University of Mosul

College of Petroleum and Mining Engineering

Department of Petroleum Reservoir Engineering

Course Descriptions

2nd Level / 1st Semester (Bologna Process)

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Ministry of Higher Education and Scientific Research

University of Mosul

College of Petroleum and Mining Engineering

Department of Petroleum Reservoir Engineering

Course Descriptions

Petroleum Reservoir Engineering

Level Two

(Bologna Process)

2024 – 2025

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Structural Geology			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **L Lab** ☐ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Code	**PE211**				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level		2	**Semester of Delivery**		3
Administering Department		Petroleum Reservoir Engineering	**College**	Petroleum and Mining Engineering	
Module Leader	Dr. Ammar Ramadhan Algburi		**e-mail**	Ammar.ramadhan@uomosul.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		10/09/2024	**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Geology of engineers	**Semester**	2
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To understand the fundamental concepts of strike and dip and their significance in the interpretation of geological structures. 2. To develop the skills to construct and interpret geological maps, including the identification and representation of structural features. 3. To comprehend the forces and stresses acting on rocks and their role in deformation processes. 4. To apply the principles of Mohr circles and stress analysis in determining stress states and their implications for rock behavior. 5. To recognize and differentiate between various types of brittle deformation structures, such as joints and veins. 6. To gain knowledge of fault types, their classification, and their significance in the Earth's crust. 7. To understand the processes of faulting and the factors influencing fault development and displacement. 8. To interpret focal mechanisms and understand their use in determining fault orientations and earthquake mechanisms. 9. To examine the concepts and techniques of hydraulic fracturing, focusing on its application to the Marcellus Shale. 10. To analyze and interpret strain in rocks, including the measurement and characterization of deformation. 11. To comprehend the processes and characteristics of ductile deformation in rocks. 12. To identify, classify, and interpret different types of folds and understand their implications in structural geology. 13. To analyze and interpret deformation fabrics, including lineations and foliations, and their significance in rock deformation. 14. To gain knowledge of the tectonic history and processes related to the formation of the Appalachian Mountains. 15. To critically evaluate the Müller & Chapin article and understand its relevance to the broader concepts of structural geology

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of the module, students will be able to: 1. Understand and apply the concepts of strike and dip in the interpretation of geological structures. 2. Interpret and construct geological maps to represent structural features and their spatial relationships. 3. Demonstrate knowledge of forces and stresses acting on rocks and their role in deformation processes. 4. Analyze and interpret Mohr circles to determine stress states and their implications for rock behavior. 5. Identify and describe various types of brittle deformation structures, incExplain the formation, classification, and characteristics of faults and their role in the Earth's crust. 7. Understand the principles of faulting and the processes involved in fault development and displacement. 8. Interpret focal mechanisms to determine the orientation and nature of faulting in earthquake studies. 9. Evaluate the concepts and techniques of hydraulic fracturing, particularly in the context of the Marcellus Shale. 10. Analyze and interpret strain in rocks, including the measurement and characterization of deformation. 11. Understand the processes and characteristics of ductile deformation in rocks. 12. Identify, classify, and interpret different types of folds and their significance in structural geology. 13. Describe and interpret deformation fabrics in rocks, including lineations and foliations. 14. Analyze and understand the tectonic history and processes related to the Appalachian Mountains. 15. Critically review and discuss the Müller & Chapin article, relating it to the broader concepts of structural geology.luding joints and veins.
Indicative Contents المحتويات الإرشادية	Introduction to Structural Geology (5 hours) • Basic concepts and terminology in structural geology • Importance and applications of structural geology Strike and Dip (10 hours) • Definition and measurement of strike and dip • Stereonets and their use in representing orientation data • Interpretation of strike and dip in geological structures

	Geological Maps and Cross-Sections (15 hours) • Interpretation and construction of geological maps • Techniques for creating cross-sections and their interpretation • Integration of maps and cross-sections for structural analysis Forces and Stress (15 hours) • Types of forces acting on rocks • Stress tensors and their components • Stress analysis and determination of principal stresses Mohr Circles and Rock Mechanics (10 hours) • Construction and interpretation of Mohr circles • Applications of Mohr circles in rock mechanics • Strength properties of rocks and failure criteria Brittle Deformation: Joints and Veins (15 hours) • Formation and classification of joints Vein formation and types of veins • Analysis and interpretation of joint and vein patterns Faults and Faulting (20 hours) • Types of faults and fault classification • Fault geometry, kinematics, and displacement • Structural analysis of fault zones Focal Mechanisms and Earthquakes (10 hours) • Focal mechanism solutions and their interpretation • Relationship between focal mechanisms and faulting • Applications of focal mechanisms in earthquake studies Hydraulic Fracturing and Marcellus Shale (10 hours) • Introduction to hydraulic fracturing techniques • Application of hydraulic fracturing in the extraction of Marcellus Shale gas • Environmental considerations and challenges Strain and Ductile Deformation (20 hours) • Types of strain and measurement techniques • Rheology of rocks and ductile deformation processes • Analysis and interpretation of ductile structures Folds and Fold Analysis (20 hours) • Types of folds and fold classification • Fold geometry, anatomy, and terminology • Techniques for fold analysis and interpretation Deformation Fabrics and Tectonic Fabrics (15 hours) • Lineations and foliations in deformed rocks • Fabric analysis techniques and interpretation • Tectonic fabrics and their significance Appalachian Tectonics (10 hours) • Overview of the tectonic history of the Appalachian Mountains • Structural features and geological evolution of the Appalachian region Müller & Chapin Article (10 hours) • Reading and critical analysis of the selected article • Discussion of the article's contribution to structural geology Review and Integration (10 hours) • Recapitulation of key concepts and topics covered in the module • Integration of knowledge and skills through practical exercises and case studies Preparation for assessments and final evaluation

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Lectures: Provide interactive lectures to introduce and explain key concepts, theories, and principles of structural geology. Use visual aids, diagrams, and real-life examples to enhance understanding. Practical Exercises: Include hands-on activities, such as measuring strike and dip, analyzing geological maps, and interpreting cross-sections. Encourage students to apply their knowledge and skills to solve practical problems. Laboratory Work: Conduct lab sessions where students can analyze rock samples, study structural features, and interpret deformation fabrics. Promote teamwork, data analysis, and critical thinking skills. Field Trips: Organize field trips to examine geological structures in real-world settings. Allow students to observe and analyze different rock formations, faults, folds, and other structural features. Group Discussions: Foster group discussions and debates on topics like hydraulic fracturing, tectonic events, and geological interpretations. Encourage students to share their perspectives and engage in critical thinking. Research Projects: Assign research projects that require students to investigate specific topics within structural geology. Encourage them to gather data, analyze information, and present their findings to the class. Assessment Methods: Use a variety of assessment methods, including quizzes, exams, practical assignments, research papers, and presentations. This allows students to demonstrate their understanding of both theoretical and practical aspects of structural geology. Online Resources: Provide access to online resources, such as interactive tutorials, video lectures, and virtual field trips, to support independent learning and provide additional study materials. Office Hours: Offer regular office hours where students can seek clarification, discuss questions, and receive individualized guidance on their studies

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	41	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	59	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

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.	None	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 Structural Geology • Strike and Dip
Week 2	Geological Maps and Cross-Sections • Forces and Stress
Week 3	Mohr Circles and Rock Mechanics • Brittle Deformation: Joints & Veins
Week 4	Faults and Faulting • Focal Mechanisms and Earthquakes
Week 5	Hydraulic Fracturing and Marcellus Shale • Strain and Ductile Deformation
Week 6	Folds and Fold Analysis • Deformation Fabrics and Tectonic Fabrics
Week 7	Appalachian Tectonics • Müller & Chapin Article Discussion
Week 8	Review and Integration
Week 9	Case Studies in Structural Geology
Week 10	Field Trip or Virtual Field Experience

