Academic Program Description Form

University Name: University of Mosul
Faculty/Institute: College of Petroleum and Mining Engineering
Scientific Department: Department of Mining Engineering
Academic or Professional Program Name: Bachelor / Mining Engineering
Final Certificate Name: Bachelor of Engineering in Mining Engineering
Academic System: Bologna and Semester System
Description Preparation Date: 21 May 2025
File Completion Date: 14 September 2025

Signature:

Head of Department Name:
Dr. Ibrahim Adil Al-Hafidh

Date: 14/9/2025

Signature:

Dean Scientific Associate Name:
Dr. Muneef Mahjoob Mohammed

Date: 14/9/2025

The file is checked by: Sarah Jamal Mayid
Department of Quality Assurance and University Performance
Director of the Quality Assurance and University Performance Department: Sara Jamal Halata
Date: 14/9/2025
Signature:

جامعة الموصل
كلية هندسة النفط والتعدين

Approval of the Dean

Ma'an H. Abdullah
14. 9. 2025

1. Program Vision

The Department of Mining Engineering aspires to be one of the leading departments, both locally and internationally, in graduating competent engineers in the field of petroleum and mining engineering, according to the latest approved international curricula. This is aimed at implementing various engineering projects that the country currently needs in the field of oil and mineral production and industry. This is achieved by providing a high-quality engineering, educational, and research environment in the field of petroleum and mining engineering, serving their country, and also contributing to the development of scientific research to contribute to development and technological progress, and having a positive impact on the local community of Nineveh Governorate in particular and the country in general.

2. Program Mission

1. To provide the Iraqi oil and industrial sector with specialized petroleum and mining engineering personnel in the fields of oil and mineral exploration and production, oil and mining industry technology, and investment, in addition to providing scientific advice to state institutions operating in the oil and industrial sectors.
2. The department seeks to provide students with a contemporary scientific experience that develops their skills by providing an appropriate environment for learning and intellectual creativity, thus achieving excellence in their professional lives. The department also seeks to graduate specialized engineering personnel with sufficient knowledge of the fundamentals of the mining profession, based on a comprehensive understanding of minerals, ore processing, oil extraction, mining, petroleum geology, and mining. We expect the curricula to provide mining engineers with the necessary knowledge of surface and subsurface mining engineering, tunnelling engineering skills, and oil well drilling mechanisms. Furthermore, mining engineers will learn the skills needed to work in the basic extractive and transformational industries.

3. Program Objectives

1. Educating, training, and preparing specialized engineering cadres, qualifying them to work in the field of oil and mining exploration and production technology and related areas, by adopting the latest theoretical and applied scientific curricula and courses accredited by many reputable universities.
2. Enabling the department's graduates to gain advanced qualifications in the field of oil and mining production and production technology in Iraq, and equipping them with the skills to use modern technologies and employ them in their specific scientific specialization.
3. Providing scientific and technical assistance and consultations to all departments, institutions, and bodies operating in the oil and industrial sector based on mineral production and extraction, contributing to the resolution of various related scientific problems and issues, and working to develop performance and academic achievement to benefit society.
4. Working to prepare creative, specialized post-bachelor's cadres capable of developing and establishing scientific frameworks in the field of oil and mineral production and exploration, and oil and mining industry technologies, to meet the immediate needs of society and provide solutions to related problems.
5. Working to establish effective partnerships locally and internationally with universities and relevant government agencies.

6. Focusing on scientific research and its essential role in serving society and solving its problems by conducting applied research and providing scientific and engineering consultations to relevant entities.
7. Fully understanding the important role played by petroleum and mining engineers in preserving the health and safety of society by protecting the environment and implementing occupational safety regulations.
8. Emphasizing continuing education to develop the skills of the department's core scientific disciplines. Such as engineering, mining and applied geology, mining engineering, planning and technology, mine surveying, ore concentration and processing engineering, tunnelling and subsurface structures engineering and design, rock mechanics and testing, ventilation and industrial safety in mines and tunnels, mineral ore geology, petroleum geology, oil, gas and groundwater well drilling, extraction of metallic and non-metallic ores, processing of applied mineral ores, metal forming and casting, metal corrosion and protection, non-metallic materials and its applications, evaluation and inspection of engineering materials, environmental studies.

4. Program Accreditation

The College of Petroleum and Mining Engineering, including the Mining Engineering Department, is committed to achieving the nine standards outlined in the Iraqi Engineering Education Accreditation Council's guide.

5. Other external influences

Non

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	8%	16	8	Essential
College Requirements	7%	14	3	
Department Requirements	85%	167	32	
Summer Training	Available			
Other				

* This can include notes on whether the course is basic or optional.

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours			
			ECTC	SWL	USSWL	SSWL
First Year (Bologna Pathway)	DME111	Geology for Engineers I	7	175	97	78
	DME112	Engineering drawing and AutoCAD	7	175	82	93
	DME113	Mathematics 1	6	150	87	63
	DME114	Engineering Mechanics	6	150	87	63
	UOM1021	English Language	2	50	17	33
	UOM1040	Democracy and Human Rights	2	50	19	31
	DME121	Engineering Physics	6	150	72	78
	DME122	Petroleum Geology	6	150	72	78
	DME 123	Numerical and Engineering Analysis	5	150	87	63
	UOM103	MS Microsoft and Internet	5	125	62	63
	DME125	Engineering Chemistry	5	125	62	63
	UOM1011	Arabic Language	2	50	17	33
Second Year (Bologna Pathway)	DME211	Mathematics 11	5	125	62	63
	DME222	Ore and Oil Exploration by Remote Sensing	5	125	47	78
	DME213	Engineering Surveying	4	100	22	78
	DME214	Static Fluid Mechanics	4	100	37	63
	DME215	Hydrogeology	4	100	62	63
	DME216	Transportation and circulation of raw materials	3	75	52	48
	UOM2022	English Language 11	2	50	17	33
	UOM2032	Computer 11	3	75	19	31
	DME221	Strength of Materials	6	150	57	93
	DME223	Project Management for Mining	5	125	62	63
	DME224	Dynamic Fluid Mechanics	4	100	37	63
	DME225	Thermodynamics	6	150	57	93
	DME226	Mathematics 111	5	125	62	63
	UOM101	Arabic Language	2	50	17	33
	UOM2050	Baath Party crimes in Iraq	2	50	17	33
Third Year (Yearly)			Theoretical		Practical	
	ME 311	Transportation and circulation of raw materials	2		0	
	ME 312	Industrial Chemistry	2		2	
	ME 313	Ore processing	3		2	
	ME 314	Well logging	1		2	
	ME 315	Mining engineering	4		0	
	ME 316	Applied rock mechanics	2		2	
	ME 317	Petroleum product engineering	3		0	
	ME 318	Sulfur production processes engineering	3		2	
Fourth Year (Yearly)	ME 411	Computer Application in Mining Engineering	3		2	
	ME 412	Environmental and safety of mines	3		0	
	ME 413	Economics and analysis of mining data	3		0	
	ME 514	Fundamentals of mining engineering and technology	3		0	
	ME 415	Design of mine machinery	2		0	

	ME 416	Rock blasting	2	0
	ME 417	Tunnel engineering	2	2
	ME 4112	Final Year Projects (annual)	2	0

8. Expected learning outcomes of the program

Knowledge

Statement A1: - Mastery of the theoretical foundations of mining engineering, including geology, heat transfer, thermodynamics, and fluid dynamics

Statement A2: Comprehensive knowledge of the latest technologies and methods used in materials extraction from surface and subsurface mines.

Statement A3: Ability to analyze mines data and develop models to predict mines behavior and evaluate different management strategies

Statement A4: Awareness of the environmental impacts of oil extraction operations and the development of strategies for sustainable extraction

Skills

Statement B1: Ability to analyze complex technical problems and develop effective solutions based on data and scientific knowledge.

Statement B2: Proficiency in using specialized engineering software for designing and analyzing mining and ventilation models.

Statement B3: Effective communication: Ability to present and explain technical information clearly to colleagues, specialists, and non-specialists

Statement B4: Teamwork and leadership: Ability to work effectively within multidisciplinary teams and lead engineering projects

Ethics

Statement C1: Strong commitment to ethical standards in all stages of engineering work, including integrity and transparency.

Statement C2: Awareness of the importance of environmental protection and contributing to sustainable development

Statement C3: Commitment to continuous learning and regularly updating knowledge and skills to keep up with technological advancements

Statement C4: Promoting mutual understanding and respect among different cultures and working effectively in multinational environments

9. Teaching and Learning Strategies

- Computer laboratories
- Graduation projects
- Industrial training
- Field visits to oil facilities
- Theoretical lectures
- Discussion sessions
- Laboratory experiments

10. Evaluation methods

- Quizzes, midterm, and final exams
- Reports
- Practical exams and homework assignments
- Presentations

11.Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Professor	Geology	Sedimentology			1	
Assistance Professor	Geology	Geophysics			1	
Assistance Professor	Geology	Geotechnique			1	
Assistance Professor	Mechanical Engineering	Thermal power and renewable energy			1	
Lecturer	Dams and Water Resources Engineering	Fluids			1	
Lecturer	Chemistry	Industrial Chemistry			1	
Lecturer	Chemistry	Physical Chemistry			1	
Lecturer	Geology	Palaeontology			1	
Lecturer	Mechanical Engineering	Fluids			1	
lecturer	Physics	Nuclear physics			1	
Lecturer	Applied geology	Engineering geology			2	
Assistant lecturer	Mechanical Engineering	Applied mechanics			1	
Assistant lecturer	Mechanical Engineering	Thermal power			1	
Assistant lecturer	Mechanical Engineering	Production and Metallurgy			1	
Assistant lecturer	Civil Engineering	Structure			1	
Assistant lecturer		Soil Mechanics			1	
Assistant lecturer		Traffic and transportation engineering			1	
Assistant lecturer	Mechanical Engineering	Research and Operations			1	
Assistant lecturer	geology	Geochemistry			1	

12.Professional Development

Mentoring new faculty members

The academic program of the Department of Mining Engineering is designed to enhance the comprehensive knowledge and skills of new faculty members in various educational fields. The program begins with a focus on equipping faculty members with the basic skills to manage their duties effectively. It then progresses to include the processes and procedures necessary to ensure the achievement of targeted learning outcomes in various programs. To achieve these goals, the program includes the following main components:

- Educational Courses: New faculty members participate in educational courses aimed at improving the quality of the educational process. These courses cover a range of topics, including training in teaching methods and teaching effective strategies for engaging students and delivering course content.
- Modern Trends in University Teaching: Exploring innovative approaches to teaching and learning in higher education.
- Student Assessment: Courses and workshops for new faculty members on the process of assessing student performance and understanding.
- Exam Preparation: Strategies for preparing fair exams.
- University Policies: Familiarize yourself with relevant laws, regulations, instructions, and e-learning platforms.
- Continuous Assessment: Faculty members, both full-time and part-time, undergo continuous assessment to identify areas for development throughout their teaching careers. This process helps ensure that faculty members are continually improving and adapting to meet the evolving needs of students and the university.
- Professional development opportunities: Faculty members are encouraged to participate in faculty development courses offered by the university's department or continuing education unit to enhance their skills and remain relevant. These courses provide opportunities to stay abreast of trends in teaching and learning and collaborate with colleagues.

Professional development of faculty members

The faculty of the Mining Engineering Department has links with key ministries in Iraq, namely the Ministry of Higher Education and Scientific Research, the Ministry of Oil, and the Ministry of Industry. The department has organized numerous seminars over the past years under the supervision of the Ministry of Higher Education and Scientific Research. The topics of the seminars addressed challenges in modern technologies and methods in oil and mineral extraction, exploration, ore processing, and export operations. These links provide faculty members with practical experience.

In this context, the Continuing Education Committee of the Mining Engineering Department has organized numerous lectures and workshops for faculty members in various fields over the past three academic years, as follows:

 Developing e-learning and teaching methods
 Scientific publications
 Academic accreditation
 Various seminars in the field of petroleum and mining engineering
 Participation in conferences, seminars, workshops, and training courses outside Iraq
 Participation in conferences, seminars, workshops, and training courses inside Iraq

13.Acceptance Criterion

The Mining Engineering Department's admissions capacity is determined within the admissions plan and based on the department's admissions capacity. The Academic Committee determines the number of new students required and then sends it to the Deanship, then the University, and

finally the Ministry for official approval. To be eligible for admission to the Mining Engineering Department at the undergraduate level, applicants must meet certain requirements. The admissions process is overseen by the Ministry of Higher Education and Scientific Research, which administers and assigns grades based on their high school grades. The following are some of the main requirements for student admission to government institutions and colleges:

1. Iraqi nationality and year of birth: Applicants must be Iraqi nationals.
2. Iraqi high school diploma: Applicants must have a certificate issued by an Iraqi high school accredited by the Ministry of Education.
3. Medical certificate: Applicants must submit a medical certificate to ensure they meet the necessary health requirements.
4. Full-time enrollment: Applicants must commit to being full-time students, dedicating their time to their studies in the department.
5. Not accepting continuation studies at another college.
6. Non-Iraqi (incoming) students who have obtained a certificate from an Iraqi high school are admitted according to the central admissions system.
7. Acceptance of the top 10% of technical institute graduates.
8. Admission of gifted students.

14. The most important information sources about the program

- University Guide
- College Website: https://uomosul.edu.iq/en/petroleumengineering/

15. Program Development Plan

To enhance the quality of education, raise graduate outcomes, and meet the required competencies, the Department Council has decided to adopt the "Bologna System for Education." This system incorporates the European Credit Transfer and Accumulation System (ECTS) instead of the current system, in line with the department's commitment to continuous improvement. The new system will be implemented starting from 2023-2024. Adopting the Bologna Process is expected to achieve several benefits:

• Student-oriented learning: The system places the student at the center of the learning process, enhancing the overall educational system.
• Increased classroom interaction: Continuous interaction between faculty and students fosters a more dynamic learning environment.
• Focus on professional and practical skills: Emphasis is placed on acquiring practical skills relevant to professional development.
• Opportunity for continuous learning: Students will have the opportunity for continuous learning, assessment, and feedback.
• Semi-annual performance evaluation: The system allows for student performance evaluation twice a year, providing more comprehensive feedback.
• Deepening subject understanding: The system is expected to contribute to deepening student understanding of subject matter.

Program Skills Outline																
				Required program Learning outcomes												
Year/ Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics				
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	
First Year (Bologna) Semester 1	DME111	Geology for Engineers I	Basic	●		●		●				●				
	DME112	Engineering drawing and AutoCAD	Basic	●				●								
	DME113	Mathematics 1	Basic	●				●								
	DME114	Engineering Mechanics	Basic	●		●										
	UOM1021	English Language	Basic					●								
	UOM1040	Democracy and Human Rights	Basic			●						●				
First Year (Bologna) Semester 2	DME121	Engineering Physics	Basic	●								●				
	DME122	Petroleum Geology	Basic	●					●							
	DME 123	Numerical and Engineering Analysis	Basic	●				●								
	UOM103	Microsoft Office and Internet	Basic	●				●				●				
	DME125	Engineering Chemistry	Basic	●												
	DME126	Scientific English Language	Basic					●				●				
Second Year (Bologna) Semester 3	DME211	Mathematics 11	Basic	●				●								
	DME222	Ore and Oil Exploration by Remote Sensing	Basic	●				●								
	DME213	Engineering Surveying	Basic	●					●			●				
	DME214	Static Fluid Mechanics	Basic	●								●				
	DME215	Hydrogeology	Basic	●					●							
	DME216	Transportation and circulation of raw materials	Basic	●				●								
	UOM2022	English Language 11	Basic					●				●				
	UOM2032	Computer 11	Basic	●				●				●				
Second Year (Bologna) Semester 4	DME221	Strength of Materials	Basic	●												
	DME223	Project Management for Mining	Basic	●								●				
	DME224	Dynamic Fluid Mechanics	Basic	●								●				
	DME225	Thermodynamics	Basic	●				●					●			
	DME226	Mathematics 111	Basic	●				●								
	UOM101	Arabic Language	Basic					●				●				
	UOM2050	Baath Party crimes in Iraq	Basic	●								●				
Third Year	ME 311	Transportation and circulation of raw materials	Basic	●				●								
	ME 312	Industrial Chemistry	Basic	●												

	ME 313	Ore processing	Basic	●				●					●		
	ME 314	Well logging	Basic	●					●						
	ME 315	Mining engineering	Basic	●				●				●			
	ME 316	Applied rock mechanics	Basic	●				●				●			
	ME 317	Petroleum product engineering	Basic	●											
	ME 318	Sulfur production processes engineering	Basic	●								●			
Fourth Year	ME 411	Computer Application in Mining Engineering	Basic	●				●							
	ME 412	Environmental and safety of mines	Basic	●								●			
	ME 413	Economics and analysis of mining data	Basic	●				●				●			
	ME 514	Fundamentals of mining engineering and technology	Basic	●								●			
	ME 415	Design of mine machinery	Basic	●				●							
	ME 416	Rock blasting	Basic	●				●				●			
	ME 417	Tunnel engineering	Basic	●				●				●			
	ME 4112	Final Year Projects (annual)	Basic	●				●				●			

- Please tick the boxes corresponding to the individual program learning outcomes under evaluation.

University of Mosul

College of Petroleum and Mining Engineering

Department of Mining Engineering

Course Description

First Stage/First Semester (Bologna Track)

Prof. Dr. Nabil Youssef Al-Banna

Head of the Scientific Committee

Dr. Ibrahim Adil Al-Hafidh

Head of Department

كلية هندسة النفط والتعدين
قسم هندسة التعدين

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Geology for Engineers**			**Module Delivery**	
Module Type	**C**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**ME111**				
ECTS Credits	**7.00**				
SWL (hr/sem)	**175**				
Module Level		**UGI**	**Semester of Delivery**		1
Administering Department		**Mining engineering**	**College**	**Petroleum and Mining engineering**	
Module Leader	**Mauj Ali Hussain**		**e-mail**	**mauj.ali@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		**Eman Kassim Yahya**	**e-mail**	**eman.q@uomosul.edu.iq**	
Scientific Committee Approval Date		**15/09/2024**	**Version Number**	**1.0**	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	Petroleum geology, Geochemistry of ores	**Semester**	2

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	**The main objectives of the course are:** 1- Study the formation of the earth's sphere. 2- Initial structure of the earth.

	3- Crystal system and how the minerals crystallized in different systems. 4- Different type of the minerals, with studies the optical and cohesive properties of the minerals. 5- Study the rocks and rock cycle. 6- Study the type of the rocks (igneous, sedimentary and metamorphic rocks). 7- Study the sedimentary processes (weathering, transportation and deposition). 8- Study the geological structures. 9- Study the plate tectonic 10- Study the hydrology. 11- Study the GIS.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- To know how can use the student syllabus content in the field of engineering geology project. 2- To use the application of engineering geology in the scientific trip. 3- To learn mainly how the students answer the questions in the examination. 4. Introduction: Concept of geology, Importance of geology in mining. Origin of the Earth - Age of the Earth, Earth and Planetary system, size, shape. Structure and constitution of the interior of the earth; atmosphere and greenhouse effect; Isostasy; elements of seismology; 5. classification types of the rocks (igneous, metamorphic, sedimentary) and identification by hand specimens. 6. Identification of the minerals by hand specimen.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **Part A-theoretical** Geology for engineers. Introduction: Concept of geology, Importance of geology in mining. Origin of the Earth - Age of the Earth, Earth and Planetary system, size, shape. Structure and constitution of the interior of the earth; atmosphere and greenhouse effect; Isostasy; elements of seismology;(6hr). Mineralogy Minerals – definition, formation, and mode of occurrences. Identification – physical properties (like Form, Color, Luster, Cleavage, Fractures, Hardness, and specific gravity), chemical properties, and Optical properties of some minerals. Classification of minerals.(2hr) Rocks, Rocks cycle, Types and Characteristics, Weathering and Erosion Types., Sedimentary Rocks, igneous rocks, sedimentary rock, fossils. (12hr)

	Economic geology Definition, fuel, ores, industry rocks. Petroleum geology(2hr). Structural Geology: Plate Tectonic Theory, Stratigraphy, Geological Time Scale. (8hr) Introduction GIS (2hr) **Part B practical** Crystals(4hr) Minerals by hand specimens. Physical Properties Of Rocks. Sedimentary rocks identification by hand specimens Igneous rocks identification by hand specimens, metamorphic rocks identification by hand specimens(12hr) The contour map , Geological concepts and methods in the mining cycle: exploration, Exploitation and closure of mines. Application of sequence Theory to interpretation of the stratigraphic record(10 hr) Application of GIS.(4hr)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this engineering geology 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 and interactive tutorials. e.g. lectures, seminars, online learning, laboratories, practice-based.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	97	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**175**		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	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	Geology for engineers.
Week 2	Introduction: Concept of geology, Importance of geology in mining. Origin of the Earth - Age of the Earth, Earth and Planetary system, size, shape. Structure and constitution of the interior of the earth; atmosphere and greenhouse effect; Isostasy; elements of seismology;
Week 3	Mineralogy Minerals – definition, formation, and mode of occurrences. Identification – physical properties (like Form, Color, Luster, Cleavage, Fractures, Hardness and specific gravity), chemical properties, and Optical properties of some minerals. Classification of minerals.
Week 4	Plate Tectonic Theory
Week 5	Rocks, Rocks Cycle, Types, and Characteristics
Week 6	Weathering and Erosion Types.
Week 7	Sedimentary Rocks
Week 8	Igneous Rocks
Week 9	Metamorphic Rocks
Week 10	Structural Geology: Stratified rocks and their structures. Attitude of strata. Outcrop and in crop
Week 11	Stereographic projection.
Week 12	Economic geology

	Definition, fuel, ores, industry rocks.
Week 13	Stratigraphy Definition and scope. Stratigraphic correlation.
Week 14	Geological Time Scale.
Week 15	**Environments deposition.**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1-2: Crystals
Week 3	Lab3: Minerals by hand specimens.
Week 4	Lab 4:the contour map
Week 5	Lab 5: Physical Properties Of Rocks.
Week 6-7	Lab 6-7: Sedimentary rocks identification by hand specimens.
Week 8	Lab8: Igneous rocks identification by hand specimens.
Week 9	Lab9: Metamorphic rocks identification by hand specimens.
Week 10	Lab10: Geological Maps: fold, fault,
Week 11	Lab11: Application Stereographic projection.
Week 12	Lab12:. Geological concepts and methods in the mining cycle: exploration, Exploitation and closure of mines.
Week 13	Lab13: Application of sequence Theory to interpretation of the stratigraphic record
Week 14	Lab14: the contour map 1
Week 15	Lab15: contour maps topographic maps.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1- Parbin, S., 2004; Engineering and General geology. Six editions (revised and enlarged). S. K. Kataria and sons. J. S. Offset printers. 2- Garg, S.K., 2003; Physical and engineering geology. Khana publisher. 3- Wicander, R. and James, S.M., 1995; Essentials of geology. West Publishing Company.	NO

	4- Mahapatra, G.B., 2004; Textbook of physical geology. CBS Publisher Distributors 5-Egger, A.E.,2003; "Earth Structure: A Virtual Journey to the Center of the Earth," *Visionlearning* Vol. EAS (1).	
Recommended Texts	Banger, K.M., 2004; Principles of Engineering Geology. Standard publisher's distributors. 1705-B,Nai Sarak,delhi-110006.	No
Websites	https://www.geologypage.com/2019/04/engineering-geology.html	

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	**Engineering Drawing (manual &AUTO-CAD)**			**Module Delivery**	
Module Type	**B**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	**ME112**				
ECTS Credits	**7**				
SWL (hr/sem)	**175**				
Module Level		**1**	**Semester of Delivery**		1
Administering Department		**Mining engineering**	**College**	Petroleum and Mining engineering	
Module Leader	**Sarah Jamal**		**e-mail**	sarahjamal@umosul.edu.iq	
Module Leader's Acad. Title		**Asst. L**	**Module Leader's Qualification**		MSc.
Module Tutor	**Zina Nofel** **Shahad Salem**		**e-mail**	zinanaufal@uomosul.edu.iq shahadsibrahim88@uomosul.edu.iq	
Peer Reviewer Name		**Eman Kassim Yahya**	**e-mail**	eman.q@uomosul.edu.iq	
Scientific Committee Approval Date		**15/9/2024**	**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	The purpose of an engineering drawing is to clearly and accurately capture all geometric features of a product or component so that a manufacturer or engineer can produced the required item.

	This study-unit covers the principles and practice of engineering drawing. It aims at providing students with the basics in understanding, reading and generating engineering drawings.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Develop the ability to produce simple engineering drawing and sketches based on current practice. Develop the skills to read manufacturing and construction drawings used in industry Develop a working knowledge of the layout of plant and equipment Develop skills in abstracting information from calculation sheets and schematic diagrams to produce working drawings for manufacturers, installers and fabricators
Indicative Contents المحتويات الإرشادية1	Indicative content includes the following. Part A – Manual Drawing Introduction to engineering drawing . instrument and accessories , folding of drawing sheets Drawing sheet layout and title block, type of lines , lettering Drawing a Parallel and perpendicular lines and drawing special angle Geometrical construction :bisecting a straight line and dividing a straight line into a given number of equal parts [12 hr] Drawing an arc tangent two lines , Drawing an arc tangent to a given point on the line Drawing an arc tangent to a line and an arc Bisect a given arc angle. Drawing a circle and tangents Construction of line tangents two circles (open belt , closed belt). Construction of an arc tangent of given radius to two given arcs [12 hr] Drawing ellipse Drawing an ogee curve[6 hr] Geometrical shapes: pentagon and hexagon in a given circle and construct a hexagon and pentagon by giving the length of the side Drawing an octagon ,General method of drawing any polygon Dimensioning, scales and unites Orthographic projections: theory of Orthographic projections, the six principle view[12 hr] Part B – AUTO-CAD Introduction about Auto-CAD engineering drawing, Component of AutoCAD screen, Title bar , Menu bar , Tool bar , properties , Make a new drawing , saving , Unite , boundary of paper , ,Command line

	Draw list, Line , Xline , circle , arc , polyline ,polygon , point (dividing , measures) , Ellipse , Text , block Modify list Erase , offset , copy , Rotate , Array , Trim , Extend, Mirror , Move , Explode , Fillet , Chamfer Object snap , Polar tracking Dimensions [12 hr] Projections with AUTO-CAD Introduction about projections, types of projections, projections in third angle, Projections Of Object contain perpendicular surface only, projection of object contain include surface Isometric drawing in AUTO-CAD [12 hr].

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.

