

# Huntingdon College Adult Degree Completion Program

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**COURSE NUMBER: PHSC 301**  
**COURSE NAME: Natural Science**  
**Spring 2009, Session II, Montgomery**

**INSTRUCTOR'S NAME:** Dr. Jaime Demick

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**COURSE DESCRIPTION:** Introduces physical geology, earth materials, history of the earth, geophysics, and geochemistry. Examines the topography and structural feature of the earth soils, soil formation, and the geological processes involved in their development.

**PREREQUISITE:** None.

**TEXT REQUIRED:** Monroe, J. S., Wicander, R., Hazlett, R., Physical Geology: Exploring the Earth, Thompson (see Huntingdon College booklist for Edition and ISBN)

**COURSE LEARNING OUTCOMES:** At the completion of this course, students are expected to competently:

1. Define the nature of natural science and physical geology.
2. Explore physics and chemistry as they relate to the geological processes of the earth, including mineral and rock formation and earth structure.
3. Explain the dynamic nature of the earth and the overall processes responsible for the changes in the planet, noting the contrast to other planets in the solar system.
4. Describe the theory of plate tectonics, the types of plates, plate boundaries, and their relationship to earthquake and volcanic activity.
5. Describe the interior structure of the earth.
6. Describe mineral formation and classification, how they pertain to natural resources, and complete activities in mineral identification.
7. Describe the rock types and formation methods of each type.
8. Explain the geological processes of soil formation, describe the soil types and topography, and complete an activity using topographic maps.
9. Understand the concept of geologic time and its classification scale.
10. Describe earthquakes, their causes and effects.
11. Describe the seafloor and its study.
12. Describe the processes of mountain building and continental formation.
13. Explore the relationship between physical geology and natural science concepts and applications in our homes, industry, businesses, and world.
14. Complete self-assessments on individual quizzes and group hands-on science activities completed during each workshop, and evaluate results.

**COURSE ASSIGNMENTS & GRADING CRITERIA:**

<b>Grading Elements</b>	<b>Percentage:</b>
Weekly Written Assignments	50%
Final Exam	20%
In Class Assignments	10%
Weekly Quizzes (4)	20%
<b>Total Points</b>	<b>100%</b>

**GRADE POINT EQUIVALENTS** - Describe the point range for each letter grade.

A = 90-100  
 B = 80-89  
 C = 70-79  
 D = 60-69  
 F = 59-below

**Reading Assignments** must be completed before each class and may be found below in the class schedule. The reading assignment for each chapter includes the Geology Matters section.

**Written Assignments** are due each week before class begins and cover the material presented that day. Assigned questions may be found below in the class schedule. Weekly Assignments are meant to help you retain and understand the assigned reading material. They should be answered in short answer format, typed and printed out. They will be graded and returned by the next session of class.

There will be two **In Class Assignments** that will apply course material to a hands-on activity.

A **Quiz** will be given at the end of the session on the reading assignment and the material presented in class. Quizzes may include short answer and/or multiple-choice questions.

#### **ATTENDANCE POLICY:**

**Absences and Tardiness – All students are required to attend the first session.** Those who do not attend the first session will be automatically dropped from the course. Students with more than one absence will receive an "F" for the course. Since this class meets only five times, missing a single class meeting is equivalent to missing three weeks of a regular term. If you cannot attend a class you must let the instructor know via email as soon as possible. In case of absence, you are responsible for obtaining all handouts and assignments. Tardiness may result in a deduction in your class participation grade. Excessive tardiness may count as an absence.

**Participation** –Participation is not the same as attendance. Participation requires students to come to class prepared to actively participate, which makes the classroom experience more meaningful. Active participation includes note taking, meaningful contributions to class discussion, and dialogue about material covered in class. Everyone is a vital contributor to the course and student participation makes the class more important and meaningful to everyone.

**Late Assignments** – Explain whether late assignments will be accepted and what penalty might be imposed if the assignment is late. Also specify what assignments can be turned in late. This will allow the student to make informed decisions.

**Accommodation of Special Needs-** Huntingdon College makes every reasonable accommodation for disabilities that have been processed and approved through our Disability Services Committee in accord with the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990. In order to request disability-related services at Huntingdon College, students must self-identify to the Disabilities Intake Coordinator, Camilla Irvin, and provide appropriate and up-to-date documentation to verify their disability or special needs. After the accommodations have been approved by the Disability Services Committee, the 504 Coordinator, Dr. Lisa Olenik Dorman, will notify your professor(s) of the committee's decision. If you have any questions regarding reasonable accommodation or need to request disability-related services, please contact Disability Services at (334) 833-4432 or e-mail at [disabilityservices@huntingdon.edu](mailto:disabilityservices@huntingdon.edu).

**Academic Honesty** –Plagiarism is literary theft. Failure to cite the author of any language or of any ideas *which are not your own creation* is plagiarism. This includes any text you might paraphrase, as well. Anyone is capable of searching the Internet or any printed media; any research you are asked to do is intended to broaden your knowledge, stimulate your creativity, and make you think, analyze, and learn. It is not consistent with the College Honor Code, nor with scholarly expectations to submit work which is not the product of your own thinking and research. Severe penalties will result upon the submission of any work found to be plagiarized, including potential failure of the entire course. It is easy and simple to properly cite all sources used in your paper. Take no risks – cite your sources.

