

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Petroleum Geology		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	PENG226			
ECTS Credits	7			
SWL (hr/sem)	175			
Module Level	2	Semester of Delivery		Fourth
Administering Department	Type Dept. Code	College	Type College Code	
Module Leader	Dr.Abdulhussien Neamah Shnawa		e-mail	abdulhussain@alayan.edu.iq
Module Leader's Acad. Title	Professor		Module Leader's Qualification	Ph.D.
Module Tutor	Dr.Abdulhussien Neamah Shnawa		e-mail	abdulhussain@alayan.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail	
Scientific Committee Approval Date		Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	PENG216, Structural Geology	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	1. Understand the formation processes of petroleum: 2. Comprehend the concept of sedimentary basins: 3. Analyze the role of source rocks in petroleum generation: 4. Examine the mechanisms of migration of petroleum: 5. Evaluate the characteristics and properties of reservoir rocks: 6. Identify the different types of traps in petroleum exploration: 7. Understand the techniques and methods used in petroleum exploration:		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Knowledge	A2	A2,1: Explain the geological formation of petroleum. A2,2: Identify and classify different types of sedimentary basins. A2,3: Analyze the characteristics of source rocks and reservoirs. A2,4: Explain the exploration process in petroleum geology A2,5: Understand the principles and methods of petroleum production.
		A3	A3,1: Analyze the characteristics of source rocks graphically. A3,2: Identify the types of kerogens by relation between H/c&O/c. A3,3: Identify the oil show by microscope and fluoroscope. A3,4: Geochemical techniques for source rock evaluation Migration of Petroleum. A3,5: Petroleum exploration techniques: seismic surveys, well logging, and core analysis
	Skills	B1	B1.1: Function efficiently as an individual. B1.2: Function as a member of multidisciplinary and multicultural teams.
	Ethics	C1	C.1.1 Define professional and ethical responsibilities C.1.2 Demonstrate diversity in their commitment to ethical responsibilities.
Indicative Contents المحتويات الإرشادية	Introduction to Petroleum Geology (10 hours) - Overview of petroleum geology and its significance in the energy industry - Historical developments and key discoveries in petroleum exploration Formation of Petroleum (15 hours) - Organic matter accumulation and preservation in sedimentary basins - Thermal maturation and generation of hydrocarbons Migration and accumulation of petroleum Sedimentary Basins (20 hours) - Classification and characteristics of sedimentary basins - Tectonic and sedimentary processes influencing basin formation - Basin analysis techniques and subsurface mapping Source Rocks (20 hours) - Types and properties of source rocks		

	• Organic matter deposition and maturation • Geochemical techniques for source rock evaluation Migration of Petroleum (15 hours) • Mechanisms and pathways of petroleum migration • Trapping mechanisms and factors influencing migration distances • Migration models and case studies Reservoirs (25 hours) • Reservoir rock properties and classification • Porosity, permeability, and fluid saturation • Reservoir characterization techniques and evaluation Traps and Trap Analysis (20 hours) • Structural traps: fault traps, fold traps, and anticlinal traps • Stratigraphic traps: pinch-out, unconformity, and lithological traps • Trap analysis methods and case studies Exploration and Production (25 hours) • Petroleum exploration techniques: seismic surveys, well logging, and core analysis • Drilling and completion techniques • Enhanced oil recovery methods and production optimization Environmental Considerations (15 hours) • Environmental impacts of petroleum exploration and production • Environmental regulations and best practices • Sustainable practices and technologies in the petroleum industry Case Studies and Field Trips (10 hours) • Analysis of real-world petroleum geology case studies • Field trips to petroleum-producing regions or geological sites of interest Assessment and Revision (10 hours) • Review of key concepts and topics covered in the module • Assessment of student learning through quizzes, assignments, and exams
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Presentation • Interactive learning • Discussions • Brainstorming • Group Solving Problems • Problem-Based Learning • Self-learning

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	97	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
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
Formative assessment	Quizzes	2	10% (10)	5 and 10	A2, A3
	Assignments	2	10% (10)	2 and 12	A2, A3
	Projects / Lab.	1	10% (10)	Continuous	A2, A3
	Report	1	10% (10)	13	A2, A3
Summative assessment	Midterm Exam	2hr	10% (10)	7	A2,A3
	Final Exam	3hr	50% (50)	16	A2, A3
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)		
المنهاج الاسبوعي النظري		
	Material Covered	
Week 1	- Introduction to Petroleum Geology - Formation of Petroleum	A2,B1,B2,C2
Week 2	Sedimentary Basins: Types and Characteristics	A2, B1, B2,C2
Week 3	Sedimentary Basins: Tectonic and Sedimentary Processes	A2, B1, B2,C2

Week 4	Source Rocks: Types and Properties	A2, B1, B2,C2
Week 5	Source Rocks: Organic Matter Deposition and Maturation	A2, B1, B2,C2
Week 6	Migration of Petroleum	A2, B1, B2,C2
Week 7	Reservoirs: Properties and Classification	A2, B1, B2,C2
Week 8	Reservoirs: Reservoir Characterization Techniques	A2, B1, B2,C2
Week 9	Traps and Trap Analysis	A2, B1, B2,C2
Week 10	Exploration Techniques: Seismic Surveys and Well Logging	A2, B1, B2,C2
Week 11	Drilling and Completion Techniques	A2, B1, B2,C2
Week 12	Enhanced Oil Recovery Methods	A2, B1, B2,C2
Week 13	Environmental Considerations in Petroleum Geology	A2, B1, B2,C2
Week 14	Case Studies and Field Trips	A2, B1, B2,C2
Week 15	Review and Assessment	A2, B1, B2,C2
Week 16	Preparatory week before the final Exam	A2, B1, B2,C2

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر		
	Material Covered	
Week 1	Introduction to Laboratory Equipment and Safety Procedures	A2, A3,B1, B2,C2
Week 2	Rock Sample Analysis: Identification of Sedimentary Rocks and their Properties	A2,A3,A3 B1, B2,C2
Week 3	Core Analysis: Porosity and Permeability Measurements	A2, A3,B1, B2,C2
Week 4	Geochemical Analysis: Source Rock Evaluation and Organic Matter Content	A2,A3, B1, B2,C2
Week 5	Reservoir Characterization: Petrographic Analysis and Thin Section Examination	A2, A3,B1, B2,C2
Week 6	Seismic Interpretation: Interpretation of Seismic Data for Reservoir Mapping	A2, A3,B1, B2,C2
Week 7	Case Study Analysis: Integration of Data for Reservoir Evaluation	A2,A3, B1, B2,C2

Learning and Teaching Resources مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Elements of Petroleum Geology, Richard C. Selley, Stephen Basic Petroleum Geology, Peter.	Yes
Recommended Texts	Basic Petroleum Geology, Source Rocks, Migration, Trapping	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.				