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	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	82	**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
	classwork	6	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Lab.	5	10% (10)	Continuous	All

	CLASSWORK	6	10%	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	20% (10)	7	LO #1 - #7
	Final Exam	3hr	40% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to engineering drawing . instrument and accessories , folding of drawing sheets Drawing sheet layout and title block, type of lines , lettering
Week 2	Drawing a Parallel and perpendicular lines and drawing special angles Geometrical construction :bisecting a straight line and dividing a straight line into a given number of equal parts
Week 3	Drawing an arc tangent two lines , Drawing an arc tangent to a given point on the line Drawing an arc tangent to a line and an arc Bisect a given arc angle. Drawing a circle and tangents
Week 4	Construction of line tangents two circles (open belt , closed belt). Construction of an arc tangent of given radius to two given arcs
Week 5	Drawing ellipse Drawing an ogee curve
Week 6	Geometrical shapes: pentagon and hexagon in a given circle and construct a hexagon and pentagon by giving the length of the side Drawing an octagon ,General method of drawing any polygon Dimensioning, scales and unites
Week 7	Orthographic projections: theory of Orthographic projections, the six principle view
Week 8	Mid- exam Orthographic projections: theory of Orthographic projections, the six principle view
Week 9	Object orientation, selection of views, spacing the selected views Alternate –position views ,Hidden features ,center lines
Week 10	Isometric drawing and sketching
Week 11	Introduction about Auto-CAD engineering drawing, Component of AutoCAD screen, Title bar , Menu bar , Tool bar , properties , Make a new drawing , saving , Unite , boundary of paper , ,Command line Draw list, Line , Xline , circle , arc , polyline ,polygon , point (dividing , measures) , Ellipse , Text , block
Week 12	Modify list Erase , offset , copy , Rotate , Array , Trim , Extend, Mirror , Move , Explode , Fillet , Chamfer Object snap , Polar tracking **Dimensions**
Week 13	**Projections**
Week 14	**Projections with AUTO-CAD** Introduction about projections , types of projections, projections in third angle , Projections Of Object contain perpendicular surface only , projection of object contain include surface

Week 15	Isometric drawing in AUTO-CAD
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Engineering drawing and Graphic technology by Thomas E.Frengh , Charles J.Vierck , Robert J.Faster	Yes
Recommended Texts	Engineering Drawing (plane and solid geometry) by N. D. BHATT , 2011 Beginner's guide To engineering drawings by Dr .E.R. Latifee , 2005 Engineering drawing from first principles Using AutoCAD by Dennis Maguire . AutoCAD 2013 for Dummies by David Byrnes and Bill Fans	No

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	**Applied Mathematics**			**Module Delivery**	
Module Type	**B**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**DME113**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	**1**	**Semester of Delivery**	**1**		
Administering Department	**Mining engineering**	**College**	**Petroleum and mining engineering**		
Module Leader	Abdullah Hussein Ibrahim	**e-mail**	abdallh.hussen@uomosul.edu.iq		
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph. D.		
Module Tutor	**None**	**e-mail**	-------		
Peer Reviewer Name	**Eman Kassim Yahya**	**e-mail**	**eman.q@uomosul.edu.iq**		
Scientific Committee Approval Date	15/09/2024	**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	This course is intended to learn student the fundamentals of domain and range, learn students how they can draw the trigonometric functions, limits, types of integrals including fractional integral, quantify the area under curve, differentiation, and an introduction about the Polar Coordinates as well as the parametric equations.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Increase the students skills to deal with the mathematical engineering questions. 2- Increase the level of students in thinking. 3- Prepare the students to understand more developed materials. 4- Determine the area under curve using integration in which the students can use this method to determine the reservoir volume. 5- Perform a connection between the mathematical equations with the petroleum engineering major. 6- Use the optimum approaches to find the solution of mathematical questions.
Indicative Contents المحتويات الإرشادية	Indicative contents: Module 1: An Introduction of Mathematics Module 2: Domain and Range of Functions Module 3: Drawing the Trigonometric functions Module 4: Limits (Continuous and Discontinuous Module 5: Transformation functions including Period, Horizontal and Vertical ships, and Amplitude Module 6: Differentiation and derivative methods Module 7: Infinite and Finite Integrals Module 8: Integration Methods Module 9: An Introduction to Polar Coordinates

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, homework's, discussion in class, and help session. This will be achieved through classes and interactive tutorials.

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	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**	4	10% (10)	3,5,11,13	LO #3, #5 and #11, #13
	Assignments	4	10% (10)	3,6,10,13	LO #3, #6 and #10, #13
	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	Module 1: An Introduction of Mathematics.
Week 2,3	Module 2: Domain and Range of Functions.
Week 3	Module 3: Functions and their Graphs.
Week 4	Module 4: Power functions and Exponential functions.
Week 5	Module 5: Trigonometric function and Graphing.
Week 6	Module 6: Relation inverse between trigonometric function.
Week 7	Module 7: Shifting and scalling graphs.
Week 8	Module 8: Transformation functions.
Week 9	Module 9: Period, Horizontal and Vertical ships, and Amplitude.
Week 10	Module 10: The quick method of drawing trignometric functions.
Week 11	Module 11: Limits.
Week 12	Module 12: Right-hand limits.
Week 13	Module 13: left -hand limits.
Week 14	Module 14: limits in Addition formulas.
Week 15	Module 15: continuous functions.
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	Curriculum and Textbook	Yes
Recommended Texts	Calculus I	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	**Engineering Mechanics**			**Module Delivery**	
Module Type	**Basic learning activities**			☒ **Theory** ☐**Lecture** ☐**Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**DME114**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Ayad M. Ahmed Alwaise		**e-mail**	Ayad_waise@yahoo.com	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name: Sarah Saad Abduljabbar		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	Strength of materials	**Semester**	4

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 statics and applications of physics theory through the application of techniques. 2. To understand forces, Moments, and equilibrium systems. 3. This course deals with the basic concept of Mechanical Engineering. 4. This is the basic subject for all statics and forces applications. 5. To understand the concept of the moment and forces problems.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write a Learning Outcomes, better to be equal to the number of study weeks. 1-Statics is a type of science that helps people design safe and strong structures, like bridges and buildings. It's all about studying how things stay in place even when they are not moving. This is important for engineers and physicists who want to understand how materials react to different forces, like the ones that happen when an airplane takes off or lands. By studying statics, people can make better things and improve technology. 2- Determine the forces acting on a structure or mechanical component: Students learn how to analyze complex systems and identify the forces acting on each individual component. This understanding is crucial for designing structures and machines that can withstand expected loads without failure. 3- Understanding of torque and power transmission: Moments are also used to analyze the transmission of torque and power in mechanical systems. Students learn how to determine the torque required for various mechanical components, such as gears, shafts, and pulleys, to ensure proper operation and efficient power transmission. 4-Free body diagrams: Students learn how to construct free body diagrams that represent the forces and moments acting on a rigid body. They learn to identify and label the forces and moments correctly, which aids in the analysis of equilibrium conditions. 5-Moment equations: Students learn to set up and solve moment equations to determine unknown forces or moments in a system. They learn how to apply the principle of moments to balance and stabilize structures and machines. 6-Some of the key learning outcomes include: Understanding Frictional Forces, Determining Static Friction, Analyzing Equilibrium. Solving Engineering Problems. 7-Dynamics is studying how things move and how different forces affect how they move. It helps us understand how planets move in space and how machines work. It's really important in science and helps us learn about how things in the world move. 8-Understanding Curvature and Tangential Components: Curvilinear motion involves the concept of curvature, which measures how sharply a path deviates from a straight line. By studying this topic, you gain an understanding of curvature and its implications in motion analysis. Additionally, you learn to determine tangential components of velocity and acceleration along the curvilinear path. 9-Understanding Projectile Motion: By studying the motion of a projectile, you gain a thorough understanding of the fundamental principles of projectile motion. You learn about the trajectory, range, maximum height, and time of flight of a projectile.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Statics is a branch of mechanics that deals with the study of stationary objects and systems under the action of external forces. In other words, statics is concerned with the analysis of forces acting on objects that are not in motion. It is an essential subject for engineers and physicists as it is the foundation for the study of mechanics, which is the branch of physics that deals with the motion of objects. Statics is a crucial sub-topic of mechanics and is essential in engineering and physics courses. [10 hrs.] It deals with the study of forces acting on objects that are not moving. The primary objectives of statics are to determine the forces acting on an object, the moments of forces acting on an object, and the equilibrium conditions of an object. The study of

	statics is essential for the design of structures, such as bridges, buildings, and machines, to ensure that they are safe and reliable. [10hrs.] Revision problem classes [6 hrs.] The study of statics is also important in understanding the behavior of materials under different conditions. It helps engineers and physicists to understand how different materials react to external forces and how they can be designed to withstand these forces. For example, in aerospace engineering, the study of statics is essential in the design of aircraft and spacecraft to ensure that they can withstand the forces of takeoff, landing, and flight. In general, the study of statics is crucial for the development of new technologies and the improvement of existing ones. [10 hrs.] Dynamics is concerned with the motion of objects, and it is often used to describe the movement of objects in three dimensions. In dynamics, the focus is on understanding how forces affect the motion of an object. The forces that act on an object can be external, such as gravity, friction, or air resistance, or they can be internal, such as the forces that hold the particles of an object together. Dynamics is a complex subject, and it requires a deep understanding of physics and mathematics to fully grasp its principles. Dynamics is a fundamental part of physics, and it is used in many different fields, from engineering to astronomy. [8 hrs.] It deals with the study of forces acting on objects that are not moving. The primary objectives of Dynamics are to determine the forces acting on an object, the moments of forces acting on an object, and the equilibrium conditions of an object. The study of Dynamics is essential for the design of structures, such as bridges, buildings, and machines, to ensure that they are safe and reliable. [4 hrs.] Revision problem classes [6 hrs.] The study of dynamics is also important in understanding the behavior of materials under different conditions. Understanding dynamics is crucial in the design and construction of machines and structures, as it allows engineers to predict how these objects will behave under different forces. In astronomy, dynamics is used to study the movement of planets and stars, and it is used to predict the behavior of celestial bodies over time. As such, dynamics is a critical subject in physics, and it is essential for anyone who wants to study the natural world in depth. [6 hrs.]
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.

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)	87	**Unstructured SWL (h/w)**	6

الحمل الدراسي غير المنتظم للطالب خلال الفصل		الحمل الدراسي غير المنتظم للطالب أسبوعيا	
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 #5, #6
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Tutorial	1	10%(10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #9
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 engineering mechanics+second newton`s law
Week 2	Forces and Resultant
Week 3	Moment
Week 4	Moment of Couple+ Free body diagram
Week 5	Equilibrium+ **Quizze**
Week 6	Centroid
Week 7	Mid exam+ Centroid
Week 8	Moment of Inertia
Week 9	Frictions
Week 10	Introduction to engineering mechanics (Dynamics) + **Quizze**
Week 11	Rectilinear Kinematics: Continuous Motion
Week 12	Rectilinear Kinematics: Erratic Motion
Week 13	General Curvilinear Motion
Week 14	Motion of a Projectile
Week 15	The Work of a Force

Week 16	The preparatory week before the Final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Engineering Mechanics (Statics) Hibbller 13rd Edition Meriam	Yes
Recommended Texts	Engineering Mechanics (Dynamics) Hibbller 13rd Edition Meriam	yes
Websites	https://www.google.com/search?client=firefox-b-d&q=engineering+mechanics+statics&si=AMnBZoFs9uB3Z_GHFPC_zPRokU4h1kiG1kM_Tt6zs41M5kAusrUywe1ttS3dYXXzQp9e0wyyHZ8lpNloWGPcATvDW7ntpdhPPVrc6JSu-QxYEZXpC1KVRcv7g6v9Xld3sYvWisKUoKjk&ictx=1&ved=2ahUKEwj18Lev0bH_AhUfxgIHHcJNDfMQnZMFegQIVRAC	

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 is required but credit awarded
	F – Fail	راسب	(0-44)	A 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**			**Module Delivery**	
Module Type	**B**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UOM1021**				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level		**1**	**Semester of Delivery**		**1**
Administering Department		**mining Engineering**	**College**	**Petroleum and mining engineering college**	
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	**non**		**e-mail**	**E-mail**	
Peer Reviewer Name		**Eman Kassim Yahya**	**e-mail**	**eman.q@uomosul.edu.iq**	
Scientific Committee Approval Date		**15/09/2024**	**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	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
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Present tense Simple present tens , the uses of simple present tense , present continuous tense, present perfective tense, vocabularies . [15 hrs] Part B – past tense Simple past tens , the uses of simple past tense , past continuous tense, past perfective tense, vocabularies . [15 hrs] Part c – future Future forms, Hot verbs- take, put – Telephoning , Expressions of quantity. – 'export and ex'port, Business expressions and numbers Modals and rel. [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 . 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		**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل		**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	

Total SWL (h/sem) الحمل الدراسي الكلي للطالب 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 #3 #4and #6
	Assignments	2	10% (10)	2 and 12	LO #1 #2 and #5
	Report	1	10% (10)	13	LO #1#2 and #4
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 - Simple present tens + vocabulary
Week 2	The uses of simple present tens + vocabulary
Week 3	present continuous tens + vocabulary
Week 4	Present perfective tense + vocabulary
Week 5	Present perfective continuous tense + vocabulary
Week 6	Examination
Week 7	Simple Past tense + vocabulary
Week 8	The uses of past tense + vocabulary
Week 9	Past continuous tense + vocabulary
Week 10	Past perfect tense + vocabulary
Week 11	Past perfective continuous tense + vocabulary
Week 12	Future forms, Hot verbs- take, put – Telephoning + vocabulary
Week 13	Expressions of quantity. – 'export and ex'port + vocabulary
Week 14	Business expressions and numbers + vocabulary
Week 15	Questions and negatives, - prefixes and antonyms, - Being polite +vocabulary
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	New-headway-plus-upper- intermediate-students-book. New-headway-plus-upperintermediate-students-workbook	No
Recommended Texts	Textbook and curriculums approved by the scientific committee and academic accreditation committee .	yes
Websites	Upper-Intermediate Fourth Edition | Headway Student's Site | Oxford University Press (oup.com) Tenses in Academic Writing | English for Uni | University of Adelaide	

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	**HUMAN RIGHTS AND DEMOCRACY**			**Module Delivery**	
Module Type	**Basic**			☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	**UOM1040**				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level	**1**		**Semester of Delivery**	**1**	
Administering Department	**Petroleum Engineering**		**College**	**Petroleum and Mining Engineering**	
Module Leader	**Basma Mohamed Natheer Ahmed**		**e-mail**	**Bsmam2022@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	**Eman Kassim Yahya**		**e-mail**	**eman.q@uomosul.edu.iq**	
Scientific Committee Approval Date	**15/09/2024**		**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	**Introducing the subject of the history and development of international relations from the Middle Ages to the end of the twentieth century, as well as clarification And interpreting the most important international and modern problems and issues that af and are affected by international relations, in order to bring the student to a high degree**

	political, intellectual and historical awareness to analyze the events and developments th occur in the world in this era. **Modern and contemporary and try to judge them objectively.**
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Upon completion of this course, students will be able to: A Knowledge and understanding 1 - The ability to understand what is right and human rights 2. The ability to differentiate between human rights in a way that is consistent with reality 3.The ability to understand the relationship between human rights and political science 4. The ability to provide appropriate advice A - The ability to identify and solve problems B -Subject-specific skills 1. - The ability to know the mechanism of political participation 2 - The ability to link theoretical study to practical reality
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, 3 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	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)	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	The Concept and History of Democracy-Features and components of a democratic system-Constitution and democracy Elections
Week 2,3	Civil Society Organisations and Democracy -The relationship between human rights and democracy Genocide Crimes- Guarantees of public freedoms and rights
Week 4,5	Conditions of democracy-Good governance-Political participation -Elections and their characteristics Political pluralism
Week 6,7	Citizenship and its components-General concepts of democracy-A general introduction to the concept of human rights -The roots of human rights and their development in human history

Week 8, 9, 10, 11	The evolution of the idea of protecting human rights in the modern era-The international community and contemporary human rights-Human rights at the regional level-Human rights at the international level United Nations Mechanisms for the Protection of Human Rights-Human duties and restrictions on the exercise of human rights
Week 12, 13,14	International organisations and bodies involved in the defence of human rights-Professional ethics- Student Discipline Law in Higher Education Institutions-Human Rights Concepts
Week 15	**Preparatory week before the final Exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Required textbooks (curricular books, if any)	Yes
	Main references (sources)	
Recommended Texts	Recommended books and references (scientific journals, reports...)	No
Websites	Electronic References, 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.

University of Mosul

College of Petroleum and Mining Engineering

Department of Mining Engineering

Course Description

First Stage/Second Semester (Bologna Track)

Prof. Dr. Nabil Youssef Al-Banna

Head of the Scientific Committee

Dr. Ibrahim Adil Al-Hafidh

Head of Department

كلية هندسة النفط والتعدين
قسم هندسة التعدين

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Engineering Physics**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**ME121**				
ECTS Credits	**6.00**				
SWL (hr/sem)	**150**				
Module Level		UGI	**Semester of Delivery**		Two
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Abdullah Hussein Ibrahim		**e-mail**	abdallh.hussen@uomosul.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		PhD
Module Tutor			**e-mail**	E-mail	
Peer Reviewer Name		**Eman Kassim Yahya**	**e-mail**	**eman.q@uomosul.edu.iq**	
Scientific Committee Approval Date		25/05/2025	**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. The foundations of Identify the types of materials and their atomic and crystal structure (semiconductors for example). 2. Study of the physical properties of minerals (electrical properties). 3. This course deals with the basic concepts of metallic materials and methods of using them in electronic devices (diodes, transistors and logic gates).

	4. To develop problem-solving skills and an understanding of circle theory through the application of techniques and physical laws. 5. To perform network and nodal analysis. 6. Fundamentals of electronic devices used in mining.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Identify the basics of the crystalline and atomic structure of materials and how to distribute atoms and electrons. 2. Studying semiconducting materials by studying their electrical properties. Know how semiconductor materials are used in the manufacture of the basics of electronic devices. 3. Identify semiconductor devices such as diodes, transistors and logic gates. 4. Knowing the laws and applications of semiconductor devices. 5. Study how the devices work individually. 6. Studying how the devices work in the electronic circuit. 7. Recognize how electricity works in electrical circuits. 8. Discuss the reaction and involvement of devices in electric circuits. Studying the application of physical laws to circuits, such as Kirchhoff's law, Ohm's law, and others. 9. Learn how to deal with electronic devices (which are the basis for command and control systems).
Indicative Contents المحتويات الإرشادية	Part A - Circuit Theory crystal structures and crystallography – type of crystallography, type of solid materials, crystal structure, Lattice translation vectors, Unit cell, Crystal systems, Crystal symmetry, Crystal planes and indices. [9 hrs] Atomic structure - The Atom, Electron configuration of atom, the periodic table elements, Materials Used in Electronic Devices, Current in Semiconductors, *N*-Type and *P*-Type Semiconductors, The *PN* Junction. [9 hrs] Part B - Analogue Electronics Fundamentals Semiconductor devices, Kirchhoff's laws, Ohm's law, Analysis of a circuit. diodes and applications, Diodes and Diode circuits – Diode characteristics and equations, ideal vs real. Signal conditioning, clamping and clipping, rectification and peak detection, photodiodes, LEDs, special diodes, Zener diodes, voltage stabilization, voltage reference, power supplies. [15 hrs] Bipolar transistor and applications. [10 hrs] Field-effect transistors. [10 hrs] Part C - Digital Electronics Digital Fundamentals Number Systems, Operations, and Codes. Logic Gates. Boolean Algebra and Logic Simplification, Half and Full Adders, Latches, Flip-Flops, and Timers. [20 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 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	6
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**	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction in Solid State Physics - crystal structures and crystallography
Week 2	Atomic structure - The Atom, Materials Used in Electronic Devices
Week 3	Current in Semiconductors, *N*-Type and *P*-Type Semiconductors, The *PN* Junction
Week 4	Diodes and Applications , Special-Purpose Diodes

Week 5	Bipolar Junction Transistors (BJT)
Week 6	Transistor Bias Circuits
Week 7	BJT Amplifiers
Week 8	BJT Power Amplifiers
Week 9	Field-Effect Transistors (FETs)
Week 10	Number Systems, Operations, and Codes
Week 11	Logic Gates
Week 12	Boolean Algebra and Logic Simplification
Week 13	Combinational Logic Analysis
Week 14	Functions of Combinational Logic
Week 15	Latches, Flip-Flops, and Timers
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Characteristic of Silicon Diode
Week 2	Lab 2: Half and Full Wave Rectifier
Week 3	Lab 3: Characteristic of Zener Diode
Week 4	Lab 4: The Diode Properties of the Transistor and Its IV Characteristic Curves
Week 5	Lab 5: Logic gates
Week 6	Lab 6: Half adder and Full adder operations
Week 7	Lab 7: The Gray codes to binary circuit & binary to Gray codes circuit

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	ELEMENTARY SOLID STATE PHYSICS: Principles and Applications, M. A. OMAR, Addison-Wesley Electronic Devices, Thomas L. Floyd, Tenth Edition Digital Fundamentals , Thomas L. Floyd, Eleventh Edition	No Yes No
Recommended Texts	فيزياء الحالة الصلبة , يحيى نوري الجمال, طبعة ثانية	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 Geology**			**Module Delivery**	
Module Type	**C**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**ME122**				
ECTS Credits	**7.0**				
SWL (hr/sem)	**150**				
Module Level		**1 UGI**	**Semester of Delivery**		2
Administering Department		**Mining engineering**	**College**	Petroleum and mining engineering	
Module Leader	**Mauj Ali Hussein**		**e-mail**	mauj.ali@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		**Eman Kassim Yahya**	**e-mail**	**eman.q@uomosul.edu.iq**	
Scientific Committee Approval Date		**15/09/2024**	**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	1. Exploring Geological Structures: Students should learn to interpret and analyze geological structures, such as folds, faults, and fractures, that can affect the occurrence and distribution of petroleum resources. This involves understanding the principles of structural geology and their application to petroleum exploration. 2. Evaluating Sedimentary Basins: Students should develop skills in evaluating sedimentary basins to determine their petroleum potential. This includes studying basin

	formation, sedimentary processes, and the relationship between basin evolution and hydrocarbon generation. 3. Assessing Reservoir Properties: Students should gain an understanding of reservoir properties, including porosity, permeability, and fluid saturation, and learn how to assess and characterize petroleum reservoirs. This involves studying reservoir rocks, sedimentology, and diagenesis. 4. Analyzing Hydrocarbon Migration: Students should learn the principles and processes of hydrocarbon migration, including the movement of oil and gas from source rocks to reservoirs. This includes studying migration mechanisms, timing, and distances. 5. Identifying Traps and Seals: Students should develop skills in recognizing and analyzing traps and seals, which are essential for the accumulation and preservation of petroleum resources. This involves understanding different types of traps (e.g., structural, stratigraphic) and seals (e.g., cap rocks, fault seals). 6. Applying Geophysical and Geological Techniques: Students should learn how to apply various geophysical and geological techniques for petroleum exploration and evaluation. This may include seismic interpretation, well logging, geochemical analysis, and remote sensing. 7. Assessing Risk and Uncertainty: Students should understand the concepts of risk and uncertainty in petroleum exploration and learn how to assess and manage them. This involves evaluating geological, technical, and economic factors that affect the success of exploration projects. 8. Environmental and Social Considerations: Students should be aware of the environmental and social impacts associated with petroleum exploration and production. They should understand the importance of sustainable practices and regulatory frameworks in the petroleum industry.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Understanding Petroleum Systems: Students should develop a comprehensive understanding of the geological processes, reservoir characteristics, and the components of petroleum systems. This includes the identification of source rocks, migration pathways, reservoir rocks, and traps 2- Exploration and Production Techniques: Students should gain knowledge of various exploration and production techniques used in the petroleum industry. This includes seismic interpretation, well logging, core analysis, and reservoir modeling. 3- Reservoir Characterization: Students should be able to characterize petroleum reservoirs by studying the properties of rocks and fluids within them. This involves analyzing porosity, permeability, lithology, fluid saturation, and reservoir connectivity 4 - Hydrocarbon Exploration and Risk Assessment: Students should learn how to evaluate exploration prospects and assess the associated risks. This includes understanding the geological factors that affect hydrocarbon accumulation, prospect evaluation methods, and the economic viability of potential reserves. 5. Petroleum Geology and Sedimentology: Students should develop a strong foundation in sedimentary processes and the principles of sedimentology. This includes the study of sedimentary facies, depositional environments, and sequence stratigraphy. 6. Basin Analysis: Students should gain knowledge of basin analysis techniques to understand the formation and evolution of sedimentary basins. This involves studying tectonic processes, subsidence analysis, thermal history, and basin modeling. 7. Geological Mapping and Field Work: Students should acquire practical skills in geological mapping and fieldwork. This includes interpreting geological structures, mapping sedimentary sequences, and conducting field investigations.

