

**Ministry of Higher Education and Scientific Research
Scientific Supervision and Scientific Evaluation Apparatus
Directorate of Quality Assurance and Academic Accreditation
Accreditation Department**



**Academic Program Description
Department of Petroleum Engineering**

2025-2026

Academic Program Description

University Name: Al-Farabi University

Faculty/Institute: College of Engineering

Scientific Department: Department of Petroleum Engineering

Academic or Professional Program Name: Bachelor of Petroleum Engineering

Final Certificate Name: Bachelor's degree in Petroleum Engineering

Academic System: Bologna system for the first, second, and third stages, and annual system for the fourth stage."

Description Preparation Date: 1/10/2025

File Completion Date: 7/10/2025

Signature:

Head of Department Name:

Dr. Sabah Jasim Dahboosh

Date: 12/10/2025

Signature:

Scientific Associate Name:

Prof. Dr. Bahjat R. Shahin

Date: 12/10/2025

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Date:

Signature:

Prof. Dr. Hanaa Hammood

12-10-2025

Approval of the Dean

Asst. Prof.

o Sama Abd ALAme

1. Program Vision

The department is staffed by qualified faculty members holding PhD and Master's degrees in Petroleum Engineering. Over the past years, they have graduated hundreds of engineers who now serve in technical and academic positions across government institutions, the private sector, and both inside and outside Iraq.

2. Program Mission

the department has taken practical steps to build strong partnerships with leading international oil companies, across various fields of petroleum engineering.

3. Program Objectives

- 1. Prepare highly qualified petroleum engineers to work across all sectors of the oil and gas industry.
- 2. Support the educational process in line with international accreditation standards to achieve the department's vision and mission.
- 3. Enhance faculty capabilities and attract distinguished expertise to the department.
- 4. Conduct rigorous applied research that generates new knowledge for use in local and international markets.
- 5. Promote scientific collaboration, exchange, and partnership agreements with peer departments and knowledge institutions in advanced countries.

4. Program Accreditation

No

5. Other External Influences

We are twinned with the University of Baghdad - College of Engineering, Department of petroleum Engineering

6. Program Structure				
Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	9	20		Basic
College Requirements	11	64		Basic
Department Requirements	29	134		Basic
Summer Training	The duration of the summer training is 30 days during the summer vacation in the month of July or August			
Other				-

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

7. Program Description				
Credit hours		Course name	Course code	year / Level
practical	theoretical			
2	3	General Geology I	PE116	First Level-First Semester
	4	Engineering Mechanics	PE115	
	4	Mathematics I	PE114	
2		Workshop Technology	PE 113	
2	1	Computer Science I	UOB103	
	2	English Language I	UOB102	
	2	Democracy and Human Rights	UOB104	
2	3	General Geology II	PE126	First Level-Second Semester
	4	Physics	PE125	
2	2	Chemistry	PE124	
	4	Mathematics II	PE123	
3	1	Engineering Drawing and Descriptive Geometry	PE122	
	2	Engineering Practices	PE121	
	2	Arabic Language	UOB101	
2	3	Structural Geology	PE216	Second Level-First Semester
	4	Fundamentals of Petroleum Engineering	PE215	
2	2	Petroleum Properties	PE214	

	3	Mathematics III	PE213	
	4	Thermodynamics	PE210	
2	1	Computer Science 2	UOB203	
	2	Arabic Language 2	UOB201	
2	3	Petroleum Geology	PE226	Second Level- Second Semester
2	2	Fluid Mechanics	PE225	
2	2	Strength of Materials	PE224	
	3	Mathematics IV	PE223	
2	3	Petrophysical Rock Properties	PE222	
	2	English Language II	UOB202	
	2	Crimes of the Baath Regime in Iraq	UOB105	
2	2	Reservoir Fluid Properties	PE316	Third Level- First Semester
2	2	Drilling Fluids and Hydraulics	PE315	
	3	Production Engineering	PE314	
	4	Engineering Mathematics	PE313	
	3	Geophysics	PE312	
	4	Well Logging and Formation Evaluation	PE311	
	3	Gas Technology	PE310	
	3	Rock Mechanics for Petroleum Engineers	PE326	Third Level- Second Semester
	4	Casing Design and Cementing	PE325	
	3	Petroleum Economics	PE324	
	4	Geostatistics	PE323	
	3	Nodal Analysis	PE322	
	3	Data Analytics and Artificial Intelligence	PE321	
	4	Fluid Flow Through Porous Media	PE320	
	5	Petroleum Reservoir Eng. II	PE400	Fourth Stage
	5	Petroleum Drilling Eng. II	PE402	
	5	Petroleum Production Eng. II	PE404	
	3	Secondary Oil Recovery	PE406	
2	2	Numerical Methods and Reservoir Simulation	PE408	
2	1	Engineering Project	PE410	
	3	Gas Technology	PE401	
1	2	Integrated Reservoir Management	PE405	

