



Ministry of Higher Education and
Scientific Research - Iraq
Al-Naji University
College of Engineering
Department of Petroleum
Engineering



MODULE DESCRIPTION for Geology (I)

نموذج وصف مادة الجيولوجيا (I)

Module Information				
معلومات المادة الدراسية				
Module Title	General Geology (I)		Module Delivery	
Module Type	Core		<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar	
Module Code	PE116			
ECTS Credits	7			
SWL (hr/sem)	175			
Module Level	1	Semester of Delivery		1
Administering Department	PE	College	COENG	
Module Leader	Prof. Muaataz Aldabbas		e-mail	profaldabbas@alnaji-uni.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	PHD	
Module Tutor			e-mail	
Peer Reviewer Name			e-mail	
Scientific Committee Approval Date			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 General Geology module provides students with a fundamental understanding of the Earth's structure, composition, and geological processes. The module covers a wide range of topics, including the Earth's position in space, its shape, and surface relief. Students will learn about the properties and classification of minerals, as well as the formation and characteristics of igneous, sedimentary, and metamorphic rocks. The module also explores the processes of weathering, erosion, transportation, and deposition that shape the Earth's surface. Students will gain knowledge of geological time and the formation of geological features such as mountains, valleys, and geological hazards.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of the module, students will be able to: <ol style="list-style-type: none">1. Understand the Earth's position in space and its relationship to the solar system.2. Describe the shape and surface relief of the Earth, including the major landforms and features.3. Identify and classify minerals based on their properties and characteristics.4. Explain the processes of rock formation, including the origin and classification of igneous, sedimentary, and metamorphic rocks.5. Understand the concepts of weathering and soil formation, and their significance in geological processes.6. Describe the processes of erosion, transportation, and deposition, and their role in shaping the Earth's surface.7. Interpret geological maps, cross-sections, and stratigraphic columns to analyze the geological history of an area.8. Explain the concept of geological time and the principles of relative and absolute dating.
Indicative Contents المحتويات الإرشادية	Earth in Space and Shape (15 hours) Introduction to the solar system and Earth's position in it Celestial bodies and their characteristics Earth's rotation, revolution, and seasons Measurement and shape of the Earth Major landforms: mountains, plateaus, plains, and valleys Earth's internal structure and its impact on surface features Minerals and Rocks (30 hours) Introduction to matter and atomic structure Chemical bonding and crystal structures Properties and identification of minerals Mineral classification and occurrence in different geological environments Formation of igneous rocks: magma, crystallization, and textures Sedimentary rock formation: weathering, erosion, deposition, and lithification Metamorphic rock formation: types, processes, and factors influencing metamorphism Weathering, Soils, and Sediments (20 hours) Weathering processes: physical and chemical weathering Factors influencing weathering rates Soil formation and soil profiles Sediment transport and deposition Sedimentary structures and their interpretation

	<p>Earth's Surface Processes (25 hours)</p> <p>Erosion processes: water, wind, ice, and gravity</p> <p>Fluvial processes: river systems, drainage patterns, and erosion features</p> <p>Glacial processes: glacier formation, movement, and landforms</p> <p>Aeolian processes: wind erosion and deposition, dunes</p> <p>Coastal processes: wave action, coastal landforms, erosion, and deposition</p> <p>Geological Time and Dating Methods (15 hours)</p> <p>Principles of relative dating: superposition, original horizontality, and cross-cutting relationships</p> <p>Fossils and their importance in dating and correlating rocks</p> <p>Absolute dating methods: radiometric dating, carbon dating, and other techniques</p> <p>Geological time scale and major divisions of Earth's history</p> <p>Geological Maps and Interpretation (20 hours)</p> <p>Introduction to geological maps and their symbols</p> <p>Reading and interpreting geological maps and cross-sections</p> <p>Stratigraphic columns and their use in reconstructing geological history</p> <p>Geological structures: folds, faults, and unconformities</p> <p>Introduction to geophysical methods in geological mapping</p> <p>Earthquakes and Volcanoes (25 hours)</p> <p>Plate tectonics and the theory of continental drift</p> <p>Earthquakes: causes, seismic waves, measurement, and effects</p> <p>Volcanic processes: types of volcanoes, volcanic eruptions, and volcanic landforms</p> <p>Volcanic hazards and their mitigation</p> <p>Geological Hazards and Environmental Geology (20 hours)</p> <p>Landslides, avalanches, and subsidence: causes, types, and prevention</p> <p>Coastal hazards: erosion, coastal flooding, and sea-level rise</p> <p>Geological hazards and their impact on human activities</p> <p>Environmental geology: geologic resources, land use planning, and sustainability</p> <p>Geology and Human Civilization (15 hours)</p> <p>Geology in natural resource exploration and extraction</p> <p>Geological factors in engineering projects: dams, tunnels, and foundations</p> <p>Geological considerations in urban planning and development</p> <p>Geology and climate change: past climate records and future predictions</p> <p>Field Excursions and Practical Sessions (20 hours)</p> <p>Field trips to geological sites for observation and interpretation</p> <p>Practical sessions on mineral and rock identification</p> <p>Laboratory exercises on sediment analysis and geological mapping</p> <p>Case Studies and Applications</p>
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	concepts related to each topic. This provides students with a comprehensive understanding of the subject matter.
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	<p>Visual Aids: Utilize visual aids such as PowerPoint presentations, diagrams, maps, and videos to enhance understanding and engage students visually.</p> <p>Interactive Discussions: Encourage active participation through interactive discussions and Q&A sessions. This promotes critical thinking and allows students to clarify their doubts and deepen their understanding.</p> <p>Laboratory and Fieldwork: Organize laboratory sessions and field trips to give students hands-on experience in mineral and rock identification, sediment analysis, and geological mapping. This provides practical exposure to geological techniques and promotes field observation skills.</p> <p>Group Activities: Assign group projects or activities that require students to work together to solve geological problems. This promotes teamwork, collaboration, and the sharing of ideas and perspectives.</p> <p>Guest Speakers: Invite guest speakers from the industry or research community to share their experiences and expertise. This provides students with insights into real-world applications of geology and exposes them to diverse perspectives.</p> <p>Formative Assessments: Conduct regular formative assessments, such as quizzes, short assignments, or class discussions, to evaluate students' understanding and identify areas that need further clarification.</p> <p>Field Excursions: Plan field excursions to geological sites of interest to provide students with firsthand exposure to geological features and processes. This helps bridge the gap between theory and practice.</p>
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Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	96	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

