

For grad students only

Course Description and Syllabus

PNGE 734 Advanced Reservoir Engineering

Course Format: Lecture

Textbooks: No Textbook is required. The notes will be made available by the instructor.

Course Pre-requisite: PNGE 434

Course Objectives:

This course will provide the students with knowledge of advanced topics in Reservoir Engineering. The topics will include application of analytical and numerical solutions to analyze and predict the performance of heterogeneous reservoirs, and the application of the reservoirs modeling and simulation for prediction and optimization of the primary, secondary and enhanced recovery performance.

Expected Learning Outcomes:

The students will be able to:

1. Analyze and predict the performance of heterogeneous reservoirs using analytical and numerical methods.
2. Predict and optimize the primary, secondary and enhanced recovery performance using reservoir modeling and simulation techniques.

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Outline:

Week Topic

1. Reservoir Characterization

2. Fluid Flow Equations in the Reservoir (Homework No. 1 due)
3. Pressure Transient Tests (Homework No. 2 due, Project 1 is assigned)
4. Pressure Derivative Method (Homework No. 3 due)
5. Hydraulically Fractured Reservoirs (Homework No. 4 due)
6. Naturally Fractured Reservoirs (Homework No. 5 due)
7. Multi Layered Reservoirs (Mid –term Exam)
8. Multi Phase Flow in the Reservoir (Homework No. 6 and Project 1 are due)
9. Immiscible Displacement (Homework No. 7 due, Project 2 is assigned)
10. Pressure Maintenance by Gas Injection (Homework No. 8 due)
11. Pressure Maintenance by Water Injection (Homework No. 9 due)
12. Secondary Recovery (Homework No. 10 due)
13. Waterflood Modeling (Homework No. 11 due)
14. Miscible Displacement (Project 2 due)
15. Enhanced Oil Recovery (Homework No. 12 due)

Grading:

1. Attendance (Attendance is required. Each absence results in 1% deduction)
2. Homework (Approximately one per week- total of 12)
3. Projects (2 major design projects- 5 weeks to complete each project)
4. Mid-term Exam (in-class exam, open book, 1.5 hrs)
5. Final Exam (comprehensive exam open book, 2 hrs)

Make-up exam policy: Make-up exam will be given only when there is an excused absence.

Attendance Policy: Attendance is compulsory – the policy will be provided during the first class meeting.