	1	English Language IV		
			Fourth stage/ second semester	
	3	Optimization	PE403	

- 8 Learning Outcomes	
Knowledge	
1- Acquiring the ability to deal with work problems and challenges through the practical and theoretical application of engineering principles and analytical mathematics.	2. Acquiring the ability to deal with work problems and challenges through the practical and theoretical application of engineering principles and analytical mathematics.
3. The ability to employ knowledge in mathematics and engineering to find solutions in fieldwork within oil fields.	4. The ability to employ knowledge in mathematics and engineering to find solutions in fieldwork within oil fields.
5. Taking responsibility in managing oil fields and adhering to professional ethics in workplace management issues, ensuring proper application of work ethics.	
6. Understanding the impact of surrounding factors and the work environment on field operations.	
7. Recognizing drilling and production techniques and field management in alignment with fieldwork requirements.	
Skills	
Ability to work in a team spirit, commit to achieving goals, and implement field work improvement plans within the specified deadlines.	
1. Conduct basic and applied engineering and scientific research to develop new, safer, and more economical methods for extracting petroleum and natural gas from rock formations.	
3. Apply scientific and engineering principles to formulate solutions to petroleum and natural gas engineering problems.	
-4 Use modern engineering techniques, skills, and tools in the field of petroleum and natural gas.	
Ethics	

- 1- Integrity: We uphold the highest ethical standards in education, research, and professional practice.
- 2- Innovation: We encourage creative solutions and cutting-edge research to advance petroleum engineering.
- 3- Sustainability: We are committed to responsible resource development that protects the environment and future generations.
- 4- We strive for superior performance in teaching, learning, and industry collaboration.
- 5- We promote teamwork and partnerships across disciplines and with industry leaders.
- 6- We value inclusivity and respect for all individuals and ideas.
- 7- Service to Society: We dedicate our expertise to meeting energy needs while contributing positively to communities.

9. Teaching and Learning Strategies

1 - Arrange effective groups during educational lectures and in laboratories to familiarize students with the team atmosphere and teach them how to cooperate with each other to achieve the best results.

2- Hold lively classroom discussions

3- Student presentation strategy and presentation of ideas

10. Evaluation methods

1- Daily and monthly exams

2. Oral discussion

3. Forming creative groups and holding a competition between them by presenting specialized topics.

4- Preparing scientific reports

5. Preparing projects and reports

11. Faculty

Faculty Members

Academic Rank	Specialization	Special Requirements/ Skills (if	Number of the teaching staff

			applicable)			
	General	Special			Staff	Lecturer
Prof. Ali Mohsin Salih Al-Mashat	Petroleum engineering	Petroleum drilling engineering			Staff	
Prof. Zuhair Dawood Ahmed	geology	Geophysics			Staff	
Prof. Muzahin Aziz Basi	geology	Sedimentary rocks			Staff	
Assist. Prof. Adnan Abbas Alwan Al-Azawi	Mechanical engineering	Air Conditioning and Refrigeration Engineering			Staff	
Dr. Shamil Ibrahim Mohammed	Petroleum engineering	Petroleum reservoir engineering			Staff	
Dr. Ahmed Jubair Mohammed	Petroleum engineering	Petroleum reservoir engineering			Staff	
Dr. Shalal Naif Mihdi Ahmed	Petroleum engineering	Petroleum drilling engineering			Staff	
Dr. Layla Sideeq Mohammed Al-Jaff	Petroleum engineering	Petroleum reservoir engineering			Staff	
Dr. sabah Jassim Dahbosh	geology	Geophysics			Staff	
Assist. Prof. Saad Zaki Abd Al-QAdir	geology	Stratigraphy				Lecturer
Dr. Hussain Ali Muslih	Mechanical engineering	Mechanical engineering			Staff	
Dr. Mohaamed Halfawy Yaheya	Petroleum engineering	Petroleum reservoir engineering			Staff	
Dr. Rami Magid Al-Haj Hussain	Physics	Condensed Matter			Staff	
Assist. Lect. Mohammed Qassab Shamikh	Petroleum engineering	Petroleum reservoir engineering			Staff	