#### **Session Topics:**

**Session 1:** Course/instructor/class introductions. Text chapters 1, 2, and 11- Active planet; plate tectonics; earth's interior; QUIZ 1

**Session 2:** Text chapters 3 and 4- Mineralogy; igneous rocks; mineral identification in class activity; QUIZ 2

**Session 3:** Text chapters 5, 6, and 7- Volcanism; sedimentary rocks; soils; topographic map in class activity; QUIZ 3

**Session 4:** Text chapters 8, 9, and 10- Metamorphic rocks; geologic time; earthquakes; seafloor; QUIZ 4

**Session 5:** Text chapters 12 and 13- Seafloor; mountain building and continents; FINAL EXAM (2 hours)

#### **Helpful Suggestions**

There is a list of Essential Questions to Ask at the beginning of each chapter. Before reading the chapter, read these questions and try to answer them in your mind as you read the chapter. There is a Review Workbook following each chapter, which answers essential questions and provides the page numbers to essential terms. After reading the chapter and as a means of studying for quizzes and the final exam, the student should review these questions and terms to ensure a basic understanding of the material.

#### **CLASS SCHEDULE:**

##### **Week 1:**

**Reading Assignment: To be completed before the first class meeting.**

Chapter 1: Understanding Earth: A Dynamic and Evolving Planet

Chapter 2: Plate Tectonics: A Unifying Theory

Chapter 11: Earth's Interior

**Writing Assignment: To be completed before first class meeting.**

Write a half page typed introduction of yourself. Include your major, place of work, background in science and mathematics, your favorite thing to do or hobby, and your plans after you complete your degree at Huntingdon College.

Home work 1:

- Chapter 1: Page 26, Review Questions 1, 2, 3, 7, 9  
Page 27, Apply Your Knowledge question 1  
Chapter 2: Page 65, Review Questions 4, 5, 6, 7, 10  
Page 65, Apply Your Knowledge question 4  
Chapter 11: Page 355, Review Questions 1, 2, 3, 8, 9

**QUIZ 1**

There will be a 30-minute quiz on Chapters 1, 2, and 11, covering the reading assignment and material presented in class.

**Week 1 Topics**

Chapter 1

- 1.1 Introduction
- 1.2 Geology in Our Every Lives
- 1.3 Global Geologic and Environmental Issues Facing Humankind
- 1.4 Origin of the Universe and Solar System
- 1.5 Earth as a Dynamic and Evolving Planet
- 1.6 Geology and the Formation of Theories
- 1.7 Plate Tectonic Theory
- 1.8 The Rock Cycle
- 1.9 Geologic Time and Uniformitarianism

Chapter 2

- 2.1 Introduction
- 2.2 Continental Drift
- 2.3 Evidence for Continental Drift
- 2.4 Paleomagnetism and Polar Wandering
- 2.5 Magnetic Reversals and Seafloor Spreading
- 2.7 The Three Types of Plate Boundaries
- 2.8 Hot Spots: An Intraplate Feature
- 2.9 Plate Movement and Motion
- 2.10 The driving Mechanism of Plate Tectonics
- 2.11 Plate Tectonics and the Distribution of Natural Resources

Chapter 11

- 11.1 Earth's Interior
- 11.2 Earth's Size, Density, and Internal Structure
- 11.3 Earth's Crust- It's Outermost Crust
- 11.4 Earth's Mantle- The Layer Below the Crust
- 11.5 The Core
- 11.6 Earth's Internal Heat
- 11.7 Gravity and How Its Force Is Determined
- 11.8 Floating Continents- The Principle of Isostasy
- 11.9 Earth's Magnetic Field

## **Week 2:**

### **Reading Assignment: To be completed before the second class meeting.**

Chapter 3: Minerals- The Building Blocks of Rocks

Chapter 4: Igneous Rocks and Intrusive Igneous Activity

### **Writing Assignment: To be completed before the second class meeting.**

#### Home work 2:

Chapter 3: Page 95, Review Questions 1, 2, 4, 6, 9

Page 95, Apply Your Knowledge question 1

Chapter 4: Page 126, Review Questions 2, 3, 7, 10, 11, 13, 14

### **In Class Assignment**

Mineral Identification Activity

### **QUIZ 2**

There will be a 30-minute quiz on Chapters 3, 4, and 5, covering the reading assignment and material presented in class.

