EASTERN ARIZONA COLLEGE
Geology of Arizona
Course Design
2016-2017

Course Information

Division	Science
Course Number	GLG 118
Title	Geology of Arizona
Credits	2
Developed by	David Morris/Revised by Dr. Carol Jones
Lecture/Lab Ratio	1 Lecture/2 Lab

Transfer Status

ASU	NAU	UA
Elective Credit	GLG Departmental Elective	GEOS Departmental Elective

Activity Course	No
CIP Code	40.0601
Assessment Mode	Pre/Post Test (50 Questions/50 Points)
Semester Taught	Upon Request
GE Category	None
Separate Lab	No
Awareness Course	No
Intensive Writing Course	No

Prerequisites

None

Educational Value

This course is designed for students interested in acquiring an overview of the geology of Arizona.

Description

Geology of Arizona focuses on the unique geological processes and features found in Arizona. The course will cover the three zones of Arizona with attention to the transition zone. The course will cover the dominant lithology and mineralogy of Arizona as well as the structural and geomorphological history of the region. Field trips will be a central feature of the course comprising of at least twelve hours combined.

Supplies

None

Competencies and Performance Standards

1. Compare the contributions made in the past with the advanced methods used today in the field of geology.

Learning objectives

What you will learn as you master the competency:

a. Explain the theory of plate tectonics and the importance of major plate boundaries.

b. Define geology and the different fields of study.

c. Explain the importance of the study of geology.

Performance Standards

Competence will be demonstrated:

o in objective tests

Criteria - Performance will be satisfactory when:

o learner can describe the history of geology

o learner can describe modern scientific contributions to geology

2. Examine the properties of minerals as the building blocks of rocks and their economic uses.

Learning objectives

What you will learn as you master the competency:

a. Explain the formation of minerals.

b. Describe the major rock-forming minerals and those minerals occurring in Arizona.

c. Describe the economic importance of major minerals and those minerals occurring in Arizona.

Performance Standards

Competence will be demonstrated:

o in objective tests

o in lab activity reports

Criteria - Performance will be satisfactory when:

o learner can identify the major minerals found in rock material

o learner can explain the economic importance of the major minerals

3. Compare the properties and processes that form the three classes of rocks that make up the rock cycle.

Learning objectives

What you will learn as you master the competency:

a. Explain the order and processes that form the three classes of rocks.

b. Identify the texture and composition associated with each class of rocks.

c. Identify the individual rocks in each class and those rocks occurring in Arizona.

d. Explain landform features developed on each class of rocks and those landforms associated with Arizona.

Performance Standards

Competence will be demonstrated:

o in objective tests

- o in lab activity reports

Criteria - Performance will be satisfactory when:

- o learner can explain the rock cycle
- o learner can identify the three major classes of rocks
- o learner can identify the major rocks within each class of rocks

4. Examine the methods used to construct the geologic time scale.

Learning objectives

What you will learn as you master the competency:

a. Explain the principles of geology used to determine the ages of rock layers.

b. Compare the difference between relative time and absolute time.

c. Describe the method of radioactivity in determining the age of rock material.

d. Describe the order of the geologic column based on fossils and major geologic events worldwide and in Arizona.

Performance Standards

Competence will be demonstrated:

- o in objective tests
- o in lab activity reports

Criteria - Performance will be satisfactory when:

- o learner can explain the methods used to determine the age of rocks
- o learner can summarize the geologic time scale based on observations of fossils and rocks

5. Interpret geologic structures based on surface outcrop patterns.

Learning objectives

What you will learn as you master the competency:

a. Identify dip and strike patterns along outcrops in order to determine the geologic structures.

b. Explain the three types of unconformities.

c. Describe the types of faults and the forces involved.

d. Interpret geologic structures on Arizona geologic maps.

e. Identify different physiographic provinces in Arizona based on their geologic structures and rock types.

Performance Standards

Competence will be demonstrated:

- o in objective tests
- o in lab activity reports

Criteria - Performance will be satisfactory when:

- o learner can identify geologic structures from rock patterns at the surface of the Earth
- o learner can identify geologic structures associated with major physiographic provinces

6. Examine the effects of mass wasting.

Learning objectives

What you will learn as you master the competency:

a. Describe factors that influence mass wasting.

b. Identify the characteristics of different types of mass wasting, both in general and in Arizona.

Performance Standards

Competence will be demonstrated:

- in objective tests
- in lab activity reports

Criteria - Performance will be satisfactory when:

- learner can explain the factors that cause mass wasting
- learner can describe the effects mass wasting has on mankind and the built environment

7. Explain the effects of groundwater and river action.

Learning objectives

What you will learn as you master the competency:

a. Explain factors that control movement of groundwater.

b. Describe the water table and zones of aeration and saturation.

c. Identify artesian wells, aquifers, springs and geysers.

d. Discuss the evolution of karst topography.

e. Explain how river channels evolve and drainage patterns develop.

f. Explain the river systems and groundwater localities in Arizona.

Performance Standards

Competence will be demonstrated:

- in objective tests
- in lab activity reports

Criteria - Performance will be satisfactory when:

- learner can explain the stages of groundwater and river development
- learner can describe the effects of groundwater and rivers on human activities and the built environment

8. Examine the ways in which earthquakes are located, measured, and predicted.

Learning objectives

What you will learn as you master the competency:

a. Explain the motion of P-wave, S-wave, and surface seismic waves.

b. Identify areas in the world with intense earthquake activity compared to areas in and around Arizona.

c. Describe the effects of an earthquake.

d. Describe the methods used to predict earthquakes.

Performance Standards

Competence will be demonstrated:

- in objective tests
- in lab activity reports

Criteria - Performance will be satisfactory when:

- learner can explain why and how earthquakes occur
- learner can explain the effects of earthquake activity
- learner can explain methods used to predict earthquakes

9. Summarize methods used to conserve the energy resources found within the Earth.

Learning objectives

What you will learn as you master the competency:

a. Explain the sources of renewable and non-renewable energy supplies.
b. Explain the resource consumption and limits to growth.
c. Describe the methods of extracting these resources.
d. Explain the major types of waste disposal and problems associated with each.
e. Explain methods of conserving these resources.
f. Explain energy resources in Arizona and their formation.

Performance Standards

Competence will be demonstrated:

- in objective tests
- in lab activity reports

Criteria - Performance will be satisfactory when:

- learner can identify energy resources within the Earth, particularly in Arizona
- learner can explain the availability of these resources and their importance
- learner can describe methods used to acquire and conserve these resources

10. Identify past environments based on their fossils.

Learning objectives

What you will learn as you master the competency:

a. Explain the definition of a fossil.
b. Describe the modes of preservation.
c. Identify index fossils.
d. Identify fossils in Arizona.

Performance Standards

Competence will be demonstrated:

- in objective tests
- in lab activity reports

Criteria - Performance will be satisfactory when:

- learner can equate specific fossil evidence with a specific environment
- learner can describe the changes in the past environment based on the changes in the fossils

Types of Instruction

Lectures with demonstrations
Use of maps, diagrams, specimens, booklets and handouts
Lab activities
Field trips

Grading Information

Grading Rationale

Pre-Test	0%
Quizzes	25%
Lab Reports	40%
Field Trip Reports	25%
Post Test/Final Exam	10%

Grading Scale

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