Assist. Lect. Mohammed Qasim Abd Talib	Petroleum engineering	Petroleum reservoir engineering			Staff	
Assist. Lect. Yasir Basheer Mohammed Mehdi	الجيولوجيا	Geochemistry				Lecturer
Assist. Lect. Hiba Ali Hassan Neama	Petroleum engineering	Petroleum reservoir engineering				
Assist. Lect. Abdul Aziz Bassim Abd Alhussain Ibrahim	Chemical engineering	Nanotechnology				
Assist. Lect. Elaf Yaheya Fadhil	Petroleum engineering	Petroleum drilling engineering				
Assist. Lect. Mustafa kamil Ahmed	geology	Geophysics				
Assist. Lect. Hassan Karim Saleem	Petroleum engineering	Petroleum reservoir engineering				
Assist. Lect. Sajad Ali Aziz	Petroleum engineering	Petroleum reservoir engineering				
Assist. Lect. Maryam Bassim Mussa	Remote Sensing	Remote Sensing				
Assist. Lect. Mohammed Amer Obeid	Petroleum engineering	Petroleum reservoir engineering				
Assist. Lect. Huda Jaleel Thjeel	Petroleum engineering	Production				
Assist. Prof. Ghanem Madeeh Farman	Petroleum engineering	Petroleum reservoir engineering				
Assist. Prof. Mohammed Jasim Mohammed	Mechanical Engineering	Mechanical Engineering				
Assist. Prof. Amal Habeeb Assi	Petroleum engineering	Petroleum drilling engineering				
Assist. Lect. Waleed Hameed Hashim	Mechanical Engineering	Energy				
Assist. Lect. Mohammed Salam Abdulghafour	Mechanical Engineering	Energy				

Dr. Farazdaq Nahidh Ismaia	Artificial Intelligence (AI)	Artificial Intelligence (AI)				
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Professional Development

Mentoring new faculty members

The program is committed to creating an atmosphere of cooperation and academic and administrative integration for new members through the following:

- 1- Holding frequent meetings with them by the department head to familiarize them with the foundations and systems of the program and the academic curricula.
2. Their apprehension about how to deal with students and how to convey information and apply it practically.
- 3- Guide them to the importance of laboratory work by introducing them to the department's laboratories and how to link theoretical information with the practical side.

Professional development of faculty members

- 1-Continuous follow-up by holding seminars to enhance the progress of the academic process by explaining how to use modern educational methods and academic communication with students.
- 2- Follow up on the academic development of faculty members and stimulate the research aspect by holding seminars on the research publishing process and increasing research citations.
- 3- Follow up on the academic evaluation of the teaching staff annually and address any weaknesses, if any

12. Acceptance Criterion

Academic qualifications eligible for application to study in the Petroleum Engineering Department:

1. Graduates of the preparatory *Applied Branch*.
2. Graduates of the *Scientific Branch* from previous years.
3. Graduates of an *Oil Institute* or any institute after the preparatory stage, provided that the applicant is a graduate of the preparatory/scientific branch. Admission to the department depends on the sixth preparatory average, not on the level of study after the preparatory stage.

13. The most important sources of information about the program

- 1- Files archived in the department.
- 2- The curriculum accredited by the Ministry of Higher Education and Scientific Research.
- 3- Recommendations of the Quality and Academic Performance Committees.
- 4- <https://alfarabiuc.edu.iq/ar/petroleum-engineering/>

14. Program Development Plan

- 1- Updating devices and equipment, and replacing them with modern technologies.
- 2- Strengthening the relationship with the Iraqi Ministry of Oil to provide job opportunities for graduates.

			Program skills outlines							
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	English I		Module Delivery	
Module Type	Support		☒ Theory Lecture Lab ☐ Tutorial Practical ☐ Seminar	
Module Code	GE 111			
ECTS Credits	4			
SWL (h/sem)	100			
Module Level	1	Semester of Delivery		First
Administering Department	Type Dept. Code	College	Type College Code	
Module Leader			e-mail	@coeng.uobaghdad.edu.iq
Module Leader's Acad. Title	Asst. Lecturer	Module Leader's Qualification	Master	
Module Tutor	Name (if available)	e-mail	E-mail	
Peer Reviewer Name	Name	e-mail	E-mail	
Scientific Committee Approval Date		Version Number		