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

Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	<ul style="list-style-type: none"> • Introduction to Geology and Earth Sciences • Earth in Space and Shape
Week 2	<ul style="list-style-type: none"> • Minerals and Rocks: Properties and Classification • Igneous Rocks: Formation and Types
Week 3	<ul style="list-style-type: none"> • Sedimentary Rocks: Formation and Classification • Metamorphic Rocks: Processes and Types
Week 4	<ul style="list-style-type: none"> • Weathering and Soils • Sediments and Sedimentary Structures
Week 5	<ul style="list-style-type: none"> • Earth's Surface Processes: Erosion, Transportation, and Deposition • Fluvial Processes and Landform
Week 6	<ul style="list-style-type: none"> • Glacial Processes and Landforms • Aeolian Processes and Landforms
Week 7	<ul style="list-style-type: none"> • Coastal Processes and Landforms • Geological Time and Dating Methods
Week 8	<ul style="list-style-type: none"> • Geological Maps and Interpretation • Structural Geology: Folds, Faults, and Unconformities
Week 9	<ul style="list-style-type: none"> • Earthquakes: Causes and Effects • Volcanoes: Types and Eruptions
Week 10	<ul style="list-style-type: none"> • Geological Hazards: Landslides and Subsidence • Geological Hazards: Coastal Hazards and Climate Change
Week 11	<ul style="list-style-type: none"> • Geological Hazards: Landslides and Subsidence • Geological Hazards: Coastal Hazards and Climate Change
Week 12	<ul style="list-style-type: none"> • Field Excursion: Geological Site Visit and Observation • Case Studies and Applications in Geology
Week 13	<ul style="list-style-type: none"> • Environmental Geology: Land Use Planning and Sustainability • Geology and Human Civilization
Week 14	<ul style="list-style-type: none"> • Review of Key Concepts and Topics (Tutorial) • Practice Problem-Solving Exercises (Tutorial)
Week 15	<ul style="list-style-type: none"> • Final Assessment, including Problem-Solving Questions and Application-Based Scenarios

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Introduction to Laboratory Safety and Procedures

Week 2-3	Principals of crystallography, types, identification
Week 4-6	Minerals and their importance in geology, with presentations
Week 7-8	Rock Identification: Igneous Rocks
Week 9-10	Rock Identification: Sedimentary Rocks
Week 11-12	Rock Identification: Metamorphic Rocks
Week 13-14	Rock cycle Hand Specimen and Thin Section Analysis
Week 15	Final assessment

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Physical Geology by Charles Plummer	yes
Recommended Texts		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.