### **Week 2 Topics**

Chapter 3

3.1 Introduction

3.2 Matter, Atoms, Elements, and Bonding

3.3 Explore the World of Minerals

3.4 Mineral Group Recognized by Geologists

3.5 Mineral Identification

3.6 The Significance of Rock-Forming Minerals

3.7 The Origin of Minerals

3.8 Natural Resources and Reserves

Chapter 4

4.1 Introduction

4.2 The Principles and Behavior of Magma and Lava

4.3 Igneous Rocks- Their Characteristics and Classification

4.4 Plutons- Their Characteristics and Origins

## **Week 3:**

### **Reading Assignment: To be completed before the third class meeting.**

Chapter 5: Volcanoes and Volcanism

Chapter 6: Weathering, Erosion, and Soil

Chapter 7: Sediment and Sedimentary Rocks

### **Writing Assignment: To be completed before the third class meeting.**

#### Home work 3:

Chapter 5: Page 161, Review Questions 4, 5, 6, 7

Chapter 6: Page 193, Review Questions 1, 4, 5, 6

Chapter 7: Page 223, Review Questions 1, 5, 7, 8

## **In Class Assignment**

Topographic Map Activity

### **QUIZ 3**

There will be a 30-minute quiz on Chapters 6, 7, and 8, covering the reading assignment and material presented in class.

### **Week 3 Topics**

Chapter 5

5.1 Introduction

5.2 Volcanism and Volcanoes

5.3 Types of Volcanoes

5.4 Other Volcanic Landforms

5.5 The Distribution of Volcanoes

5.6 North America's Active Volcanoes

5.7 Plate Tectonics, Volcanoes, and Plutons

5.8 Volcanic Hazards, Volcano Monitoring, and Forecasting Eruptions

Chapter 6

6.1 Introduction

6.2 Alteration of Minerals and Rocks

6.3 Mechanical Weathering- Disaggregation of Earth Materials

6.4 Chemical Weathering- Decomposition of Earth Materials

6.5 Soil and Its Origin

6.6 Expansive Soils and Soil Degradation

6.7 Weathering and Natural Resources

Chapter 7

7.1 Introduction

7.2 Sediment Sources, Transport, and Deposition

7.3 Lithification: Converting Sediment into Sedimentary Rock

7.4 The Types of Sedimentary Rocks

7.5 Sedimentary Facies

7.6 Read the Story Told by Sedimentary Rocks

7.7 Important Resources in Sediments and Sedimentary Rocks

### **Week 4:**

**Reading Assignment: To be completed before the third class meeting.**

Chapter 8: Metamorphism and Metamorphic Rocks

Chapter 9: Geologic Time: Concepts and Principles

Chapter 10: Earthquakes

**Writing Assignment: To be completed before the third class meeting.**

Home work 4:

Chapter 8: Page 256, Review Questions 1, 5, 6, and 7

Chapter 9: Page 293, Review Questions 1, 4, and 7

Chapter 10: Page 329, Review Questions 1, 3, 5, 7, and 10

### **QUIZ 3**

There will be a 30-minute quiz on Chapters 9, 10, and 12, covering the reading assignment and material presented in class.

#### **Week 4 Topics**

##### Chapter 8

- 8.1 Introduction
- 8.2 Equilibrium and the Causes of Metamorphism
- 8.3 The Main Types of Metamorphism
- 8.4 Classification of Metamorphic Rocks
- 8.5 Metamorphic Zones and Facies
- 8.6 Plate Tectonics and Metamorphism
- 8.7 Metamorphism and Global Climate Change
- 8.8 Some Economic Uses of Metamorphic Materials

##### Chapter 9

- 9.1 Introduction
- 9.2 Early Concepts of Geologic Time
- 9.3 James Hutton and the Recognition of Geologic Time
- 9.4 Relative Dating Methods
- 9.5 Correlating Rock Units
- 9.6 Absolute Dating Methods
- 9.7 Development of the Geologic Time Scale
- 9.8 Geologic Time and Climate Change

##### Chapter 10

- 10.1 Introduction
- 10.2 Elastic Rebound Theory
- 10.3 Seismology
- 10.4 The Frequency and Distribution of Earthquakes
- 10.5 Seismic Waves
- 10.6 Locating an Earthquake
- 10.7 Measuring the Strength of an Earthquake
- 10.8 The Destructive Effects of Earthquakes
- 10.9 Earthquake Prediction
- 10.10 Earthquake Control

#### **Week 5:**

**Reading Assignment: To be completed before the third class meeting.**

Chapter 12: The Seafloor

Chapter 13: Deformation Mountain Building, and the Evolution of Continents

**Writing Assignment: To be completed before the third class meeting.**

Home work 5:

Chapter 12: Page 383, Review Questions 3, 5, 6, 8

Chapter 13: Page 419, Review Questions 4, 6 and 8

#### **Final Exam Review**

Question and answer period before the Final Exam.

#### **Final Exam**

There will be a 2-hour Final Exam covering all chapters.

Week 5 Topics

Chapter 12

12.1 Introduction

12.2 Methods Used to Study the Seafloor

12.3 Oceanic Crust- Its Structure and Composition

12.4 The Continental Margins

12.5 Features Found in the Deep-Ocean Basins

12.6 Sediments on the Deep Seafloor

12.7 Reefs- Rocks Made by Organisms

12.8 Resources from the Oceans

Chapter 13

13.1 Introduction

13.2 Rock Deformation

13.3 Folded Rock Layers

13.4 Joints and Faults- Deformation by Fracturing

13.5 Deformation and the Origin of Mountains

13.6 The Formation and Evolution of Continents