Week 11	Guest Speaker Session on Current Research in Structural Geology
Week 12	Practical Exercises and Data Analysis
Week 13	Student Presentations on Research Projects
Week 14	Exam Preparation and Revision
Week 15	Final Exam or Assessment

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي العملي	
	Material Covered
Week 1	•Introduction to Lab Equipment and Safety • Measurement of Strike and Dip
Week 2	•Geological Mapping Techniques • Interpretation of Geological Maps
Week 3	• Mohr Circle Construction and Analysis • Measurement of Stress Components
Week 4	• Analysis of Joints and Veins in Rocks • Identification of Faults in Rock Samples
Week 5	• Measurement and Analysis of Strain • Interpretation of Ductile Deformation Structures
Week 6	• Focal Mechanism Analysis using Data
Week 7	• Analysis of Folds in Rock Samples • Identification and Interpretation of Deformation Fabrics

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Structural geology	Yes
Recommended Texts		
Websites	None	

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Fundamental of Petroleum Engineering			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	PRE 212				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	2		**Semester of Delivery**	3	
Administering Department	Petroleum Reservoir Engineering		**College**	Petroleum and Mining Engineering	
Module Leader	Dr. Mahmood Salman Ahmed		**e-mail**	mahmood.salman@uomosul.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/9/2024		**Version Number**	1	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Geophysics,geology	**Semester**	1
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To develop problem solving skills and understanding of petroleum Engineering through the application of techniques. 2. Gives insights into the role of petroleum engineering in the search and application. 3. The module covers a number of measurement methods and how these are used . to determine important fundamentals parameters such as Bulk volume, grain volume, pore volume and porosity concept 4. This is the basic subject for all petrophysical properties. 5. To understand permeability ,capillary pressure , wettability. 6. To perform sp-log and gamma ray analysis.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize how A geophysicist adds to the information of a geologist by studying the physics of the earth. 2. List the Petroleum exploration: a process of determining the location of petroleum reservoir. This process, Direct indications ,Geological methods, 3 . physical measurement of subsurface condition made from surface location. There are three types of methods, which are: • Gravitational (gravity survey)• Magnetic survey• Seismic survey. 4. Summarize what is meant by a Migration of Petroleum. 5. Discuss the Parameters Controlling Petroleum Occurrence . 6. Describe Lithology of Petroleum Reservoirs t. 7. classified Petroleum Traps. 8. Classification of reservoirs fluid types 9. Drilling rig A modern rotary rig as consists of several systems but the power system. hoisting system. rotation system. circulation system. well control (blowout prevention system). 10. What is well completion . 11. Porosity Logs - General. geophysical methods

Indicative Contents المحتويات الإرشادية	This course is a "must have" for anyone working with the subsurface within the life application. Students will understand and employ the scientific method of inquiry to draw conclusions based on verifiable evidence. Students will explain the impact of scientific theories, discoveries, or technological changes on society. Students will demonstrate critical thinking skills in the analysis of scientific data. understand that real data can be uncertain and that one has to use common sense and understanding in order to find good answers to the interpretation problems

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Teaching/Learning Strategies include: 1- Direct Instruction in classroom, 2 hrs per week. 2- Classroom Discussions 3- tests, quizzes, class participation, projects, homework assignments, presentations. Methods of assessment for students. 1- Compulsory exercises 2- Quarterly exams. 3- Discussions and assignments for project. *The overall assessment for this course is as follows: Annual pursuit of 50 points from the total mark, which includes assignments, oral examinations and quarterly in addition to presentations. *50marks for the final exam

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	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

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.	None	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 – of petroleum engineering
Week 2	Origin of petroleum
Week 3	Learn the students the importance of learning the rock science
Week 4	Understanding the exploration methods including gravity, magnetic, and seismic methods
Week 5	Applications of Porosity . Variation of porosity with depth
Week 6	Saturation
Week 7	Permeability . Permeability Classification , Darcy's law
Week 8	Rock compressibility , Wettability , capillary pressure
Week 9	Oil PVT Properties , Gas PVT Properties, Compressibility Factor (Z-Factor)
Week 10	Recovery. Reservoir Drive Mechanisms . Secondary Recovery. Tertiary Recovery (EOR)
Week 11	Reservoir type -Binary system
Week 12	Drilling Engineering. Type of rig , type of drilling fluid ,hosting system, rotary system
Week 13	Well completion. Completion Design criteria. Well completion equipments
Week 14	Well log . Resistivity and Measurement Concept. Resistivity Application
Week 15	WELL LOGGING – PART 3 [SP, GR, CAL]