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College of Engineering

Department of Petroleum Engineering



MODULE DESCRIPTION for Engineering Mechanics

نموذج وصف الميكانيك الهندسي

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Mathematics		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	PE 114		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	1	Semester of Delivery	
Administering Department	PE	College	COENG
Module Leader		e-mail	
Module Leader's Acad. Title		Module Leader's Qualification	
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date		Version Number	1.0
Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	<p>This module is a core subject in engineering education that focuses on understanding how the functions can be pictured as graphs, how they are combined and transformed, and ways they can be classified. It is intended to learn students:</p> <ul style="list-style-type: none"> Understand the concept of a function
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	<ul style="list-style-type: none"> • Recognize and classify different types of functions including Trigonometric, exponential, and logarithmic. • Introduce definition of the functions and find domain, co-domain for it then sketched it. • Learn how to sketch the graphs of various types of functions, identifying key features such as intercepts, asymptotes, increasing/decreasing intervals, and turning points. • Define the limit and how it can be used to find the continuity of a function. • Understand the Concept of a Derivative. • Understand and compute higher-order derivatives (second derivatives, third derivatives, etc.) and interpret their meanings, such as concavity and acceleration.
<p>Module Learning Outcomes</p> <p>مخرجات التعلم للمادة الدراسية</p>	<p>At the end of the module, the student will be able to:</p> <ol style="list-style-type: none"> 1. Acquire the ability to think logically and factually, and learning how to generalize the concepts of engineering mathematics 2. Learn how functions are pictures as graphs, how they combined and transformed, and ways they can be classified. 3. Learn and recruit Logarithmic and Trigonometric Functions in the related mathematical models. 4. Learn how to find the limit of function and to understand continuity. 5. Understand the rules of differentiation, derivatives of Trigonometric functions, and the Chain Rule. 6. Learn how to perform the derivatives of inverse functions and logarithms as well as the derivatives of inverse Trigonometric functions. 7. Learn the applications of differentiations in which students can use derivatives to find extreme values of functions and to determine and analyze the shapes of graphs. 8. Understand professional, social and ethical responsibilities. 9. Communicate effectively.
<p>Indicative Contents</p> <p>المحتويات الإرشادية</p>	<p>Introductory Concepts to Functions</p> <ul style="list-style-type: none"> • Functions and Their Graphs • Combining Functions; Shifting and Scaling Graphs • Trigonometric Functions • Exponential Functions • Inverse Functions • Logarithms Functions <p>Introductory Concepts to limits and Continuity</p> <ul style="list-style-type: none"> • Limit of a Function and Limit Laws • Continuity <p>Derivatives</p> <ul style="list-style-type: none"> • Differentiation Rules • The Derivative as a Rate of Change • Derivatives of Trigonometric Functions • The Chain Rule • Implicit Differentiation • Derivatives of Inverse Functions and Logarithms • Derivatives of Inverse Trigonometric Functions • Related Rates <p>Introduction to Graphing Rational Functions</p> <ul style="list-style-type: none"> • Linearization and Differentials

	Applications of Differentiations <ul style="list-style-type: none"> • Extreme Values of Functions • The Mean Value Theorem • Monotonic Functions and the First Derivative Test • Concavity and Curve Sketching • Indeterminate Forms and L'Hôpital's Rule
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	<p>Lectures: during the week, the theoretical lectures will be presented throughout the semester; the discussion of practical work within the lab will be organized and illustrated with activities.</p> <p>Assignments: after the lectures, the assignment will be explained and given to students. It is expected to be done on a weekly basis.</p> <p>Quizzes: the contents of each lecture will be discussed during class for open questions and answers to make sure every student will participate and be active.</p> <p>Practical Discussion: during the practical session, the students will combine as partners and form a group to discuss their class learning and open tutorials on the topics.</p> <p>In class brainstorming sessions: provide students with enough sources and background knowledge briefly within the topics during class to top up their challenge packs to be more active</p>

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	87	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
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	HomeWorks	4	10% (10)	3, 6, 10, and	All

assessment				13	
	Quizzes	3	30% (30)	4, 11 and 14	All
Summative assessment	Midterm Exam	1hr	10% (10)	8	LO #1 - #5, #8 and #9
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introductory Concepts to Functions <ul style="list-style-type: none"> • Functions and Their Graphs • Combining Functions; Shifting and Scaling Graphs
Week 2	<ul style="list-style-type: none"> • Trigonometric Functions
Week 3	<ul style="list-style-type: none"> • Exponential Functions
Week 4	<ul style="list-style-type: none"> • Inverse Functions
Week 5	<ul style="list-style-type: none"> • Logarithms Functions
Week 6	Introductory Concepts to limits and Continuity <ul style="list-style-type: none"> • Limit of Function and Limit Laws • Continuity
Week 7	Derivatives <ul style="list-style-type: none"> • Differentiation Rules • The Derivative as a Rate of Change
Week 8	<ul style="list-style-type: none"> • Derivatives of Trigonometric Functions • The Chain Rule
Week 9	<ul style="list-style-type: none"> • Implicit Differentiation
Week 10	<ul style="list-style-type: none"> • Derivatives of Inverse Functions and Logarithms
Week 11	<ul style="list-style-type: none"> • Derivatives of Inverse Trigonometric Functions • Related Rates
Week 12	Introduction to Graphing Rational Functions <ul style="list-style-type: none"> • Linearization and Differentials
Week 13	Applications of Differentiations <ul style="list-style-type: none"> • Extreme Values of Functions • The Mean Value Theorem

Week 14	<ul style="list-style-type: none"> • Monotonic Functions and the First Derivative Test
Week 15	<ul style="list-style-type: none"> • Concavity and Curve Sketching • Indeterminate Forms and L'Hôpital's Rule

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Text and Books	<ul style="list-style-type: none"> • "Thomas Calculus" G. Thomas, M. Weir, et al., 13th edition, 2014. 	Yes
Recommended Texts		
Websites		

Grading Scheme				
مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
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