

Ministry of Higher Education and Scientific Research

University of Mosul

College of Petroleum and Mining Engineering



Courses Description

Mining Engineering Department

Level Four / Semester One / Bologna Process

2025 – 2026

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Geographical Information System		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☒ Practical ☐ Seminar	
Module Code	DME411			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	1	Semester of Delivery		1
Administering Department	Type Dept. Code	College	Type College Code	
Module Leader	Azealdeen Al-Jawadi		e-mail	azealdeenaljawadi@uomosul.edu.iq
Module Leader's Acad. Title	Asst. Professor		Module Leader's Qualification	Ph.D.
Module Tutor	Azealdeen Al-Jawadi		e-mail	azealdeenaljawadi@uomosul.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail	
Scientific Committee Approval Date	01/06/2026	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 develop problem solving skills and understanding of GIS application of techniques. 2. To understand the concept of GIS. 3. This course deals with the basic concept of GIS. 4. This is the basic subject for all GIS tools. 5. To understand GIS problems.
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. Recognize how GIS work. 2. List the various terms associated with GIS. 3. Summarize what is meant by a basic GIS. 4. Discuss the reaction and involvement of atmosphere.

	5. Describe GIS. 6. Define GISw. 7. Identify the basic GIS elements and their applications. 8. Discuss the operations of Arc GIS. 9. Discuss the various properties of GIS. 10. Explain the GIS laws used in analysis. 11. Identify the GIS relationship with respect to Mining.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - GIS</u> Principles of GIS, applications [15 hrs] Concepts of GIS. [15 hrs] Arc GIS principles and applications. [10 hrs] Methods of applications in computers. [15 hrs] Revision problem classes [6 hrs] <u>Part B – Arc GIS</u> Fundamentals Development of computer applications in GIS. [15 hrs] Components and active devices for GIS applications. [7 hrs] Tools used in Arc GIS and their developments. [15 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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.

Student Workload (SWL)					
الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا					
Structured SWL (h/sem)		63	Structured SWL (h/w)		4
الحمل الدراسي المنتظم للطلاب خلال الفصل			الحمل الدراسي المنتظم للطلاب أسبوعيا		
Unstructured SWL (h/sem)		62	Unstructured SWL (h/w)		4
الحمل الدراسي غير المنتظم للطلاب خلال الفصل			الحمل الدراسي غير المنتظم للطلاب أسبوعيا		
Total SWL (h/sem)		125			
الحمل الدراسي الكلي للطلاب خلال الفصل					
Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10

Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Geographic Information Systems in Petroleum Exploration and Development: Introduction
Week 2	Geographic Information Systems (GIS) Technology: A Brief History, Trends, and Probable Future
Week 3	An Overview of GIS in the Geosciences
Week 4	Geoscientific Modeling: Past, Present, and Future
Week 5	GIS Technology—A Vendor Perspective of its History and Prospects in Petroleum Exploration and Production
Week 6	A Conversation with Petroleum Exploration
Week 7	On the Implementation of GIS for Petroleum Exploration and Development: Issues and Perspectives
Week 8	Building a Regional Study in GIS
Week 9	GIS-Based Analysis of Fluid Migration in Sedimentary Basins
Week 10	The Gap Mountain Prospect: A New Approach to Conceptual Geological Modeling ductance
Week 11	Evaluating International Acquisitions Using a Spatial Database System—A Low-Cost Approach
Week 12	Use of Geographic Information Systems in Hydrocarbon Resource Assessment and Opportunity Analysis
Week 13	Integrated Geo-Systems—A Computational Environment for Integrated Management, Analysis, and Presentation of Petroleum Industry Data
Week 14	Using the World Wide Web to Manage Exploration and Production Team Data
Week 15	GIS—The Exploration and Exploitation Tool
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المناهج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Principles of GIS
Week 2	Lab 2: Tools 1
Week 3	Lab 3: Tools 2
Week 4	Lab 4: Tools 3
Week 5	Lab 5: Tools 4
Week 6	Lab 6: Tools 5
Week 7	Lab 7: Developments of tools

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	(AAPG Computer Applications in Geology, No. 4) Coburn T.C., Yarus J.M. (eds.) - Geographic Information Systems in Petroleum Exploration and Development -AAPG (2000)	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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Design of Mining Equipment		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	DME412			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	UGIV	Semester of Delivery		7
Administering Department	Mining Engineering	College	Petroleum and Mining Engineering	
Module Leader	Adil Akram Mahmood		e-mail	adel.akram88@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	01 / 09 / 2026		Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Mathematics	Semester	2, 3
	Engineering Mechanics		
	Strength of Materials.		
Co-requisites module	-	Semester	-

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The module objectives of Design of Mining Equipment are as follows: 1. To introduce students to the principles and practices of design in the context of mining equipment. 2. To provide students with an understanding of the engineering design process, including conceptual design, detailed design, and design for manufacturing. 3. To teach students how to analyze and evaluate the performance of mining equipment. 4. To enable students to design and optimize mining equipment components and systems for maximum efficiency and safety.