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Fundamentals of petroleum engineering collage of Eng	Yes
Recommended Texts	1- Fundamentals of petrol textbook 2- Fundamentals of petroleum engineering	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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Petroleum properties**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**PRE213**				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level		Two	**Semester of Delivery**		Three
Administering Department		Petroleum Reservoir Engineering	**College**	Petroleum and Mining Engineering	
Module Leader	Marwa Hassan Yahya		**e-mail**	marwaaltamer@uomosul.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor			**e-mail**		
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		01/09/2024	**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**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	The main objective of oil and gas properties is to familiarize the students with the theories of source of petroleum origin and to find out the main formation of oil and gas. The chemical and physical composition of crude oil and natural gas consider as a main goal of this course. Finally, the student should also know how to classify crude oil according to some parameters, Petroleum and natural gas must familiarity a series of refining processes that converts them into a variety of products. The practical part of this course aims to give an experimental knowledge about physical properties of crude oil such as flash point, fire point, and water content.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of this course, the student will gain the knowledge about: 1- Theories of origin of crude oil (Organic and Inorganic theories) 2- Hydrocarbons and non-hydrocarbons compounds, classification of crude oil according to type and also by some characterization methods. 3- Back ground about refining processes. 4- Crude oil products and its physical and chemical properties. 5- Types of Natural gas. 6- Natural gas specifications.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **Module 1:** Origin and Formation of Petroleum, Organic and inorganic theories of petroleum formation, Occurrence of Petroleum, conditions for petroleum accumulations, composition, Characteristics, Constituents of Petroleum or crude oil. Types of Hydrocarbons and Non- hydrocarbons present in petroleum, Classification of Petroleum. According to API, Density, Specific gravity, Viscosity and viscosity index. [12 hrs] **Module2:** Evaluation of petroleum, Laboratory classification of crude oil according to volatility, combustion, melting point and oxidization. Classification of laboratory test & physical properties of crude oil (Reid Vapor Pressure, ASTM Distillation, Flash point and Fire point. Classification of Laboratory test and physical properties (Slat Content, The weight percentage of sulfur content, Pour point and Cloud point, Ash Content.) Classification of laboratory test & physical properties of crude oil (Sediments and water content, Self-Ignition point, Thermal decomposition point. The Carbon residue, The acidity, Octane number, Cetane number, Aniline point). [17 hrs] **Module3:** Crude oil pretreatment" Preparation of crude oil for distillation" (Degassing, Dehydration & Desalting). Refining of Crude Oil, Fractional distillation, Basic products of crude oil. [6 hrs] **Module 4:** Natural gas, Advantages and Disadvantages. Gas Storage and transportation infrastructure, Usages of natural and synthetic gas. Types of natural gas, Refinery gas, Liquefied petroleum gas. Natural gas specifications (Volume, Calorific value, Methane number, Hydrogen sulfide content, Dew point. [12 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	In this course, the students learn the origin of crude oil and understand the special tests for crude oil by showing laboratory experiments and preparing reports in this regard, in addition to understanding and knowing the chemical composition of crude oil, how to separate it from water and prepare it for refining operations, as well as knowing the types of petroleum derivatives, their specifications and their most important uses.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	3	10% (10)	5, 9 and 13	LO #1, #2 and #3, #4 and #5
	Assignments	2	10% (10)	4 and 10	LO #2and #4
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	10	LO #3,4
Summative assessment	**Midterm Exam**	2hr	10% (10)	8	LO #1 - #3
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1,2	Introduction: Uses of crude oil, Occurrence of petroleum, and its formation (Organic Theory and Inorganic Theory). Chemical Composition of Petroleum (Paraffins, Naphthenes, Aromatics compounds). Non-Hydrocarbon (Sulphur compound, Nitrogen compound, Oxygen compound, Metallic compound).
Week 3	Classification of Petroleum (Classification as a hydrocarbon resource, Classification by density and API gravity)
Week 4,5	Physical and Chemical Properties of Crude Oil and Oil Products (Density, Specific Gravity, API Gravity, Viscosity, Vapor pressure, specific heat; and heat of combustion)
Week 6,7	Physical and Chemical Properties of Crude Oil and Oil Products (Molecular Weight, Pour point, Carbon Residue, Salt Content, Sulfur Content, and Flash point).
Week 8,9	Crude oil pretreatment, Preparation of crude oil for distillation (Degassing, Dehydration & Desalting).
Week 10,11	Refining Crude Oil, Fractional distillation, Basic products of crude oil.
Week 12	Evaluation of Crude Oil, Fractionation distillation and TBP
Week 13	Chemical Analysis of Crude oil (Elemental Analysis, Detailed Hydrocarbon Analysis, Hydrocarbon Family Analysis, Aromatic Carbon Content, SARA Analysis)
Week 14	Natural gas, Advantages and Disadvantages, Gas Storage and transportation infrastructure, Usages of natural and synthetic gas.
Week 15	Types of natural gas, Refinery gas, Liquefied petroleum gas. Natural gas specifications (Volume, Calorific value, Methane number, Hydrogen sulfide content, Dew point.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction
Week 2,3	Lab 1: Measuring API ° gravity of Crude Oil through measuring specific gravity by Bottle, pycnometer, and hydrometer.
Week 4	Lab 2: Determination of Viscosity of diesel and transformer oils by viscometer.
Week 5	Lab 3: Measuring Flash point and fire point (closed cup test) of gasoline, kerosene and other products.
Week 6	Lab 4: Carbon Residue of Petroleum Products, Conradson Carbon Residue Test (CCR).
Week 7	Lab 5: Measuring water and sediment content of petroleum products.
Week 8,9	Lab 6: Measuring Aniline Point and Diesel Index of petroleum products.
Week 10,11	Lab 7: Measuring the Volatility of some types of fuels.
Week 12,13	Lab 8: Determination of the Softening point, Penetration, and ductility of bitumen.

Week 14	Lab 9: Determination of acid value in oils.
Week 15	Lab 10: Determination of Cloud & Pour points of petroleum products.

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Characterization and Properties of Petroleum Fractions First Edition, by M. R. Riazi, January 2005.	No
Recommended Texts	1- Chemical Energy from Natural and Synthetic Gas, by Yatish T. Shah, 2017 by Taylor & Francis Group, LLC. 2- - Fundamentals of Petroleum and Petrochemical Engineering, Uttam Ray Chaudhuri, University of Calcutta, Calcutta, India,2011. 3- Introduction to Petroleum Engineering, John R. Fanchi and Richard L. Christiansen, 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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Mathematics III**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**PRE214**				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level		Two	**Semester of Delivery**		Three
Administering Department		Petroleum Reservoir Engineering	**College**	Petroleum and Mining Engineering	
Module Leader	Raghad Sobhe Fathe		**e-mail**	raghad.s@uomosul.edu.iq	
Module Leader's Acad. Title		Assistant Lecturer	**Module Leader's Qualification**		MSc
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		1/7/2024	**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		**Semester**	
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Raising the student's level to reach a state in which he is qualified to relate what he has learned from mathematics linking them in solving engineering problems and engineering and research nature in oil engineering and expanding understanding of the basics and solving the most important equations used in the field of specialization, including about The way to build mathematical models and solve them to reach the results before starting them practically To avoid possible errors that cost economic losses unless they are resolved before starting work
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The course profile of mathematics gives the students with the necessary skills to analyze the financial aspects of petroleum projects, evaluate investment opportunities, and make informed decisions in the oil and gas industry. It provides a valuable foundation for professionals involved in project management, investment analysis, and economic planning within the petroleum engineering field.
Indicative Contents المحتويات الإرشادية	The course of mathematics refers to the recent growth in oil industry, redistribution of equipment, the course objective is to get interview and basic understanding of production engineering size of petroleum field, net present value and other indications on whether an investment will be profitable, petroleum fiscal system and how the value of oil is shared between companies and government, also exploiting petroleum resources also development of production economy. Student will study all the above paragraphs. **Lecture titles FIRST TERM** Mathematics analysis Alternative energy International strategy of energy Methods of engineering decision

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students. * Lectures are conducted by face-to-face education in the classroom, two hours per week, and students' technical reports. * Conducting dialogues and discussions with the request **Methods of assessment for students.** * Quarterly exams. * Discussions and assignments. *The overall assessment for this course is as follows: Annual pursuit of 50 points from the total mark, which includes assignments and oral examinations and quarterly in addition to presentations. *50 marks for the final exam

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

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.	None	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	Double and Iterated Integrals over Rectangles, Double Integrals over General Regions, Area by Double Integration, Double Integrals in Polar Form, Triple Integrals in Rectangular Coordinates, Moments and Centers of Mass
Week 2,3	Triple Integrals in Cylindrical and Spherical Coordinates.
Week 4,5	Substitutions in Multiple Integrals Analyze microwave circuits that involve microwave hybrids (magic T) and directional couplers in terms of input and output powers from all their Ports Double and Iterated Integrals over Rectangles.
Week 6,7	Inflation
Week 8, 9, 10, 11	Line Integrals , Vector Fields and Line Integrals: Work, Circulation, and Flux
Week 12, 13,14	Path Independence, Conservative Fields, and Potential Functions, Green's Theorem in the Plane, Surfaces and Area , Surface Integrals

Week 15	Second-Order partial differential Equations, Nonhomogeneous Linear Equations, Applications, Euler Equations, Power Series Solution

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Curriculum and textbook	Yes
Recommended Texts	• Jerrold Marsden and Alan Weinstein, Calculus II second edition 1985 • George B. Thomas, Thomas' calculus, thirteen editions, 2014 Jerrold Marsden and Alan Weinstein, Calculus II second edition 1985	Yes
Websites	non	

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Thermodynamics**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐**Lecture** ☐**Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**PRE 215**				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	2		**Semester of Delivery**	3	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Sarah Jamal Halata		**e-mail**	E-mail : sarahjamal@umosul.edu.iq	
Module Leader's Acad. Title	Assistant lecture		**Module Leader's Qualification**	MS.C	
Module Tutor			**e-mail**		
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	10/9/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**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	This module will introduce students to the principles of thermodynamics and energy conversion systems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of this course students will be able to: 1. Determine properties of substances. 2. Calculate the work done by and heat taken in by a system undergoing a change of state. 3. Perform first law analysis of steady-state flow systems (heat exchangers, turbines, pumps, condensers, boilers, and throttle valves).
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Basic Topics: States of matter, concepts of heat and work, laws of thermodynamics, temperature and Zeroth law of thermodynamics Properties of pure substances, phase-change processes, property diagrams, ideal gas equations - 1 st law of thermodynamics for closed systems, heat capacity, enthalpy of reactions