	8. Environmental Considerations: Students should understand the environmental impacts of petroleum exploration and production. This includes studying environmental regulations, risk assessment, and mitigation strategies. 9. Ethical and Professional Practices: Students should be aware of ethical and professional practices in the petroleum industry, including the importance of integrity, environmental responsibility, and safety.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - Circuit Theory</u> Introduction: what is petroleum? Economic importance; Geologic factors. Petroleum Formation and Accumulation: Sedimentology and Depositional Environments, Role of petroleum geologists in the oil and gas industry, Overview of the petroleum system concept [15 hrs] Reservoir rock properties and types of traps, Earth Materials: Minerals and Rocks Earth Materials: Minerals and Rocks, Exploration Techniques: Geophysical methods (seismic, gravity, magnetic), Well logging and core analysis,Well logging and core analysis [15 hrs] Petroleum Reservoirs: Classification and characterization of reservoirs Porosity, permeability, and fluid flow in reservoir rocks, Reservoir rock types (sandstones, carbonates, shales). [10 hrs] Environmental and Social Impact: Environmental issues related to oil and gas exploration, Health and safety regulations in the industry, Social and ethical considerations in petroleum operations, Sustainable practices and alternative energy sources [6 hrs] <u>Part B -</u> . Lab 1: crystals, Lab 2: crystal systems, Lab 3: miller indices,Lab 4: minerals Lab 5: rocks [15 hrs] Lab 6: mapping-1, Lab 7: mapping -2. [7 hrs], Lab 8: cartography,Lab 9: Topographical Maps , Lab 10 l contour map1,Lab 11 : contour map2,Lab 13: structural contour map1,Lab 10 : structural contour map2,Lab 14 : oil well contour map1,Lab 14 : oil well contour map2 [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 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)	72	**Unstructured SWL (h/w)**	5

الحمل الدراسي غير المنتظم للطالب خلال الفصل		الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction: what is petroleum? Economic importance; Geologic factors.
Week 2	Petroleum Formation and Accumulation: Sedimentology and Depositional Environments
Week 3	Role of petroleum geologists in the oil and gas industry
Week 4	Overview of the petroleum system concept
Week 5	Reservoir rock properties and types of traps
Week 6	Earth Materials: Minerals and Rocks
Week 7	Exploration Techniques: Geophysical methods (seismic, gravity, magnetic), Well logging and core analysis.
Week 8	Well logging and core analysis
Week 9	Petroleum Reservoirs: Classification and characterization of reservoirs
Week 10	Porosity, permeability, and fluid flow in reservoir rocks
Week 11	Reservoir rock types (sandstones, carbonates, shales)
Week 12	Drilling and Production: Drilling techniques and equipment
Week 13	Well completion and production techniques, Well testing and formation evaluation, Enhanced oil recovery methods

Week 14	Petroleum Systems Analysis: Basin analysis and tectonic controls, Petroleum system modeling and basin modeling, Hydrocarbon play analysis and prospect evaluation , Risk assessment and economic considerations.
Week 15	Environmental and Social Impact: Environmental issues related to oil and gas exploration, Health and safety regulations in the industry, Social and ethical considerations in petroleum operations, Sustainable practices and alternative energy sources
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: crystals
Week 2	Lab 2: crystal systems
Week 3	Lab 3: miller indices
Week 4	Lab 4: minerals
Week 5	Lab 5: rocks
Week 6	Lab 6: mapping-1
Week 7	Lab 7: mapping -2
WEEK 8	Lab 8: cartography
Week 9	Lab 9: Topographical Maps
Week 10	Lab 10 l contour map1
Week 11	Lab 11 : contour map2
Week 12	Lab 13: structural contour map1
Week 13	Lab 10 : structural contour map2
Week 14	Lab 14 : oil well contour map1
Week 15	Lab 14 : oil well contour map2

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	1. Ron H. Johnson, 2010,"Petroleum Geology". Springer 2. Richard C. Selley & Stephen A. Sonnenberg, 2015, "Elements of Petroleum Geology. Academic Press 3. Philip A. Allen & John R. Allen, 2013,"Basin Analysis: Principles and Applications. Wiley-Blackwell	NO
Recommended Texts	Robert Stoneley,1995 , "Introduction to Petroleum Exploration for Non-geologists". Oxford University Press.	No

Websites	https://www.onepetro.org

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	**Numerical and Engineering Analyses**			**Module Delivery**	
Module Type	**B**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**DME123**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		**1**	**Semester of Delivery**		2
Administering Department		**Mining engineering**	**College**	Petroleum and mining engineering	
Module Leader	**Hudhaifa Raad Hamzah**		**e-mail**	hudhaifahamzah@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		**Eman Kassim Yahya**	**e-mail**	**eman.q@uomosul.edu.iq**	
Scientific Committee Approval Date		**15/09/2024**	**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 module objectives for teaching Numerical and Engineering Analyses can include the following: 1- Develop a thorough understanding of the fundamental principles and concepts of numerical methods and their applications in engineering. 2- Gain knowledge of various numerical techniques used for solving engineering problems, such as root finding, interpolation, differentiation, integration, and differential equations.

	3- Understand the sources of errors in numerical computations and how to analyze and minimize them. 4- Comprehend the principles and techniques of optimization, statistical analysis, and uncertainty quantification in engineering. 5- Apply numerical methods to solve engineering problems, including root finding, interpolation, curve fitting, differentiation, integration, and differential equations. 6- Analyze the accuracy, efficiency, and stability of different numerical methods for various engineering applications. 7- Identify appropriate numerical techniques for specific engineering problems and evaluate their suitability. 8- Develop skills in modeling engineering problems and formulating them into mathematical equations suitable for numerical analysis.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The module on Numerical and Engineering Analyses aims to achieve the following learning outcomes for students: 1- Develop a comprehensive understanding of various numerical methods and techniques used in engineering analysis. 2- Acquire knowledge of mathematical concepts and principles underlying numerical analysis. 3- Understand the application of numerical methods to solve engineering problems and interpret the results. 4- Apply numerical methods to analyze and solve engineering problems accurately and efficiently. 5- Evaluate the appropriateness of different numerical techniques for specific engineering applications. 6- Critically assess the accuracy, stability, and limitations of numerical solutions.
Indicative Contents المحتويات الإرشادية	The indicative contents for a module on Numerical and Engineering Analyses could include the following topics: 1- <u>Introduction to Numerical Analysis:</u> - Overview of numerical methods and their applications in engineering - Sources of errors in numerical computations and error analysis 2- <u>Root Finding Methods:</u> - Bisection method - Newton-Raphson method - Secant method - Fixed-point iteration method 3- <u>Interpolation and Curve Fitting:</u> - Polynomial interpolation (Lagrange, Newton) - Splines and piecewise interpolation - Least squares approximation 4- <u>Numerical Differentiation and Integration:</u>

	- Finite difference approximations - Numerical differentiation methods (forward, backward, central differences) - Trapezoidal rule - Simpson's rule - Romberg integration 5- <u>Ordinary Differential Equations (ODEs):</u> - Initial value problems (IVPs) and boundary value problems (BVPs) - Euler's method - Runge-Kutta methods 6- <u>Systems of ODEs and Higher-Order ODEs:</u> - Numerical methods for systems of ODEs - Higher-order ODEs and reduction to systems of first-order ODEs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main approach employed in this module will be to foster active student engagement in resolving analytical and numerical challenges, aiming to enhance their proficiency in mathematical reasoning. This will be facilitated through in-class exercises and assignments.

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 assessment	**Quizzes**	8	15% (15)	4,7,10,14	LO #1,5,2,6
	Assignments	5	10% (10)		LO # 1,5,6,

	Projects / Lab.		0% (0)		
	Report		0% (0)		
Summative assessment	**Midterm Exam**	1hr	15% (15)	8	LO # 1,5,2,6
	Final Exam	3hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Numerical and Engineering Analyses. Overview of numerical methods and their applications in engineering.
Week 2	Error analysis and propagation.
Week 3	Round-off and truncation errors
Week 4	Root finding methods (e.g., Bisection method, Newton-Raphson method)
Week 5	Solving nonlinear equations
Week 6	Interpolation and curve fitting
Week 7	Least squares approximation
Week 8	Numerical differentiation
Week 9	Numerical integration (e.g., Trapezoidal rule, Simpson's rule)
Week 10	Ordinary differential equations (ODEs)
Week 11	Initial value problems and numerical solutions (e.g., Euler's method, Runge-Kutta methods)
Week 12	Systems of ODEs Numerical methods for solving systems of ODEs
Week 13	Statistical analysis and data processing
Week 14	Sensitivity analysis and uncertainty quantification
Week 15	Case studies and applications in engineering Real-world examples showcasing the use of numerical and engineering analyses in various fields
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**

Required Texts	Chapra, S. C. (2010). *Numerical methods for engineers*. Mcgraw-hill. Chapra, S. (2011). *EBOOK: Applied Numerical Methods with MATLAB for Engineers and Scientists*. McGraw Hill.	yes
Recommended Texts	Epperson, J. F. (2021). *An introduction to numerical methods and analysis*. John Wiley & Sons.	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	**Microsoft Office and Internet**			**Module Delivery**	
Module Type	**B**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**DME124**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	**UGx11 1**	**Semester of Delivery**	**2**		
Administering Department	**Mining Engineering**	**College**	**Petroleum & Mining Engineering**		
Module Leader	**Zainab Hazim Hameed**	**e-mail**	**eng.zainab.alkhafaf@uomosul.edu.iq**		
Module Leader's Acad. Title	**Assistant Lecturer**	**Module Leader's Qualification**	**M.Sc.**		
Module Tutor	**Name (if available)**	**e-mail**	**E-mail**		
Peer Reviewer Name	**Eman Kassim Yahya**	**e-mail**	**eman.q@uomosul.edu.iq**		
Scientific Committee Approval Date	**15/09/2024**	**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	1. Teaching the student to recognize the basic rules for dealing with and managing the computer to help him achieve Projects, print matters, prepare statistics and graphs, create presentations, design engineering graphics, and more. 2. The emergence of the Internet as a means of communication available to all has become very necessary for the student to learn to use the computer, due

	to the role of the Internet in many fields, including education, scientific research, trade and marketing via the Internet, correspondence, web pages, and electronic speaking. 3. The student learns the methods and skills of scientific research
	A- Cognitive goals 1. The student's comprehension of the material is the ability to analyze and apply what he learned practically on the computer 2. That the evaluation is done by presenting the material to the students in the laboratory and then applying what they learned from them 3. Software knowledge 4. Knowledge of programs creating presentations 5. Knowledge of applied software 6. Knowledge of the Internet 7. Turn on the computer 8. Learn the skill of editing, word processing and typing using Microsoft Word 9. Learn the skill of making and creating tables, curves and statistics in Microsoft Excel 10. Learn the skill of making presentations with Microsoft PowerPoint 11. Using the Internet and learning the skill of scientific research methods 12. Knowledge of applied programs
Indicative Contents المحتويات الإرشادية	1- Run the program word and its window elements, write and modify texts, apply text and paragraph formatting tools, apply copy and move commands within the document, apply commands to adjust the distance between lines and paragraphs, and add bullets and numbers with appropriate choices. Application of file handling commands (new, open, save, close). Adding header and footer to document attributes in the appropriate format. Inserting page numbers with setting numbering options. Inserting a different header and footer for document pages. Adjusting the distance between page borders, header and footer. Inserting symbols that are not on the keyboard. Add indentation to paragraphs. [10] 2- Add borders around a paragraph or page in different formats, adjust page settings (size, margins, and orientation), use the Print box to preview pages, adjust print options, use search and replace commands for texts in the document, insert a new table and fill it with data, adjust the width of table columns, row height, add columns and rows to the table after creating delete rows And its columns from the table and differentiate between the command to delete a table and the command to delete a table and adjust the properties of the table and apply commands to format texts inside the table and add borders to the table in the appropriate way and apply merge and divide cells and divide the table and design an integrated table using the commands of the Word program and insert images and shapes in the document and apply commands dealing with images and shapes and adjust Selections and fills for appropriate shapes, add effects to images and shapes, and apply rotation, alignment, and distribution tasks to shapes and images [14] 3-The basics of using the Excel program, summarizing the concepts and terms related to the Excel program, distinguishing the elements of the Excel program window and using each of them, applying data entry skills, moving within the worksheet, applying the skills of selecting cells in the worksheet, applying control commands in the

	worksheet appearance options window, applying copy, cutting and pasting commands, and using the fill handle And to fill the cells with data chains and apply the program's tools to format the cells and create simple equation formulas and add columns and rows in the worksheet and delete columns and rows from the worksheet and adjust the height of the rows and the width of the columns in an appropriate way and apply the commands to add, modify and delete comments and apply the command to delete the formatting of cells and apply commands to deal with worksheets and create Create a new blank file or from a template and move between open files [10] 4- Advanced skills using functions to perform mathematical operations, apply the skills of using functions in short ways, copy the formula value and not the formula itself, write formulas in a way that takes into account the priority of executing mathematical operations, apply commands to freeze rows and columns of headings, apply commands to format numbers, currency, and dates, apply commands to arrange data, ascending or descending, and distinguish the most important error codes that appear in the worksheet and using the simple F function to test data conditions and charts and apply commands to deal with files (save, open and close) and create a chart of the appropriate type and apply commands to format and adjust chart shapes and the trainee uses the nested F function to test more than one possibility and adjust page settings and choose to print data [10] 5- The basics of using PowerPoint, distinguishing the elements of the PowerPoint program window, creating a new presentation from a template, using different methods for displaying slides, using commands (delete, insert, arrange, and duplicate) a slide, adding shapes to the slide with appropriate formatting, adding images to the slides, applying appropriate effects, applying commands for deleting and inserting table rows and columns, and applying commands Merge and split cells, apply text formatting commands in the table, apply commands to add and format cell borders, use the master slide and its slide layouts, set handout pages to print several slides on a sheet, adjust notes page settings, adjust slides, handouts, and notes pages, add transitions between slides, and add animation effects for elements on The slide adds custom motion paths to the element, adjusts the motion effect settings for the element, designs an integrated presentation using PowerPoint tools, and designs a question slide to test [10] 6- Using the Internet to learn scientific research methods, scientific websites, the mechanism of using scientific platforms in writing reports, arranging sources, and how to search in scientific libraries [9].

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.

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	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**	5	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				
Summative assessment	**Midterm Exam**	2hr	20% (20)	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	Word software environment ,Basics of using Word
Week 2	Organizing, formatting and page settings
Week 3	Create and coordinate tables and insert pictures
Week 4	Formatting tables and inserting pictures
Week 5	Complement the inclusion of graphics and spell checking
Week 6	Excel environment ,Basics of using Excel

Week 7	Mid-term Exam + Organizing worksheets and using formulas
Week 8	Excel functions
Week 9	Charts in Excel
Week 10	PowerPoint environment ,Basics of using PowerPoint
Week 11	Draw shapes and insert commands, slides, pictures, and videos
Week 12	Transition effects and motion
Week 13	Research methodology I
Week 14	Research methodology II
Week 15	Research methodology III
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Computer application basics of using the Word program
Week 2	Lab 2: Computer application for organization, coordination and page settings
Week 3	Lab 3: Computer application for Create , coordinate tables and insert pictures
Week 4	Lab 4: Formatting tables and inserting pictures
Week 5	Lab 5: Complement the inclusion of graphics and spell checking
Week 6	Lab 6: Computer application basics of using the excel program
Week 7	Lab 7: Computer application for organizing worksheets and using formulas
Week 8	Lab 8: Computer application for Excel functions
Week 9	Lab 9: Computer application for Excel charts
Week 10	Lab 10: Computer application basics of using PowerPoint program
Week 11	Lab 11: Computer application draw shapes and insert commands, slides, pictures, and videos
Week 12	Lab 12: Computer application of transition effects and motion
Week 13	Lab 13: Computer application for research methodology
Week 14	Lab 14: Computer application for research methodology
Week 15	Lab 15: Computer application for research methodology

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

Required Texts	1-Bernard V. Liengme /AGuide to Microsoft excel 2013 for scientists and engineers 2-Ranjit Kumar/ Research methodology a step-by-step guide for beginners, 3rd edition 2011	NO
Recommended Texts	New Perspectives Microsoft® Office 365 & Office 2019 Introductory, Patrick Carey, Katherine Pinard, Ann Shaffer, Mark Shellman	No
Websites	https://www.microsoft.com/ar-iq/ https://scholar.google.com/schhp?hl=ar https://www.researchgate.net/ https://orcid.org/ https://libgen.is/	

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	**Engineering Chemistry**			**Module Delivery**	
Module Type	**B**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**DME125**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level		**1**	**Semester of Delivery**		**2**
Administering Department		**Mining Engineering**	**College**	**Petroleum and Mining Engineering**	
Module Leader	**Islam kamal saeed Al-tayi**		**e-mail**	**islam.kamal158@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		**Eman Kassim Yahya**	**e-mail**	**eman.q@uomosul.edu.iq**	
Scientific Committee Approval Date		**15/09/2024**	**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	To impart the knowledge of applied aspects of chemistry and utilizing the same for the technological advancement in various discipline of engineering.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On successful completion of the course, the students will be able to, 1. Explain the basic concept of batteries & fuel cells and their applications. 2. Apply the knowledge in corrosion science to control corrosion problems. 3. Identify various methods to enhance the quantity & quality of gasoline.

	4. Apply the knowledge of different methods for water analysis and purification. 5. Explain the processing of high polymers & their applications.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. MODULE-1 : Battery Technology Introduction - Galvanic cell, electrode potential, EMF of the cell and cell representation. Batteries and their importance, Classification of batteries- primary, secondary and reserve batteries with examples. Battery characteristics - voltage, capacity, energy density, power density, energy efficiency, cycle life and shelf life. Basic requirements for commercial batteries. Construction, working and applications of: Zn-Ag2O, Ni-Cd, Zn-air and Lithium ion battery. Fuel Cells- Differences between battery and a fuel cell, Classification of fuel cells -based on type of fuel, electrolyte and temperature. Construction, working and applications of solid oxide fuel cell. **SLE: Supercapacitors: Definition, types and characteristics.** [6 hrs] MODULE-2: Corrosion and its Control Introduction, Electrochemical theory of corrosion with respect to iron. Factors influencing the corrosion rate: physical state of the metal, nature of the metal, area effect, over voltage, pH, temperature and nature of the corrosion product. Types of corrosion: galvanic series; (i) Differential aeration corrosion- oxygen concentration cell, (ii) Stress corrosion- explanation-caustic embrittlement. Corrosion control by: i) Using inhibitors, ii) Cathodic protection- sacrificial anode and impressed current methods iii) Protective coatings-metal coatings- galvanizing and tinning. **SLE: Galvanic corrosion, Water line corrosion and seasonal cracking.** [15 hrs] MODULE-3: Chemical fuels Introduction, classification with examples, calorific value-classification (HCV & LCV), determination of calorific value of solid and liquid fuels using Bomb calorimeter-numerical problems. Petroleum cracking -fluidized bed catalytic cracking. Reformation of petrol-explanation with reactions, Knocking in IC engine, its ill effects and prevention of knocking. Anti-knocking agent: Leaded and unleaded petrol. Power alcohol and its advantages. Synthetic petrol - Bergius process. Solar energy- Photo voltaic cells- definition, working and importance of PV cells. Production of solar grade silicon by chemical vapor deposition. **SLE: Octane number, cetane number. Purification of silicon by zone refining technique.** [15 hrs] MODULE-4: Water technology Introduction, water analysis: i. Hardness-determination by EDTA method-numerical problems, ii. Alkalinity-determination by double indicator method-numerical problems, iii. Determination of dissolved oxygen by Winkler's method and iv. Determination of chemical oxygen demand - numerical problems. Boiler scales-formation and ill effects, prevention of scales by external method (hot lime-soda process). Desalination by electrodialysis. **SLE: Determination of chloride by Mohr's method. Prevention of boiler scales by internal methods: Calgon and Phosphate conditioning.** [20 hrs.] MODULE-5: High polymers for engineering applications Introduction, Polymerization techniques - bulk, solution, suspension and emulsion polymerization. Glass transition temperature (Tg)-meaning - factors affecting Tg

	(crystallinity, effect of side groups, molecular weight & plasticizers) and significance. Preparation, properties and applications of Kevlar, Polyurethane, and Epoxy resin; Determination of molecular weight of polymers by number average and weight average method-numerical problems. Conducting polymers - mechanism of conduction in polyacetylene and applications. **SLE: Classification of polymers based on occurrence, thermal behavior, type of polymerization and chemical structure.** [20 hrs.] **(Note: SLE – Self Learning Exercise)**

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	On successful completion of this course, the students will be able to: 1- Understandthe concepts of electrochemistry and electrochemical phenomenon involved in the energy storage and energy conversion devices. 2- Able to know the mechanism of corrosion and its control and application of electrochemical concepts for surface modification techniques. 3- Know the importance of petroleum products as conventional sources of energy and the importance of polymers as an engineering material, their synthesis and application in automobile, electronic and aerospace applications. 4- Know the importance of analysis of water and waste .

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	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
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 #3, #4
	Assignments	1	10% (10)	5 and 10	LO #1, #2 and #4, #5
	Projects / Lab.	1	10% (10)	Continuous	All

	Report				
Summative assessment	**Midterm Exam**	2hr	20% (20)	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	Battery Technology: Introduction - Galvanic cell, electrode potential, EMF of the cell and cell representation. Batteries and their importance
Week 2	Classification of batteries- primary, secondary and reserve batteries with examples. Battery characteristics - voltage, capacity, energy density, power density, energy efficiency, cycle life and shelf life. Basic requirements for commercial batteries. Construction, working and applications of: Zn-Ag2O, Ni-Cd, Zn-air and Lithium ion battery.
Week 3	Fuel Cells- Differences between battery and a fuel cell, Classification of fuel cells -based on type of fuel, electrolyte and temperature. Construction, working and applications of solid oxide fuel cell.
Week 4	Corrosion and its Control: Introduction, Electrochemical theory of corrosion with respect to iron. Factors influencing the corrosion rate: physical state of the metal, nature of the metal, area effect, over voltage, pH, temperature and nature of the corrosion product.
Week 5	Types of corrosion: galvanic series; (i) Differential aeration corrosion- oxygen concentration cell, (ii) Stress corrosion- explanation-caustic embrittlement.
Week 6	Corrosion control by: i) Using inhibitors, ii) Cathodic protection- sacrificial anode and impressed current methods iii) Protective coatings-metal coatings- galvanizing and tinning.
Week 7	Chemical fuels: Introduction, classification with examples, calorific value-classification (HCV & LCV), determination of calorific value of solid and liquid fuels using Bomb calorimeter-numerical problems.
Week 8	Petroleum cracking -fluidized bed catalytic cracking. Reformation of petrol-explanation with reactions, Knocking in IC engine, its ill effects and prevention of knocking.
Week 9	Anti-knocking agent: Leaded and unleaded petrol. Power alcohol and its advantages. Synthetic petrol - Bergius process. Solar energy- Photo voltaic cells- definition, working and importance of PV cells. Production of solar grade silicon by chemical vapor deposition.
Week 10	Water technology: Introduction, water analysis: i. Hardness-determination by EDTA method-numerical problems, ii. Alkalinity-determination by double indicator method-numerical problems, iii. Determination of dissolved oxygen by Winkler's method and iv.
Week 11	Determination of chemical oxygen demand - numerical problems. Boiler scales-formation and ill effects, prevention of scales by external method (hot lime-soda process). Desalination by electrodialysis.
Week 12	High polymers for engineering applications: Introduction, Polymerization techniques - bulk, solution, suspension and emulsion polymerization.
Week 13	Glass transition temperature (Tg)-meaning - factors affecting Tg (crystallinity, effect of side groups, molecular weight & plasticizers) and significance.
Week 14	Preparation, properties and applications of Kevlar, Polyurethane, and Epoxy resin; Determination of molecular weight of polymers by number average and weight average method-numerical problems.

Week 15	Conducting polymers - mechanism of conduction in polyacetylene and applications.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	General information, Safety in the laboratory, Common laboratory equipment.
Week 2	Lab 1: **Titrimetry**: Estimation of ferrous iron by dichrometry.
Week 3	Lab 2: .Estimation of hardness of water by EDTA method.
Week 4	Lab 3: **Mineral analysis**: Determination of percentage of copper in brass.
Week 5	Lab 4: Estimation of manganese dioxide in pyrolusite.
Week 6	Lab 5: **Instrumental Methods**: Colorimetry: Determination of ferrous iron in cement by colorimetric method.
Week 7	Lab 6: : Estimation of copper by colorimetric method.
Week 8	Lab 7: **Conductometry**: Conductometric titration of strong acid vs strong base.
Week 9	Lab 8: Conductometric titration of mixture of acids vs strong base.
Week 10	Lab 9: **Potentiometry**: Titration of strong acid vs strong base by potentiometry.
Week 11	Lab 10: Titration of weak acid vs strong base by potentiometry.
Week 12	Lab 11: **Physical properties**: Determination of viscosity of sample oil by redwood / oswald's viscometer.
Week 13	Lab 12: Determination of Surface tension of lubricants.
Week 14	Lab 13: **Preparations:** Preparation of Thiokol rubber.
Week 15	Lab 14: **Adsorption:** Adsorption of acetic acid on charcoal.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1- Text book of Engineering Chemistry by Dr. K. Pushpalatha, published by Wiley publications 2nd edition. 2- Text book of Engineering Chemistry by S.S. Dara, published by Chand and Co., 2009. 3- Practical Engineering Chemistry by K. Mukkanti, etal, B.S. Publications, Hyderabad.	No

Recommended Texts	1- Principles of Physical Chemistry by B. R. Puri, L. R. Sharma and M. S. Pathania, S. Nagin Chand and Co. 2- Text book of Physical Chemistry by Soni and Dharmatha, S. Chand & Sons. 3- Text book of Polymers science by Gowarikar and Vishwanathan. 4- Corrosion Engineering by M. G. Fontana, Mc Graw Hill Publications.	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	**B**			☒ **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		**Mining 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	**Non**		**e-mail**		
Peer Reviewer Name		**Eman Kassim Yahya**	**e-mail**	**eman.q@uomosul.edu.iq**	
Scientific Committee Approval Date		**15/9/2024**	**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	CLO1: Introducing the student to the necessity of practicing the rules of writing and speaking in classical Arabic.

مخرجات التعلم للمادة الدراسية	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.

University of Mosul

College of Petroleum and Mining Engineering

Department of Mining Engineering

Course Description

Second Stage/First Semester (Bologna Track)

Prof. Dr. Nabil Youssef Al-Banna

Head of the Scientific Committee

Dr. Ibrahim Adil Al-Hafidh

Head of Department

كلية هندسة النفط والتعدين
قسم هندسة التعدين

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Mathematics II**			**Module Delivery**	
Module Type	**B**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**DME 211**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level		**2**	**Semester of Delivery**		**3**
Administering Department		**Mining Engineering**	**College**	**Petroleum and Mining Engineering**	
Module Leader	**Abdullah Hussein Ibrahim**		**e-mail**	abdallh.hussen@uomosul.edu.iq	
Module Leader's Acad. Title		**Lecturer**	**Module Leader's Qualification**		Ph. D.
Module Tutor	**None**		**e-mail**	-------	
Peer Reviewer Name		**Eman Kassim Yahya**	**e-mail**	**eman.q@uomosul.edu.iq**	
Scientific Committee Approval Date		**15/09/2024**	**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	**DME113, Applied Mathematics**	**Semester**	First
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 course aims to teach students the basics of differentiation and integration for different types of functions, as well as to study different types of differentiation and higher degrees of multiple differentiation and integration, as well as applications of differentiation and integration.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Increase the students skills to deal with the mathematical engineering questions. 2- Increase the level of students in thinking. 3- Prepare the students to understand more developed materials. 4- Determine the area under curve using integration in which the students can use this method to determine the reservoir volume. 5- Perform a connection between the mathematical equations with the petroleum engineering major. 6- Use the optimum approaches to find the solution of mathematical questions.
Indicative Contents المحتويات الإرشادية	Indicative contents: Module 1: An Introduction of Mathematics. Module 2: Domain and Range of Functions. Module 3: Drawing the Trigonometric functions. Module 4: Limits (Continuous and Discontinuous). Module 5: Transformation functions including Period, Horizontal and Vertical ships, and Amplitude. Module 6: Differentiation and derivative methods. Module 7: Infinite and Finite Integrals. Module 8: Integration Methods. Module 9: An Introduction to Polar Coordinates.

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, homework's, discussion in class, and help session. This will be achieved through classes and interactive tutorials.

