writing information derived from course related readings of the major concepts and themes in the earth 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 earth science 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 earth science concepts.**
- 1.4 Demonstrate the ability to use the appropriate technology to carry out course requirements.**

Unit 2 The Solid Earth

General Outcome:

2.0 The student shall: be able to demonstrate a basic understanding of: 1) the building blocks of the solid earth (rocks, minerals, elements, atoms), and of the 2) earth's external processes of weathering, soil development, stream flow, ground water systems, glaciation and desert formation; 3) the earth's internal process of earthquakes, igneous activity and mountain building; 4) the relationship of both the internal and external processes of the earth to plate tectonics and recognize the importance of the earth as a great internal heat engine; and 5) correlate the geologic processes with geologic time.

Specific Measurable Learning Outcomes:

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

2.1 Solid Earth building block learning outcomes:

2.1.1. Identify and sketch the basic structure of the atom and how atoms combine.

2.1.2. Recognize and write the formulas of the most common elements that compose the earth's crust.

2.1.3. Explain isotopes and radioactivity.

2.1.4. Describe physical properties of minerals and mineral identification.

2.1.5. Compare and contrast the different mineral groups.

2.1.6. Describe the importance of the silicate minerals and their basic compositions and structure.

2.1.7. Evaluate the economic use of select non-silicate minerals.

2.1.8. Distinguish between mineral resources, reserves and ores.

2.1.9. Explain the difference between a mineral and a rock.

2.1.10. Recognize and illustrate the rock cycle.

2.1.11. Categorize igneous, sedimentary and metamorphic rock types based on their origin, composition and texture.

2.2 Earth's external processes learning outcomes:

2.2.1. Describe the processes of weathering, erosion and mass wasting.

2.2.2. Compare and contrast the processes of mechanical and chemical weathering.

2.2.3. Discuss soil composition, texture, structure, formation and classification.

2.2.4. List and describe the various types of mass wasting.

- 2.2.5. Recognize and illustrate the movement of water through the hydrological system.**
- 2.2.6. Describe the processes of stream flow and the stream's ability to erode.**
- 2.2.7. Describe the major features produced by stream erosion.**
- 2.2.8. Describe the types of stream valleys and how they can change over time.**
- 2.2.9. Discuss the different types of drainage patterns.**
- 2.2.10. Discuss the occurrence and movement of groundwater, specifically how it relates to Florida groundwater.**
- 2.2.11. Compare and contrast springs, geysers, wells and artesian systems. Locate these water sources in Florida.**
- 2.2.12. List and describe the major environmental problems associated with surface and ground water systems.**
- 2.2.13. Discuss karst features and caves.**
- 2.2.14. Describe the types and locations of glaciers.**
- 2.2.15. List the types of glacial sediments.**
- 2.2.16. Describe the features produced by glacial erosion.**
- 2.2.17. Define the Ice Age and the Pleistocene Epoch.**
- 2.2.18. Evaluate the causes of the ice ages.**
- 2.2.19. Discuss the roles of weathering and water in arid regions and human expansion into these areas.**
- 2.2.20. List the types and features of wind deposits.**

2.3 Earth's Internal processes learning outcomes:

- 2.3.1. Describe the interior structure and composition of the Earth.**
- 2.3.2. Classify earthquakes in terms of their depth of focus, magnitude and isoseismal pattern.**
- 2.3.3. Discuss the type of seismic waves and their mode of propagation.**
- 2.3.4. Describe how an earthquake epicenter is located.**
- 2.3.5. Discuss the worldwide distribution of earthquakes.**
- 2.3.6. Evaluate the risks of living in areas with high occurrences of earthquakes and discuss the nature of earthquake prediction.**

2.3.7. Discuss the relationship of plate tectonics and igneous activity.

2.3.8. Describe isostatic adjustment.

2.3.9. Explain the difference between elastic and plastic rock deformation.

2.3.10. List the major types of folds and faults and describe how they form.

2.3.11. Use block diagrams and geologic maps to identify faults and folds.

2.3.12. Evaluate the various processes that contribute to mountain building.

2.3.13. Describe the four main mountain types and give examples of each.

2.4 Relationship of Internal and external processes learning outcomes:

2.4.1. List the evidence that was used to support the continental drift hypothesis.

2.4.2. Describe the theory of plate tectonics.

2.4.3. List and describe the evidence used to support the plate tectonics theory.

2.4.4. Compare and contrast the different plate boundaries.

2.4.5. Discuss the formation and breakup of Pangaea.

2.4.6. Describe the models that have been proposed as the driving mechanism for plate motion.

2.4.7. Categorize volcanism based on magma composition and location relative to plate boundaries.

2.4.8. Describe major volcanic and plutonic features.

2.4.9. Compare and contrast magma and lava and their origins.

2.5 Geologic Processes/Geological Time learning outcomes:

2.5.1. Differentiate between relative and absolute age dating and categorize the techniques used for each.

2.5.2. Interpret the relative ages of rock formations in block diagrams using the principles of superposition, cross-cutting relationships, and the law of original horizontality.