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	In this course the topics covered are based on syllabus for undergraduate studies in engineering. the lecture would be arranged in a sequences and starts from the basic concepts **Lectures**: theoretical subjects will be explained through lecture. **Classwork**: after all theoretical lectures the student solve exercise which achieves the aim of lecture. **Homework :** homework will be given to increase a skill of a student. **Report** : homework will be given to increase a skill of a student.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
+ **Unstructured SWL (h/sem)** الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.46
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

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
	Classwork	4	10% (10)	2 -5-8- 12	All
	Homework	4	10% (10)	3- 6-9-10	All
	Report	2	10% (10)	5 -10	All
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #3
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction, Concept, Definitions, Dimensions & Units, Pressure, and Temperature, and Problems
Week 2	Thermodynamic Systems, Perfect Gas Law, Equation of State , Equation of state (Boyl's Law, Charl's Law and Gay-Lusac Law) and Problems
Week 3	Characteristic Gas Equation, specific volume, and molecular weight, and Problems
Week 4	Forms of Energy
Week 5	Energy Transfer by Work, Mechanical Forms of Work
Week 6	Properties of a Pure Substance Phase-Change Processes of Pure Substances
Week 7	Property Tables
Week 8	The Ideal-Gas Equation of State, Compressibility Factor
Week 9	First Law Of Thermodynamic, energy analysis of closed system
Week 10	Mass and energy analysis of control volume
Week 11	Steady-Flow Engineering Devices (Nozzles and Diffusers, Turbines and Compressors, Throttling Valves, Mixing Chambers , Heat Exchangers و Pipe and Duct Flow
Week 12	Second Law of Thermodynamic, Heat Engines
Week 13	Refrigerators and Heat Pumps
Week 14	Reversible and Irreversible Processes, The Carnot Cycle
Week 15	Entropy , Gas mixture
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	- Thermodynamics :an engineering approach: , Yunus A. Çengel, University of Nevada, Reno, Michael A. Boles, North Carolina State University, Mehmet Kanoğlu, University of Gaziantep. 2019	Yes
Recommended Texts	- Fundamentals of classical Thermodynamics; Gordon John Van Wylen - Engineering Thermodynamics: Work and Heat Transfer; G. F. C. Rogers and Y. R. Mayhew - Fundamentals of Engineering Thermodynamics; michael j. moran, el at. The Principles of Thermodynamics, (N. D. Hari Dass)	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

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MODULE DESCRIPTION FORM

(Fluid Mechanics)

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Fluid Mechanics**			**Module Delivery**	
Module Type	Core			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	PRE216				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level		Two	**Semester of Delivery**		Three
Administering Department		Petroleum Reservoir Engineering	**College**	College of Petroleum and Mining Engineering	
Module Leader	Dr. Ibrahim Adil Ibrahim Al-Hafidh		**e-mail**	iibrahim@uomosul.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor			**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		10/09/2024	**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Mechanics	**Semester**	1
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	To introduce the concepts of fundamental fluid mechanics. These concepts include characteristics of fluid flow in terms of definition, derivation, equations, and applications. **Fundamental Understanding of Fluids** 1- Introduce the basic concepts and properties of fluids, including density, viscosity, surface tension, and compressibility. 2- Differentiate between liquids and gases and their behavior under different conditions. **2. Fluid Statics (Hydrostatics)** 1- Explain the concept of pressure in a static fluid and its variations with depth. 2- Apply Pascal's Law and Archimedes' Principle to engineering problems. 3- Analyze forces on submerged and floating bodies, including stability considerations.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Upon completion of this course, students will be able to: 1- Determine the dimensions and units of physical quantities. 2- Identify the key fluid properties used in the analysis of fluid behavior. 3- Calculate common fluid properties given appropriate information. 4- Explain the effects of fluid compressibility. 5- Use the concepts of viscosity, vapor pressure, and surface tension. 6- Determine the pressure at various locations in a fluid at rest. 7- Explain the concept of manometers and apply appropriate equations to determine pressures. 8- Calculate the hydrostatic pressure force on a plane or curved submerged surface.
Indicative Contents المحتويات الإرشادية	The indicative content of a fluid mechanics module outlines the key topics covered throughout the course. Below is a typical structure of a fluid mechanics syllabus: 1. Characteristics of Fluids 2. Dimensions, Dimensional Homogeneity, and Units 3. Analysis of Fluid Behavior. 4. Measures of Fluid Mass and Weight a) Density b) Specific Weight c) Specific Gravity 5. Ideal Gas Law 6. Viscosity 7. Compressibility of Fluids a) Bulk Modulus b) Compression and Expansion of Gases 8. Vapor Pressure 9. Surface Tension 10. Pressure at a Point (Pascal's law) 11. Pressure Variation in a Fluid at Rest a) Incompressible Fluid b) Compressible Fluid

	12. Standard Atmosphere 13. Measurement of Pressure 14. Manometer a) Piezometer Tube b) U-Tube Manometer c) Inclined-Tube Manometer 15. Mechanical and Electronic Pressure-Measuring Devices 16. Hydrostatic Force on a Plan Surface. 17. Pressure Prism.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Effective teaching strategies in fluid mechanics should combine theoretical concepts, problem-solving techniques, practical applications, and hands-on experiences. The goal is to ensure that students grasp fundamental principles while developing critical thinking and engineering problem-solving skills. Below are common learning and teaching strategies used in fluid mechanics course. 1- Problem-Solving and Tutorials a) Step-by-step demonstration of problem-solving techniques. b) In-class problem-solving sessions with guided instructor support. c) Assigning problem sets to reinforce concepts and enhance analytical skills. d) daily quizzes and monthly tests to encourage the student to read and analysis 2- Laboratory Experiments a- Hands-on experiments to demonstrate key fluid mechanics principles such as hydrostatics, Bernoulli's equation, and pipe flow. b- Measurement of pressure, velocity, and flow rate using instruments like pitot tubes, manometers, and venturi meters. c- Data analysis and interpretation of experimental results.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	20% (20)	2 and 12	
	Classwork	2	5% (5)	2 and 12	
	Lab / Report	4	10% (15)	Continuous	
	Study Sessions	1	5% (5)	13	
Summative assessment	Midterm Exam	2hr	10% (10)	7	
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Characteristics of Fluids
Week 2	Measures of Fluid Mass and Weight
Week 3	1- Viscosity 2- Compressibility of Fluids (Bulk Modulus).
Week 4	1- Vapor Pressure. 2- Surface Tension.
Week 5, 6	Measurement of Pressure.
Week 7,8	Mechanical and Electronic. Pressure-Measuring Devices.
Week 9,10	Hydrostatic Force on a Plane Surface.
Week 11	Pressure Prism + Solving examples
Week 12, 13	Hydrostatic Force on a Curved Surface.
Week 14, 15	Hydrostatic Force on a Curved Surface examples.