	5. To introduce students to the relevant safety regulations, standards, and codes applicable to the design of mining equipment.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The module learning outcomes for this course may include: 1. Understanding of the principles and practices of designing mining equipment. 2. Ability to identify and apply appropriate design methods and techniques for different equipment types. 3. Knowledge of safety and environmental regulations related to the design of mining equipment. 4. Analytical skills in evaluating the performance and efficiency of equipment designs. 5. Ability to use relevant software and tools for designing and analyzing equipment. 6. Effective communication skills to present and explain equipment designs to different stakeholders in the industry. 7. Ability to work in a team to develop effective solutions to complex equipment design problems.
Indicative Contents المحتويات الإرشادية	The design of mining equipment typically includes a variety of components and systems that are tailored to the specific requirements of the industry. Some indicative contents of the design of petroleum and mining equipment may include: 1. Mechanical design of structures, such as shaft, gears, pipelines, and storage tanks 2. Safety considerations for preventing accidents, spills, and emissions 3. Materials selection and corrosion resistance for durability and long-term performance 4. Cost and feasibility analysis for optimization of design and manufacturing processes.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The design of mining equipment involves various strategies and principles, including the following: 1. Safety: Safety is a primary concern in the design of mining equipment. The equipment must be designed to ensure that workers are safe while using it. The design must take into account all potential hazards and safety risks that workers may encounter while operating the equipment. 2. Efficiency: Efficiency is another important strategy in the design of mining equipment. The equipment must be designed to perform its intended function as efficiently as possible. This means that it should be designed to reduce downtime and maximize productivity. 3. Durability: mining equipment are exposed to harsh environments, and they must be designed to withstand these conditions. The equipment must be durable and able to withstand the wear and tear that comes with daily use. 4. Ease of maintenance: Maintenance is an essential aspect of equipment operation, and the design of mining equipment must take this into account. The equipment must be designed to be easy to maintain and repair to reduce downtime and maintenance costs. 5. Environmental considerations: The design of mining equipment must take into account environmental considerations. This includes minimizing the impact of the equipment on the environment, reducing emissions, and complying with environmental regulations.

Student Workload (SWL) الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem)	78	Structured SWL (h/w)	5

الحمل الدراسي المنتظم للطلاب خلال الفصل		الحمل الدراسي المنتظم للطلاب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب 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	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Mechanical Engineering Design
Week 2	Keystones of Design: Materials Selection and Geometry Determination
Week 3	Simple stresses
Week 4	Combined stresses.
Week 5	Failures Resulting from Static Loading
Week 6	Fatigue Failure Resulting from Variable Loading
Week 7	Shafts and Shaft Components
Week 8	Midterm Exam
Week 9	Welding and Bonding
Week 10	Design of Permanent Joints
Week 11	Gears—General
Week 12	Brakes
Week 13	Power screws
Week 14	bolts
Week 15	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?

Required Texts	- Shigley's Mechanical Engineering Design, Ninth Edition. - Mechanical design of machine elements and machines Second Edition - Textbook of Machine Design R_S Khurmi	Yes
Recommended Texts	-	-

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	Building Stones and Sustainability		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☒ Practical ☒ Seminar	
Module Code	DME413			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	UGIV	Semester of Delivery		7
Administering Department	Type Dept. Code	College	Type College Code	
Module Leader	Nihad Saoud Najim Aljuboori		e-mail	nihadsaoud@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	01/06/2026	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. Understand the significance of building materials in the context of sustainability. 2. Learn about different types of building stones and their characteristics. 3. Study the geological formation and composition of various building stones. 4. Analyze the physical and mechanical properties of different stones. 5. Discuss techniques for responsible quarrying and mining operations. 6. Study methods for reducing energy consumption and waste generation in stone processing. 7. Explore innovative construction techniques using stone materials.