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	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	4	10% (10)	3,5,11,13	LO #3, #5 and #11, #13
	Assignments	4	10% (10)	3,6,10,13	LO #3, #6 and #10, #13
	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	Module 1: Differentiation
Week 2,3	Module 2: Differentiation Rules
Week 3	Module 3: Higher derivative
Week 4	Module 4: derivative Trigonometric function
Week 5	Module 5: derivative of the inverse Trigonometric function
Week 6	Module 6: chain Rule
Week 7	Module 7: Parametric equations
Week 8	Module 8: L-Hopital Rule
Week 9	Module 9: Integration
Week 10	Module 10:Indefinite integrals
Week 11	Module 11 :Definite integrals
Week 12	Module 12: integral of Rational function
Week 13	Module 13:integration factors
Week 14	Module14: Integration by partes
Week 15	Module 15: Application of Definite integrals
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Curriculum and Textbook	Yes
Recommended Texts	Calculus I	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	**Ore and Oil Exploration by Remote Sensing**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	**DME222**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level		**2** UGII	**Semester of Delivery**		**3**
Administering Department		**DME**	**College**	**PMEUOM**	
Module Leader	**Dr. Ryan Ghazi Thanooun**		**e-mail**	rayan.ghazi@uomosul.edu.iq	
Module Leader's Acad. Title		**Professor**	**Module Leader's Qualification**		**Ph.D.**
Module Tutor	**Dr. Eman Kassim Yahya**		**e-mail**	eman.q@ uomosul.edu.iq	
Peer Reviewer Name	**Dr. Eman Kassim Yahya**		**e-mail**	eman.q@uomosul.edu.iq	
Scientific Committee Approval Date		**15/09/2024**	**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	1. To develop problem solving skills and understanding of remote sensing application of techniques. 2. To understand the methods of satellite working. 3. Education in basic principles witch would apply to any GIS or remote sensing software. 4. Training in the specifics of a particular software package. 5. To provide an understanding of the state –of – the art of remote sensing. 6. To introduce the student to the physical Advanced Satellite of Remote Sensing, Hyperspectral Remote Sensing, LIDAR Remote Sensing and their different application in terrestrial and vegetation mapping. 7. Acquire skills in handling instruments, tools, techniques and modelling while using Remote Sensing Technology
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: 1. Provide an understanding of the principles of electromagnetic radiation pertaining to remote sensing 2. . The students will acquire advanced conceptual knowledge and comprehensive understanding of the fundamental principles in Remote sensing, Geographical Information System (GIS), Global Positioning System (GPS), Digital Image processing (DIP), Geo-Science and their different filed applications 3. They will be prepared to take up challenges as globally competitive Geo Scientists/researchers in diverse areas of theoretical as well as experimental GIS. 4. They will be equipped with enough technical and analytical skilled to pursue their further studies and develop continuous learning through their professional career. 5. They will trained to appear national level tests like UGC-CSIR NET, GATE, etc., successfully. 6. They will acquire the sense of academic and social ethics. 7. On completion of this course, the student shall be able to 8. Understand concepts of passive and active microwave system 9. Gain knowledge in the principles of Microwave image analysis and interpretation 10. 4. Understand the various application domains of microwave satellite data 11. 5. Acquire skills in analysing Thermal and Hyperspectral Remote Sensing data for various 12. Thematic mapping and its applications. 13. 6. Provides employability opportunity in space organization

Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A - Theory Principles of Remote sensing, Mapping Hydrothermal Alteration with Landsat Thematic Mapper Data, The Atmosphere. [15 hrs] Passive and active images, The Interaction of Electromagnetic Energy with Object Surfaces on the Earth Global navigation satellite system Customization of geospatial tools, [15 hrs] Role of Spectral Reflectance Curves in Remote Sensing, Remote Sensing Systems [10 hrs] Remote Sensing Image Analysis Techniques, Remote Sensing in Exploration Geology. Remote sensing of petroleum exploration, Remote sensing of ore exploration [15 hrs] Arial photographs , Drones [6 hrs] Part B – practical Maps, Stereoscopic analysis, Arial photograph analysis . [15 hrs] Image process, Image process. [7 hrs] Photogrammetry and cartography. [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 للطالب محسوب لـ ١٥ أسبوعا

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**	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	Principles of Remote sensing
Week 2	Mapping Hydrothermal Alteration with Landsat Thematic Mapper Data
Week 3	The Atmosphere
Week 4	Passive and active images
Week 5	The Interaction of Electromagnetic Energy with Object Surfaces on the Earth
Week 6	Global navigation satellite system
Week 7	Customization of geospatial tools
Week 8	Role of Spectral Reflectance Curves in Remote Sensing
Week 9	Remote Sensing Systems
Week 10	Remote Sensing Image Analysis Techniques
Week 11	Remote Sensing in Exploration Geology

Week 12	Remote sensing of petroleum exploration
Week 13	Remote sensing of ore exploration
Week 14	Arial photographs
Week 15	Drones
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Maps
Week 2	Lab 2: Stereoscopic analysis
Week 3	Lab 3: Arial photograph analysis
Week 4	Lab 4: Image process
Week 5	Lab 5: Digital Image processing
Week 6	Lab 6: Image statistics
Week 7	Lab 7: Photogrammetry and cartography

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts		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	**Engineering Surveying (Geomatic)**			**Module Delivery**	
Module Type	**S**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	**DME213**				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level		**2**	**Semester of Delivery**		3
Administering Department		**DME**	**College**	PMEUOM	
Module Leader	**Ali A. Hussein Al-Zubaidi**		**e-mail**	ali.ameer86@uomosul.edu.iq	
Module Leader's Acad. Title		**Assistant Lecturer**	**Module Leader's Qualification**		M.Sc.
Module Tutor	**Zina Nofel**		**e-mail**	zinanaufal@uomosul.edu.iq	
Peer Reviewer Name		**Eman Kassim Yahya**	**e-mail**	**eman.q@uomosul.edu.iq**	
Scientific Committee Approval Date		**15/09/2024**	**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Mathematics 1	**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	1. To discuss the importance of surveying as a profession. 2. Identify and apply the theory and practice of basic surveying skills. 3. To cover some basic concepts regarding measurement, computation, and surveying mathematics. 4. To give the beginning student a foundation for effective study of the traditional and modern surveying instruments, and the practical applications related to each instrument alongside with field and office procedures,

	5. Use application of modern computer programs to reduce data and the plotting of details and contour plans. 6. Recognize the role of the professional surveying, and modern development in surveying.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write a Learning Outcomes, better to be equal to the number of study weeks. Surveying may be defined as the science of determining the position, in three dimensions, of natural and man-made features on or beneath the surface of the Earth. These features may be represented in analogue form as a contoured map, plan or chart, or in digital form such as a digital ground model (DGM). In engineering surveying, either or both of the above formats may be used for planning, design and construction of works, both on the surface and underground. At a later stage, surveying techniques are used for dimensional control or setting out of designed constructional elements and also for monitoring deformation movements.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Geometry is an applied science that depends very much on mathematics for solutions to many problems. But most surveying problems do not require the use of mathematics beyond the level of algebra, geometry, and trigonometry. It is generally assumed that surveying students have a good background in these subjects and are prepared to apply that knowledge. Many, though, can benefit from a brief review of fundamentals, particularly those who may have been out of school for a while before beginning their study of surveying. [4 hrs.] Horizontal Distances: The tasks of determining the horizontal distance between two existing points and of setting a new point at a specified distance from some other fixed positions are fundamental surveying operations. The surveyor must select the appropriate equipment and apply suitable field procedures to determine or set and mark distances with the required degree of accuracy. [15 hrs.] Vertical Distances: The vertical direction is parallel to the direction of gravity; at any point, it is the direction of a freely suspended plumb-bob cord. The vertical distance of a point above or below a given reference surface is called the elevation of the point. The most commonly used reference surface for vertical distance is mean sea level (MSL). (The words altitude and height are sometimes used in place of elevation.) Vertical distances are measured by the surveyor to determine the elevations of points, in a process called running levels or, simply, leveling. The importance of leveling cannot be overestimated; [15 hrs.]
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Classes are given in weekly mode and include workshops by online classes. The workshops are supported by videos, problem solving exercises and class notes. Students will also be provided the using surveying equipment. The subject comprises active learning modules for students whereby demonstrations in using surveying equipment, taking measurements and completing field reports will be showcased, as practical skills are an essential component of the learning and assessment of this subject. Each active learning session is also supported by information on online classes including videos, which will need to be consulted/previewed prior to attending class, and where necessary, pre-class quizzes

	need to be completed. The completion of these quizzes allows for feedback to be provided to students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	100	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	50	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**200**		

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 / Tutorial	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)		

Theoretical - Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Engineering Surveying
Week 2	Units of Measurements
Week 3	Scale and Mapping
Week 4	Geometry
Week 5	Geometry
Week 6	Vertical Measurements (Leveling): Introduction
Week 7	Vertical Measurements (Leveling): Methods and Procedure
Week 8	Mid-Term Exam

Week 9	Profile Leveling
Week 10	Topographic Surveying: Introduction
Week 11	Topographic Surveying: Procedures
Week 12	Earthworks: Areas and Volumes
Week 13	Angles and Directions
Week 14	Angels and Directions
Week 15	Total Station and GPS
Week 16	**Preparatory week before the final Exam**

Practical - Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي العملي	
	Material Covered
Week 1	Introduction to Surveying Instruments
Week 2	Horizontal Distances: Introduction
Week 3	Taping: Applications
Week 4	Taping: Applications
Week 5	Taping: Applications
Week 6	Vertical Measurements (Leveling): Level Instrument
Week 7	Vertical Measurements (Leveling): Application
Week 8	Med-Term Exam
Week 9	Profile Leveling: Application
Week 10	Topographic Surveying: Grid Leveling
Week 11	Topographic Surveying: Application
Week 12	Earthworks: Application
Week 13	Angles and Directions: The Theodolite
Week 14	Angels and Directions: Application
Week 15	Total Station and GPS
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	- Surveying Fundamentals and Practices, 6th Ed (Nathanson, Jerry A. et.al.) (2011) - Surveying Problem Solution With Theory and Objective Type Questions (Chandra, A M) (2005) - Engineering Surveying, 6th Ed. (Schofield, W & Breach, Mark) (2007)	No
Recommended Texts		No
Websites	https://www.sundersurveying.com/list-of-surveying-instruments-and-their-uses/ https://civiconcepts.com/blog/surveying-instruments https://theconstructor.org/surveying/types-of-leveling-methods/14679/	

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 “Static”)

نموذج وصف المادة الدراسية

ميكانيك الموائع الساكن

Module Information معلومات المادة الدراسية					
Module Title	**Static Fluid Mechanics**			**Module Delivery**	
Module Type	**B**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**DME214**				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level		UGII	**Semester of Delivery**		3
Administering Department		Mining 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	Ali Abdulameer Hussein Al-Zubaidi (Lab lecturer)		**e-mail**	ali.ameer86@uomosul.edu.iq	
Peer Reviewer Name		**Eman Kassim Yahya**	**e-mail**	eman.q@uomosul.edu.iq	
Scientific Committee Approval Date		15/09/2024	**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Physics, Mechanics	**Semester**	
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	
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
	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	**Hydrogeology**			**Module Delivery**	
Module Type	**S**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**DME215**				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level	**1**		**Semester of Delivery**	3	
Administering Department	**Mining engineering**		**College**	**Mining and petroleum engineering**	
Module Leader	**Azealdeen Al-Jawadi**		**e-mail**		
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	**Eman Kassim Yahya**		**e-mail**	**eman.q@uomosul.edu.iq**	
Scientific Committee Approval Date	15**/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 objectives of a Hydrogeology module may vary depending on the specific course or program. However, here are some common objectives that are often covered in such modules: 1. Understanding Hydrogeology methods: The module aims to provide students with a comprehensive understanding of different Hydrogeology methods used in the mining. This includes open-pit mining, quarries, underground mining. 2. Aquifer planning and design: Students learn how to plan and design wells efficiently and effectively. This involves topics such as pit optimization, equipment selection, and road design. 3. Geotechnical considerations: The module addresses the geotechnical aspects related to surface and ground water, including slope stability analysis, rock mechanics, and ground control. Students learn how to assess and mitigate risks associated with geotechnical hazards in Hydrogeology operations. 4. Equipment and technology: Students gain knowledge about the various types of equipment and technology used in Hydrogeology operations. This includes drilling techniques, and automation technologies for improving productivity and safety. 5. Environmental and social considerations: The module covers the environmental and social impacts of aquifers 6. Safety and risk management: Safety is a crucial aspect of surface and groundwater aquifers. The module emphasizes the importance of safety protocols, hazard identification, risk assessment, and emergency response planning in well operations. Students learn how to develop and implement safety programs to ensure a safe working environment. 7. Economic and financial aspects: Hydrogeology operations involve significant investments, and it is important to understand the economic and financial considerations. Students learn about cost estimation, financial analysis, aquifer valuation, and project evaluation techniques to make informed decisions regarding mining investments. 8. Sustainable water practices: The module highlights the importance of sustainable water practices and responsible water extraction. Students explore topics such as energy efficiency, water management, waste reduction, and reclamation strategies to promote sustainable development in water aquifers.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	After completing the module, students may attain the following potential learning outcomes: 1. Knowledge of Hydrogeology methods: Students should have a comprehensive understanding of various Hydrogeology methods, including their advantages, limitations, and applicability to different geological and operational conditions.

	2. Ability to plan and design wells: Students should be able to develop water plans and designs considering factors such as well, equipment selection that maximize productivity while minimizing costs and environmental impacts. 3. Competence in geotechnical considerations: Students should be competent in evaluating geotechnical risks associated with Hydrogeology operations. They should be able to analyze slope stability, assess rock mechanics, and develop appropriate ground control measures to ensure safe and stable ground water operations. 4. Familiarity with drilling equipment and technology: Students should be familiar with the types of equipment and technology used in well boring, including their functions, capabilities, and maintenance requirements. They should understand how to select and utilize equipment effectively to optimize mining operations. 5. Understanding of environmental and social aspects: Students should have an understanding of the environmental and social impacts of Hydrogeology and be able to apply mitigation strategies. They should be familiar with environmental regulations, reclamation techniques, and community engagement practices to promote sustainable mining operations. 6. Proficiency in safety and risk management: Students should possess the knowledge and skills to identify and assess safety hazards in Hydrogeology and well drilling operations. They should be able to develop and implement safety programs, conduct risk assessments, and respond effectively to emergencies, ensuring a safe working environment for all personnel. 7. Application of sustainable water practices: Students should be able to apply sustainable water practices in Hydrogeology operations. They should have an understanding of energy-efficient practices, water management strategies, waste reduction techniques, and reclamation principles to minimize environmental impacts.
Indicative Contents المحتويات الإرشادية	These indicative contents provide a general framework for a Hydrogeology module. The specific topics covered and the depth of coverage may vary depending on the academic institution, course level, and duration of the module. Introduction to Hydrology: Overview of the aquifer Types of aquifers Historical development of water managements Hydrogeology Methods: Hydrology: planning, design, and operations Testing techniques and considerations Placer hydrology In-situ leaching and solution mining borehole Planning and Design: Water exploration and resource estimation Well optimization

	Drilling layout and equipment selection Waste water management and disposal techniques Water transportation systems Geotechnical Considerations: Rock mechanics and properties of rocks Slope stability analysis and monitoring Ground control methods and techniques drilling principles and techniques Hydrogeology Equipment and Technology: Types and selection of drill equipment Drilling techniques Test machinery and equipment Water transport systems Automation and digital technologies in surface and underground water Environmental and Social Aspects of Water: Environmental impact assessment and management Reclamation and land rehabilitation Water management in mining operations Community engagement and social responsibility Sustainable Water Practices: Energy efficiency and renewable energy sources Water conservation and management Waste reduction and recycling Biodiversity conservation and ecosystem restoration Corporate social responsibility and sustainable development

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	A combination of various learning and teaching strategies can be employed to effectively deliver a Hydrogeology module. Here are some strategies that can be used to enhance student engagement and promote effective learning: 1. Lectures: Lectures provide a structured overview of the key concepts and theories related to Hydrogeology. Instructors can present theoretical knowledge, case studies, and examples to introduce students to the subject matter. 2. Field Trips: Organizing field trips to active mining sites or mine museums gives students the opportunity to witness Hydrogeology operations firsthand. It allows them

	to observe mining practices, interact with industry professionals, and gain a practical understanding of the challenges and considerations in the field. 3. Group Discussions: Group discussions promote student engagement and encourage peer-to-peer learning. Students can analyze and discuss various Hydrogeology topics, share their perspectives, debate different approaches, and develop their communication and critical thinking skills. 4. Case Studies and Projects: Assigning case studies and projects related to Hydrogeology allows students to delve deeper into specific topics or real-world challenges. They can conduct research, analyze data, and develop solutions, fostering independent learning and problem-solving skills. 5. Guest Lectures and Industry Experts: Industry experts can share their experiences, discuss current industry practices, and address emerging trends and challenges. 6. Multimedia Resources: Utilizing multimedia resources such as videos, documentaries, and online tutorials can enhance student engagement and facilitate visual and auditory learning. These resources can be used to supplement lectures, provide visual demonstrations, or showcase industry best practices. 7. Assessments and Feedback: Regular assessments, such as quizzes, tests, and assignments, help students evaluate their understanding and progress. Providing timely feedback on their performance enables students to identify areas of improvement and reinforce their learning. It is important to use a combination of these strategies to cater to different learning styles and promote active participation from students. Additionally, incorporating real-world applications, industry examples, and current research advancements can help students connect theoretical concepts to practical applications in the field of Hydrogeology.

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	62	**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.	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 Hydrology Overview of the hydrology and its significance Types of aquifers Historical development of hydrology
Week 2	The geological and geomorphological framework
Week 3	Hydrological methods
Week 4	Hydrochemical methods
Week 5	Geophysical methods
Week 6	Modelling karst hydrodynamics
Week 7	Field Hydrogeology
Week 8	Quaternary deposits and hydrogeology
Week 9	water resources
Week 10	physical geography and climatic constraints on water resources
Week 11	Well drilling
Week 12	Equipment of well drilling
Week 13	Managements of hydrogeology aquifers
Week 14	Environmental aspects of hydrogeology
Week 15	Group Projects and Presentations
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered

Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Manual of Applied Field Hydrogeology Willis D. Weight, John L. Sonderegger McGraw-Hill professional engineering 2001	Yes
Required Texts		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	**Transport and circulation of raw materials**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**DME216**				
ECTS Credits	**3**				
SWL (hr/sem)	**75**				
Module Level	**2**	**Semester of Delivery**	**3**		
Administering Department	**DME**	**College**	**PMEUOM**		
Module Leader	**Hudhaifa Raad Hamzah**	**e-mail**	**hudhaifahamzah@uomosul.edu.iq**		
Module Leader's Acad. Title	**Lecturer**	**Module Leader's Qualification**	**Ph.D.**		
Module Tutor	**Non**	**e-mail**	**E-mail**		
Peer Reviewer Name	**Eman Kassim Yahya**	**e-mail**	**eman.q@uomosul.edu.iq**		
Scientific Committee Approval Date	**15/09/2024**	**Version Number**	**1.0**		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	Petroleum and Gas Transport and Exchange	**Semester**	6

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1- Understand the importance of transport and circulation in the supply chain. 2- Identify various modes of transportation. 3- Analyze factors influencing transportation decisions. 4- Explore global supply chains by examining the complexities involved in international trade, including customs regulations, tariffs, logistics, and cultural considerations. 5- Investigate the role of technology in transportation and circulation. 6- Examine sustainability and environmental impacts by exploring sustainable practices, alternative fuels, carbon footprints, and ways to minimize the environmental consequences associated with the movement of raw materials. 7- Understand the role of government and policy in transportation.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The module on the transport and circulation of raw materials aims to achieve the following learning outcomes for students: 1- <u>Knowledge and Understanding:</u> - Gain a solid understanding of the importance of transportation and circulation in the supply chain of raw materials. - Acquire knowledge about various modes of transportation used for the movement of raw materials and their advantages and disadvantages. - Understand the factors that influence transportation decisions, including cost, distance, accessibility, infrastructure, and environmental impact. - Comprehend the complexities involved in global supply chains and international trade of raw materials. 2- <u>Analysis and Evaluation:</u> - Develop the ability to analyze transportation scenarios and make informed decisions based on cost-effectiveness, efficiency, and sustainability considerations. - Evaluate the environmental impacts associated with transportation systems and propose measures to mitigate them. - Assess the role of technology in enhancing transportation and circulation processes and their impact on efficiency and effectiveness. - Evaluate the impact of government regulations and policies on transportation and circulation systems. 3- <u>Application and Problem-Solving:</u> - Apply knowledge of transportation modes and factors to solve transportation challenges encountered in real-world scenarios. - Utilize critical thinking skills to evaluate transportation options and propose optimized solutions for the movement of raw materials. - Apply principles of sustainability to design and optimize environmentally friendly transportation and circulation systems. - Analyze logistical and supply chain challenges related to transportation and circulation and propose strategies to overcome them.

Indicative Contents المحتويات الإرشادية	The indicative contents for a module on the transport and circulation of raw materials include the following topics: 1- <u>Introduction to Transport and Circulation:</u> - Importance of transportation and circulation in the supply chain. - Overview of the movement of raw materials from source to destination. 2- <u>Factors Influencing Transportation Decisions:</u> - Cost considerations: fuel, labor, maintenance, and infrastructure costs - Distance considerations: short-haul vs. long-haul transportation - Accessibility considerations: road conditions, port facilities, and warehouse locations - Infrastructure considerations: road networks, railways, ports, and airports - Environmental impact considerations: emissions, carbon footprint, and sustainability 3- <u>Technology in Transportation and Circulation:</u> - Automation and robotics in logistics and supply chain management. - Tracking systems and real-time monitoring. - Supply chain management software and technologies. - Digital platforms and data analytics for transportation optimization. 4- <u>Collaboration and Communication Skills</u>: - Group discussions and activities to explore transportation scenarios - Collaborative problem-solving exercises - Presenting findings and solutions to peers

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1- Lectures and Presentations: Conducting informative lectures and presentations can provide students with an overview of key concepts, theories, and principles related to transportation and circulation. Use visual aids, case studies, and real-world examples to engage students and facilitate their understanding. 2- Interactive Discussions: Foster interactive discussions to encourage active student participation. Pose questions, encourage critical thinking, and facilitate debates to explore different perspectives on transportation and circulation challenges. 3- Case Studies and Problem-Solving: Present real-life case studies that involve transportation and circulation issues. Engage students in analyzing and solving

	problems related to logistics, supply chain management, and transportation decisions. 4- Group Projects and Collaborative Learning: Assign group projects that require students to work together in teams. Each team can be given a specific transportation or circulation scenario to analyze, propose solutions, and present their findings. 5- Technology Integration: Utilize technology tools and resources to enhance the learning experience. 6- Assessment through Projects and Presentations: Design assessments that require students to demonstrate their understanding through projects, presentations, or reports.

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	27	**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)	4 and 10	LO #1, #2, #3 and #8, #9
	Assignments	3	10% (10)	6 and 12,14	LO #2 ,#3, #4 and #10, #12, #13.
	Projects / Lab.	0	10% (10)	Continuous	All
	Report	1	10% (10)	15	All
Summative assessment	**Midterm Exam**	2hr	20% (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 Materials Handling
Week 2	Principles of Materials Handling
Week 3	Unit Load Concept
Week 4	Classification of Materials Handling Equipment **+ Quizze1.**
Week 5	Belt Conveyors **+Home work1.**
Week 6	Chain Conveyors.
Week 7	**Mid-term exam** + Haulage, Cable, Bucket, Roller and Screw Conveyors.
Week 8	Pneumatic Conveyors **+ Quizze2.**
Week 9	Hydraulic Conveyors **+Home work2.**
Week 10	Hoisting Equipment
Week 11	Bulk Handling Equipment and Systems
Week 12	Robotic Handling **+Home work3.**
Week 13	Piping System Part I
Week 14	Piping System Part II
Week 15	Organization, Maintenance and Safety + **Discuss reports.**
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Ray, S. (2008). *Introduction to materials handling*. New Age International (P) Ltd., Publishers.	No
Recommended Texts	Fruchtbaum, J. Bulk Materials Handling Handbook [electronic resource].	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	**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		**Mining Engineering**	**College**	**Petroleum and Mining Engineering**	
Module Leader	**Shatha Muhamad**		**e-mail**	**@uomosul.edu.iq**	
Module Leader's Acad. Title		**Assistant Lecturer**	**Module Leader's Qualification**		**MSc**
Module Tutor	**Non**		**e-mail**	**E-mail**	
Peer Reviewer Name		**Eman Kassim Yahya**	**e-mail**	**eman.q@uomosul.edu.iq**	
Scientific Committee Approval Date		**15/09/2024**	**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	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 √-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**			**Module Delivery**	
Module Type	**B**			☒ **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	**mining 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	**Non**		**e-mail**	**E-mail**	
Peer Reviewer Name	**Eman Kassim Yahya**		**e-mail**	**eman.q@uomosul.edu.iq**	
Scientific Committee Approval Date	**15/09/2024**		**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	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. <u>types of sentences</u> 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		**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل		**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل			

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	Conditional sentence + vocabularies
Week 2	Passive voice + vocabularies
Week 3	Direct and Indirect speech + vocabularies
Week 4	Adjective , types and uses + vocabularies
Week 5	Adverb , types and uses + vocabularies
Week 6	Examination
Week 7	Simple sentence , reading and listening + vocabularies
Week 8	Compound sentence , reading and listening + vocabularies
Week 9	Complex sentence , reading and listening + vocabularies
Week 10	Affirmative sentence (Declarative and Assertive) , reading and listening + vocabularies
Week 11	Positive , negative and interrogative sentence , reading and listening + vocabularies
Week 12	Quiz
Week 13	Patterns of possibilities + Reading scientific passages
Week 14	Countable and uncountable nouns , , reading and listening + vocabularies
Week 15	Conditional verbs , reading and listening + vocabularies
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

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
	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.

University of Mosul

College of Petroleum and Mining Engineering

Department of Mining Engineering

Course Description

Second Stage/Second Semester (Bologna Track)

Prof. Dr. Nabil Youssef Al-Banna

Head of the Scientific Committee

Dr. Ibrahim Adil Al-Hafidh

Head of Department

كلية هندسة النفط والتعدين
قسم هندسة التعدين

MODULE DESCRIPTION

وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Strength of Materials**			**Module Delivery**	
Module Type	**Basic learning activities**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☒**Seminar**	
Module Code	**DME221**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		**UGII**	**Semester of Delivery**		4
Administering Department		**Mining Engineering**	**College**	**Petroleum and Mining Engineering**	
Module Leader	**Sarah Mwafaq**		**e-mail**	saraaltaie87@uomosul.edu.iq	
Module Leader's Acad. Title		**Assistant lecturer**	**Module Leader's Qualification**		MSc
Module Tutor	**Shahad Salim**		**e-mail**	shahadsibrahim88@uomosul.edu.iq	
Peer Reviewer Name		**Eman Kassim Yahya**	**e-mail**	**eman.q@uomosul.edu.iq**	
Scientific Committee Approval Date		**15/09/2024**	**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Engineering mechanics	**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	1. Understanding the conditions of equilibrium between the external forces and reactions on a member. 2. Understanding the relationships between strains (deformation) in a member and stresses (internal forces) producing them. 3. Understanding the conditions that can lead to failure in structural members and machine elements.