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Munson, Okiishi, Hubsch, Rothmayer (2013) Fundamentals of Fluid Mechanics, 7th ed., WILEY United State of America	Yes

Recommended Texts	Vennard j. Street R. (1982) Elementary Fluid Mechanics, 6th edition, John Wiley.	Yes
Websites	None	

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
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Computer II**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UOM 2032**				
ECTS Credits	**3**				
SWL (hr/sem)	**75**				
Module Level		Two	**Semester of Delivery**		Three
Administering Department		Petroleum Reservoir Engineering	**College**	Petroleum and Mining Engineering	
Module Leader	Ziadoon Mohanad Khalil		**e-mail**	ziadoon.khaleel@uomosul.edu.iq	
Module Leader's Acad. Title		Assistant Lecturer	**Module Leader's Qualification**		MSc
Module Tutor	Sarah jamal halata		**e-mail**	E-mail : sarahjamal@umosul.edu.iq	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		1/12/2024	**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		**Semester**	
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Students successfully completing this course will be able to: 1. Utilize the computer for fundamental tasks. 2. Identify and discuss the hardware components of the computer system. 3. Creating documents using a word processor and creating presentations. 4. Conducting research on the Internet. 5. An introduction to Artificial Intelligence
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Apply Computer Basics: Demonstrate a fundamental understanding of computer components, software types, and operating systems. Troubleshoot basic computer issues independently. Excel Proficiency: Create and format spreadsheets with clarity and precision. Analyze data effectively using advanced Excel functions and tools. Word Mastery: Generate professional documents with advanced formatting. Collaborate on documents using review tools and integration of multimedia. Access Competence: Develop and manage relational databases using Microsoft Access. Implement queries, forms, and reports for data manipulation. Email and Internet Skills: Manage email accounts efficiently and apply advanced features. Navigate the internet securely and utilize online collaboration tools. Advanced Technology Integration: Understand cloud computing concepts and utilize file-sharing platforms. Effectively use project management tools for task organization. Holistic Application: Integrate knowledge from various software applications into a final project. Apply computer fundamentals to solve real-world problems effectively
Indicative Contents المحتويات الإرشادية	Week L-T: Introduction to Computers • Computer hardware: CPU, RAM, storage devices. • Computer software: System software vs. application software. • Operating systems: Windows, macOS, Linux. • Basic troubleshooting techniques. Week V-³: Microsoft Excel Basics • Excel interface and navigation. • Creating and formatting spreadsheets. • Basic calculations: SUM, AVERAGE, MAX, MIN. • Data presentation: charts and graphs. Week O-1: Advanced Excel Functions • Advanced formulas: VLOOKUP, HLOOKUP, INDEX, MATCH. • Pivot tables and pivot charts. • Data import/export techniques. • Automation with Macros. Week V-^: Microsoft Word Basics • Word interface and document formatting. • Document creation and editing. • Headers, footers, and page layouts. • Collaboration tools and multimedia integration.

	Week 9-L·: Advanced Word Features • Mail merge for personalized documents. • Document protection and encryption. • Advanced formatting: styles and themes. • Document review tools: track changes, comments. Week LL-LT: Microsoft Access Basics • Introduction to database design principles. • Creating tables, queries, forms, and reports. • Data manipulation and relationship management. Week LV-L³: Email and Internet Usage • Email etiquette and best practices. • Managing email accounts and organizing messages. • Internet browsing, search engines, and online communication. • Online collaboration tools: Google Docs, SharePoint. Week LO: Advanced Topics and Review • Cloud computing basics: Google Drive, OneDrive. • Introduction to project management tools: Trello, Asana. • Review of key concepts from the entire module. • Final project incorporating multiple software applications.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	L. Interactive Lectures: • Engage students with discussions, questions, and multimedia presentations. 2. Hands-On Practice: • Conduct practical workshops for hands-on application of software skills. • Assign exercises and projects to reinforce learning. 3. Flipped Classroom: • Use the flipped classroom model, providing pre-class materials and using class time for active learning. 4. Problem-Based Learning: • Introduce real-world problems for collaborative problem-solving activities. 0. Assessments: • Utilize both formative and summative assessments for evaluating understanding. 1. Technology Integration: • Leverage technology tools, online tutorials, and virtual labs for enhanced learning. V. Industry Insights: Invite guest speakers to share insights into computer fundamentals and industry trends

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	42	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**75**		

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.	None	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	Security and Networking
Week 2,3	E-Commerce
Week 4,5	Introduction to AI, AI in Our Daily Lives
Week 6,7	AI and Society
Week 8, 9, 10, 11	Applications of AI ,
Week 12, 13,14	Ethical Challenges in AI ,
Week 15	Computer Troubleshooting

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	David Watson , Graham Brown , Cambridge IGCSE Information and Communication Technology Third Edition	No
Recommended Texts		
Websites	Non	

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**English language II**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UOM2022**				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level		2	**Semester of Delivery**		3
Administering Department		Petroleum Reservoir Engineering	**College**	Petroleum and Mining Engineering	
Module Leader	Amira Rifae Hannawi		**e-mail**	amira.rifae@uomosul.edu.iq	
Module Leader's Acad. Title		Assist. Lecturer	**Module Leader's Qualification**		Msc.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		01/08/2024	**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**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. to enable the learner to communicate effectively and appropriately in real life situation. 2. to use English effectively for study purpose across the curriculum. 3. to develop interest in and appreciation of language 4. to develop and integrate the use of the language skills i.e. Reading, Speaking and Writing . 5. to revise and reinforce structure and grammar already learnt.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Define The ability to read English with understanding the student is able to understand the total content 2. Identify the ability to understand English when it is spoken. 3. Promote the ability to write English correctly . 4. Outline the correct usage of the grammatical items. 5. Describing and Identify some concepts of petroleum and mining study to enhance students' lexicon of specific terms . 6. List students' weaknesses in an attempt to strengthen and overcome them 7. Encourage student to write reports about different topics . 8. Enforce their language by giving them assignment that strengthen the method of research and writing
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. types of sentences An affirmative sentence (a declarative or assertive) sentence, and it can be either a simple, complex or compound sentence as long as it is positive , Negative and interrogative sentences . [15hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering English language is to encourage students' participation in the exercises, discussion and use brainstorming by asking many questions to keep in touch with the students .In this course we will also encourage students how to write , read and discuss different scientific topics . while at the same time refining and expanding their critical thinking skills and give and receive feedback from the students. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**50**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	6 and 12	LO #3 #4and #6
	Assignments	2	10% (10)	2 and 12	LO #1 #2 and #5 #8
	Report	1	10% (10)	13	LO #1#2 and #4 #7
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	All
	Final Exam	3hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction – Conditional Scentence + reading and listening scientific passage
Week 2	Passive voice + reading and listening scientific passage
Week 3	Reported Speech + reading and listening scientific passage
Week 4	Adjective + reading and translating scientific passage
Week 5	Adverb + reading and listening scientific passage
Week 6	Examination
Week 7	Numbers and Measurement + reading and translating scientific passage
Week 8	Describing Equipment + reading and translating scientific passage
Week 9	Giving Instructions + reading and translating scientific passage
Week 10	Safety + reading and translating scientific passage
Week 11	Describing Systems + reading and translating scientific passage

Week 12	Making Comparisons + reading and translating scientific passage
Week 13	Describing Processes + reading and translating scientific passage
Week 14	Expressing Possibility + reading and translating scientific passage
Week 15	Countable/uncountable nouns How much/how many + reading and translating scientific passage
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Levrai. P (2020) English for Oil and Gas FOUNDATION COURSE .TTLINTERNATIONAL Frendo.E with Bonamy, D(1997) English for the Oil industry , PEARSON LONGMAN .	No
Recommended Texts	Textbook and curriculums approved by the scientific committee and academic accreditation committee .	No
Websites	https://academicguides.waldenu.edu/writingcenter/scholarlyvoice/sentencestructure https://byjus.com/english/types-of-sentences/	

