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	**PE226**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	2		**Semester of Delivery**	2	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader			**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor	Name (if available)		**e-mail**	E-mail	
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	PE216	**Semester**	
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: • Explain the geological processes involved in the formation of petroleum. • Describe the organic matter accumulation and preservation in sedimentary basins. 2. Comprehend the concept of sedimentary basins: • Identify the types and characteristics of sedimentary basins. • Explain the tectonic and sedimentary processes that contribute to basin formation. 3. Analyze the role of source rocks in petroleum generation:

	• Identify the types of source rocks and their depositional environments. • Understand the geochemical processes involved in the generation of hydrocarbons. 4. Examine the mechanisms of migration of petroleum: • Describe the various mechanisms of petroleum migration within sedimentary basins. • Understand the factors influencing migration pathways and distances. 5. Evaluate the characteristics and properties of reservoir rocks: • Identify the types of reservoir rocks and their geological properties. • Understand the principles of reservoir characterization and evaluation. 6. Identify the different types of traps in petroleum exploration: • Describe the geological features and structures that form traps. • Understand the types of traps, including structural, stratigraphic, and combination traps.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of the module, students will be able to: 1. Explain the geological processes involved in the formation of petroleum and understand the factors contributing to its accumulation in sedimentary basins. 2. Identify and classify different types of sedimentary basins and describe their characteristics and formation mechanisms. 3. Analyze the characteristics of source rocks and understand their role in the generation and preservation of hydrocarbons. 4. Describe the mechanisms of petroleum migration within sedimentary basins and understand the factors influencing migration pathways and distances. 5. Evaluate the properties and characteristics of reservoir rocks and apply principles of reservoir characterization for effective resource assessment. 6. Identify and describe various types of traps and understand their geological features and structures. 7. Communicate effectively and present geological concepts related to petroleum geology using appropriate terminology and formats.
Indicative Contents المحتويات الإرشادية	Introduction to Petroleum Geology • Overview of petroleum geology and its significance in the energy industry • Historical developments and key discoveries in petroleum exploration Formation of Petroleum • Organic matter accumulation and preservation in sedimentary basins • Thermal maturation and generation of hydrocarbons Migration and accumulation of petroleum Sedimentary Basins • Classification and characteristics of sedimentary basins • Tectonic and sedimentary processes influencing basin formation • Basin analysis techniques and subsurface mapping Source Rocks • Types and properties of source rocks

	• Organic matter deposition and maturation • Geochemical techniques for source rock evaluation Migration of Petroleum • Mechanisms and pathways of petroleum migration • Trapping mechanisms and factors influencing migration distances • Migration models and case studies Reservoirs • Reservoir rock properties and classification • Porosity, permeability, and fluid saturation • Reservoir characterization techniques and evaluation Traps and Trap Analysis • Structural traps: fault traps, fold traps, and anticlinal traps • Stratigraphic traps: pinch-out, unconformity, and lithological traps • Trap analysis methods and case studies Case Studies and Field Trips • Analysis of real-world petroleum geology case studies • Field trips to petroleum-producing regions or geological sites of interest • Review of reservoir rocks, source rocks, seals and traps for Iraq's oil and gas fields. Assessment and Revision • Review of key concepts and topics covered in the module • Assessment of student learning through quizzes, assignments, and exams
Laboratory	1. Identification and interpretation of clastic and carbonate rocks. 2. Examination of mineral and rock thin sections under the microscope. 3. Analysis of topographical features using geological maps. 4. Interpretation of geological structures from surface geological maps. 5. Preparation and construction of subsurface structural contour maps. 6. Introduction to wireline logging and well log interpretation. 7. Analysis and interpretation of subsurface geological structures using borehole data. 8. Application of acoustic impedance and seismic reflection techniques for geological interpretation. 9. Reserve estimation using the volumetric method applied to contour maps. 10. An introduction to geoscience mapping, well log analysis, and seismic interpretation using industry-standard software tools.
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	

Strategies	Lectures: Conduct engaging and interactive lectures to introduce and explain key concepts, theories, and principles of petroleum geology. Use visual aids, multimedia resources, and real-life examples to enhance understanding. Case Studies: Incorporate case studies of successful exploration and production projects to provide practical insights into the application of petroleum geology concepts. Analyze reservoir data, geological maps, and seismic data to illustrate exploration and production techniques. Field Trips: Organize field trips to petroleum-producing regions or geological sites of interest to provide students with firsthand exposure to the geology of oil and gas reservoirs. This allows them to observe geological features, sedimentary basins, and structural formations. Group Discussions: Facilitate group discussions and debates on topics such as environmental considerations, sustainable practices, and ethical issues in petroleum geology. Encourage students to critically analyze and express their opinions, fostering a deeper understanding of the subject matter. Assignments and Projects: Assign individual or group projects that require students to apply their knowledge of petroleum geology to solve practical problems or analyze real data. This helps develop critical thinking, research skills, and the ability to work collaboratively.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All

Total assessment	100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	• Introduction to Petroleum Geology • Formation of Petroleum
Week 2	• Sedimentary Basins: Types and Characteristics
Week 3	• Sedimentary Basins: Tectonic and Sedimentary Processes
Week 4-5	• Source Rocks: Types and Properties
Week 6-7	• Source Rocks: Organic Matter Deposition and Maturation
Week 8	• Migration of Petroleum
Week 9-10	• Traps and Trap Analysis
Week 11	• Reservoirs: Properties and Classification
Week 12-13	• Review of reservoir rocks, source rocks, seals and traps that control Iraq's petroleum system and resources.
Week 14	• Review and Assessment
Week 15	• **Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	• Elements Of Petroleum Geology- By Richard C. Shelley, 1998.	Yes
Recommended Texts	• The Petroleum Geology of Iraq- By Adnan Aqrawi et. al., 2010. • Geologyof Iraq: BasicPrinciples- By Kamal HajiKarim, 2017.	No
Websites		

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.