	4. Analysis to determine the limiting loads that a member can stand before failure or excessive deformation occurs. 5. Understand the classification of materials based on ductility or brittleness. 6. Describe types of beams in their loading conditions. 7. Calculate the shear force required in causing a failure of a loaded beam. 8. Determine the location for bending and the maximum bending moment possible in a particular loading condition. 9. Analysis any form of loaded beams and draw the shear and bending diagrams. 10. Establish the effect of torque on a rotating shaft.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Students who successfully complete this course will have demonstrated an ability to: 1. Understand the concepts of stress and strain at a point as well as the stress-strain relationships for homogenous, isotropic materials. 2. Calculate the stresses and strains in axially-loaded members, circular torsion members, and members subject to flexural loadings. 3. Determine the stresses and strains in members subjected to combined loading and apply the theories of failure for static loading. 4. Determine and illustrate principal stresses, maximum shearing stress, and the stresses acting on a structural member. 5. Design simple bars, beams, and circular shafts for allowable stresses and loads. 6. Demonstrate competence in problem identification, formulation and solution, and critical thinking.
Indicative Contents المحتويات الإرشادية	Revise the cross section properties; general internal forces. [5 hrs.] Normal stress and strain application to the analysis of simple structures; stresses on an oblique plane under axial loading and moment, Normal stresses in elastic bodies for heterogeneous and composite symmetrical and unsymmetrical sections for eccentric axial loading. [10 hrs.] Shear stress and strain ,Shear stresses due to direct and flexural shear. Determination of shear stresses due to shearing force; Transverse loading: Shear flow; shear stresses; stresses under combined loading. Determination of shear stresses on sections and bolts due to torsional. Determination of combined stresses; Principal stresses; maximum shearing stress. [12 hrs.] Bending stresss and Torsional loading of shafts. [10 hrs.]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	● Provision of detailed explanation in class on each topic. ● Provision of adequate illustration on the board. ● Making lecturing periods interactive. ● Giving the students class work during the lecture period. ● Giving take-home assignments at the end of each lecture. ● Solving practical questions.

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**	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 / Tutorial	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 mechanics of materials
Week 2	Tension, Compression, and Shear.
Week 3	Beams, shear force and bending moment equations.
Week 4	Shear Forces and Bending Moments diagrams
Week 5	Stresses in Beams
Week 6	Elongation, stress and strain for axial loads.
Week 7	Strain
Week 8	Strain transformation plane strain
Week 9	Bending stresses of beams.
Week 10	Bending stresses of composite sections.
Week 11	Shear stress in beams.

Week 12	Shear stress in bolt.
Week 13	Torsion
Week 14	Torsional deformations
Week 15	Statically Indeterminate Beams.
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	• Mechanics of materials, sixth edition, Ferdinand P. Beer • Mechanics of materials:an integrated learning system,Philpot • Strength of Materials 4th Ed. by Ferdinand L. Singer	Yes
Recommended Texts		No
Websites	https://www.google.com/search?q=strength+of+materials+books&sourceid=chrome&ie=UTF-8	

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	**Project Management for Mining**			**Module Delivery**	
Module Type	**Core**			☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☒ Seminar	
Module Code	**DME223**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level		**UGII**	**Semester of Delivery**		**4**
Administering Department		**DME**	**College**	**PMEUOM**	
Module Leader	**Dr. Ibrahim Adil Ibrahim**		**e-mail**	**iibrahim@uomosul.edu.iq**	
Module Leader's Acad. Title		**Lecturer**	**Module Leader's Qualification**		**Ph.D.**
Module Tutor	**Non**		**e-mail**	**E-mail**	
Peer Reviewer Name		**Eman Kassim Yahya**	**e-mail**	**eman.q@uomosul.edu.iq**	
Scientific Committee Approval Date		**15/09/2024**	**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	Mining projects are complex. The path to successful project completion is imbedded with situational uncertainties and strewn with obstacles. These course offer practical solutions to remove the obstacles and provide sound insight to cope with the uncertainties. The goal is to bring the project management world into better focus, to place project managers in positions where they can anticipate rather than respond, and to lay out the project execution path in straightforward patterns with understandable success strategies that will achieve the desired outcome. Project Management for Mining provides the originator of a mining idea or mineral opportunity with the necessary guidance to develop that idea or opportunity into a well-defined project that will successfully meet the corporation's business objectives. This course presents a best practice process for steering development of the project through senior management approval and on-site execution. The intent is for this course to serve as a handy reference of proven techniques and winning approaches for effective project management within the mining industry, and to impart knowledge to all those who seek to manage mining project work, not just the project manager.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The target audience of this course includes not only the project manager but also all those mining personnel with an interest in or responsibility for successful project execution, for example, ■ Corporate leaders who have to approve the project. ■ Project sponsors who have to keep stakeholders satisfied with project progress. ■ Geologic discoverers, developers, and entrepreneurs. ■ Project team members who have to execute the project. ■ Mine operators who have to take delivery of the completed project.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Introduction Definition of a Project. Project Management for Mining provides the originator of a mining idea or mineral opportunity with the necessary guidance to develop that idea or opportunity into a well-defined project that will successfully meet the corporation's business objectives. [8hrs]. Part B – Ethics This chapter apprises the project manager of the conflicts that can arise within a project and how best to approach these issues and "do the right thing" from an ethics viewpoint. [8hrs] Part C – Governance The role of project governance is to provide a decision-making framework that is logical, robust, and repeatable for the control of an organization's capital investments. [8hrs] Part D – Management Review This initial company management review analyzes the results of the scoping evaluation. The project potential is then sufficiently described in a Management Review Submission to allow management to reach a yes or no decision on whether to proceed to the next stage. [8hrs] Part E – Prefeasibility Study

	A prime purpose of the prefeasibility study is to undertake all possible trade-offs on the different options that can be sensibly postulated for achieving the project's goals. If there are no alternatives to the scoping evaluation path, then the prefeasibility study may be optional. [8hrs] Part F – Feasibility Study The feasibility study is the final, definitive proof of viability, that is, preparation of a bankable quality study that meets all the external financing requirements. The feasibility study is more detailed than the prefeasibility study, providing a more accurate estimate and a higher level of confidence in the probability of project success. The complete project and the installations to be built are fully described. The major risks and the steps for their mitigation are assessed. If approved, the feasibility study and the PEP become the primary control documents for the project. [10hrs] Part G – Environmental Impact, Permits, Social Acceptance, and Sustainability This chapter lays out the steps that are required for the project to earn acceptance and approval from those external entities that affect and/or control project progress. [10hrs] Part H – Risk Management Risk management encompasses the steps for identification, assessment, and prioritization of project risks. Following these steps is the key follow-up action for coordinated and economical application of resources to mitigate the probability and/or impact of unfortunate events and to maximize the realization of any opportunities. [10hrs]

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 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	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
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 13	LO #1- #4 and #8- #11
	Assignments	2	10% (10)	4 and 15	LO #2- #3 and #13, #14
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	10	LO #4, #5 and #6
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #6
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction Definition of a Project and its objective. What Is Project Management?. Purpose of Project Management. Project management activities. Project Responsibility and Accountability. The Successful Project Manager. Measurement of a Project's Success. Project stages timeline.
Week 2	Ethics Right and Wrong, Company Code of Conduct. Professional Codes of Ethics.
Week 3	Ethics Personal Code of Ethics. Situational Ethics. Building Trust and Overcoming Hurdles.
Week 4	Governance What Is Project Governance? Components of Project Governance. Three Pillars of Project Governance. Core Principles of Project Governance. Attributes of Good Governance.
Week 5	Governance Project Elements for Good Governance Attainment. Project Governance Roles. Governance Issues That Have Caused Project Problems. Results of Good Governance.
Week 6	Management Review Objective, Stage Gate, Documentation, Review and Approval Process, Result of Review, Management review.
Week 7	Midterm Exam, Management Review. Objective, Stage Gate.
Week 8	Management Review Documentation, Review and Approval Process, Result of Review, Management review.
Week 9	Prefeasibility Study Objective, Scope, Activities Required, Conclusion for Project Continuation,
Week 10	Prefeasibility Study Level of Effort for Prefeasibility Study.
Week 11	Feasibility Study Objective, Scope, Activities Required
Week 12	Feasibility Study Project Definition Rating Index, Key Feasibility Study Deliverables

Week 13	Environmental Impact, Permits.
Week 14	Social Acceptance, and Sustainability
Week 15	Risk Management
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1:
Week 2	Lab 2:
Week 3	Lab 3:
Week 4	Lab 4:
Week 5	Lab 5:

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Project Management for Mining	EBook
Recommended Texts		EBook
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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	C - Good	جيد	70 - 79	Sound work with notable errors
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Dynamics Fluid Mechanics**			**Module Delivery**	
Module Type	B			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	DME224				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level		2	**Semester of Delivery**		4
Administering Department		Mining 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	Ali Abdulameer Hussein Al-Zubaidi		**e-mail**	ali.ameer86@uomosul.edu.iq	
Peer Reviewer Name		**Eman Kassim Yahya**	**e-mail**	**eman.q@uomosul.edu.iq**	
Scientific Committee Approval Date		15/09/2024	**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Physics, Mechanics	**Semester**	
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. **1 . Fluid Dynamics** 1- Explain the concept dynamics flow, Newton's Second Law. 2- Euler equations of motion 3- Bernoulli's equation. 4- Application of Bernoulli' equation. 5- Flow rate measurements in pipe systems. 6- Energy line and Hydraulic Grade line. 2. **Dimensional Analysis, Simulated and Modeling** 1. Dimensional Analysis of Pipe Flow. 2. Bukingham theorem Pi Analysis.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Upon completion of this course, students will be able to: 1. Discuss the application of Newton's second law to fluid flows. 2. Explain the development, uses, and limitations of the Bernoulli equation. 3. Use the Bernoulli equation (stand-alone or in combination with the continuity equation) to solve simple flow problems. 4. Apply the concepts of static, stagnation, dynamic, and total pressures. 5. Calculate various flow properties using the energy and hydraulic grade lines. 6. Apply the Buckingham pi theorem. 7. Develop a set of dimensionless variables for a given flow situation. 8. Identify and understand various characteristics of the flow in pipes. 9. Discuss the main properties of laminar and turbulent pipe flow and appreciate their differences. 10. Calculate losses in straight portions of pipes as well as those in various pipe system components. 11. Predict the flowrate in a pipe by use of common flowmeters.
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.

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	
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	1- One-, Two-, and Three-Dimensional Flows 2- Streamlines, Streaklines, and Pathlines 3- Euler's equation.
Week 2	1- Bernoulli's equation 2- Application of Bernoulli' equation.
Week 3	Solving Examples and discussing a problems of use of the Bernoulli Equation.
Week 4	Conservation of mass – the Continuity Equation.
Week 5	Solving Examples and discussing a problems of use of the Continuity Equation.
Week 6	Newton's Second Law—The Linear Momentum and Moment-of- Momentum Equations.
Week 7	Flow rate measurements in pipe systems.
Week 8	Energy line and Hydraulic Grade line.
Week 9	Dimensional Analysis of Pipe Flow. Bukingham Pi Analysis.
Week 10	Solving Examples and discussing a problems of use of the Bukingham Pi theorem.
Week 11	General Characteristics of Pipe Flow. Laminar and Turbulent Flow.
Week 12	Dimensional Anylisis of Pipe Flow. Major Losses, Minor Losses.
Week 13	Pipe Flow Example. Single Pipes, Multiple pipe system.
Week 14	Pipe Flowrate Measurement. Pipe Flowrate Meters. Volume Flowmeters.Fl
Week 15	Exam

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
	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	**Basic**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**DME225**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	**2**		**Semester of Delivery**	**4**	
Administering Department	**DME**		**College**	**PMEUOM**	
Module Leader	**Hudhaifa Raad Hamzah**		**e-mail**	hudhaifahamzah@uomosul.edu.iq	
Module Leader's Acad. Title	**Lecturer**		**Module Leader's Qualification**	**Ph.D.**	
Module Tutor	**Non**		**e-mail**	**E-mail**	
Peer Reviewer Name	**Eman Kassim Yahya**		**e-mail**	**eman.q@uomosul.edu.iq**	
Scientific Committee Approval Date	**15/09/2024**		**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	1- Understanding the laws of thermodynamics: These laws include the Zeroth law, the first law, and the second law. 2- Analyzing energy and heat transfer: Thermodynamics deals with the transfer of energy and heat between systems and their surroundings. 3- Applying thermodynamic principles to real-world systems: The study of thermodynamics is aimed at applying its principles to real-world systems, such as engines, power plants, refrigeration systems, and chemical processes. 4- Understanding thermodynamic properties and equations of state: Thermodynamic properties, such as temperature, pressure, volume, and entropy, play a crucial role in characterizing systems. 5- Analyzing thermodynamic cycles and processes: Thermodynamic cycles, such as the Carnot cycle, Rankine cycle, and Brayton cycle, are important in power generation and energy conversion. 6- Studying phase equilibrium and phase transitions: Thermodynamics explores phase equilibrium and phase transitions, such as solid-liquid-gas transitions, vapor-liquid equilibrium, and chemical reactions.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Students will gain a proper understanding of the fundamental concepts, principles, and laws of thermodynamics. 2- Students will be able to apply thermodynamic principles and equations to analyze and solve problems in various thermodynamic processes and cycles. 3- Students will be able to apply thermodynamic principles to analyze and evaluate the behavior and performance of real-world systems, such as engines, power plants, refrigeration systems, and chemical processes. 4- Students will develop problem-solving skills specific to thermodynamics. 5- Students can develop critical thinking skills to analyze and interpret thermodynamic phenomena and processes. 6- Students can be able to communicate thermodynamic concepts, principles, and solutions effectively. 7- Students can understand the connections between thermodynamics and other related disciplines, such as physics, chemistry, engineering, and materials science.
Indicative Contents المحتويات الإرشادية	The indicative contents of a thermodynamics subject can vary depending on the specific curriculum and the depth of the course. However, here are some common topics that are often covered in a thermodynamics module: 1- <u>Introduction to Thermodynamics:</u> Definition of thermodynamics Basic concepts (system, surroundings, boundary, state and process) Units and dimensions in thermodynamics

	2- Laws of Thermodynamics: Zeroth law of thermodynamics First law of thermodynamics (conservation of energy) Second law of thermodynamics (entropy and irreversibility) 3- Properties of Pure Substances: Temperature, pressure, and volume Phases of matter (solid, liquid, gas) 4- thermodynamic Cycles and Power Plants: Carnot cycle and Carnot heat engine Rankine cycle (steam power plant) Brayton cycle (gas turbine power plant) Combined cycles (gas-steam combined cycle)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Learning and teaching strategies play a crucial role in effectively delivering a thermodynamics course and helping students grasp the concepts and principles. Here are some common strategies employed in teaching thermodynamics: 1- Lectures: Lectures are a primary teaching strategy in thermodynamics courses. 2- Problem-Solving Sessions: Problem-solving sessions are essential for students to apply thermodynamic principles and equations to solve numerical problems. 3- Case Studies and Examples: Case studies and real-world examples help students connect thermodynamic principles to practical applications. 4- Interactive Discussions: Interactive discussions encourage active learning and engage students in the subject matter. 5- Visual and Multimedia Resources: Visual and multimedia resources, such as animations, simulations, videos, and interactive software, can enhance students' understanding of complex thermodynamic processes and phenomena. 6- Conceptual Mapping and Visualization: Thermodynamics involves understanding the relationships between various concepts, principles, and equations.

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	4
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)	4 and 10	LO #1, #2, #3 and #8, #9
	Assignments	3	10% (10)	6 and 12,14	LO #2 ,#3, #4 and #10, #12, #13.
	Projects / Lab.	0	10% (10)	Continuous	All
	Report	1	10% (10)	15	All
Summative assessment	**Midterm Exam**	2hr	20% (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 and basic concepts of thermodynamics.
Week 2	Energy, Energy Transfer, and General Energy Analysis.
Week 3	The First Law of Thermodynamics.
Week 4	Properties of pure substances **+ Quizze1.**
Week 5	The Ideal-Gas Equation of State **+Home work1.**
Week 6	Energy Analysis of Closed Systems.
Week 7	**Mid-term exam** + Mass and Energy Analysis of Control Volumes.
Week 8	Some Steady-Flow Engineering Devices**+ Quizze2.**

Week 9	The Second Law of Thermodynamics **+Home work2.**
Week 10	Heat engines, Refrigerators and Heat Pumps.
Week 11	The Carnot cycle.
Week 12	The Carnot Heat Engine, Refrigerator and Heat Pump **+Home work3.**
Week 13	The Rankine cycle.
Week 14	The Brayton cycle
Week 15	The Otto and Diesel cycles+ **Discuss reports.**
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Cengel, Y. A., Boles, M. A., & Kanoğlu, M. (2011). *Thermodynamics: an engineering approach* (Vol. 5, p. 445). New York: McGraw-hill.	yes
Recommended Texts	Moran, M. J., Shapiro, H. N., Boettner, D. D., & Bailey, M. B. (2010). *Fundamentals of engineering thermodynamics*. John Wiley & Sons.	No
Websites	https://www.learnthermo.com/index.php	

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	**DME226**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	**Two**		**Semester of Delivery**	**Four**	
Administering Department	**Mining Engineering**		**College**	**Petroleum and Mining Engineering**	
Module Leader	**Hudhaifa Raad Hamzah**		**e-mail**	hudhaifahamzah@uomosul.edu.iq	
Module Leader's Acad. Title	**Lecturer**		**Module Leader's Qualification**	**Ph.D.**	
Module Tutor	**non**		**e-mail**		
Peer Reviewer Name	**Eman Kassim Yahya**		**e-mail**	**eman.q@uomosul.edu.iq**	
Scientific Committee Approval Date	15/09/2024		**Version Number**	**1.0**	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Nothing	**Semester**	
Co-requisites module	Nothing	**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 mining projects, evaluate investment opportunities, and make informed decisions in the mining industry. It provides a valuable foundation for professionals involved in project management, investment analysis, and economic planning within the mining engineering field.
Indicative Contents المحتويات الإرشادية	The course of mathematics refers to the recent growth in mining field, redistribution of equipment, the course objective is to get interview and basic understanding of production engineering size of mining field, net present value and other indications on whether an investment will be profitable, minig fiscal system and how the value of mining is shared between companies and government, also exploiting material resources also development of production economy. Student will study all the above paragraphs. **Lecture titles** Mathematics analysis Alternative energy International strategy of energy Methods of engineering decision

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. * Lectures are conducted by face-to-face education in the classroom, four 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	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
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.
Week 2	Basics of mathematics.
Week 3	Understand the reason behind studying mathematical engineering and its main applications.
Week 4,5 & 6	Sequences, Infinite Series, The Integral Test, Comparison Tests, Absolute Convergence; The Ratio and Root Tests, Alternating Series and Conditional Convergence, Power Series, Taylor and Maclaurin Series, Convergence of Taylor Series, The Applications of Taylor Series.
Week 7 & 8	Parametrizations of Plane Curves, Calculus with Parametric Curves, Polar Coordinates, Contents, Graphing Polar Coordinate Equations, Areas and Lengths in Polar Coordinates.

Week 9, 10 & 11	Three-Dimensional Coordinate Systems, Vectors, The Dot Product, The Cross Product, Lines and Planes in Space, Cylinders and Quadric Surfaces, Curves in Space and Their Tangents Integrals of Vector Functions; Projectile Motion, Arc Length in Space.
Week 12, 13,14	Functions of Several Variables, Limits and Continuity in Higher Dimensions, Partial Derivatives, The Chain Rule, Directional Derivativesand Gradient Vectors, Tangent Planes and Differentials, Extreme Values and Saddle Points, Lagrange Multipliers, Taylor's Formula for Two Variables, Partial Derivatives with Constrained Variables Functions of Several Variables.
Week 15	Preparatory week before the final Exam.

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.

Curriculum update rate = 5%

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Arabic language II**			**Module Delivery**	
Module Type				☒ **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	**Mining 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	**Non**		**e-mail**		
Peer Reviewer Name	**Eman Kassim Yahya**		**e-mail**	**eman.q@uomosul.edu.iq**	
Scientific Committee Approval Date	**15/9/2024**		**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	**Baathist crimes in Iraq**			**Module Delivery**	
Module Type	**Secondary**			☒ **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		**Mining engineering**	**College**	**petroleum and Mining engineering**	
Module Leader	**Basma Mohamed Natheer Ahmed**		**e-mail**	Bsmam2022@uomosul.edu.iq	
Module Leader's Acad. Title		**Lecturer**	**Module Leader's Qualification**		MSc.
Module Tutor	**Non**		**e-mail**		
Peer Reviewer Name		**Eman Kassim Yahya**	**e-mail**	**eman.q@uomosul.edu.iq**	
Scientific Committee Approval Date		**15/9/2024**	**Version Number**	1	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	The law	**Semester**	3
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims 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			
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	3
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)	4, 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**	1.5hr	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

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Required textbooks (curricular books, if any)	Yes
	Main references (sources) ➢	
Recommended Texts	➢ Recommended books and references (scientific journals, reports...)	Yes
Websites	Electronic References, 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 is required, but credit is given.
	F – Fail	راسب	(0-44)	A significant amount of work is 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.

University of Mosul

College of Petroleum and Mining Engineering

Department of Mining Engineering

Course Description

Third Stage/Annual System

Prof. Dr. Nabil Youssef Al-Banna

Head of the Scientific Committee

Dr. Ibrahim Adil Al-Hafidh

Head of Department

كلية هندسة النفط والتعدين
قسم هندسة التعدين

1. Course Name:
Transportation and trading of ore / Third stage
2. Course Code:
ME 311
3. Semester / Year:
Annual / 2024-2025
4. Description Preparation Date:
October 1, 2024
5. Available Attendance Forms:
In-person (On-campus)
6. Number of Credit Hours (Total) / Number of Units (Total)
57 hours / 2 Units
7. Course administrator's name (mention all, if more than one name)
Name: **Dr. Hudhaifa Raad Hamzah** **Email:** hudhaifahamzah@uomousl.edu.iq
8. Course Objectives

Course Objectives	1- Understand the importance of transport and circulation in the supply chain. 2- Identify various modes of transportation. 3- Analyze factors influencing transportation decisions. 4- Explore global supply chains by examining the complexities involved in international trade. 5- Investigate the role of technology in transportation and circulation.
9. Teaching and Learning Strategies	
Strategy	1- Lectures and Presentations: Conducting informative lectures and presentations can provide students with an overview of key concepts, theories, and principles related to transportation and circulation. 2- Interactive Discussions: Pose questions, encourage critical thinking, and facilitate debates to explore different perspectives. 3- Case Studies and Problem-Solving: Present real-life case studies that involve transportation and circulation issues. 4- Technology Integration: Utilize technology tools and resources to enhance the learning experience. 5- Assessment through Projects and Presentations: Design assessments that require students to demonstrate their understanding through projects or reports.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
The first	**1**	Understand basics of materials handling	**Introduction to Materials Handling I**	Theoretical	Explanation and discussion
The second	**2**	Describe material handling systems.	**Introduction to Materials Handling II**	Theoretical +discussion	Explanation and discussion
The third	**2**	Explain core principles of handling	**Principles of Materials Handling I**	Theoretical +discussion	Explanation and discussion
Fourth	**2**	Apply principles to simple scenarios	**Principles of Materials Handling II**	Theoretical +discussion	Explanation and discussion
Fifth	**2**	Define the unit load concept	**Unit Load Concept I**	Theoretical +discussion	Explanation and discussion
Sixth	**2**	Analyze unit load benefits	**Unit Load Concept II**	Theoretical +discussion	Explanation and discussion
Seventh	**2**	Identify handling equipment types	**Classification of Materials Handling Equipment I**	Theoretical +discussion	Explanation and discussion
The eighth	**2**	Classify common equipment	**Classification of Materials Handling Equipment II+ Quiz #1**	Theoretical +discussion	Explanation, discussion and exam
Ninth	**2**	Explain belt conveyor systems	**Belt Conveyors I**	Theoretical +discussion	Explanation and discussion
tenth	**2**	Analyze belt conveyor applications	**Belt Conveyors II + H.W. #1.**	Theoretical +discussion	Explanation, discussion, and written exercise
eleventh	**1**	Describe chain conveyor basics	**Chain Conveyors I**	Theoretical	Explanation and discussion
twelfth	**2**	Discuss chain conveyor types	**Chain Conveyors II**	Theoretical +discussion	Explanation and discussion
thirteenth	**2**	Examine haulage and cable systems	**Haulage and Cable Conveyors.**	Theoretical +discussion	Explanation and discussion
fourteenth	**2**	Compare bucket, roller, screw conveyors	**Bucket, Roller and Screw Conveyors.**	Theoretical +discussion	Explanation and discussion
fifteenth	**2**	Demonstrate overall concept integration	**Mid-term exam**	Theoretical	Exam
sixteenth	**2**	Understand pneumatic conveying	**Pneumatic Conveyors I**	Theoretical +discussion	Explanation and discussion
seventeenth	**2**	Evaluate pneumatic systems	**Pneumatic Conveyors II + Quiz # 2**	Theoretical +discussion	Explanation, discussion and exam
eighteenth	**2**	Explain hydraulic conveying	**Hydraulic Conveyors I**	Theoretical +discussion	Explanation and discussion
nineteenth	**2**	Assess hydraulic system uses	**Hydraulic Conveyors II + H.W. #2.**	Theoretical +discussion	Explanation, discussion, and written exercise
Twenty	**2**	Identify hoisting equipment	**Hoisting Equipment I**	Theoretical +discussion	Explanation and discussion
twenty-first	**2**	Explain hoisting operations	**Hoisting Equipment II**	Theoretical +discussion	Explanation and discussion
twenty-second	**2**	Analyze bulk handling equipment	**Bulk Handling Equipment and Systems I**	Theoretical +discussion	Explanation and discussion

twenty-third	**2**	Discuss bulk handling systems	**Bulk Handling Equipment and Systems II**	Theoretical +discussion	to explain and discussion
twenty-fourth	**2**	Understand robotic handling basics	**Robotic Handling, I**	Theoretical +discussion	Explanation and discussion
twenty-fifth	**2**	Apply robotic handling concepts	**Robotic Handling II + H.W. #3.**	Theoretical +discussion	Explanation, discussion, and written exercise
twenty-sixth	**1**	Describe piping system functions	**Piping System I**	theoretical	Monthly Exam
twenty-seventh	**2**	Explain piping components	**Piping System II**	Theoretical +discussion	Explanation and discussion
twenty-eighth	**2**	Evaluate safety and maintenance practices	**Organization, Maintenance and Safety**	Theoretical +discussion	Explanation and discussion
twenty-ninth	**2**	Present and discuss final reports	**Discuss reports**	Theoretical +discussion	Report presentation
thirty	**2**	Demonstrate comprehensive understanding	**Final Exam**	Theoretical	Final exam

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Not available
Main references (sources)	Ray, S. (2008). Introduction to materials handling.
Recommended books and references (scientific journals, reports…)	Fruchtbaum, J. Bulk Materials Handling Handbook.
Electronic References, Websites	Articles from the Internet