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 Aims أهداف المادة الدراسية	1- The aim of this course is to empower students with the language and life skills 2- The integrated skills approach of the course develops the student's self-confidence 3- succeed in professional and social encounters within an English-speaking global environment 4- using language to express knowledge of Environment and health impacts hazards
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	A1) Find and understand information about vocabulary, pronunciation, usage, and grammar in reference texts, online resources, and English language dictionaries, (A2) Develop conversational English skills necessary for becoming a contributing participant in small group activities, large group discussions, and oral presentations, (A3) Understand texts using effective learning strategies for reading and vocabulary building,
Indicative Contents المحتويات الإرشادية	Speaking, reading and writing

Learning and Teaching Strategies	
استراتيجيات التعلم والتعليم	
Strategies	Lecture and classroom discussion

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

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	20% (20)	5, 10	1,2
	Assignments	2	10% (10)	2, 12	3,1
	Projects / Lab.	0	0	0	0
	composition	1	10% (10)	13	3,1
Summative assessment	Midterm Exam	2 hr	10% (10)	7	1,2
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Unit 1,2
Week 2	Unit 3,4
Week 3	Unit 5,6
Week 4	Unit 7,8
Week 5	Unit 9,10
Week 6	Unit 11
Week 7	Unit 12
Week 8	Unit 13
Week 9	Unit 14
Week 10	General discussion
Week 11	Composition Writing
Week 12	English for Specific Purposes
Week 13	English for Specific Purposes
Week 14	English for Specific Purposes
Week 15	English for Specific Purposes
Week 16	General discussions

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	(1) New Headway Plus [Beginner] by John and Liz Soars, Oxford: Oxford University Press (2006), (2) Modern scientific articles from the news related to the students' specialty, and (3) Internet links and videos related to the topics discussed in General English and English for Specific Purposes lectures. (4) New Headway Plus [Beginner] by John and Liz Soars, Oxford: Oxford University Press (2006),	No
Recommended Texts	Morphy, A.J (1983) English Grammar in use. Cambridge: CUP	No
Websites	https://www.englishclub.com/grammar/verb-tenses.htm https://www.ego4u.com/en/cram- www.perfect-english-grammar.com/verb-tenses.htm https://en.wikipedia.org/wiki/Grammatical_tense	

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	Workshop Technology		Module Delivery	
Module Type	Support		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	CENG 113			
ECTS Credits	3			
SSWL (hr/sem)	33			
USSWL (hr/sem)	42			
SWL (hr/sem)	75			
Module Level	1	Semester of Delivery		
Administering Department	Type Dept. Code	College	Type College Code	
Module Leader	Haitham Hashem Al-Jawad		e-mail	E-mail: haithem.hashem@coeng.uobaghdad.edu.iq
Module Leader's Acad. Title		Module Leader's Qualification	Ph.D.	
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	Name		e-mail	E-mail
Scientific Committee Approval Date		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. This is the basic subject for all engineering fields. 2. This course deals with the basic concept of the workshop including welding, filings, carpentry, and turning. 3. The student will have the required skills to use the carpentry tools in manufacturing different parts. 4. The student will have the required skills to use the welding, filing and turning process in manufacturing different parts.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize how to select suitable processes in the production of different parts. 2. Recognize how to select suitable tools. 3. Recognize how to select suitable sound materials. 4. The student will have the skills to manufacture different parts. 5. The student will understand how to control the quality of the parts produced by welding and turning process
Indicative Contents المحتويات الإرشادية	

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 practical applications, and by considering types of simple experiments involving some sampling activities that are interesting to the students.
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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)	75		

الحمل الدراسي الكلي للطالب خلال الفصل	
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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	Definition of carpentry and types of wood - natural wood and industrial wood
Week 2	Wood defects
Week 3	The tools and tools used in the carpentry process and the cutting of wood.
Week 4	Electrical devices used in the carpentry process
Week 5	A general definition of filings, their importance, method of work, and how to use the tools.
Week 6	Classification of the files tools
Week 7	Manual planer and its types (flat - triangular - bent edge). Sawing process and types of saws.
Week 8	Lathing: - general lathes - multi-pen lathes - turret lathes - vertical lathes
Week 9	Parts of the lathe and lathing pens (brushes - fixed crow - moving crow - carriage and plotter - traction covenants and guide column)
Week 10	The angles of the pens (prism angle - fragment angle
Week 11	Types of lathing operations - (longitudinal lathing - transverse lathing - cutting lathing - conical surfaces) and the metals used in the production of cutting tools (pens) - maintenance of carbide pens - methods of attaching artifacts to the machine - safety and security precautions)
Week 12	Definition of welding and its advantages and disadvantages, along with a brief history of welding.
Week 13	Joining metals: - the most important methods of joining metals by means of screws - rivets - plumbing and mortar – welding.
Week 14	Types of Welding: - Cross - Cold - Electrical Resistance - Electric Arc - Gas - Forging (Methods).

