University of Arkansas - Fort Smith
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General Syllabus

GEOL 2311 Minerals and Rocks Laboratory

Credit Hours: 1 **Lecture Hours: 0** **Laboratory Hours: 2**

Prerequisite: CHEM 1403/1401 College Chemistry I/Lab or Consent of Instructor

Corequisite: GEOL 2313 Minerals and Rocks

Effective Catalog: 2020-2021

I. Course Information

A. Catalog Description

Laboratory analysis and identification of solid materials that make up the Earth's crust including minerals, rocks, and sediments. Major topics include rock and mineral composition, texture, and structure, including geologic environments of formation. Rock and mineral hand specimen classification and identification techniques are emphasized.

II. Student Learning Outcomes

A. Subject Matter

Upon successful completion of this course, the student will be able to:

1. Define a mineral, geologically, and explain the difference between elements, minerals, and rocks.
2. List and define mineral physical properties and describe how these properties are used to identify materials.
3. Explain mineral classification and how minerals are classified based on chemical composition.
4. Compare and contrast felsic and mafic silicate minerals.
5. Visualize and draw crystalline mineral structures.
6. Define the rock cycle and explain how igneous, sedimentary, and metamorphic rocks form.
7. Classify and identify igneous rocks using the QAP/FAP triangles.
8. Compare and contrast volcanic and plutonic igneous rocks.

9. Describe Bowen's Reaction Series and explain how it is used to identify common igneous rocks
10. Explain why weathering and erosion are crucial in the formation of sedimentary rocks.
11. Classify and identify detrital and chemical sedimentary rocks.
12. Determine the depositional environments of detrital and chemical sedimentary rocks.
13. Compare and contrast contact and regional metamorphism.
14. Explain how foliated and non-foliated metamorphic rocks form.
15. Classify and identify foliated and non-foliated metamorphic rocks.

B. University Learning Outcomes

This course will enhance student abilities in the following areas.

Analytical Skills

Critical Thinking Skills

Students will identify a problem or issue and will research, evaluate, and compare information from varying sources in order to evaluate authority, accuracy, recency, and bias relevant to the problems/issues. The student will generate solutions/analysis of problems/issues evaluated and will assess and justify the solutions and/or analysis.

Communication Skills (written and oral)

Students will communicate proficiently. The student will compose coherent documents appropriate to the intended audience and effectively communicate orally in a public setting.

III. Major Course Topics

A. Basic atomic bonding and mineral physical properties.
B. Rock forming silicate mineral classification: felsic and mafic minerals.
C. Non-silicate mineral classification and economic importance.
D. Optical and crystalline properties of minerals.
E. Plate tectonics and volcanism
F. Igneous rock classification and identification: aphanitic and phaneritic textures
G. Weathering, erosion, and depositional environments; sedimentary rock facies and terranes
H. Sedimentary rock classification and identification.
I. Metamorphism; orogenic events associated with plate tectonics.

Metamorphic rock classification and identification: foliated vs. non-foliated rocks.