Name and signature of the department head

Dr. Azealdeen Salih Hassan

Name and signature of the course lecturer

Dr. Hudhaifa R. Hamzah

Course Description Form

1. Course name and academic level
Industrial Chemistry/ 3rd stage
2. Course code
ME 312
3.Semester/Year
Annual /2024 - 2025
4. Date this description was prepared
2\ 9 \2024
5. Available forms of attendance
In-person attendance
6.(Number of study hours (total) / Number of units (total .6
(120) hours / (6 Units)
7. Name of the course supervisor (if more than one name is mentioned) and academic title.
Name: Dr. Asmaa Alhasany Email: rosefirst78@uomosul.edu.iq
8.Course objectives

Course objectives	• Identify raw materials and their types (oil and minerals). • Explore the main units in petroleum facilities. • Gain knowledge about extraction, recovery, and purification methods.
9. Teaching and learning strategies	
Strategy	Lectures, discussions, class assignments, homework and reports

10. Course structure

week	watches	Required learning outcomes	Name of unit or topic	Learning method	Evaluation method
1	2		Course Introduction and Syllabus		
2	2	Define and describe Refining Processes	Introduction	Live lectures + discussion	Conduct an evaluation exam
3	2	List and label the Refinery Feedstocks and Products	Refinery Feedstocks and Products	Live lectures + discussion	Ask and discuss questions
4	2	List and describe the Products Composition	Products Composition	Live lectures + video presentations	Ask and discuss questions
5	2	Recognize the Physical Property Characterization Data	Physical Property Characterization Data	Live lectures + discussion	Conduct an evaluation exam
6	2	Understanding the Chemical Analysis Data	Chemical Analysis Data	Live lectures + discussion	Ask and discuss questions
7	2	Define and Describe	Crude Distillation Process Description	Live lectures +	Ask and discuss questions

		Crude Distillation Process		discussion	
8	**2**	List and describe the Operation of Crude Distillation Units	Operation of Crude Distillation Units	Live lectures + video presentations	Ask and discuss questions
9	**2**	Explain the steps of Crude Oil Desalting	Crude Oil Desalting	**Live lectures + discussion**	Ask and discuss questions
10	**2**	Explain Vacuum Distillation	Vacuum Distillation		
11	**2**	Recognize Crude Distillation Material Balance	Crude Distillation Material Balance	Live lectures + discussion	Ask and discuss questions
12	**2**	Explain How Using Process Simulators to Design of Crude Distillation Units	Design of Crude Distillation Units Using Process Simulators	Live lectures + video presentations	Ask and discuss questions
13	**2**	Explain Catalytic Reforming	Catalytic Reforming and Isomerization Catalytic Reforming	Live lectures + discussion	Ask and discuss questions
14	**2**	Explain the Isomerization of Light Naphtha	Isomerization of Light Naphtha		Conduct an evaluation exam
15	**2**		Exam	Live lectures + discussion	
16	**2**	Understanding the Role of FCC in the Refinery	Fluidised Catalytic Cracking Role of FCC in the Refinery	Live lectures + video presentations	Ask and discuss questions
17	**2**	List and describe the FCC Reactions	FCC Reactions	Live lectures + discussion	Ask and discuss questions
18	**2**				Conduct an evaluation exam
19	**2**	Understanding the Thermodynamics of FCC Reactions	Thermodynamics of FCC Reactions	Live lectures + discussion	Ask and discuss questions
20	**2**	Describe The Process Description	Process Description	Live lectures + video presentations	Conduct an evaluation exam
21	**2**	List Metals and describe The Extraction and Refining of Metals	Metals INTRODUCTION The Extraction and Refining of Metals	Live lectures + discussion	Ask and discuss questions
22	**2**	Explain the Primary Metal Production	Primary Metal Production		Ask and discuss questions
23	**2**	Describe the Hydrometallurgy of Copper	Hydrometallurgy of Copper	Live lectures + discussion	Conduct an evaluation exam
24	**2**	Explain the Primary Aluminum Production	Primary Aluminum Production	Live lectures + video presentations	
25	**2**	Explain the extraction of rare metals	extraction of rare metals	Live lectures + discussion	Ask and discuss questions
26	**2**		Exam		
27	**2**	List ENGINEERING MATERIALS	ENGINEERING MATERIALS	Live lectures + discussion	Conduct an evaluation

					exam
28	**2**	Explain the manufacturing and production of cement	Cement	Live lectures + video presentations	Ask and discuss questions
29	**2**	List and explain battery raw materials	battery raw materials	Live lectures + discussion	Conduct an evaluation exam
30	**2**		Exam		

Practical Part	
Week 1	Boiling Point Estimation
Week 2	Melting Point Estimation
Week 3	Viscosity Determination
Week 4	Acid Number Determination for Oil
Week 5	Flash Point Measurement
Week 6	Carbon Residue Determination of Petroleum Products by the Conradson Method
Week 7	Water and Sediment Determination by Centrifuge
Week 8	Water in Petroleum Products

11. Course Evaluation and Grade Divisions

First semester grade: 10 theoretical and 5 practical (exams and reports)
Midterm grade: 15 theoretical and 5 practical
Second semester grade: 10 theoretical and 5 practical (exams and reports)
Final exam: 40 theoretical and 10 practical.

12. Learning and teaching resources

Required textbooks (methodology if any)	Not available
Main References (Sources)	1. Fundamentals of Industrial Chemistry_ Pharmaceuticals, Polymers, and Business - PDF Room 2014 by John Wiley & Sons, Inc. All rights reserved 2. LOVk9FudkehCuKRXwoew 3. عملى كيمياء صناعية
Recommended supporting books and references (scientific (...journals, reports	Industrial Chemistry & Materials journal International Journal of Industrial Chemistry

Electronic references, websites	https://tech.chemistrydocs.com/Books/Applied%20-%20Industrial/Fundamentals-of-Industrial-Chemistry-Pharmaceuticals,-Polymers,-and-Business-by-John-A.-Tyrell.pdf https://www.google.com/search?client=opera&hs=Bkr&sca_esv=6fc066ba50ffeefd&q=تطبيقات+في+الكيمياء+الصناعية+pdf&sa=X&ved=2ahUKEwjgzL2d_7uNAxWs9rsIHXPZBzQQ1QJ6BAgkEAE&biw=1226&bih=552&dpr=1.5
Curriculum or description update rate	%10

Name and signature of the decision holder

Name and signature of the decision holder

Dr. Asmaa Alhasany

Course Description Form

1. Course Name:
Minerals processing/ third stage
2. Course Code:
ME313
3. Semester / Year:
Annual/ 2024-2025
4. Description Preparation Date:
15/ 9/2024
5. Available Attendance Forms:
In-person (On-campus)
6. Number of Credit Hours (Total) / Number of Units (Total)
150 hours / 8 unit
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Eman Kassim Yahya Email: eman.q@uomosul.edu.iq Name: Dr. Rahma Sael Abed Email: rahma.saeel86@uomosul.edu.iq
8. Course Objectives

Course Objectives	• Finished products perform one or both of two major functions: first, they form the material into the desired shape, and, second, they alter or improve the properties of the material. • Study the five important factors in the selection of raw material Qualities to consider when ordering raw materials that is include: Purity, Potency, Shelf life, Composition, Value. • Explain the step of processing of material from mine to product. • Study the equipment that used and system of processing material in plants. • Study the chemical and physical properties of raw material to choose the type of processing.

9. Teaching and Learning Strategies	
Strategy	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, scientific trips to the plants, and prepare reports about raw materials and processing specially that riches in country.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	5	Knowledge, Understanding, Comprehension	1. Properties of minerals & raw materials	**Theoretical + practical**	**Discussion**
2	5	Knowledge, Understanding, Comprehension	2. Terminology in minerals processing.	**Theoretical practical**	**Discussion**
3	5	Knowledge, Understanding, Comprehension	3. Mineral beneficiation operations	**Theoretical practical**	**Discussion**
4	5	Scientific Practical Skills	4. Sampling process	**Theoretical practical**	**Discussion**
5	5	Scientific Practical Skills	5. Sieve analyses	**Theoretical practical**	**Quiz**
6	5	Knowledge, Understanding, Comprehension	6. Types of Screens	**Theoretical practical**	**Discussion**
7	5	Scientific Practical Skills	7. Description of screening process	**Theoretical practical**	**Discussion**
8	5	Scientific Practical Skills	8. Screen Efficiency	**Theoretical practical**	**Home work**
9	5	Scientific Practical Skills	9. Grade of ore	**Theoretical practical**	**Discussion**
10	5	Scientific Practical Skills	10. Exam	**Theoretical practical**	**Exam**
11	5	Knowledge, Understanding, Comprehension	11. Liberation	**Theoretical practical**	**Discussion**
12	5	Knowledge, Understanding, Comprehension	12. Types of comminution operations	**Theoretical practical**	**Discussion**
13	5	Knowledge, Understanding, Comprehension	13. Crushing	**Theoretical practical**	**Discussion**
14	5	Knowledge, Understanding, Comprehension	14. Crushing Operation	**Theoretical practical**	**Discussion**
15	5	Knowledge, Understanding, Comprehension	15. Grinding	**Theoretical practical**	**Discussion**
16	5	Scientific Practical Skills	16. Exam	**Theoretical practical**	**Exam**
17	5	Knowledge, Understanding, Comprehension	17. Physical separation	**Theoretical practical**	**Discussion**
18	5	Knowledge, Understanding, Comprehension	18. Type of minerals particles settling	**Theoretical practical**	**Discussion**
19	5	Knowledge, Understanding, Comprehension	19. sizing classifier	**Theoretical practical**	**Discussion**
20	5	Scientific Practical Skills	20. sorting classifiers	**Theoretical practical**	**Quiz**

21	5	Knowledge, Understanding, Comprehension	21. centrifugal classifiers	**Theoretical practical**	**Discussion**
22	5	Knowledge, Understanding, Comprehension	22. hydrocyclone	**Theoretical practical**	**Discussion**
23	5	Scientific Practical Skills	23. Chemical separation+ flotation method	**Theoretical practical**	**Home work**
24	5	Knowledge, Understanding, Comprehension	24. leaching method	**Theoretical practical**	**Discussion**
25	5	Knowledge, Understanding, Comprehension	25. Magnetic separation	**Theoretical practical**	**Discussion**
26	5	Knowledge, Understanding, Comprehension	26. Electrical separation	**Theoretical practical**	**Discussion**
27	5	Scientific Practical Skills	27. Metallurgical balance	**Theoretical practical**	**Quiz**
28	5	Knowledge, Understanding, Comprehension	28. Contact angle in flotation.	**Theoretical practical**	**Discussion**
29	5	Knowledge, Understanding, Comprehension	29. application of mining processing	**Theoretical practical**	**Discussion**
30	5	Scientific Practical Skills	30. Exam	**Theoretical practical**	**Exam**

11. Course Evaluation

Midterm Exam: 20
Midterm Exam: 20
Daily Exams: 5
Reports: 5
Final Exam: 50

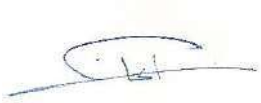
12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Not available
Main references (sources)	1- DRZYMALA, J., Mineral Processing Foundations of theory and practice of minerallurgy,2007,1st Ed., Wroclaw University of Technology, Oficyna Wydawnicza PWr., 2007,, 708 pp www.ig.pwr.wroc.pl/minproc. 2- Mineral Beneficiation A CONCISE BASIC COURSE, SUBBA RAO, D.V., 2011, S.D.S. Autonomous College Andhra Pradesh, India, Taylor & Francis Group press, 173 pp.
Recommended books and references (scientific journals, reports…)	1- GRINDING, TECHNICAL NOTES 8, R. P. King, 2000, 39p. 2- Flotation Froth Phase Bubble Size Measurement, Bhondayi, C., 2020, Institute for the Development of Energy for African Sustainability, University of South Africa, Florida, South Africa , Taylor & Francis Group, LLC , 23 p., https://doi.org/10.1080/08827508.2020.1854250.
Electronic References, Websites	1- www.rocscince.org

Name and signature of the department head

Dr. Azealdeen Salih Hassan

Name and signature of the course lecturer



Dr. Eman Kassim Yahya

Course Description Form

1. Course name and academic level
Well log/ 3rd stage
2. Course code
ME314
3.Semester/Year
Annual / 2024-2025
4. Date this description was prepared
2024\9\2
5. Available forms of attendance
In-person attendance
6.(Number of study hours (total) / Number of units (total .6
(120) hours / (4 Units)
7. Name of the course supervisor (if more than one name is mentioned) and academic title.
Name: Dr. Rahma Sael Al-Auqadi Email:Rahma.saeel86@uomosul.edu.iq
8.Course objectives

Course objectives	• Identify various well logging tools and their uses in determining reservoir petrophysical properties, including porosity, water saturation, and even permeability. • Provide information on the formation evaluation process and the techniques used in reservoir evaluation. • Demonstrate knowledge of how to integrate logs for more accurate interpretation.
9. Teaching and learning strategies	
Strategy	Lectures, discussions, class assignments, homework and reports

10. Course structure

week	watches	Required learning outcomes	Name of unit or topic	Learning method	Evaluation method
1	2		Course Introduction and Syllabus		
2	2	Define and describe of well logging	Introduction to Well logging, History of well logging	Live lectures + discussion	Conduct an evaluation exam
3	2	List and label the basic rock properties	Basic Rock Properties: Rocks type, Porosity, Permeability, and fluid saturation	Live lectures + discussion	Ask and discuss questions
4	2	List and describe the petrophysical properties	Fluid Saturation and ways of measurement, Capillary pressure, Clay and Shale distribution	Live lectures + video presentations	Ask and discuss questions
5	2	Recognize the Electrical Properties	Electrical Properties ,Resistivity, Formation	Live lectures + discussion	Conduct an evaluation

		of Formation	Factor, Water Saturation Estimation.		exam
6	**2**	Summarize the Borehole Environment	Borehole Environment and Mud Drilling.	Live lectures + discussion	Ask and discuss questions
7	**2**	Define a Mud and Invasion profiles	Fluid Drilling Mud and Invasion profiles	Live lectures + discussion	Ask and discuss questions
8	**2**	Compare between well logging methods and techniques	Wireline Well-Logging Techniques: Open-hole logging, Cased-hole logging, (LWD) and (MWD), Well Logging Methods	Live lectures + video presentations	Ask and discuss questions
9	**2**	Define Temperature Logging	Temperature Logging.	**Live lectures + discussion**	Ask and discuss questions
10	**2**		Exam		
11	**2**	Recognize Mechanical Calipers Log	Mechanical Calipers Log	Live lectures + discussion	Ask and discuss questions
12	**2**	Define GR log	Gamma-Ray Logs Introduction	Live lectures + video presentations	Ask and discuss questions
13	**2**	Evaluate the V_{sh}	Application of GR Log-1, Estimation the V_{sh}	Live lectures + discussion	Ask and discuss questions
14	**2**	Evaluate Mineral types	Application of GR Log-2, Mineral Identification		Conduct an evaluation exam
15	**2**		Exam	Live lectures + discussion	
16	**2**	Estimate Electrical Logs	Electrical Logs: Spontaneous Potential (SP) Log requirements for the existence of an SP current, The Source of SP: Shale Potential and liquid junction Potential	Live lectures + video presentations	Ask and discuss questions
17	**2**	List Factors affecting on SP value	Factors affecting on SP value, Static Spontaneous Potential (SSP), SP deflection with different resistivities, Uses of SP log	Live lectures + discussion	Ask and discuss questions
18	**2**	Define the resistivity logs	Resistivity logs-Introduction		Conduct an evaluation exam
19	**2**	Describe the normal log's types	Normal log's types, The Basic Laterologs	Live lectures + discussion	Ask and discuss questions
20	**2**	Describe The Dual Laterolog,	The Dual Laterolog,	Live lectures + video presentations	Conduct an evaluation exam
21	**2**	Define Induction Logging	Induction Logging	Live lectures + discussion	Ask and discuss questions
22	**2**	List porosity logs	Porosity Logs: Density Log		Ask and discuss questions
23	**2**	Describe the neutron log	Neutron Log	Live lectures + discussion	Conduct an evaluation exam
24	**2**	List Applications of Neutron –Density	Applications of Neutron –Density logs	Live lectures + video	

		logs		presentations	
25	**2**	Interpret Quick-look Technique	Quick-look Technique	Live lectures + discussion	Ask and discuss questions
26	**2**		Exam		
27	**2**	Define sonic log	Sonic Log	Live lectures + discussion	Conduct an evaluation exam
28	**2**	Interpret Cross plotting Porosity Logs	Cross plotting Porosity Logs	Live lectures + video presentations	Ask and discuss questions
29	**2**	Interpret set of logs	Interpretation of Logs Set	Live lectures + discussion	Conduct an evaluation exam
30	**2**		Exam		

Practical Part	
Week 1	**Lab 1:** Calculation of porosity theoretically, Calculation Permeability by Darcy's Law and relationship between water saturation and porosity.
Week 2	**Lab 2:** Measurement the fluid saturation, Find formation resistivity factor (F), water saturation Sw estimation by Archie equation.
Week 3	**Lab 3:** Resistivity of NaCl water solution, Estimation of formation temperature with depth
Week 4	**Lab 4:** Estimation the cementation factor
Week 5	**Lab 5:** Estimation the saturation exponent
Week 6	**Lab 6:** Calipers Log interpretation
Week 7	**Lab 7:** Applications of gamma ray log
Week 8	**Lab 8:** Application of SP log
Week 9	**Lab 9:** Correct the laterologs to true resistivity

11. Course Evaluation and Grade Divisions

First semester grade: 10 theoretical and 5 practical (exams and reports)
Midterm grade: 15 theoretical and 5 practical
Second semester grade: 10 theoretical and 5 practical (exams and reports)
Final exam: 40 theoretical and 10 practical.

12. Learning and teaching resources

Required textbooks (methodology if any)	Asquith, G., and Krygowski, D., 2004, Basic Well Log Analysis, AAPG Methods in exploration 16, Tulsa, Oklahoma, USA, 244p
Main References (Sources)	1. Rider, M., (2002): The Geological Interpretation of well logs (2nd ed.), Whittles Publishing, 280P.Hencher, S., 2015. Practical Rock Mechanics 2. Schlumberger, (2002): Log interpretation, Principles/Applications .
Recommended supporting books and	Lie, H., (2017): Principles and Applications

references (scientific journals, (...reports	of Well Logging, Petroleum Industry Press and Springer-Verlag Berlin Heidelberg, 356P.
Electronic references, websites	http://www.slb.com https://www.spec2000.net/index.htm
Curriculum or description update rate	%10

Name and signature of the decision holder

Name and signature of the decision holder

Dr. Rahma Sael Al-Auqadi

1. Course Name:

Mining Engineering / Third Year

2. Course Code:

ME 315

3. Semester / Year:

Annual / 2024-2025

4. Description Preparation Date:

October 1, 2024

5. Available Attendance Forms:

In-person (On-campus)

6. Number of Credit Hours (Total) / Number of Units (Total)

114 hours / 6 Units

7. Course administrator's name (mention all, if more than one name)

Name: **Dr. Nihad Saoud Najim**
Email: nihadsaoud@uomousl.edu.iq

8. Course Objectives

Course Objectives	The course aims to provide students with foundational knowledge in mining engineering, including types and methods of mining, identification of mining equipment, design approaches, and the criteria for selecting appropriate mining methods. It also focuses on applying this knowledge to evaluate and solve issues related to mine and quarry operations, such as slope failures. Topics include slope angle determination in open-pit mines and support techniques (surface and underground) to enhance safety factors.

9. Teaching and Learning Strategies

Strategy	• Building conceptual and scientific foundations to develop technical competence. • Understanding the most common mining methods. • Ability to design and define mine operations based on given data and constraints. • Identification of the major challenges facing mining engineers, especially slope failures and operational safety.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
The first	**2**	Introduction to mining engineering, Mining terminology - Review	**Introduction**	Theoretical	Explanation and discussion
The second	**4**	Ores and major types of Ores.	**Ores and major types of Ores.**	Theoretical +discussion	General questions and discussion or exam
The third	**4**	Mining engineering and Mineral	**Mining engineering and Mineral**	Theoretical	Explanation,

		Processing.	**Processing.**	+discussion	discussion and short exam
Fourth	**4**	Mining techniques (divided into two common excavation types).	**Mining techniques**	Theoretical +discussion	General questions and discussion or exam
Fifth	**4**	Surface Mining (definition and introduction. Mining excavations).	**Surface Mining**	Theoretical +discussion	General questions and discussion or exam
Sixth	**4**	Surface-mining methods, Area mines (characteristic, Mining excavations).	**Surface-mining methods**	Theoretical +discussion	General questions and discussion or exam
Seventh	**4**	Open Pit Mining (definition and characteristic, Mining excavations).	**Open Pit Mining**	Theoretical +discussion	Explanation and discussion
The eighth	**4**	Stages in the life of Open Pit mine, Pushbacks and benches.	**Stages in the life of Open Pit mine**	Theoretical +discussion	Explanation, discussion and exam
Ninth	**4**	Consideration of Pit slop: design and bench configuration.	**Consideration of Pit slop**	Theoretical +discussion	to explain and discussion
tenth	**4**	Production cycle: kind of haul road systems.	**Production cycle**	Theoretical +discussion	Explanation, discussion and exam
eleventh	**2**	Monthly exam.	**Monthly exam.**	Theoretical	Monthly Exam
twelfth	**4**	Quarrying (definition, characteristic), Glory Holing.	**Quarrying**	Theoretical +discussion	discussion
thirteenth	**4**	Strip Mining (definition, processing and characteristics, mining excavations).	**Strip Mining**	Theoretical +discussion	Explanation, discussion and exam
fourteenth	**4**	Contour mines { (characteristic), Mountaintop removal: Characteristic and processing, Mining excavations}	**Contour mines**	Theoretical +discussion	to explain and discussion
fifteenth	**4**	Surface Techniques-Solution: aqueous extraction methods: Placer mining.	**Surface Techniques**	Theoretical +discussion	Explanation, discussion and exam
sixteenth	**4**	Consideration of a Pit slop design and bench configuration	**Consideration of a Pit slop design and bench configuration**	Theoretical +discussion	Explanation, discussion and exam
seventeenth	**4**	Production Cycle & Haul Road Design	**Production Cycle & Haul Road Design**	Theoretical +discussion	to explain and discussion
eighteenth	**4**	Modeling in Surface Mining Engineering, practice and discussion.	**Modeling in Surface Mining Engineering, practice and discussion.**	Theoretical +discussion	Explanation, discussion and exam
nineteenth	**4**	Underground mining (engineering Terminology in	**Underground mining (engineering Terminology in**	Theoretical +discussion	Explanation, discussion and

		Mineral Processing):	**Mineral Processing):**		exam
Twenty	**4**	Definition and characteristic.	**Definition and characteristic.**	Theoretical +discussion	to explain and discussion
twenty-first	**4**	Stages in the life of Underground mining: Mining Operations Stages: Prospecting, Exploration, Mine Development, Exploitation,	**Stages in the life of underground mining**	Theoretical +discussion	Explanation, discussion and exam
twenty-second	**4**	Ventilation, Reclamation.	**Ventilation, Reclamation.**	Theoretical +discussion	Explanation, discussion and exam
twenty-third	**4**	Underground mining techniques include. Drift, Slope, Shaft Mining.	**Underground mining techniques**	Theoretical +discussion	to explain and discussion
twenty-fourth	**4**	Underground M. Unsupported methods, Rooms and Pillars, Mining excavations.	**Underground M. Unsupported methods**	Theoretical +discussion	Explanation, discussion and exam
twenty-fifth	**4**	Ground control: pillar design and roof bolting.	**Ground control**	Theoretical +discussion	Explanation, discussion and exam
twenty-sixth	**2**	Monthly exam.	**Monthly exam.**	theoretical	Monthly Exam
twenty-seventh	**4**	Supported mining methods: Longwall Mining, Mining excavations.	**Supported mining methods**	Theoretical +discussion	Explanation, discussion and exam
twenty-eighth	**4**	Shrinkage stopping mining and Sublevel stopping.	**Shrinkage stopping mining and Sublevel stopping.**	Theoretical +discussion	Explanation, discussion and exam
twenty-ninth	**4**	Cut-and-fill stopping.	**Cut-and-fill stopping.**	Theoretical +discussion	to explain and discussion
thirty	**4**	Environmental Impacts of Mining.	**Environmental Impacts of Mining.**	Theoretical +discussion	Explanation, discussion and exam

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports.... etc.

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Not available
Main references (sources)	1- Applied Mining Geology 2- Guidelines and Considerations for Open Pit Designers. 3- Surface and Underground Excavations Methods Introduction to Mineral Exploration
Recommended books and references (scientific	Rock Blasting in Open Pit Mining

journals, reports…)	
Electronic References, Websites	Articles from the Internet

Name and signature of the department head

Dr. Azealdeen Salih Hassan

Name and signature of the course lecturer

Dr. Nihad Saoud Najim

Course Description Form Rock Mechanics

1. Course Name:

Rock Mechanics third stage

2. Course Code:

ME305

3. Semester / Year:

2024-2025

4. Description Preparation Date:

1/10/2024

5. Available Attendance Forms:

Physical and online

6. Number of Credit Hours (Total) / Number of Units (Total)

120 hours / 4 units

7. Course administrator's name (mention all, if more than one name)

Name: Dr. Azealdeen Salih Hassan Al-Jawadi
Email: azealdeenaljawadi@uomosul.edu.iq
Name: Sarah Mwafaq Abdulaziz
Email: saraaltaie87@uomosul.edu.iq

8. Course Objectives

- Study rock mechanics and its role in engineering applications.
- Prepare students to understand the subjects of tunneling and mining engineering they will receive in the fourth year.
- Enabling students to calculate and analyze laboratory and field results and apply them to engineering and design projects.
- Prepare students practically and scientifically to solve problems they will encounter in their practical life after graduation.
- Apply the basic principles of mechanics and geology to evaluate the response of rocks when affected by environmental forces, changes in the original forces surrounding the rocks and their impact on factors resulting from engineering projects.