	8. Learn from real-world examples and best practices in sustainable stone construction. 9. Explore the environmental impact of conventional building materials. 10. Identify the need for sustainable alternatives in the construction industry. 11. Promote awareness and advocacy for sustainable stone use.
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. Demonstrate an understanding of the environmental impact of conventional building materials and the need for sustainable alternatives. 2. Identify and describe different types of building stones, including their geological formation, composition, and physical/mechanical properties. 3. Evaluate the sustainability aspects of building stones, including their environmental impact, energy efficiency, and durability. 4. Explain sustainable practices in stone extraction and processing, including responsible quarrying and methods to reduce energy consumption and waste generation. 5. Apply the concept of life cycle assessment (LCA) to evaluate the environmental impacts of building stones throughout their life cycle. 6. Identify sustainable sourcing options for building stones, considering factors such as local/regional sources and certifications for environmentally responsible production. 7. Understand the design and construction considerations for building with stone, including structural properties, design guidelines, and innovative construction techniques. 8. The economic and social aspects of using building stones sustainably, considering economic feasibility, long-term benefits, cultural value, and aesthetic aspects. 9. Advocate for sustainable stone use and raise awareness about the importance of sustainable building materials in the construction industry.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Introduction to Building Materials and Sustainability • Overview of the construction industry and its impact on the environment • Introduction to sustainable building materials and the importance of sustainability in construction 2. Types of Building Stones • Introduction to different types of building stones (e.g., granite, limestone, marble, sandstone) • Geological formation and composition of building stones • Physical and mechanical properties of building stones 3. Environmental Impact of Building Stones • Exploration of the environmental impact of stone extraction and processing • Assessment of carbon footprint, water consumption, and waste generation in stone production • Comparison of the environmental impact of different types of building stones 4. Sustainable Practices in Stone Extraction and Processing • Responsible quarrying and mining practices • Techniques for reducing energy consumption and minimizing waste in stone processing • Recycling and reusing stone waste materials 5. Advocacy and Awareness for Sustainable Stone Use • Strategies for promoting the use of sustainable building stones • Collaboration with industry professionals and organizations to drive sustainable practices

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Lectures and Presentations: Conduct informative lectures and presentations to introduce key concepts, provide theoretical knowledge, and present case studies and examples of sustainable stone construction. This strategy can lay the foundation for participants' understanding of building stones and sustainability. Interactive Discussions: Facilitate group discussions and encourage active participation. Engage participants in discussions on topics such as the environmental impact of building materials, sustainable stone sourcing, and design considerations. This strategy promotes critical thinking, knowledge sharing, and the exploration of different perspectives. Hands-on Activities: Incorporate hands-on activities, such as laboratory experiments or field visits to stone quarries or processing facilities. These activities allow participants to observe and engage directly with building stones, reinforcing their understanding of their characteristics and sustainability aspects. Guest Speakers: Invite industry professionals, architects, engineers, or sustainability experts as guest speakers. Their expertise and experiences can provide valuable insights and practical knowledge related to building stones and sustainability. Guest speakers can also inspire participants and provide real-world perspectives on sustainable stone use. Field Trips and Site Visits: Organize field trips to sustainable stone projects or sites where participants can observe sustainable stone sourcing, extraction, or construction practices. This strategy provides firsthand exposure to sustainable stone use and allows participants to see the practical implementation of sustainable principles
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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	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
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.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative	Midterm Exam	2hr	10% (10)	7	LO #1 - #7

assessment	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 Building Materials and Sustainability
Week 2	Geological formation and composition of building stones
Week 3	Physical and Mechanical Properties of Building Stones
Week 4	Types of Building Stones
Week 5	Gypsum Rock
Week 6	Gypsum Products and Applications
Week 7	Limestone Rock
Week 8	Limestone Products and Applications
Week 9	Sandstone rock
Week 10	Shale rock
Week 11	Marble rock
Week 12	Granite rock
Week 13	Environmental Impact of Building Stones
Week 14	Recycling and reusing buildings materials
Week 15	Importance of sustainability in construction
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Building Materials Testing and Sustainability, Oxford university, 2019	No
Recommended Texts		No
Websites	https://geokansas.ku.edu	

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	Mining Economics		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☒ Seminar	
Module Code	DME 414			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	UGIV	Semester of Delivery		7
Administering Department	Mining department	College	Petroleum and Mining Engineering	
Module Leader	Ammar Faisal Mahmood		e-mail	ammar.faisal@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	01 / 09 / 2026	Version Number	3.0	

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 Mining Economics course aims to enable students to: - Understand the nature of oil and gas as strategic commodities with economic and political dimensions. - Analyze global oil markets and the mechanisms of supply and demand. - Comprehend the concepts of oil pricing and their historical development. - Identify the economics of petroleum exploration, production, and development. - Evaluate the economic feasibility of petroleum projects using financial methods. - Understand the role of international petroleum organizations and their impact on the global market. - Recognize the relationship between النفط and sustainable economic development. - Develop economic analysis and decision-making skills in the energy sector.