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
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University of Mosul

College of Petroleum and Mining Engineering

Department of Petroleum Reservoir Engineering

Course Descriptions

2nd Level / 2nd Semester (Bologna Process)

Dr. Maha Muneeb Al-Dabbagh

Head of Department

Dr. Ayman Mahmoud Ahmed

Chairman of the Scientific Committee

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	**PRE221**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		2	**Semester of Delivery**		4
Administering Department		Petroleum Reservoir Engineering	**College**	Petroleum and Mining Engineering	
Module Leader	Dr. Mahmood Salman Ahmed		**e-mail**	mahmood.salman@uomosul.edu.iq	
Module Leader's Acad. Title			**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		03/03/2025	**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	geology	**Semester**	
Co-requisites module		**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 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. 7. Understand the techniques and methods used in petroleum exploration: • Explain the exploration process, including prospect generation, seismic surveys, and well drilling. • Identify the different exploration methods, such as geological mapping, seismic interpretation, and well logging. 8. Gain knowledge of petroleum production: • Understand the concepts of reservoir engineering and production optimization. • Identify the methods and technologies used in petroleum production, such as drilling, well completion, and enhanced oil recovery. 9. Address environmental considerations in petroleum geology: • Identify the potential environmental impacts of petroleum exploration and production. • Understand the principles and practices of environmental management in the petroleum industry. 10. Apply critical thinking and problem-solving skills to petroleum geology: • Analyze geological data and interpret geological maps, seismic data, and well logs.
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 geologicalfeatures and structures. 7. Explain the exploration process in petroleum geology, including prospect generation, seismic surveys, and drilling techniques. 8. Understand the principles and methods of petroleum production, including well drilling, completion, and enhanced oil recovery techniques. 9. Recognize the environmental considerations associated with petroleum exploration and production, and apply principles of environmental management in the industry. 10. Apply critical thinking and problem-solving skills to analyze geological data, interpret geological maps, seismic data, and well logs in the context of petroleum geology. 11. Communicate effectively and present geological concepts related to petroleum geology using appropriate terminology and formats. 12. Demonstrate an understanding of the ethical and professional responsibilities in the field of petroleum geology, including adherence to safety standards and ethical conduct.
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 Indicative Contents 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

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. Laboratory Work: Conduct hands-on laboratory sessions to allow students to examine rock samples, conduct experiments, and analyze geological data. This helps reinforce learning and develop practical skills in reservoir characterization and analysis. 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. Computer Simulations and Modeling: Utilize computer-based simulations and modeling software to simulate geological processes, reservoir behavior, and exploration scenarios. This allows students to gain practical experience in reservoir modeling and prediction.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
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.	None	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
Week 2	Sedimentary Basins: Types and Characteristics
Week 3	Sedimentary Basins: Tectonic and Sedimentary Processes
Week 4	Source Rocks: Types and Properties
Week 5	Source Rocks: Organic Matter Deposition and Maturation
Week 6	Migration of Petroleum
Week 7	Reservoirs: Properties and Classification
Week 8	Reservoirs: Reservoir Characterization Techniques

Week 9	Traps and Trap Analysis
Week 10	Exploration Techniques: Seismic Surveys and Well Logging
Week 11	Drilling and Completion Techniques
Week 12	Enhanced Oil Recovery Methods
Week 13	Environmental Considerations in Petroleum Geology
Week 14	Case Studies and Field Trips
Week 15	Review and Assessment

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

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts		
Recommended Texts		
Websites	None	

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Strength of Materials**			**Module Delivery**	
Module Type	**C**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**PER222**				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	2		**Semester of Delivery**	4	
Administering Department	Petroleum Reservoir Engineering		**College**	Petroleum and Mining Engineering	
Module Leader	Raghad Sobhe Fathe		**e-mail**	raghad.s@uomosul.edu.iq	
Module Leader's Acad. Title	assistant teacher		**Module Leader's Qualification**	M.Sc.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Sarah Saad Abdul-Jabbar		**e-mail**	sarahsaad3860707@uomosul.edu.iq	
Scientific Committee Approval Date	02/09/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		**Semester**	
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The course aims to provide students with fundamental knowledge of how materials behave under various forces, enabling them to analyze stress and strain in structural elements and perform basic design of beams and columns.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	this course, students will be able to: 1. Understand and explain the fundamental concepts of stress and strain in engineering materials. 2. Calculate stresses and strains due to axial loads, shear forces, and bending moments. 3. Draw and analyze shear force and bending moment diagrams for structural elements. 4. Apply basic theories to design beams and columns under different loading conditions. 5. Analyze members with combined loads and non-symmetrical cross sections. 6. Solve real-world structural problems using mathematical and engineering approaches.
Indicative Contents المحتويات الإرشادية	The Strength of Materials course is a fundamental subject in civil and mechanical engineering that focuses on understanding how materials and structural elements behave under various types of loads and forces. It covers key topics such as stress and strain, shear forces and bending moments, column buckling, and beam bending, as well as thermal effects and eccentric loading. The instructional content aims to equip students with the theoretical foundation and analytical skills necessary to assess the safety and performance of structural components. Practical applications and laboratory tests are also included to understand the mechanical properties of materials.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Teaching and learning strategies for the Strength of Materials course focus on combining theoretical and practical approaches to enhance student understanding. Interactive lectures are used to explain core concepts such as stress and strain, supported by diagrams and structural behavior illustrations. Problem-solving exercises and homework assignments help develop analytical skills. Laboratory experiments and real-life tests reinforce mechanical principles, while models and simulations are used to visualize abstract concepts effectively.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

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.	None	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
Week 2,3	Stress & Strain
Week 4	Mechanical Properties of Materials
Week 5,6	Axial Loading and Stress Analysis
Week 7,8	Torsion and Torsional Deformation
Week 9,10	Bending and Flexural Analysis
Week 11,12,13	Shear Forces and Shear Stresses in Beams
Week 14,15	Thermal Stresses

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Strength of Materials	Yes
Recommended Texts	1.Gere, J.M., *Mechanics of Materials*. 2.Hibbeler, R.C., *Mechanics of Materials*.	No
Websites	Beer & Johnston, *Mechanics of Materials*	

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
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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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Mathematics IV**			**Module Delivery**	
Module Type	**C**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**PER223**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	2		**Semester of Delivery**	4	
Administering Department	Petroleum Reservoir Engineering		**College**	Petroleum and Mining Engineering	
Module Leader	Raghad Sobhe Fathe		**e-mail**	raghad.s@uomosul.edu.iq	
Module Leader's Acad. Title	assistant teacher		**Module Leader's Qualification**	As.L	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	02/09/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		**Semester**	
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	This course aims to help the students understanding the basics of mathematics theories, methods and techniques. It also intends to introduce the applications of petroleum engineering field applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The course profile of mathematics gives the students with the necessary skills to analyze the financial aspects of petroleum projects, evaluate investment opportunities, and make informed decisions in the oil and gas industry. It provides a valuable foundation for professionals involved in project management, investment analysis, and economic planning within the petroleum engineering field.
Indicative Contents المحتويات الإرشادية	The course of mathematics refers to the recent growth in oil industry, redistribution of equipment, the course objective is to get interview and basic understanding of production engineering size of petroleum field, net present value and other indications on whether an investment will be profitable, petroleum fiscal system and how the value of oil is shared between companies and government, also exploiting petroleum resources also development of production economy. Student will study all the above paragraphs. **Lecture titles FIRST TERM** Mathematics analysis Alternative energy International strategy of energy Methods of engineering decision