9. Teaching and Learning Strategies

This science is concerned with applying the basic principles of rock mechanics and geological influences to evaluate the response of rocks when engineering projects are implemented in, on, and within them, and the change in stresses and their concentration, as well as any change in the original forces surrounding and on the rocks due to the influence of factors resulting from engineering projects.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Knowledge Comprehension	Introduction to rock mechanics	Theoretical practical	General Questions
2	4	Knowledge, Comprehension, Understanding	How do we look at rocks from an engineering point of view	Theoretical practical	General Questions and Discussion

3	4	Scientific Practical Skills	Rock mechanics and rock engineering	Theoretical practical	General Questions
4	4	Scientific Practical Skills	Introduction to structure motion	Theoretical practical	Daily Exam
5	4	Scientific Practical Skills	Physical Properties of rocks I	Theoretical practical	General Questions
6	4	Scientific Practical Skills	Physical Properties of rocks II	Theoretical practical	General Questions and Discussion
7	4	Scientific Practical Skills	Mechanical Properties of rocks I	Theoretical practical	General Questions
8	4	Scientific Practical Skills	Mechanical Properties of rocks II	Theoretical practical	Homework
9	4	Scientific Practical Skills	Exam	Theoretical practical	Monthly Exam
10	4	Scientific Practical Skills	Stress and strain	Theoretical practical	General Questions and Discussion
11	4	Scientific Practical Skills	Creep	Theoretical practical	General Questions
12	4	Scientific Practical Skills	Mohr circle representation of stress state	Theoretical practical	General Questions and Discussion
13	4	Scientific Practical Skills	Stereographic interpretation	Theoretical practical	General Questions
14	4	Scientific Practical Skills	Application of planar and wedge failure	Theoretical practical	Homework
15	4	Scientific Practical Skills	Exam	Theoretical practical	Monthly Exam
16	4	Knowledge, Comprehension, Understanding	Field survey	Theoretical practical	General Questions and Discussion
17	4	Scientific Practical Skills	Outcrop description I	Theoretical practical	General Questions
18	4	Scientific Practical Skills	Outcrop description II	Theoretical practical	General Questions and Discussion
19	4	Scientific Practical Skills	Rock Quality Designation	Theoretical practical	Daily Exam
20	4	Scientific Practical Skills	Terzaghi Classification System	Theoretical practical	General Questions and Discussion
21	4	Scientific Practical Skills	Geological Strength Index System	Theoretical practical	General Questions
22	4	Scientific Practical Skills	Exam	Theoretical practical	Monthly Exam
23	4	Scientific Practical Skills	Rock Mass Rating System	Theoretical practical	Homework
24	4	Knowledge, Comprehension, Understanding	Rock Tunneling Quality Index Q-System	Theoretical practical	General Questions
25	4	Scientific Practical Skills	Strength of rock and rock mass	Theoretical practical	General Questions and Discussion
26	4	Scientific Practical Skills	Rock slope stability I	Theoretical practical	General Questions
27	4	Scientific Practical Skills	Rock slope stability II	Theoretical practical	General Questions and Discussion
28	4	Scientific Practical Skills	Stress concentration in underground openings	Theoretical practical	General Questions
29	4	Scientific Practical Skills	Useful Formulas	Theoretical practical	Homework
30	4	Scientific Practical Skills	Exam	Theoretical practical	Comprehensive Exam

11. Course Evaluation

Monthly Exam: 20

Midterm Exam: 20 Daily Exams: 5 Reports: 5 Final Exam: 50

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1. Obert and Duvall, 1968. Rock mechanics and the design of structures in rocks
Main references (sources)	2. Application of Rock Mechanics in Surface and Underground Mining 3. Design Analysis in Rock Mechanics, Vol. 1&2
Recommended books and references (scientific journals, reports...)	4. Hudson and Harrison, Engineering rock mechanics
Electronic References, Websites	5. www.rocscince.org
Curriculum or description update rate	15%

Name and signature of the department head

Dr. Azealdeen Salih Hassan

Name and signature of the course lecturer

Dr. Azealdeen Salih Hassan

Course Description Form

1. Course Name:
Petroleum Product Engineering
2. Course Code:
PRE301
3. Semester / Year:
Third Class
4. Description Preparation Date:
15/9/2024
5. Available Attendance Forms:
Student attendance
6. Number of Credit (Total) / Number of Units (Total):
90 Hours
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Nabil Yousif Mohammed Email: nabil.albanna@uomosul.edu.iq

8. Course Objectives	
Course Objectives	1. Learn about the oil well and its types. 2. Study the types of flow within an oil reservoir and the types of complete oil wells. 3. Study the types of early well perforation methods and related perforation directions and types of perforation fluids. 4. In addition to the above, the semester covers all the basic terms for preparing wells for oil production. 5. Identify oil production problems, primarily water and gas congestion, and how to address their impact. 6. Identify Drill Stem Testing (DST), the benefits they have on production and oil field depletion, and how to calculate them. 7. Study the devices and equipment used to isolate and separate gas associated with field production.
9. Teaching and Learning Strategies	
Strategy	The teaching strategy in this course depends on the instructor explaining the topic, clarifying this by presenting realistic examples similar to the course, and then discussing the course vocabulary with the students.

10. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
week1	3		Introduction to Production Technology	Lectures,video lectures	General questions and discussion
Week2	3		Reservoir Drive Mechanisms	Lectures,video lectures	Questions and Discussion
Week3	3		Flow geometries (Radial flow ,Linear flow, Spherical and hemispherical flow)	Lectures,video lectures	Questions and Discussion
Week4	3		Fluid flow equations (Darcy's Law)	Lectures,video lectures	Quiz
Week5	3		Completion Design Consideration	Lectures,video lectures	Discussion & General questions
Week6	3		Methods of completion	Lectures,video lectures	Exam
Week7	3		Selection of the flow conduit between the reservoir and surface	Lectures,video lectures	Discussion & General questions
Week8	3		Monthly examination	Lectures,video lectures	Questions and Discussion
Week9	3		Conventional tubular configurations:	Lectures,video lectures	Questions and Discussion
Week10	3		Completion Equipment	Lectures,video lectures	Group assignments
Week11	3		Production packer setting methods	Lectures,video lectures	Questions and Discussion
Week12	3		Well Completion Program	Lectures,video lectures	Discussion & Quiz
Week13	3		Perforating Techniques	Lectures,video lectures	Discussion & General questions
Week14	3		Perforation Charge Arrangement	Lectures,video lectures	Group assignments
Week15	3		Final Monthly examination	Lectures,video lectures	Exam
Week16	3		Water and gas coning	Lectures,video lectures	Discussion & General questions
Week17	3		Meyer and Gardner and Pirson Methods (Gas coning, water coning)	Lectures,video lectures	Questions and Discussion
Week18	3		Simultaneous Gas and Water coning	Lectures,video lectures	Questions and Discussion
Week19	3		Completion Efficiency (S fm)	Lectures,video lectures	Group assignments
Week20	3		Completion Efficiency (SC, Spp)	Lectures,video lectures	Questions and Discussion
Week21	3		Flow efficiency	Lectures,video lectures	Questions and Discussion
Week22	3		Drill Stem Testing, DST	Lectures, Tutorial	Exam
Week23	3		Monthly examination	Lectures,video lectures	Group assignments
Week24	3		Pressure versus Time Plot	Lectures,	Questions and

				Tutorial	Discussion
Week25	3		Steps of determining reservoir properties by using Horner plot to analysis pressure buildup test:	Lectures,video lectures	Questions and Discussion
Week26	3		Reservoir and fluid anomaly indications	Lectures,video lectures	Questions and Discussion
Week27	3		Depletion	Lectures, Tutorial	Group assignments
Week28	3		Oil and Gas Separation	Lectures,video lectures	Questions and Discussion
Week29	3		Separators Design , Capacity of separators	Lectures, Tutorial	Questions and Discussion
Week30	3		Final Monthly examination	Lectures,video lectures	Exam

11. Course Evaluation

The grade is distributed out of 100 based on the tasks assigned to the student, such as daily preparation, daily, oral, monthly, and written exams, reports, etc. (Monthly exams 30%, classroom activities and reports 10%, end-of-course exam 60%).

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Petroleum product engineering
Main references (sources)	Reservoir Engineering Hand Book (Tarek Ahmad)
Recommended books and references (scientific journals, reports…)	Fundamental of Reservoir Engineering (L. P. Dake)
Electronic References, Websites	

Head of the Department

Course Description Form

1. Course Name:
Engineering of Sulfur Production Processes
2. Course Code:
ME 318
3. Semester / Year:
Third Class
4. Description Preparation Date:
29/9/2024
5. Available Attendance Forms:
Student attendance
6. Number of Credit (Total) / Number of Units (Total):
150 Hours/ 6 Units
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Marwa Hassan Yahya Email: marwaaltamer@uomosul.edu.iq Name: Dr. Islam Kamal Saeed Email: **islam.kamal158@uomosul.edu.iq**
8. Course Objectives

Course Objectives	This study aims to provide a comprehensive study of sulfur, its formation, sources, extraction methods, the presence of raw sulfur in Iraq, and the contribution of sulfur ore obtained from the consumption of Mishraq and Kamel. It also aims to provide an understanding of industrial sulfur applications, their effects on the environment and humans, and ways to mitigate these effects.
9. Teaching and Learning Strategies	
Strategy	A- Knowledge and Understanding 1. Knowledge of the main methods of sulfur extraction 2. A detailed study of the sulfur fields located south of Mosul (the Mishraq fields) 3. A comprehensive study of the most important areas where sulfur is used as a raw material. 4. An understanding of the methods used to reduce pollution caused by sulfur gases.

10. Course Structure				
Theoretical Part				
Week	**Hours**	**Unit or subject name**	**Learning method**	**Evaluation method**
Week1	3	Introduction, Allotropes of Sulfur.	Lectures	Discussion & General questions
Week2	3	Source of Sulfur, Natural Sources of Sulfur.	Lectures, Tutorial	Questions and Discussion
Week3	3	Man-Made Sources of Sulfur (Natural Gas), Claus process.	Lectures	Questions and Discussion
Week4	3	Man-Made Sources of Sulfur (Petroleum, Oil Sands).	Lectures, Tutorial	Group assignments
Week5	3	Man-Made Sources of Sulfur (Sulfide Smelting, and Coal).	Lectures, video lectures	Questions and Discussion
Week6	3	Create of Sulfur.	Lectures,	Questions and Discussion
Week7	3	Frasch mines processing method.	Lectures, video lectures	Exam
Week8	3	The algorithm of functioning of well sensors.	Lectures, Tutorial	Group assignments
Week9	3	Properties of Sulfur (Melting/Freezing Point, Viscosity, Density, Color, Thermal Conductivity).	Lectures, Tutorial	Questions and Discussion
Week10	3	Monthly Exam.	Exam	
Week11	3	Sulfur solidification and handling systems.	Lectures, video lectures	Questions and Discussion
Week12	3	The Sandvik Rotoform process, Process description – pastillation with the Rotoformer.	Lectures, Tutorial	Group assignments
Week13	3	Types of Rotoformer, Advantages of pastillation.	Lectures, video lectures	Questions and Discussion
Week14	3	Environmental aspects, Handling of solid sulfur.	Lectures, Tutorial	Questions and Discussion
Week15	3	Midterm Exam.		Exam
Week16	3	Al-Mishraq raw elemental sulfur, methods to sulfur purification.	Lectures, video lectures	Discussion & General questions
Week17	3	Sulfur Production Process Stages in Mishraq Sulfur Mine.	Lectures, Tutorial	Questions and Discussion
Week18	3	Production of Sulfuric Acid: The lead chamber process.	Lectures, video lectures	Questions and Discussion
Week19	3	Production of Sulfuric Acid: The Contact	Lectures, Tutorial	Group assignments

		process.		
Week20	3	Wet Contact Process, Pressure Process, Process Control Optimization.	Lectures, video lectures	Questions and Discussion
Week21	3	Alum production, Detection of alum, Uses of Alum.	Lectures, video lectures	Questions and Discussion
Week22	3	Fertilizers.	Lectures, Tutorial	Exam
Week23	3	Sulfur nanoparticles. Application of sulfur nanoparticles	Lectures, video lectures	Group assignment
Week24	3	Monthly exam.	Lectures, Tutorial	Questions and Discussion
Week25	3	Environment and sulfur.	Lectures, video lectures	Questions and Discussion
Week26	3	Hazard rating of sulfur.	Lectures, video lectures	Questions and Discussion
Week27	3	Health hazards of sulfur.	Lectures, Tutorial	Group assignment
Week28	3	Health hazards of sulfur dioxide.	Lectures, video lectures	Questions and Discussion
Week29	3	Acid rain.	Lectures, Tutorial	Questions and Discussion
Week30	3	Monthly exam		Exam

Practical Part

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week1	2	1	General information, Safety in the laboratory.	Lectures	Discussion & General questions
Week2	2	1	Introduction of Sulfur element , Physical properties, Melting point of Sulfur.	Lectures, video lectures	Questions and Discussion
Week3	2	1	Chemical properties of sulfur.	Lectures, Tutorial	
Week4	2	1	Analytical Methods for Sulfur Determination in Glasses, Rocks and Minerals, Infrared absorption technology.	Lectures, video lectures	Questions and Discussion
Week5	2	1	Isotope effects	Lectures, Tutorial	Questions and Discussion
Week6	2	1	Mass spectrometer technology.	Lectures, video lectures	Questions and Discussion
Week7	2	1	X-ray fluorescence.	Lectures, video lectures	Questions and Discussion
Week8	2	1	Separation Processes: Distillation.	Lectures, video lectures	Questions and Discussion
Week9	2	1	Crystallization.	Lectures, Tutorial	Questions and Discussion
Week10	2	1	*Monthly exam.*	Exam	

Week11	2	1	Adsorption process.	Lectures, Tutorial	Group assignmen
Week12	2	1	*Absorption and Stripping.*	Lectures, Tutorial	Questions and Discussion
Week13	2	1	Manifestation of sulfur, Frasch process.	Lectures, video lectures	Questions and Discussion
Week14	2	1	Production of sulfur from hydrogen sulfide: Chemically, Biologically.	Lectures, Tutorial	Questions and Discussion
Week15	2	1	Midterm exam.		Exam
Week16	2	1	Purification of Al-Mishraq raw elemental sulfur.	Lectures, Tutorial	Questions and Discussion
Week17	2	1	Extraction of sulfur from the raw sulfur in laboratory.	Lectures, Tutorial	Group assignmen
Week18	2	1	Discuss reports	Lectures, Tutorial	Questions and Discussion
Week19	2	1	The most important applications of sulfur.	video lectures	Questions and Discussion
Week20	2	1	Sulfur modified asphalt, Rheological properties of asphalt.	video lectures	Questions and Discussion
Week21	2	1	Rheological properties of asphalt, Procedure of sulfur addition on the rheological properties of virgin asphalt.	video lectures	Questions and Discussion
Week22	2	1	Scientific visit at the Company of Al. Mishraq Sulfur.	Discussion	Discussion & General questions
Week23	2	1	The preparation of the Sulfuric acid in lab, The °Baume scale.	video lectures	Questions and Discussion
Week24	2	1	*Monthly exam.*		Exam
Week25	2	1	Introduction of alum, Alum preparation. The procedure of Alum (aluminum sulfate) in laboratory.	video lectures	Questions and Discussion
Week26	2	1	Calculation of theoretical and Experimental yield of alum, Some examples.	Lectures, Tutorial	Questions and Discussion
Week27	2	1	Fertilizers production, types, uses.	Lectures, Tutorial	Questions and Discussion
Week28	2	1	Procedure of Fertilizers in laboratory.	Lectures, Tutorial	Questions and Discussion
Week29	2	1	Discuss reports	Discussion	Discussion & General questions
Week30	2	1	Final exam.		Exam

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports.... etc.

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Sulfur. History, Technology, Applications & Industry. Gerald

	Kutney, 2013
Main references (sources)	Sulphur Dioxide: Environmental Effec Fate and Behaviour. WBK & Associa Inc. 2003.
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	
5%	Update ratio

اسم وتوقيع صاحب المقرر
م.د. مروة حسان يحيى

اسم وتوقيع رئيس القسم او الفرع

م.د. اسلام كمال سعيد

University of Mosul

College of Petroleum and Mining Engineering

Department of Mining Engineering

Course Description

Fourth Stage/Annual System

Hudhaifa Raad Hamzah

Prof. Dr. Nabil Youssef Al-Banna

Head of the Scientific Committee

Dr. Ibrahim Adil Al-Hafidh

Head of Department

كلية هندسة النفط والتعدين
قسم هندسة التعدين

Course Description Form Computer Applications in Mining Engineering

1. Course Name:
Computer Applications in Mining Engineering
2. Course Code:
ME 411
3. Semester / Year:
2024-2025
4. Description Preparation Date:
1/10/2024
5. Available Attendance Forms:
Physical and online
6. Number of Credit Hours (Total) / Number of Units (Total)
150 hours / 6 units
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Azealdeen Salih Hassan Al-Jawadi Email: ahmeddaboo@uomosul.edu.iq Name: Shahad Salim Email: shahadsibrahim88@uomosul.edu.iq
8. Course Objectives
The objectives of computer applications in mining and metallurgy module may vary, but some common objectives are: 1. To equip students with knowledge of computer applications in the fields of mining and metallurgy, which can enable them to solve complex problems related to the industry. 2. To impart skills related to the use of various computer software packages, tools, and techniques that are used in mining and metallurgical engineering. 3. To provide an understanding of the application of data science, machine learning, and artificial intelligence in the mining and metallurgical industry. 4. To enhance students' analytical and computational skills, which are critical for effective decision-making in the mining and metallurgical industry. Overall, the module aims to prepare students for a career in the mining and metallurgical industries, where computer applications are becoming increasingly important.
9. Teaching and Learning Strategies
There are various learning and teaching strategies for computer applications in mining and metallurgy, including: 1. Simulation-based learning: This approach involves using computer simulations to simulate real-world situations and scenarios. With simulation-based learning, students can practice using various computer applications in a safe and controlled environment. 2. Project-based learning: In this approach, students work on projects that require the use of specific computer applications related to mining and metallurgy. This helps students develop practical skills in using these applications and reinforces their knowledge of the subject matter. 3. Collaborative learning: Students work together in groups to solve problems and complete tasks related to mining and metallurgy using computer applications. This approach encourages teamwork and communication skills while reinforcing knowledge of the subject matter. 4. Online learning: Online courses, tutorials and webinars can be used to teach computer applications in mining and metallurgy. These can be self-paced or instructor-led and can be accessed from anywhere in the world. 5. Flipped classroom: In a flipped classroom, students are required to watch instructional videos or complete readings outside of class time. The in-class time is then primarily used to apply the concepts using computer applications, work on projects, or collaborate with other students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Knowledge Comprehension	Introduction to the course subjects and highlighting its important.	Theoretical practical	General Questions
2	4	Knowledge, Comprehension, Understanding	Basic of Finite Element Analysis.	Theoretical practical	General Questions and Discussion
3	4	Scientific and Prac Skills	Procedure followed using Ansys software and l to start.	Theoretical practical	General Questions
4	4	Knowledge, Comprehension, Understanding	Getting starting with Ansys	Theoretical practical	Homework
5	4	Scientific and Prac Skills	Introduction to the Workbench.	Theoretical practical	General Questions
6	4	Scientific and Prac Skills	Using the Ansys to design, draw and model sin and basic models.	Theoretical practical	General Questions and Discussion
7	4	Scientific and Prac Skills	Using the Ansys to design, draw and model sin and basic models.	Theoretical practical	General Questions
8	4	Scientific and Prac Skills	Exam	Theoretical practical	Monthly Exam
9	4	Scientific and Prac Skills	Capabilities and utilizing of Ansys software in Mining Engineering.	Theoretical practical	General Questions and Discussion
10	4	Scientific and Prac Skills	Modeling a 3D centrifugal pump starting with meanline design.	Theoretical practical	General Questions and Discussion
11	4	Scientific and Prac Skills	Modelling using static structural analysis.	Theoretical practical	General Questions
12	4	Scientific and Prac Skills	Modeling using static and thermal structural analysis.	Theoretical practical	General Questions and Discussion
13	4	Scientific and Prac Skills	Evaluating students by raising some relevant problems in turbomachinery.	Theoretical practical	General Questions
14	4	Scientific and Prac Skills	Exam	Theoretical practical	Monthly Exam
15	4	Scientific and Prac Skills	Getting start with Microsoft Excel with basic operations of Excel 2013 and printing data.	Theoretical practical	General Questions and Discussion
16	4	Knowledge, Comprehension, Understanding	Using functions (array formulas, matrix functic solving system of equations) and some exercise	Theoretical practical	Homework
17	4	Scientific and Prac Skills	Conditional Functions (Logical Comparison Operators, if function, array formulas and conditional formatting).	Theoretical practical	General Questions
18	4	Scientific and Prac Skills	Taking some tasks and engineering exercise i.e Data Mining (Importing TXT File, Counting ar Summing with Criteria and Frequency Distribution).	Theoretical practical	General Questions and Discussion
19	4	Scientific and Prac Skills	Charts & Regression Analysis	Theoretical practical	General Questions and Discussion
20	4	Scientific and Prac Skills	Exam	Theoretical practical	Daily Exam
21	4	Scientific and Prac Skills	Introduction to Micromine software.	Theoretical practical	General Questions
22	4	Scientific and Prac Skills	Getting start with the basic commands.	Theoretical practical	General Questions
23	4	Scientific and Prac Skills	Charts & Regression Analysis	Theoretical practical	Homework
24	4	Knowledge, Comprehension, Understanding	Design of the pit geometry, tools and the mach using the software.	Theoretical practical	General Questions and Discussion

25	4	Scientific and Prac Skills	Build a Basic Model of airway ducts & Regula	Theoretical practical	General Questions and Discussion
26	4	Scientific and Prac Skills	Introduction to Ventsim software.	Theoretical practical	General Questions
27	4	Scientific and Prac Skills	Basic Operations & Import Files to Ventsim	Theoretical practical	General Questions and Discussion
28	4	Scientific and Prac Skills	Underground Heat Simulation Modelling	Theoretical practical	General Questions
29	4	Scientific and Prac Skills	Fan Ventilation Modelling& Construct Ventila Ducts	Theoretical practical	Homework
30	4	Scientific and Prac Skills	Exam	Theoretical practical	Comprehensive Exam

11. Course Evaluation

Monthly Exam: 20
Midterm Exam: 20
Daily Exams: 5
Reports: 5
Final Exam: 50

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	Matsson, John E. *An Introduction to ANSYS Fluent 2022*. Sdc Publications, 2022.
Recommended books and references (scientific journals, reports...)	*Lee, Huei-Huang. Finite Element Simulations with ANSYS Workbench 2023: Theory, Applications, Case Studies. SDC publications, 2023.* *VentSim DESIGN™ User Guide*
Electronic References, Websites	*https://www.youtube.com/watch?v=od0IfSCeo_0* *http://www.louisvillelectures.org/new-blog/2019/mechanical-vent-1/rodrigo-cavallazzi* *https://www.thoracic.org/professionals/clinical-resources/video-lecture-series/mechanical-ventilation/mechanical-ventilation-101-resistance-and-compliance.php*
Curriculum or description update rate	15%

Name and signature of the department head

Dr. Azealdeen Salih Hassan

Name and signature of the course lecturer

Dr. Ahmed Daabo
Mrs. Shahad Salim

Course Description Form Environment and Safety of Mines

1. Course Name:

Environment and Safety of Mines

2. Course Code:

ME412

3. Semester / Year:

2024-2025

4. Description Preparation Date:

1/10/2024

5. Available Attendance Forms:

Physical and online

6. Number of Credit Hours (Total) / Number of Units (Total)

90 hours / 3 units

7. Course administrator's name (mention all, if more than one name)

Name: Dr. Azealdeen Salih Hassan Al-Jawadi
Email: ahmeddaboo@uomosul.edu.iq
Name: Asmaa Alhasany
Email: rosefirst78@uomosul.edu.iq

8. Course Objectives

The objectives of a mine safety and environment unit are typically to:
• Educate miners and employees about the various safety and environmental hazards associated with mining, and help them develop strategies and practices to reduce or mitigate these hazards.
• The unit 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 unit is to provide miners with the knowledge and skills necessary to work safely and responsibly in the mining sector without causing harm to themselves, others, or the environment.

9. Teaching and Learning Strategies

Learning and teaching strategies in the Mine Environment and Safety module may include:
• Lectures and presentations: Lectures are used to provide theoretical information on environmental and safety regulations, best practices, and case studies of mine accidents.
• Case studies: Case studies are used to explore real-life mine accidents and consider what could have been done differently to prevent them.
• Practical exercises: Practical exercises are used to demonstrate how to conduct safety checks, assess risks, and use safety equipment.
• Group discussions: Group discussions facilitate the learning process by encouraging students to actively engage with the course material, share their knowledge and opinions, and learn from others.
• Field trips or site visits: Field trips or site visits allow students to gain practical experience in observing and enforcing safety rules and regulations in mining environments. • Online resources and self-learning: Online resources and self-learning can be used to complement classroom learning and provide students with access to additional information about mine safety and environmental regulations.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Knowledge Comprehension	Fundamental Concepts of Fluid Mechanics for Mine Ventilation.	Theoretical practical	General Questions

2	4	Knowledge, Comprehension, Understanding	Fundamental Concepts of Fluid Mechanics for Mine Ventilation.	Theoretical practical	General Questions and Discussion
3	4	Scientific and Prac Skills	Environmental Conditions in the Mine/ Safety Mathematics and Basics	Theoretical practical	General Questions
4	4	Knowledge, Comprehension, Understanding	Exam	Theoretical practical	Daily Exam
5	4	Scientific and Prac Skills	Flow Rates and Pressure Measurements	Theoretical practical	General Questions
6	4	Scientific and Prac Skills	Flow Rates and Pressure Measurements	Theoretical practical	General Questions and Discussion
7	4	Scientific and Prac Skills	Dusts and Other Mine Aerosols	Theoretical practical	General Questions
8	4	Scientific and Prac Skills	Dusts and Other Mine Aerosols	Theoretical practical	Homework
9	4	Scientific and Prac Skills	Exam	Theoretical practical	Monthly Exam
10	4	Scientific and Prac Skills	Mine Ventilation Networks	Theoretical practical	General Questions and Discussion
11	4	Scientific and Prac Skills	Main Ventilation/ Natural Ventilation	Theoretical practical	General Questions
12	4	Scientific and Prac Skills	Main Ventilation/ Natural Ventilation	Theoretical practical	General Questions and Discussion
13	4	Scientific and Prac Skills	Airflow through Mine Openings and Ducts	Theoretical practical	General Questions
14	4	Scientific and Prac Skills	Airflow through Mine Openings and Ducts	Theoretical practical	Homework
15	4	Scientific and Prac Skills	Main Ventilation/ Forced Ventilation	Theoretical practical	General Questions and Discussion
16	4	Knowledge, Comprehension, Understanding	Exam	Theoretical practical	Monthly Exam
17	4	Scientific and Prac Skills	Fans and Flow Control Devices	Theoretical practical	General Questions
18	4	Scientific and Prac Skills	Fans and Flow Control Devices	Theoretical practical	General Questions and Discussion
19	4	Scientific and Prac Skills	Energy Consumed in Ventilation	Theoretical practical	Daily Exam
20	4	Scientific and Prac Skills	Energy Consumed in Ventilation	Theoretical practical	General Questions and Discussion
21	4	Scientific and Prac Skills	Calculation by the Simplified Expression of the Regulator Area	Theoretical practical	General Questions
22	4	Scientific and Prac Skills	Calculation by the Simplified Expression of the Regulator Area	Theoretical practical	General Questions
23	4	Scientific and Prac Skills	The Role of Ventilation in Fires and Explosion	Theoretical practical	Homework
24	4	Knowledge, Comprehension, Understanding	Exam	Theoretical practical	Monthly Exam
25	4	Scientific and Prac Skills	Secondary Ventilation	Theoretical practical	General Questions and Discussion
26	4	Scientific and Prac Skills	Secondary Ventilation	Theoretical practical	General Questions
27	4	Scientific and Prac Skills	Control of Mine Fires and Explosions	Theoretical practical	General Questions and Discussion
28	4	Scientific and Prac Skills	Control of Mine Fires and Explosions	Theoretical practical	General Questions
29	4	Scientific and Prac Skills	Heat Sources and Effects in Mines	Theoretical practical	Homework

30	4	Scientific and Prac Skills	Exam	Theoretical practical	Comprehensive Exam

11. Course Evaluation

Monthly Exam: 20
Midterm Exam: 20
Daily Exams: 5
Reports: 5
Final Exam: 50

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1. Banerjee S.P. (2003); "Mine Ventilation"; Lovely Prakashan, Dhanbad, India. 2. Hartman, H. L., Mutmansky, J. M. & Wang, Y. J. (1982); "Mine Ventilation and Air Conditioning"; John Wiley & Sons, New York. 3. Deshmukh, D. J. (2008); "Elements of Mining Technology, Vol. – II"; Denett & Co., Nagpur, India.
Main references (sources)	1. McPherson, M. J. (1993); Subsurface Ventilation and Environmental Engineering"; Chapman & Hall, London. 2. Misra G.B. (1986); "Mine Environment and Ventilation"; Oxford University Press,
Recommended books and references (scientific journals, reports...)	Deshmukh, D. J. (2008); "Elements of Mining Technology, Vol. – II"; Denett& Co., Nagpur, India. Jensen, J. H. (1977); "The role of light and radiant energy in health and safety"; Professional Safety; April; pp. 12-16.
Electronic References, Websites	https://www.youtube.com/watch?v=od0IfSCeo_0 http://www.louisvillelectures.org/new-blog/2019/mechanical-vent-1/rodrigo-cavallazzi https://www.thoracic.org/professionals/clinical-resources/video-lecture-series/mechanical-ventilation/mechanical-ventilation-101-resistance-and-compliance.php
Curriculum or description update rate	15%

Name and signature of the department head

Name and signature of the course lecturer

Course Description Form

1. Course name and academic level:
Mining Economics, Fourth stage
2. Course code:
ME413
3.Semester/Year:
Annual / 2024 - 2025
4. Date this description was prepared:
2/9/2024
5. Available attendance forms:
in-person
6. Number of study hours / Number of units
(120) hours / (4 units)
7. Course Instructor Name
Name: Dr. Rahma Sael Abdul Email: Rahma.saeel86@uomosul.edu.iq Name: M.M. Ruba Rafeh Mohammed Al-Wazzan Email : ruba.rafee@uomosul.edu.iq
8. Course objectives

	•Understanding economic fundamentals: Identifying basic economic principles and how to apply them to the mining industry. •Market analysis: Studying the forces of supply and demand in the mineral and natural resource market. • Studying the environmental impact of mining activities and how to achieve a balance between the economy and the environment.
9. Teaching and Learning Strategies	
	First: Learning Outcomes By the end of this course, the student should be able to: 1. Understand the basic concepts of mining economics, such as the concept of demand, the concept of supply, mineral and petroleum commodities, and artificial intelligence in mining. 2. Evaluate the factors affecting production costs and returns in mining operations.