Module Learning Outcomes	After completing the course, the student will be able to:
مخرجات التعلم للمادة الدراسية	1. Explain the basic concepts of oil and gas economics. 2. Analyze the structure of the global oil market and the factors affecting it. 3. Interpret oil pricing mechanisms and their economic determinants. 4. Evaluate oil and gas reserves from an economic perspective. 5. Apply the concept of the time value of money in petroleum projects. 6. Use economic feasibility indicators (NPV, IRR, and Payback Period). 7. Distinguish between depreciation, depletion, and amortization in the petroleum industry. 8. Analyze the impact of taxes and petroleum contracts on project profitability. 9. Relate petroleum policies to economic development and energy security. 10. Make well-informed economic decisions regarding petroleum-related issues. 11. Work effectively within a team and analyze real-world case studies. 12. Prepare petroleum economic reports using a scientific approach.

Indicative Contents المحتويات الإرشادية	1. Explain the concept of petroleum reserves, their classifications, and analyze the impact of economic factors on converting resources into commercial reserves. 2. Analyze the role of international petroleum organizations and the impact of their policies on the global oil market. 3. Classify crude oil and relate its type to its economic value and industrial uses. 4. Explain oil pricing mechanisms and analyze the factors affecting global oil prices. 5. Evaluate the role of alternative energy in the global energy mix and its impact on petroleum economics. 6. Analyze the forces of supply and demand and interpret fluctuations in oil prices. 7. Analyze international energy strategies and their role in achieving energy security. 8. Apply the concept of the time value of money in evaluating petroleum projects. 9. Analyze different types of interest rates and their impact on investment decisions. 10. Calculate and interpret rates of return used in petroleum project evaluation. 11. Apply engineering economic decision-making methods to select optimal economic alternatives. 12. Explain and calculate depreciation and analyze its impact on costs and profits. 13. Explain and calculate depletion of petroleum resources and analyze its effect on reserve evaluation. 14. Distinguish amortization and apply it to intangible assets in petroleum projects. 15. Analyze the impact of taxes and petroleum contracts on project profitability.
Learning and Teaching Strategies استراتيجيات التعليم	
Strategies	The course relies on a set of teaching and learning strategies, including: 1. Theoretical lectures supported by real-world examples. 2. Classroom discussions and analysis of contemporary petroleum issues. 3. Case studies from the petroleum industry. 4. Solving economic problems and quantitative applications. 5. Problem-Based Learning (PBL). 6. The use of presentations and audio-visual teaching aids. 7. Assigning students to prepare short research papers and reports. 8. Encouraging self-learning and the use of modern references and resources.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ٥١ 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

Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	100
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Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	10% (10)	2 , 6, and 9	LO #1
	Assignments		10% (10)	3, 4, 8,12	
	Exam		10% (10)	7	-----
	Report		10% (10)	11	
Summative assessment	Midterm Exam		10% (10)	13	
	Final Exam		50	16	
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Petroleum Reserves and Their Classifications
Week 2	Organizations of Oil Exporting and Importing Countries
Week 3	Oil Classification
Week 4	Oil Pricing
Week 5	Alternative Energy
Week 6	Supply and Demand in the Global Oil Market
Week 7	International Energy Strategy
Week 8	Time Value of Money
Week 9	Interest Rates
Week 10	Rates of Return
Week 11	Engineering Decision-Making Methods
Week 12	Depreciation
Week 13	Depletion
Week 14	Amortization
Week 15	Petroleum Taxes and Petroleum Contracts
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس					
		Text			
Required Texts	Petroleum Economics	Van	Penn	A fundamental textbook on petroleum	
	and Engineering	Meurs, P.	Well	project economics.	
	Economics of the Oil and Gas Industry	Al-Chalabi, M.	Springer	A comprehensive reference on the economic principles of oil and gas.	
	Oil and Gas Economics	Johnston, D.	Penn Well	Used for explaining pricing, contracts, and investment.	
	Petroleum Resource Management System (PRMS)	SPE et al.	SPE	A standard guideline for reserve classification.	
Recommended Texts	Energy Economics Journal	Recent Economic Research on Energy		Scientific Journal	
	Journal of Petroleum Science & Engineering	Integrating Technical Aspects with Economic Aspects		Scientific Journal	
	Resources Policy Journal	Resource Policies and Petroleum Rent		Scientific Journal	
	تقارير Carbon Pricing	Analysis of Carbon Pricing and Its Economic Impact		World Bank / IMF	
	تقارير ESG	Sustainability and Governance in the Energy Sector		IEA / OECD	
Websites	الموقع الإلكتروني	الجهة		Usage	
	www.iea.org	International Energy Agency		Global Energy Data and Reports	
	www.opec.org	OPEC		Oil Statistics and Prices	
	www.eia.gov	U.S. Energy Information Administration		Economic Databases and Analyses	
	www.worldbank.org	World Bank		Petroleum Taxes and Resource Rent	
	www.spe.org	Society of Petroleum Engineers		PRMS Standards and Reserve Studies	