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students. * Lectures are conducted by face-to-face education in the classroom, two hours per week, and students' technical reports. * Conducting dialogues and discussions with the request **Methods of assessment for students.** * Quarterly exams. * Discussions and assignments. *The overall assessment for this course is as follows: Annual pursuit of 30 points from the total mark, which includes assignments and oral examinations and quarterly in addition to presentations. *70 marks for the final exam

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	77	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

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.	None	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 Mathematics IV
Week 2,3,4	Double and Iterated Integrals over Rectangles , Double Integrals over General Regions , Area by Double Integration , Double Integrals in Polar Form , Triple Integrals in Rectangular Coordinates , Moments and Centers of Mass , Triple Integrals in Cylindrical and Spherical Coordinates
Week 5,6	Substitutions in Multiple Integrals Analyze microwave circuits that involve microwave hybrids (magic T) and directional couplers in terms of input and output powers from all their ports Double and Iterated Integrals over Rectangles
Week 7	Inflation
Week 8,9,10	Line Integrals , Vector Fields and Line Integrals: Work, Circulation, and Flux , Path Independence, Conservative Fields, and Potential Functions.
Week 11,12,13	Green's Theorem in the Plane , Surfaces and Area , Surface Integrals

Week 14,15	Second-Order partial differential Equations , Nonhomogeneous Linear Equations , Applications , Euler Equations , Power Series Solution

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Curriculum and textbook	Yes
Recommended Texts	• Jerrold Marsden and Alan Weinstein, Calculus II second edition 1985 • George B. Thomas, Thomas' calculus, thirteen editions, 2014 Jerrold Marsden and Alan Weinstein, Calculus II second edition 1985	No
Websites	none	

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Occupational Safety and Health**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**PRE225**				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level		Two	**Semester of Delivery**		Four
Administering Department		Petroleum Reservoir Engineering	**College**	Petroleum and Mining Engineering	
Module Leader	Marwa Hassan Yahya		**e-mail**	marwaaltamer@uomosul.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date		01/11/2024	**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**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- Complete information about the health and safety of employees and protection of the environment. 2- Awareness of best practices to follow at work to cause minimal environmental pollution. 3- Knowledge of certain precautionary measures while working and handling machinery or other equipment to prevent occupational hazards. 4- The necessary information to handle waste material in a controlled manner to minimize negative environmental impact. 5- The required skill and capability to devise, implement, and manage safety and health management systems in the organization.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of this course, the student will gain knowledge about: The student is expected to be able to describe the basic components of safety, health, and environmental systems as defined by the Occupational Safety and Health Administration.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **Module 1:** Introduction, safety signs, Hazardous Waste Standard [12 hrs] **Module2:** Mechanical Hazards, Control of Hazardous Energy, Falling, Impact, Acceleration, Lifting, and Vision Hazards, Hazards of Temperature, Burns and Their Effects. [17 hrs] **Module3:** Pressure Hazards, Hazards of Unfired Pressure Vessels, Electrical Hazards Fire Hazards and Life Safety, Airborne Contaminants, Prevention and Control The Oil and Gas Industry Hazard, Risk Management Process [6 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	السلامة والصحة المهنية تُركز على تحديد وتقييم وإدارة المخاطر المرتبطة بالتلوث والمواد الخطرة. تتضمن المادة التعرف على مصادر التلوث وأنواعه، بالإضافة إلى الآثار الصحية والبيئية للتعرض للملوثات. كما يتعلم طلاب السلامة والصحة المهنية تقنيات تقييم المخاطر وإدارتها، بما في ذلك تحديد المخاطر وتحليلها والتواصل بشأنها. يدرسون مبادئ إدارة السلامة، بما في ذلك التخطيط للاستجابة للطوارئ، والتحقيق في الحوادث، والامتثال للوائح التنظيمية. تُعد هذه المادة أساسية لأي شخص مهتم بمتابعة مسيرة مهنية في مجال الإدارة البيئية، أو الصحة العامة، أو السلامة المهنية، لأنها تُوفر أساسًا متينًا لهذه المبادئ.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	3	10% (10)	3, 9 and 13	LO #1, #2, #3 and #5, #6 and #9,#10, #11
	Assignments	2	10% (10)	4 and 10	LO #2and #9
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	10	LO #8
Summative assessment	**Midterm Exam**	2hr	10% (10)	8	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, history, hazards, occupational safety and occupational health
Week 2,3	Hazardous Waste Standard
Week 4,5	Mechanical Hazards, Control of Hazardous Energy
Week 6,7	Falling, Impact, Acceleration, Lifting, and Vision Hazards
Week 8,9	Hazards of Temperature, Burns and Their Effects
Week 10,11	Pressure Hazards, Hazards of Unfired Pressure Vessels, Electrical Hazards
Week 12,13	Fire Hazards and Life Safety
Week 14	Airborne Contaminants, Prevention and Control
Week 15	The Oil and Gas Industry Hazard, Risk Management Process

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	The Claremont Colleges Services Environmental Health and Safety 2021-2022 Academic Year	No

Recommended Texts	1- Occupational Safety and Health Act (OSHA) And Regulation, MDC Publishers SDN. BHD, 2008 Edition 2- Guidelines for Hazard Identification, Risk Assessment and Risk Control, Dosh Malaysia, 2008.	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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Arabic language II**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Code	**UOM2012**				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level	2		**Semester of Delivery**	4	
Administering Department	Petroleum Reservoir Engineering		**College**	Petroleum and Mining Engineering	
Module Leader	Arwa Issa Mohammed		**e-mail**	arwa.issa.m@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Lecturer		**Module Leader's Qualification**	Msc.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	05/12/2024		**Version Number**	2.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Arabic I	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The aim of this semester is to enable students to read correctly and acquire the ability to use language correctly in communication with others, such as speed, quality of delivery, and eloquence. It also aims to teach students to listen well, develop their literary taste, and accustom them to correct, clear expressions.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	CLO1: Introducing the student to the necessity of practicing the rules of writing and speaking in classical Arabic. CLO2: Introducing the student to the levels of the Arabic language system CLO3: Deepening the student's connection with the Arab and Islamic heritage. CLO4: Promote scientific research in the field of Arabic language and its sciences to prepare studies and research. CLO5: Showing the beauty of the Arabic language, the breadth of its meanings and its constructional styles. CLO6: Enabling the student to overcome and correct linguistic errors. CLO7: Developing the student's literary taste to understand the aesthetic aspects of speech style, images and meanings. CLO8: Introducing the most prominent poets of the Abbasid era
Indicative Contents المحتويات الإرشادية	Part One: (6 hours) • Arabic Grammar (Syntax) • Subject and Predicate • Subject and Predicate Rejectors Part Two: (6 hours) • Kana and its Sisters • In and its Sisters • Zan and its Sisters Part Three: (6 hours) • Midterm Exam • Accusative Nouns • Absolute Object Part Four: (4 hours) • Grammatical Mistakes • Spelling Part Five: (8 hours) • Literature in the Abbasid Era

