

University of Arkansas - Fort Smith
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General Syllabus

GEOL 4323 Petroleum Geology

Credit Hours: 3

Lecture Hours: 3

Laboratory Hours: 0

Prerequisite(s): GEOL 4104 Sedimentary Deposition or Consent of the Instructor

Effective Catalog: 2020-2021

I. Course Information

A. Catalog Description

Introduction to petroleum exploration using techniques from sedimentology, stratigraphy, structural geology, and hydrogeology. Analysis and reconstruction of sedimentary basins. Well log analysis, seismic interpretation, drilling techniques, and new techniques like sequence stratigraphy will be covered.

II. Student Learning Outcomes

A. Subject Matter

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

1. Determine how thermally-driven alteration of marine organic material produces petroleum
2. Assess the characteristics of organic-rich source rocks
3. Interpret porosity and permeability in sedimentary rocks
4. Assess how burial and diagenesis occurs
5. Explore reservoirs and traps
6. Assess the geochemistry of oil and gas
7. Explain how basin formation occurs and the types
8. Apply sequence stratigraphy to basin analysis
9. Discuss the mechanics of primary and secondary migration
10. Practice interpreting geophysical logs
11. Explore and discuss the different drilling and fracturing techniques

B. University Learning Outcomes (ULO)

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.

Ethical Decision Making

Students will model ethical decision-making processes. The students will identify ethical dilemmas and affected parties and will apply ethical frameworks to resolve a variety of ethical dilemmas.

Global & Cultural Perspectives

Students will reflect upon cultural differences and their implications for interacting with people from cultures other than their own. The students will demonstrate understanding or application of their discipline in a global environment and will demonstrate how their discipline impacts or is impacted by different cultures.

III. Major Course Topics

- A. Petroleum systems
- B. Fluids and pressures
- C. Conventional drilling
- D. Primary and secondary migration
- E. Reservoirs
- F. Structural traps
- G. Seismic interpretation
- H. Unconventional drilling