

MODULE DESCRIPTION

Module Information				
معلومات المادة الدراسية				
Module Title	Reservoir Engineering 1 and rock mechanics		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☒ Practical ☐ Seminar	
Module Code	PENG316			
ECTS Credits	7			
SWL (hr/sem)	175			
Module Level		3	Semester of Delivery	Fifth
Administering Department		Petroleum Engineering	College	Engineering college
Module Leader		Dr. Ghanim M. Farman	e-mail	ghanimzubaidy@uobaghdad.iq
Module Leader's Acad. Title		Doctor	Module Leader's Qualification	Ph.D.
Module Tutor		MSc.ALI RIYAED DAHHAM	e-mail	ali.riyeed@alayen.edu.iq
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Scientific Committee Approval Date		5/10/2025	Version Number	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	PENG215, Fundamental of Petroleum Engineering	Semester	Third
Co-requisites module	none	Semester	



Module Aims, Learning Outcomes and Indicative Contents				
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية				
Module Objectives أهداف المادة الدراسية	Types of traps, Types of oil reservoirs, Types of GAS reservoirs ,Porosity, compressibility and permeability,Poueseli law, Kozeny Equation , measurements permeability, Klinkenberg effect; Gas flow equation, Radial flow ,Productivity equation, average permeability for stratified reservoirs , Saturation, Capillary pressure,Wettability, Linear flow (piston like, leaky piston) and BuckleyLeverett equation			
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Knowledge	A2	A2.1 Define Porosity, compressibility, permeability , Saturation, Capillary pressure,Wettability. A2.2 NAME Types of traps, Types of oil reservoirs, Types of GASl reservoirs. A2.3 EXPLAIN Types of oil reservoirs, Types of GAS reservoirs, Average permeability for stratified reservoirs A2.4 APPLY Gas flow equation, Poueseli law, Kozeny Equation, Darcy's law, Radial flow	
		A3	A3.1 RECOGNIZE, CORE CUTTING MACHINE, Core Cleaning, Porosity measurements using helium grain volume, POROSITY MEASUREMENT USING LIQUID SATURATION. A3.2 CLASSIFY GAS reservoirs, Gas flow equation	
	Skills	B2	B.2.1 Communicate effectively – graphically with a range of audiences using contemporary tools. B.2.2 Communicate verbally and in writing with a range of audiences using contemporary tools.	
		B3	B.3.1 Acquire and apply new knowledge. B.3.2 Practice the strategies of searching for information in life – long self-learning	
	Ethics	C1	C.1.1 Define professional and ethical responsibilities. C.1.2 Demonstrate diversity in their commitment to ethical responsibilities.	
		C2	C.2.1 Supervise and monitor engineering projects, taking into consideration other trades requirements.	
		C3	C.3.1 Utilize contemporary technologies. C.3.2 Make use of codes of practice and standards, quality guidelines. C.3.3 Utilize health and safety requirements. C.3.4 Show environmental issues and risk management principles.	

Indicative Contents المحتويات الإرشادية	Indicative content includes the following: - Types of traps and Types of oil reservoirs. (4 h) - Porosity, compressibility; and permeability(4h) - Poueseli law, Kozeny Equation (4 h) - Darcy's law; measurements of permeability (4 h) - Klinkenberg effect; Gas flow equation(2 h) - Radial flow (2 h) - Productivity equation (4 h) - average permeability for stratified reservoirs (2 h) - Flow through channels and fractures(2 h) - Saturation; Capillary pressure; and Wettability (4h) - Multiphase flow through porous media; Linear flow (piston like, leaky piston)(6h) - Fractional flow equation; BuckleyLeverett equation(4h)
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	✓ Presentations. ✓ Discussions. ✓ Tutorial and graphics. ✓ Problem solving. ✓ Brain storming. ✓ Research and reporting. ✓ Problem Solving. ✓ Report & discussion assessment.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	94	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5.5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	81	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation تقييم المادة الدراسية					
	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome	
Quizzes	2 hr	10% (10)	5,10	A2,A3,	
Assignments	2 hr	10% (10)	2 and 12	A2, A3, C2	

Formative assessment	Lab.	2 hr	10% (10)	6,11	A3
	Report	1 hr	10% (10)	13	A2,A3,
Summative assessment	Midterm Exam	2hr	10% (10)	7	A2,A3,B2,C2
	Final Exam	3hr	50% (50)	16	A2,A3,B2,C2
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري		
	Material Covered	LOs
Week 1	Introduction	
Week 2	Basics of Reservoir Engineering	A2, B2
Week 3	Types of traps and Types of oil reservoirs Understand the reason behind studying Petroleum Reservoir engineering and its main applications.	A2, B2, C2
Week 4,5,6	- Porosity, compressibility; and permeability - Poueseli law, Kozeny Equation - Darcy's law; measurements of permeability - Klinkenberg effect; Gas flow equation	A2, B2, C1
Week 7,8	- Radial flow - Productivity equation - average permeability for stratified reservoirs - Flow through channels and fractures - Saturation; Capillary pressure; and Wettability	A2, B3, C2
Week 9	Mid -term EXAM	A2,B2,C2
Week 10,11	- Multiphase flow through porous media; Linear flow (piston like, leaky piston) - Fractional flow equation; BuckleyLeverett equation	A2, B2, C2
Week 12,13,14,15	- Gas properties (Boyle and Charles laws; Avogadro law; Dalton law, equation of state) - compressibility factor	A2, B3, C2

Delivery Plan (Weekly Lab. Syllabus)		
المنهاج الاسبوعي للمختبر		
	Material Covered	
Week 1	Introduction	
Week 2,3	CORE PLUGGING MACHINE	A3, B1, C2
Week 4,5	CORE CUTTING MACHINE	A3, B2, C3
Week 6,7	Core Cleaning	A3, B2, C2
Week 8	Mid -term EXAM	A3
Week 9,10	Porosity measurements using helium grain volume	A3, B2, C3
Week 11,12	POROSITY MEASUREMENT USING LIQUID SATURATION	A3, B2, C3
Week 13,14	PERMEABILITY MEASUREMENT USING GAS SATURATION	A3, B2, C1
Week 15	Examination	A3

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Curriculum and textbook	Yes
Recommended Texts	Tarek Ahmed, Reservoir Engineering handbook, fifth Edition, 2019	Yes
Websites	https://eng.alayen.edu.iq//colleges/e/42	

Grading Scheme				
مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above				