

Course Description

1. Course Name: Secondary Oil recovery	
2. Course Code: PE406	
3. Semester / Year: Academic year 2025/2026	
4. Description Preparation Date: 10/9/2025	
5. Available Attendance Forms: classrooms	
6. Number of Credit Hours (90) / Number of Units (6)	
7. Course administrator's name (mention all, if more than one name)	
Name: Najeh Yousef Alali Email: dr.najehalali@alayen.edu.iq	
8. Course Objectives	
Course Objectives	- Develop a suitable plan to enable the student to acquire the necessary knowledge. - understand the interrelationship between the oil layer, the well, and the surface. - The student will be able to develop an integrated and appropriate production system for the well under study. - minimizing the pressure lost to extract oil, thus ensuring the reservoir's continued viability.
9. Teaching and Learning Strategies	
Strategy 	✓ Presentations. ✓ Discussions. ✓ Tutorials and illustrations. ✓ Problem solving. ✓ Brainstorming. ✓ Evaluation of reports and discussions

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	A1, A4, A5,B2	PRINCIPLES OF WATERFLOODING	Theoretical lecture	-Interim testing -Asking questions - Final test
2	3	A1, A4, A5,B2	FACTORS TO CONSIDER IN WATERFLOODING	Theoretical lecture	-Interim testing -Asking questions - Final test
3	3	A1, A4, A5,B2	Reservoir Uniformity and Pay Continuity	Theoretical lecture	-Interim testing -Asking questions - Final test
4	3	A1, A4, A5,B2	OPTIMUM TIME TO WATERFLOOD	Theoretical lecture	-Interim testing -Asking questions - Final test
5	3	A1, A4, A5,B2	EFFECT OF TRAPPED GAS ON WATERFLOOD RECOVERY	Theoretical lecture	-Interim testing -Asking questions - Final test
6	3	A1, A4, A5,B2	ELECTION OF FLOODING PATTERNS	Theoretical lecture	-Interim testing -Asking questions - Final test
7	3	A1, A4, A5,B2	OVERALL RECOVERY EFFICIENCY	Theoretical lecture	-Interim testing -Asking questions - Final test
8	3	A1, A4, A5,B2	DISPLACEMENT EFFICIENCY	Theoretical lecture	-Interim testing -Asking questions - Final test
9	3	A1, A4, A5,B2	Fractional Flow Equation	Theoretical lecture	-Interim testing -Asking questions - Final test
10	3	A1, A4, A5,B2	Effect of Water and Oil Viscosities	Theoretical lecture	-Interim testing -Asking questions - Final test
11	3	A1, A4, A5,B2	AREAL SWEEP EFFICIENCY	Theoretical lecture	-Interim testing -Asking questions - Final test
12	3	A1, A4, A5,B2	VERTICAL SWEEP EFFICIENCY	Theoretical lecture	-Interim testing -Asking questions - Final test
13	3	A1, A4, A5,B2	Couples; resultant of coplanar force systems	Theoretical lecture	-Interim testing -Asking questions - Final test

14	3	A1, A4, A5,B2	Calculation of Vertical Sweep Efficiency	Theoretical lecture	-Interim testing -Asking questions - Final test
15	3	A1, A4, A5,B2	Frontal Advance Equation	Theoretical lecture	-Interim testing -Asking questions - Final test
16	3	A1, A4, A5,B2	Buckley and Leverett of Frontal Advance Equation	Theoretical lecture	-Interim testing -Asking questions - Final test
17	3	A1, A4, A5,B2	Oil Recovery Calculations	Theoretical lecture	-Interim testing -Asking questions - Final test
18	3	A1, A4, A5,B2	Principals of Dynamics	Theoretical lecture	-Interim testing -Asking questions - Final test
19	3	A1, A4, A5,B2	Recovery Performance to Breakthrough	Theoretical lecture	-Interim testing -Asking questions - Final test
20	3	A1, A4, A5,B2	Recovery Performance After Breakthrough	Theoretical lecture	-Interim testing -Asking questions - Final test
21	3	A1, A4, A5,B2	AREAL SWEEP EFFICIENCY	Theoretical lecture	-Interim testing -Asking questions - Final test
22	3	A1, A4, A5,B2	Flood Patterns	Theoretical lecture	-Interim testing -Asking questions - Final test
23	3	A1, A4, A5,B2	Cumulative Water Injected	Theoretical lecture	-Interim testing -Asking questions - Final test
24	3	A1, A4, A5,B2	Recovery Performance to Breakthrough	Theoretical lecture	-Interim testing -Asking questions - Final test
25	3	A1, A4, A5,B2	Recovery Performance After Breakthrough	Theoretical lecture	-Interim testing -Asking questions - Final test
26	3	A1, A4, A5,B2	Fluid Injectivity	Theoretical lecture	-Interim testing -Asking questions - Final test
27	3	A1, A4, A5,B2	Constant Injection Pressure and Variable Injection Rate "iw	Theoretical lecture	-Interim testing -Asking questions - Final test

28	3	A1, A4, A5,B2	Constant Injection Rate and Variable Injection Pressure	Theoretical lecture	-Interim testing -Asking questions - Final test
29	3	A1, A4, A5,B2	Effect of Initial Gas Saturation	Theoretical lecture	-Interim testing -Asking questions - Final test
30	3	A1, A4, A5,B2	interference-Fill-Up	Theoretical lecture	-Interim testing -Asking questions - Final test

11. Course Evaluation

- Weekly tests, assignments, and activities: 10 marks
- Biweekly quizzes: 10 marks
- Main midterm exam (first semester, second semester): 20 marks
- Final theoretical exam: 60 marks

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	OIL AND GAS, PRODUCTION. HANDBOOK, An introduction to oil and gas production- Håvard Devold- © 2006 ABB ATPA Oil and Gas.
Recommended books and references (scientific journals, reports...)	-Petroleum Engineering Handbook- Larry W. Lake, Editor-in-Chief- U. of Texas at Austin. -Petroleum production Engineering - ISI 0750682701- Publisher: Elsevier Science Technology Books- Pub. Date: February 2007
Electronic References, Websites	https://eng.alayen.edu.iq//colleges/e/42