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	Environment and Safety of Mines		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☒ Seminar	
Module Code	DME415			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	UGIV	Semester of Delivery		7
Administering Department	Type Dept. Code	College	Petroleum and Mining Engineering	
Module Leader	Ahmed Mahmood Abdullah Daabo		e-mail	ahmeddaboo@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	/06/2023	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	The prerequisite modules for “Environment and Safety of Mines” include basic courses in Geology, Mining Operations, Mine Planning, or Engineering disciplines. Additionally, courses related to environment, health and safety, laws and regulations pertaining to mining and mineral exploitation may also be required.		Semester
Co-requisites module	Fluid Mechanics, Design, Heat Transfer Tunnels Engineering and Mining Environment and safety		Semester

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The objectives of the Environment and Safety of Mines module would typically be to educate miners and mine employees about the various safety and environmental hazards associated with mining and to help them develop strategies and practices to minimize or mitigate these hazards. The module may cover topics such as mine ventilation and air quality, water management, land reclamation, hazardous materials and waste management, mine emergency preparedness, and health and safety regulations and compliance. Ultimately, the goal of the module would be to provide miners with the knowledge and skills to work safely and responsibly in the mining industry without causing harm to themselves, others, or the environment.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The learning outcomes for a module on environment and safety in mining may include developing an understanding of environmental hazards and their potential effects on human health and the environment, identifying various types of risks and hazards associated with mining operations, understanding the safety protocols, regulations, and best practices in the industry, and developing skills in identifying, assessing, and managing risks associated with mining activities. Other potential learning outcomes may include the ability to evaluate environmental impacts of mining, design effective mitigation strategies, and develop plans for emergency response and disaster management in mining operations.
Indicative Contents المحتويات الإرشادية	The environment and safety of mines module may include topics such as mine safety legislation, safety hazards and risks in mining, mine ventilation and lighting, emergency preparedness and response, environmental management in mining, occupational health and hygiene, water management in mining, and community relations and social responsibility.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The learning and teaching strategies of environment and safety of mines module may include the following: 1. Lectures and presentations: Lectures may be used to provide theoretical information about environmental and safety regulations, best practices, and case studies of accidents that occurred in mines. 2. Case studies: Case studies can be used to explore real-life incidents that have happened in mines and reflect on what could have been done differently to prevent them. 3. Practical exercises: Practical exercises can be used to demonstrate how to perform safety checks, conduct risk assessments, and use safety equipment. 4. Group discussions: Group discussions can facilitate learning by encouraging students to actively engage with the material, share their knowledge and opinions, and learn from others.

	5. Field trips or site visits: Field trips or site visits can provide students with hands-on experience in observing and applying safety rules and regulations in mining environments. 6. Online resources and self-directed learning: Online resources and self-directed learning can be used to supplement classroom learning and provide students with access to additional information about mine safety and environmental regulations.
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Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	1	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	2	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	Fundamental Concepts of Fluid Mechanics for Mine Ventilation.
Week 2	Environmental Conditions in the Mine/ Safety Mathematics and Basics
Week 3	Flow Rates and Pressure Measurements
Week 4	Dusts and Other Mine Aerosols
Week 5	Mine Ventilation Networks
Week 6	Main Ventilation/ Natural Ventilation