	• The Poet Al-Mutanabbi • The Poet Abu Tammam • The Poet Abu Firas Al-Hamdani

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The primary goal of Arabic language lessons is to eliminate the difficulty and rigidity that may accompany some of the topics covered in these lessons, in addition to conveying the required ideas and information to students in ways that are understandable and appropriate to their individual differences. The most prominent focus of the lectures is Arabic grammar and literature. The study consists of lectures, exams, in-class assignments, discussions, and homework.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**50**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	1	10% (10)	4, 8 and 10	All
	Assignments	1	10% (10)	6	CLO4, CLO5, and CLO6
	On-site Assignment	1	10% (10)	10	CLO4, CLO5, and CLO6
	Report	1	10% (10)	12	All
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	All
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Arabic Grammar (Grammar) importance of
Week 2	Subject and Predicate
Week 3	Subject and Predicate Rejectors
Week 4	Kana and its Sisters
Week 5	Inna and its Sisters
Week 6	Zanna and its Sisters
Week 7	Midterm Exam
Week 8	Accidental Nouns
Week 9	Absolute Object
Week 10	Linguistic Mistakes
Week 11	Spelling
Week 12	Literature in the Abbasid Era
Week 13	The Poet Al-Mutanabbi
Week 14	The Poet Abu Tammam
Week 15	The Poet Abu Firas Al-Hamdani
Week 16	Final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Comprehensive Grammar / Abbas Hassan	Yes
Recommended Texts	In Abbasid Literature / Muhammad Mahdi Al-Basir	Yes
Websites	https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/	

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Crimes of the Baath regime in Iraq**			**Module Delivery**	
Module Type	**B**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UOM2050**				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level	2		**Semester of Delivery**	4	
Administering Department	Petroleum Reservoir Engineering		**College**	Petroleum and Mining Engineering	
Module Leader	Basma Mohamed Natheer Ahmed		**e-mail**	Bsmam2022@uomosul.edu.iq	
Module Leader's Acad. Title	assistant teacher		**Module Leader's Qualification**	Msc.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	25/2/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		**Semester**	
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	- The graduate will be able to expand their scientific knowledge.2- The graduate will be able to distinguish between types of crimes and understand the characteristics of each type and the possibility of applying them.3- The graduate will be able to steer behavioral pathways towards positivity.4- The graduate will be able to understand the effects of crimes on nations and the nature of internationally prohibited weapons used against the Iraqi people.5- The graduate will be able to understand the importance of human rights in the context of crimes against humanity.6- The ability to understand the effects of crimes on the population.7- The ability to connect theoretical study with practical reality.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Informing students about the types of crimes, their forms, and their conflict with human rights and its requirements and objectives. The importance of democratic governments, as part of the requirements of human rights, to compensate for the crimes suffered by the people and to rehabilitate areas that have been subjected to war crimes.
Indicative Contents المحتويات الإرشادية	Students will understand the scientific method of inquiry and use it to draw conclusions based on verifiable evidence. It explains to students the impact of crime on society. It will show students critical thinking skills and the analysis of the science of crime.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**50**		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	4 and 12	LO #1, 2, 10 and 11
	Assignments	1	10% (10)	6	LO # 3, 4, 6 and 7
	Projects / Lab.	10	10% (10)	Continuous	All
	Report	1	5% (5)	9	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2hr	15% (15)	8	LO # 1-4
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	A general introduction to the concept of crimes
Week 2	Crime departments Types of crimes
Week 3	Social crimes, their mechanisms and effects Human rights violations
Week 4	Psychological crimes, their mechanisms and effects
Week 5	Military and
Week 6	Destruction of cities (scorched earth policy)
Week 7	Drying the marshes
Week 8	Dredging orchards
Week 9	radiation pollution
Week 10	Decisions issued by the Supreme Criminal Court
Week 11	Mass graves
Week 12	Mass grave events
Week 13	Chronological
Week 14	Classification of mass graves
Week 15	Chronological classification of mass graves
Week 16	Mass grave sites

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Rapporteur of the Ministry of Higher Education and Scientific Research	No
Recommended Texts		
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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Petrophysical Rock Properties			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Code	**PE224**				
ECTS Credits	**7**				
SWL (hr/sem)	**175**				
Module Level		2	**Semester of Delivery**		Fourth
Administering Department		Petroleum Reservoir Engineering	**College**	Petroleum and Mining Engineering	
Module Leader	Dr. Ammar Algburi		**e-mail**	Ammar.ramadhan@uomosul.edu.iq	
Module Leader's Acad. Title			**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		10/09/2024	**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Fundamental of petroleum engineering	**Semester**	1
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	This module aims to provide students with a comprehensive understanding of petrophysical rock properties, their significance in reservoir characterization, and their applications in the petroleum and geoscience industries. It will equip students with the knowledge and analytical skills required to evaluate and interpret rock properties for hydrocarbon exploration and production.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of this module, students should be able to: 1. Understand fundamental petrophysical properties of reservoir rocks. 2. Describe and analyze porosity, permeability, and fluid saturation. 3. Explain rock-fluid interactions and their impact on reservoir performance. 4. Apply petrophysical principles to evaluate reservoir quality. 5. Interpret laboratory and well-log data to characterize reservoir rocks. 6. Utilize petrophysical data in hydrocarbon exploration and production decision-making.

Indicative Contents
المحتويات الإرشادية
	• **Introduction to Petrophysics:**
	
	  • Definition and importance in reservoir characterization.
	  • Relationship between petrophysics and other geoscience disciplines.
	
	• **Porosity:**
	
	  • Types of porosity (total, effective, secondary).
	  • Factors affecting porosity (grain size, sorting, cementation).
	  • Measurement techniques (core analysis, well logs).
	
	• **Permeability:**
	
	  • Definition and significance in fluid flow.
	  • Darcy's Law and its applications.
	  • Permeability measurement techniques.
	
	• **Fluid Saturation:**
	
	  • Concepts of water, oil, and gas saturation.
	  • Capillary pressure and saturation relationships.
	  • Determination of irreducible water saturation.
	
	• **Rock-Fluid Interactions:**

	• Wettability and its impact on reservoir performance. • Relative permeability and its effect on multiphase flow. • Electrical properties and resistivity logs. • **Measurement and Evaluation Techniques:** • Core sample analysis (laboratory methods). • Well logging tools and interpretation (density, neutron, sonic, resistivity logs). • Integration of core and log data for reservoir evaluation. • **Applications in Reservoir Engineering:** • Reservoir modeling and characterization. • Role of petrophysical properties in reserve estimation. • Influence of rock properties on enhanced oil recovery (EOR) techniques.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Teaching/Learning Strategies include: 1- Direct Instruction in classroom, 7 hrs per week+ 1 hr per week tutorial. 2- Classroom Discussions 3- tests, quizzes, class participation, projects, homework assignments, presentations. Methods of assessment for students. 1- Compulsory exercises 2- Quarterly exams. 3- Discussions and assignments for project. *The overall assessment for this course is as follows: Annual pursuit of 50 points from the total mark, which includes assignments, oral examinations and quarterly in addition to presentations. *50 marks for the final exam

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	82	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	None	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 Petrophysical Rock Properties
Week 2,3	Porosity, classification, Calculation of Porosity, Measuring Porosity
Week 4,5	Rock compressibility , capillary pressure
Week 6,7,8,9	Permeability. Permeability Classification, Darcy's law.
Week 10, 11	Fluid Saturation, Measuring Fluid Saturation, Limitations of Using Extraction Methods,
Week 12, 13,14	Electrical Properties, Understanding Archie's Law, Factors Affecting Resistivity of Reservoir Rocks, Capillary Pressure
Week 15	Wettability

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Introduction to Petrophysics of Reservoir Rocks	Yes
Recommended Texts	Petrophysics: Theory and Practice of Measuring Reservoir Rock and Fluid Transport Properties	Yes
Websites	None	

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
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