	3. Apply economic models to analyze mineral prices and fluctuations in global markets. 4. Employ financial analysis methods to make investment decisions in the mining sector. 5. Understand the environmental and social dimensions associated with mining activities from an economic perspective. Second: Teaching and Learning Methods 1. Theoretical lectures: To present economic concepts and models related to mining. 2. Case studies: To analyze real mining projects in terms of economic feasibility. 3. Practical workshops: Financial simulation tools to analyze economic data. 4. Group work and classroom discussions: To develop critical thinking and communication skills.

10. Course structure.

week	Hours	Required learning outcomes	Name of unit or topic	Learning method	Evaluation method
1	**3**	**Contributions of minerals to economic development**	**Understanding the role of minerals in the economy**	**Theoretical**	**General questions and discussion**
2	**3**	**Minerals and economic resources**	**Identify the types of minerals and their classifications according to economic use.**	**theoretical**	**General questions and discussion**
3	**3**	**Costs, income and break-even point in mining operations.**	**Cost classification in mining projects / Calculating total and average costs / Analyzing income sources / Applying the break-even point concept.**	**theoretical**	**General questions and discussion or exam**
4	**3**	**Classification of mineral resources and reserves**	**Explain the basic concepts of mineral resources/Distinguish international classifications/Interpret the criteria used to determine economic raw material reserves**	**theoretical**	**General questions and discussion**
5	**1**	**Analysis of production processes in the mining sector**	**Description of the basic stages of production processes in mining projects / Analysis of the costs associated**	**theoretical**	**eaxam**

			with each production stage.		
6	**3**	**Fundamentals of economics and its relationship to other sciences**	**Understanding the economic problem, the concept of demand and the factors determining demand, the concept of supply and the factors determining supply**	**theoretical**	**General questions and discussion**
7	**3**	**The mining sector and its role in the economy**	**The concept of minerals, the importance of minerals and their vital role in life, the role of the mining sector in the global economy, technology in the mining sector**	**theoretical**	**General questions and discussion**
8	**3**	**Mineral and petroleum commodities**	**The importance of commodities in the global economy, the best exchange for trading precious metals**	**theoretical**	**General questions and discussion**
9	**3**	**Mineral and oil commodity markets**	**Trading in mineral and oil commodities, pricing of mineral and oil commodities, factors affecting mineral and oil commodity markets**	**theoretical**	**General questions and discussion**
10	**3**	**Investing in precious metals**	**How to invest in gold, oil, how to invest in oil, other metals, how to invest in metals, is investing in metals good, risks of investing in precious metals.**	**theoretical**	**General questions and discussion**
11		**Artificial Intelligence in Mining**	**The concept of artificial intelligence in mining, examples of how artificial intelligence is used, cases of using artificial intelligence in mining**	**theoretical**	**General questions and discussion**
11	**3**	**Economic feasibility of mining projects**	**The concept of economic feasibility study, the importance of economic feasibility study in the mining sector, stages of economic feasibility study for mining projects,**	**theoretical**	**General questions and discussion**

			environmental and social study, factors affecting the economic feasibility of mining projects		
12	**3**	**Economic feasibility study for establishing a solid waste recycling project**	**The concept of economic feasibility studies, the concept of solid waste, sources of solid waste, obstacles to recycling solid waste**	**theoretical**	**General questions and discussion**
14	**3**	**Licensing rounds**	**Learn about licensing rounds, types of projects under service contracts, Iraqi labor, recovery of petroleum and additional costs, and profitability fees.**		**General questions and discussion**
15	**3**	**Oil and gas revenues**	**Elements involved in oil and gas revenues, characteristics of oil and gas revenues, importance of oil and gas revenues**	**theoretical**	**General questions and discussion**
16	**3**	**OPEC**	**Definition of OPEC, objectives of OPEC, reasons for the establishment of the Organization of the Petroleum Exporting Countries, membership requirements**	**theoretical**	**General questions and discussion**

11. Course Evaluation and Grade Divisions

The grade is distributed out of 100 based on the tasks assigned to the student, such as daily preparation, daily, oralmonthly and written exams, reports, etc.

12. Learning and teaching resources

Required textbooks (methodology if (any	طارق العكيلي ،موسوعة العمري في التعدين والطاقة.
(Main References (Sources	https://resourcecapitalfunds.com/insights/rcf-/partners-blog/mineral-resources-reserves

Recommended supporting books and references (scientific journals, ...reports)	(الانسانيات والعلوم الاجتماعية ، مجلة كلية الاداب جامعة الفيوم)
Electronic references, websites	Sustainability reporting in the mining sector current status and future trend ، https://b2broker.com/ja/news/what-are-metals-in-trading-and-how-it-works/
Curriculum or description update rate	% 8

Name and signature of the department head

Dr. Azealdeen Salih Hassan

Name and signature of the course lecturer

Dr. Rahma Sael

Ass. L Ruba Rafee mohamed

Course Description Form

1. Course Name:
Mining Engineering Techniques / Fourth Stage
2. Course Code:
ME 414
3. Semester / Year:
Annual /2024-2025
4. Description Preparation Date:
1/10/2024
5. Available Attendance Forms:
In-person attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
150 Hours / 6 Units
7. Course administrator's name (mention all, if more than one name)
Name : Zainab Hazim Hameed Email:eng.zainab.alkhafaf@uomosul.edu.iq
8. Course Objectives

Course Objectives	**The main objective of this course is to provide an overview of the business and technology of mining engineering and engineering design of open-pit mines, underground mines, drilling machinery, and equipment, and to identify the problems facing the mining engineer in the design.**
9. Teaching and Learning Strategies	
Strategy	**Learning outcomes and methods of teaching, learning and assessment:** **1. Knowledge and understanding** **This course provides knowledge and experience in the applications of engineering principles to explore Earth resources and construct Earth systems in an engineering system orientation setting. In addition to the methods of students learning to design surface mines and methods of**

	designing subsurface mining, in addition to the students learning the skill of designing a mineral extraction plant. **2) Subject-specific skills** **The student acquires the engineering design skill for surface and subsurface mining methods, Acquire the skill of determining the best method for extracting mineral deposits, Acquiring the skill of designing a mineral extraction unit**

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	1	Mine Design (Design of open pit)	Theory	discussion
2	=	=	Continue	=	Quize1
3	=	=	Pit slopes geometry,	=	Quize1
4	=	=	Terms in open pit Benches(Bench Slope, Bank Angle, Bench height	=	exercise
5	=	=	Continue	=	exercise
6	=	=	Open pit Stability	=	exercise
7	=	=	**Exam 1**	=	exercise
8	=	=	Underground mining design, Unit operations of mining.	=	exercise
9	=	=	Continue	=	exercise
10	=	=	Continue	=	Reports
11	=	=	**Exam 2**	=	Reports
12	=	=	Drilling Technology drilling system basics of drilling, Types of drill bits	=	Reports
13	=	=	Continue	=	Reports
14	=	=	**seminar**	=	Reports
15	=	=	**Final Term1 Exam**	=	Reports
16	=	=	Introduction to Mineral Processing Plant Design	=	Reports
17	=	=	Continue	=	Reports
18	=	=	Process flow diagram/flow sheet/ Material flow	=	Reports

			diagram/ circuit design		
19	=	=	Continue	=	**Reports**
20	=	=	Continue	=	**Reports**
21	=	=	**Exam1**	=	
22	=	=	Materials Balance in mineral processing	=	**exercise**
23	=	=	Continue	=	**exercise**
24	=	=	Energy Balance in Mineral Processing	=	**exercise**
25	=	=	Continue	=	**exercise**
26	=	=	**Exam2**	=	**exercise**
27		=	Exercise 0n Mineral Processing	=	**exercise**
28	=	=	Extraction metallurgy by: Pyrometallurgy, Hydrometallurgy, and Electrometallurgy.	=	**exercise**
29	=	=	**seminar**	=	
30		=	**Final Term2 Exam**	=	
Week	**Hours Practical**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1	**3**	3	The Concept of Grid Sampling System and Types Square, Rectangular, Triangular, Random Grid System. Determination of the Range of sites to the Sampling (with examples solved).	**Theory**	**Reporting**
2	=	=	Continue	=	**Reporting**
3	=	=	Determination of Mineral Deposits.	=	**Reporting**
4	=	=	Continue	=	**Reporting**
5	=	=	Calculation of the Thickness of the Mineral Deposits in a mine or a single well or a group of Recovery .wells Rate Calculation	=	**Reporting**
6	=	=	Continue	=	**Exam**

7	=	=	Calculate the Concentration Degree of Ore. Calculation of Ore Concentration. Calculate the rate of Concentration of crude with the extent of the impact of the site.	=	**Reporting**
8	=	=	Continue	=	**Homework, Reporting**
9	=	=	Calculate the Rate of Concentration in the pulp wells to Evaluate the metal layer. Calculate the Thickness Rate in the pulp wells to evaluate the metal layer.	=	**Homework, Reporting**
10	=	=	Continue	=	**Reporting**
11	=	=	Evaluation (Thickness Rate and Rate of Concentration) in a cauliflower	=	**Homework, Reporting**
12	=	=	Continue	=	**Homework, Reporting**
13	=	=	Determination of the limits of the Mineral Deposits by Thickness of the Cut and the Cutting unit of the Concentration.	=	**Homework, Reporting**
14	=	=	Continue	=	**Homework, Reporting**
15	=	=	Mineral Deposits Reserve. The Concept of Mineral Reserve,Estimation of the on-site Reserve of Mineral Deposits,Density Mineral Deposits, Reserves Account.	=	**Homework, Reporting**
16	=	=	Continue	=	**Exam**
17	=	=	Methods of Estimation of	=	**Reporting**

			Mineral Deposits Reserves.		
18	=	=	Continue	=	**Reporting**
19	=	=	Practical Issues on the metal reserve account.	=	
20	=	=	Continue	=	**Reporting**
21	=	=	Mining extraction methods. Stripping Ratio,The Angle of Repose,Calculation of Stripping Ratio	=	**Reporting**
22	=	=	Continue	=	**Quize**
23	=	=	Underground Mine, Surface Mine Planning. Extraction of Mineral Deposits in Bench Mining	=	**Reporting**
24	=	=	Continue	=	**Quize**
25	=	=	Stability of Rocky Slopes. Factors Affecting the Stability of Rocky Slopes.	=	**Homework, Reporting**
26	=	=	Continue	=	**Reporting**
27			Mineral Extraction, Dillution Mining,Calculate the Amount of Ore extracted and the Amount of dilution with the Concentration degree.		**Homework, Reporting**
28	=	=	Continue	=	**Reporting**
29	=	=	Classification of Ore materials according to the grade of Concentration transferred to the Mineral Extraction Plant: Heag Grade, Recoverable Grade,Cut-off Grade.	=	**Homework, Reporting**
30			**Exam**		

11. Course Evaluation	
The grade is distributed out of 100 based on the tasks assigned to the student, such as daily preparation and daily exams (5%), monthly exams (40%), written work (40%), and reports.(%5)	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	unavailable
Main references (sources)	- Hartman, H.L., and Mutmansky , J.M. 2002. Introductory Mining Engineering. John Wiley & Sons Inc, New Jersey, U.S.A. -Barry A. Wills and Tim Napier-Munn. Mineral Processing Technology, Seventh Edition: An Introduction to the Practical Aspects of Ore Treatment and Mineral Recovery. 2005 Elsevier
Recommended books and references (scientific journals, reports).	Juan Herrera Herbert (2024), Planning and design of underground mining operation
Electronic References, Websites	https://www.azomining.com/Article.aspx?ArticleID=1837

Dr. Azealdeen Salih Hassan
Head of Department

A.L. Zainab Hazim Hameed
Lecturer

1. Course Name:	
Design of mine machinery/ Fourth stage	
2. Course Code:	
ME 415	
3. Semester / Year:	
Second Semester /2024-2025	
4. Description Preparation Date:	
October 1, 2024	
5. Available Attendance Forms:	
In-person (On-campus)	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 hours / 3 unit	
7. Course administrator's name (mention all, if more than one name)	
Name: **Dr. Hudhaifa Raad Hamzah** **Email:** hudhaifahamzah@uomousl.edu.iq	
8. Course Objectives	
Course Objectives	**1.** To introduce students to the principles and practices of design in the context of petroleum and 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 petroleum and mining equipment. **4.** To enable students to design and optimize petroleum and 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 petroleum and mining equipment.
9. Teaching and Learning Strategies	
Strategy	1- Theoretical Lectures: Fundamental principles and concepts are introduced through structured classroom. 2- Interactive Discussions: Class sessions include discussions to encourage student participation and critical thinking around mining machinery topics. 3- Case-Based Learning: Real-world equipment scenarios and handling systems are examined to apply theoretical knowledge practically. 4- Homework and Written Exercises: Assignments and written tasks are used to reinforce understanding and assess students' analytical skills. 5- Quizzes and Exams: Periodic quizzes, midterm, and final exams are employed to evaluate students' retention.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
The first	**1**	Understand the basics of mechanical design	**Introduction to Mechanical Engineering Design**	Theoretical +discussion	Explanation and discussion
The second	**2**	Select materials and determine geometric dimensions	**Keystones of Design: Materials Selection and Geometry Determination + H.W. #1**	Theoretical +discussion	Explanation, discussion, and written exercise
The third	**2**	Design efficient pipeline systems	**Pipeline Mechanical Design**	Theoretical +discussion	Explanation and discussion
Fourth	**2**	Analyze pressurized cylinders and interference fits	**Pressurized Cylinders; Interference Fits + Quiz #1**	Theoretical +discussion	Explanation, discussion and exam
Fifth	**2**	Evaluate deflection and stiffness	**Deflection and Stiffness**	Theoretical +discussion	Explanation and discussion
Sixth	**2**	Identify causes of static loading failure	**Failures Resulting from Static Loading**	Theoretical +discussion	Explanation and discussion
Seventh	**2**	Integrate concepts in the midterm exam	**Mid exam**	Theoretical	Exam
The eighth	**2**	Analyze fatigue failure under variable loading	**Fatigue Failure Resulting from Variable Loading**	Theoretical +discussion	Explanation and discussion
Ninth	**2**	Design shafts and related components	**Shafts and Shaft Components + H.W. #2**	Theoretical +discussion	Explanation, discussion, and written exercise
tenth	**2**	Design permanent joints (welding and bonding)	**Welding, Bonding, and the Design of Permanent Joints**	Theoretical +discussion	Explanation and discussion
eleventh	**1**	Understand the principles of gears	**Gears—General**	Theoretical +discussion	Explanation and discussion
twelfth	**2**	Analyze brakes, couplings, and flywheels	**Brakes, Couplings and Flywheels + Quiz # 2**	Theoretical +discussion	Explanation, discussion and exam
thirteenth	**2**	Study flexible mechanical elements	**Flexible Mechanical Elements**	Theoretical +discussion	Explanation and discussion
fourteenth	**2**	Analyze power transmission case studies	**Power Transmission Case Study**	Theoretical +discussion	Explanation and discussion
fifteenth	**2**	Consolidate knowledge in the final exam	**Final exam**	Theoretical	Exam

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Not available
Main references (sources)	Pipeline design & construction: a practical approach.
Recommended books and references (scientific journals, reports…)	Mechanical Engineering Design
Electronic References, Websites	Articles from the Internet

Name and signature of the department head lecturer

Dr. Azealdeen Salih Hassan

Name and signature of the course

Dr. Hudhaifa R. Hamzah

Course Description Form Rock Blasting Engineering

1. Course Name:

Rock Blasting Engineering

2. Course Code:

ME416

3. Semester / Year:

first/ 2024-2025

4. Description Preparation Date:

1/10/2024

5. Available Attendance Forms:

Physical and online

6. Number of Credit Hours (Total) / Number of Units (Total)

30 hours / 2 units

7. Course administrator's name (mention all, if more than one name)

Name: Dr. Azealdeen Salih Hassan Al-Jawadi
Email: azealdeenaljawadi@uomosul.edu.iq
Name: Asmaa Alhasany
Email: rosefirst78@uomosul.edu.iq

8. Course Objectives

- Study rock mechanics and its role in engineering applications.
- Prepare students to understand the subjects of tunneling and mining engineering they will receive in the fourth year.
- Enabling students to calculate and analyze laboratory and field results and apply them to engineering and design projects.
- Prepare students practically and scientifically to solve problems they will encounter in their practical life after graduation.
- Apply the basic principles of mechanics and geology to evaluate the response of rocks when affected by environmental forces, changes in the original forces surrounding the rocks and their impact on factors resulting from engineering projects.

9. Teaching and Learning Strategies

This science is concerned with applying the basic principles of rock blasting and geological effects to evaluate the response of rock during blasting operations when engineering projects are being carried out in, on, and with it, and the change in stresses and their concentration, as well as any change in the original forces surrounding and on the rocks due to the influence of factors resulting from blasting to carry out engineering projects.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Knowledge Comprehension	Introduction to Rocks Blast Engineering	Theory	General Questions
2	2	Knowledge, Comprehension, Understanding	Definitions	Theory	General Questions and Discussion

3	2	Scientific Practical Skills	Types of Explosives	Theory	General Questions
4	2	Scientific Practical Skills	Chemistry of Explosives I	Theory	Daily Exam
5	2	Scientific Practical Skills	Chemistry of Explosives II	Theory	General Questions
6	2	Scientific Practical Skills	Rock Blasting Basics	Theory	General Questions and Discussion
7	2	Scientific Practical Skills	Rules of Blasting	Theory	General Questions
8	2	Scientific Practical Skills	The Physics of Energy Release and Rock Breakage	Theory	Homework
9	2	Scientific Practical Skills	Exam	Theory	Monthly Exam
10	2	Scientific Practical Skills	Blasting Engineering	Theory	General Questions and Discussion
11	2	Scientific Practical Skills	Drilling, Spacing, and Timing	Theory	General Questions
12	2	Scientific Practical Skills	Presplitting, Smoothing and Trimming	Theory	General Questions and Discussion
13	2	Scientific Practical Skills	Air Blast, Fly Rock, and Ground Vibration	Theory	General Questions
14	2	Scientific Practical Skills	Environmental Impact from Blasting	Theory	Homework
15	2	Scientific Practical Skills	Exam	Theory	Comprehensive Exam

11. Course Evaluation

Monthly Exam: 20
Midterm Exam: 20
Daily Exams: 5
Reports: 5
Final Exam: 50

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1. Calvin J. Konya, and Edward J. Walter, 1991. Rock Blasting and Overbreak Control 2. Liu, J. 2015. Liquid Explosives
Main references (sources)	3. Stig, O. Olofsson, 1990. Applied Explosives Technology for Construction and Mining
Recommended books and references (scientific journals, reports...)	4. R. Meyer, J. Köhler, A. Homburg, 2007. Explosives
Electronic References, Websites	1. www.rocscince.org
Curriculum or description update rate	15%

Lecturer

Head of Department

Course Description Form

1. Course Name:

Tunnel Engineering / Fourth stage

2. Course Code:

ME417

3. Semester / Year:

Annual /2024-2025

4. Description Preparation Date:

15/9/2024

5. Available Attendance Forms:

Physical and online

6. Number of Credit Hours (Total) / Number of Units (Total)

90 hours / 4 units

7. Course administrator's name (mention all, if more than one name)

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Email: azealdeenaljawadi@uomosul.edu.iq
Name: Dr. Hamed Jassim Mohammed
Name: Sarah Mwafaq Abdulaziz
Email: saraaltaie87@uomosul.edu.iq

8. Course Objectives

- Applying what has been eliminated in Black Mechanics to its applications in tunneling engineering.
- Preparing the student to understand tunneling methods.
- Enabling the student to calculate field stress analysis and employ it in engineering projects and tunnel design.
- Introducing the student to practical terrain and understanding the problems he faces in real life after hard work.

9. Teaching and Learning Strategies

This science applies the basic principles of tunneling engineering and geological influences to assess the response of rocks when tunnels are excavated, the stresses and stress concentrations change, and any changes in the original forces surrounding and upon the rocks due to the influence of factors resulting from engineering projects.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Knowledge Comprehension	Introduction to Tunnels Engineering	Theoretical practical	General Questions
2	4	Knowledge, Comprehension, Understanding	Types and Constructions of Tunnels	Theoretical practical	General Questions and Discussion
3	4	Scientific Practical Skills	Single tunnels	Theoretical practical	General Questions

4	4	Scientific Practical Skills	Single Tunnel Joints	Theoretical practical	Daily Exam
5	4	Scientific Practical Skills	Multiple Tunnels	Theoretical practical	General Questions
6	4	Scientific Practical Skills	Classification of Tunnels	Theoretical practical	General Questions and Discussion
7	4	Scientific Practical Skills	Tunnel Construction	Theoretical practical	General Questions
8	4	Scientific Practical Skills	Shallow Tunnels and Weak Rock Tunnels	Theoretical practical	Homework
9	4	Scientific Practical Skills	Exam	Theoretical practical	Monthly Exam
10	4	Scientific Practical Skills	Conventional Bottom-Up Construction	Theoretical practical	General Questions and Discussion
11	4	Scientific Practical Skills	Top-Down Construction	Theoretical practical	General Questions
12	4	Scientific Practical Skills	Pipe jacking Method	Theoretical practical	General Questions and Discussion
13	4	Scientific Practical Skills	New Austrian Tunneling Method	Theoretical practical	General Questions
14	4	Scientific Practical Skills	Drill and Blast Tunneling	Theoretical practical	Homework
15	4	Scientific Practical Skills	Exam	Theoretical practical	Monthly Exam
16	4	Knowledge, Comprehension, Understanding	Typical Cross Section Elements	Theoretical practical	General Questions and Discussion
17	4	Scientific Practical Skills	Rock Bolts	Theoretical practical	General Questions
18	4	Scientific Practical Skills	Groundwater Control	Theoretical practical	General Questions and Discussion
19	4	Scientific Practical Skills	Temporary Support of Tunnels	Theoretical practical	Daily Exam
20	4	Scientific Practical Skills	Permanent Support of Tunnels	Theoretical practical	General Questions and Discussion
21	4	Scientific Practical Skills	Shotcrete	Theoretical practical	General Questions
22	4	Scientific Practical Skills	Exam	Theoretical practical	Monthly Exam
23	4	Scientific Practical Skills	Tunnel Drainage Requirements	Theoretical practical	Homework
24	4	Knowledge, Comprehension, Understanding	Ventilation Requirements	Theoretical practical	General Questions
25	4	Scientific Practical Skills	Lighting Requirements	Theoretical practical	General Questions and Discussion
26	4	Scientific Practical Skills	Traffic Control Requirements	Theoretical practical	General Questions
27	4	Scientific Practical Skills	Safety of Tunnels I	Theoretical practical	General Questions and Discussion
28	4	Scientific Practical Skills	Safety of Tunnels II	Theoretical practical	General Questions
29	4	Scientific Practical Skills	Environmental Issues	Theoretical practical	Homework
30	4	Scientific Practical Skills	Exam	Theoretical practical	Monthly Comprehensive Exam

11. Course Evaluation

Midterm Exam: 20
Midterm Exam: 20
Daily Exams: 5

Reports: 5 Final Exam: 50	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	1. Obert and Duvall, 1968. Rock mechanics and the design of structures in rocks
Main references (sources)	2. Singh, B. and Goel, R.K. 2006. Tunnelling in Weak Rocks 3. Pariseau, W.G., 2007. Design analysis in rock mechanics
Recommended books and references (scientific journals, reports...)	4. C. Jeremy Hung, PE, James Monsees, PhD, PE, Nasri Munfah, PE, and John Wisniewski, PE, 2009. Technical Manual for Design and Construction of Road Tunnels – Civil Elements
Electronic References, Websites	5. www.rocscince.org
Curriculum or description update rate	15%

Name and signature of the department head

Dr. Azealdeen Salih Hassan

Name and signature of the course lecturer

Dr. Azealdeen Salih Hassan