Week 7	Airflow through Mine Openings and Ducts
Week 8	Main Ventilation/ Forced Ventilation
Week 9	Fans and Flow Control Devices
Week 10	Energy Consumed in Ventilation .
Week 11	Calculation by the Simplified Expression of the Regulator Area
Week 12	The Role of Ventilation in Fires and Explosions
Week 13	Secondary Ventilation
Week 14	Control of Mine Fires and Explosions
Week 15	Heat Sources and Effects in Mines

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Mine Ventilation A Concise Guide for Students MINE VENTILATION AND AIR CONDITIONING	No
Recommended Texts	Environmental Impact of MINING AND MINERAL PROCESSING Management, Monitoring, and Auditing Strategies. Mine Safety A Modern Approach.	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	Graduation Project		Module Delivery
Module Type	B		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☒ Practical ☒ Seminar
Module Code	DME416		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	UGIV	Semester of Delivery	
Administering Department		College	Type College Code
Module Leader		e-mail	
Module Leader's Acad. Title		Module Leader's Qualification	Ph.D., MSc.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	01/09/2026	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Successful completion of all core courses through the 7th semester of the Mining Engineering program (per department regulations) — Semester: 7	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. Enable students to apply the engineering knowledge and skills acquired throughout the program to an independent, real or realistic mining engineering problem. 2. Develop students' ability to plan, organize, and manage an engineering project within a defined timeframe and set of constraints. 3. Strengthen students' skills in engineering data collection, analysis, design, and evaluation of alternative solutions. 4. Enhance students' ability to communicate technical work effectively through written reports and oral presentation. 5. Foster awareness of professional, ethical, safety, economic, and environmental considerations relevant to mining engineering practice.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Identify and formulate a mining engineering problem and define its objectives and scope. (SO1, SO2) 2. Apply mathematics, science, and engineering knowledge to analyze and develop a solution to the project problem. (SO1, SO6) 3. Conduct engineering investigations — including data collection, analysis, and interpretation — to support project conclusions. (SO1, SO6) 4. Design a system, process, or approach that meets specified requirements within realistic economic, environmental, safety, and social constraints. (SO2) 5. Function effectively individually or as part of a team to accomplish the project's objectives. (SO5) 6. Communicate the project's methodology, results, and conclusions clearly in a written report and an oral presentation/defense. (SO3) 7. Recognize and apply professional and ethical responsibilities relevant to mining engineering practice. (SO4)
Indicative Contents المحتويات الإرشادية	1. Selection of the project topic and formulation of the problem statement, in coordination with the project supervisor. 2. Literature review and background study relevant to the project topic. 3. Preparation of the project proposal: objectives, scope, methodology, and work plan. 4. Data collection and/or experimental, field, or laboratory work as required by the project. 5. Engineering analysis, design, modelling, or simulation relevant to the project topic. 6. Evaluation and discussion of results, and comparison with relevant engineering/design standards. 7. Consideration of economic, safety, environmental, and ethical aspects of the proposed solution. 8. Preparation of the final project report following the department's technical writing guidelines.

	9. Preparation and delivery of the final oral presentation and defense before an examination committee.
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Regular individual (or small-group) supervision meetings with the project advisor. 2. Independent research, data collection, and engineering analysis conducted by the student(s). 3. Periodic progress seminars/presentations to monitor progress and provide feedback. 4. Guided use of relevant software, laboratory, or field tools appropriate to the project topic.

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

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Progress Report / Proposal	1	10% (10)	5	CLO1, CLO2
	Progress Seminar	1	10% (10)	10	CLO3, CLO4
Summative assessment	Final Project Report	1	40% (40)	14	CLO2–CLO6
	Final Oral Presentation & Discussion	1	40% (40)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المناهج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to graduation project requirements; allocation of supervisors and project topics.
Week 2-3	Literature review and background research; refinement of the problem statement.
Week 4	Submission and discussion of the project proposal (objectives, scope, methodology, work plan).
Week 5-6	Initial data collection and/or setup of experimental, field, or laboratory work.
Week 7-9	Continued data collection, engineering analysis, and design work under supervision.
Week 10	First progress seminar — presentation to the department supervising committee.
Week 11-12	Refinement of analysis/design based on feedback; continued engineering work.
Week 13	Preparation of the draft final report and supervisor review.
Week 14	Submission of the final project report.
Week 15	Final oral presentation and discussion (defense) before the examination committee.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Relevant technical references, standards, and literature specific to each student's project topic, as identified with the project supervisor.	
Recommended Texts	Reference textbooks and peer-reviewed journal articles related to the specific mining engineering sub-field addressed by the project.	
Websites		

Grading Scheme مخطط الدرجات				
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