2.5.3. Evaluate evidence that has led to the development of the Geologic Time Scale.

2.5.4. Discuss the process of radiometric dating and identify some important parent/daughter combinations.

2.5.5. Determine the age of a sample rock given the ratio of parent to daughter isotopes and the half-life.

2.5.6. Recognize the major features, processes, and major forms of life associated with the eons, eras and periods of the Geologic Time Scale.

Common Course Number: ESC 1000

Unit 3 The Oceans

General Outcome:

3.0 The student shall: be able to demonstrate a basic understanding of the unifying principles and processes that bind physics, chemistry, biology and geology to the study of the world's ocean.

Specific Measurable Learning Outcomes:

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

3.1 Describe the extent and boundaries of the world's ocean.

3.2 Discuss the chemical composition of seawater.

3.3 Explain the ocean's layered temperature and salinity structure.

3.4 Describe the relation between submarine canyons, turbidity currents and turbidites.

3.5 Describe the major features of the continental margin and ocean floor.

3.6 List the types of sea floor sediments.

3.7 Compare the relationship between sea level and sediment deposits.

3.8 Examine the factors that influence surface ocean currents.

3.9 Discuss the importance of surface ocean currents.

3.10 Describe deep ocean circulation.

3.11 Describe the factors that influence the tides.

3.12 Describe wave characteristics and types.

3.13 Describe wave erosion and the shoreline features produced.

3.14 Evaluate shoreline erosional problems and solutions, including man's influence on both the problem and the solution.

3.15 Explain the differences in emergent and submergent coasts.

Unit 4 The Atmosphere

General Outcome:

4.0 The student shall: be able to demonstrate a basic understanding of the processes that govern the physics of the atmosphere, starting with heating by the sun and the consequences of the earth's motion on atmospheric phenomena, weather and climate. This includes a basic understanding of the composition, structure and temperature of the earth's atmosphere, the importance of moisture in the atmosphere, air pressure and wind, weather patterns and severe storms, air-ocean interactions, as well as world climates. The student should also demonstrate an awareness of man's impact on the atmosphere and how this relates to global change.

Specific Measurable Learning Outcomes:

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

- 4.1 Describe the science of meteorology.**
- 4.2 Compare and contrast weather and climate.**
- 4.3 Describe the most important elements of weather and climate.**
- 4.4 List the major and variable components of air.**
- 4.5 Describe the extent and structure of the atmosphere.**
- 4.6 Describe how the atmosphere is heated.**
- 4.7 Explain the causes of seasons.**
- 4.8 List the factors that cause temperature to vary place to place.**
- 4.9 Describe the general distribution of the global temperatures.**
- 4.10 Evaluate and describe the processes that cause water to change from one state of matter to another.**
- 4.11 Explain saturation, vapor pressure, specific humidity, relative humidity and dew point.**
- 4.12 Describe how relative humidity is determined.**
- 4.13 Identify the three processes that initiate the vertical movement of air.**
- 4.14 Discuss the conditions necessary for condensation.**
- 4.15 List the criteria used to classify clouds.**
- 4.16 Describe the formation of fog.**

- 4.17 Describe the formation and forms of precipitation.
- 4.18 Discuss air pressure, how it is measured and how it changes with altitude.
- 4.19 Explain how the pressure gradient force, Coriolis effect and friction influence wind.
- 4.20 Describe the movements of air associated with the two types of pressure centers.
- 4.21 Describe and evaluate the idealized global patterns of pressure and wind.
- 4.22 Discuss the general atmospheric circulation of mid-latitudes.
- 4.23 List the names and causes of major local winds.
- 4.24 Relate the global distribution of precipitation to the global wind patterns
- 4.25 Classify air masses based on their climate characteristics.
- 4.26 Describe the general weather associated with air mass types.
- 4.27 Compare and contrast warm fronts and cold fronts.
- 4.28 Describe the primary mid-latitude weather producing systems.
- 4.29 List the atmospheric conditions that produce thunderstorms, tornadoes and hurricanes.
- 4.30 Explain what is meant by the Earth's climate system.
- 4.31 Discuss the factors that give every location a distinctive climate.
- 4.32 Describe the Koppen system of climate classification.