Week 15	Methods of preparing acetylene gas - (in the workshop - in the laboratory).
Week 16	Preparatory week before the final Exam
Delivery Plan (Weekly Lab. Syllabus) المناهج الاسبوعي للمختبر	
	Material Covered
Week 1	Practical application: The student uses the available equipment to make different geometric shapes
Week 2	The student submits a report showing his complete understanding of the theoretical and applied aspects
Week 3	The filing method is in the form of practical exercises with geometric shapes
Week 4	The student submits a report showing his complete understanding of the theoretical and applied aspects
Week 5	The student practices the types of lathe operations through the application of practical exercises
Week 6	The student submits a report showing his complete understanding of the theoretical and applied aspects
Week 7	Practical application, method and technique of welding and student submits a report showing his complete understanding of the theoretical and applied aspects

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1. اسس هندسة المعادن, تاليف كايسر, ترجمة د-شاكر السامرائي, د-قحطان الخزرجي	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
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	F – Fail	راسب	(0-44)	Considerable amount of work required

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Engineering mechanics		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☒ Seminar	
Module Code	PENG115			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	1	Semester of Delivery		Second
Administering Department	Type Dept. Code	College	Type College Code	
Module Leader	Haider Hussein Hamad		e-mail	haider.hussein@coeng.uobaghdad.edu.iq
Module Leader's Acad. Title	teacher		Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	Name		e-mail	E-mail
Scientific Committee Approval Date	01/06/2023		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. Introduce the basic principles of force system and equilibrium 2. Introduce the basic principles of truss system and frames 3. Introduce the basic principles centroid and moment of inertia 4. Introduce the basic principles of friction 5. Introduce the basic principles dynamic and motion 6. Introduce the basic principles of stress and strain 7. Introduce the principles of thermal stresses and torsion 8. Introduce the principles of shear force and bending moment 9. Introduce the principles compound stresses
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. understanding the basic principles of force system 2. understanding the basic principles of equilibrium 3. understanding the basic principles of truss system 4. understanding the basic principles centroid 5. understanding the basic principles of moment of inertia 6. understanding the basic principles of friction 7. understanding the basic principles of dynamic system 8. understanding the basic principles of stresses and strain 9. understanding the basic principles of torsion and thermal stresses and compound stresses
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Weeks 1-2: Introduction to mechanical system (8 hours) Definition and objectives of mechanical systems (2 hours) Historical development and evolution mechanical system (2 hours) Weeks 3-4: force system (12 hours)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Direct instruction
	Solving problems

Student Workload (SWL)			
الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	94	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	56	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	150		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	5% (5)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	5% (5)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	20% (20)		
	Report	1			
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	Force system1
Week 2	equilibrium
Week 3	truss
Week 4	centroid and moment of inertia
Week 5	friction
Week 6	dynamic motion
Week 7	stress and strain
Week 8	normal stress
Week 9	shear stress

Week 10	thermal stresses
Week 11	Pressure vessels
Week 12	torsion
Week 13	shear force diagram
Week 14	bending moment diagram
Week 15	compound stresses
Week 16	Preparatory week before the final Exam

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Engineering mechanics and strength of material	Yes
Recommended Texts	Engineering mechanics by meriam Strength of material by singer	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 Science I		Module Delivery	
Module Type	Suport		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	GE112			
ECTS Credits	4			
SWL (hr/sem)	100			
Module Level	1	Semester of Delivery		First
Administering Department	Type Dept. Code	College	Type College Code	
Module Leader	Zena F. Rasheed		e-mail	Zena.fouad@coeng.uob.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	Name		e-mail	E-mail
Scientific Committee Approval Date	17/06/2023		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	Elements of a computer, Windows system (history, elements, functions, applications, special types); Microsoft office (Word, Excel, Power Point); Internet (types of networks, search tools, method of search, E-mail; Web page.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	This module introduces students to the fundamental principles of computer programming and its applications in the field of petroleum engineering. It aims to equip students with programming skills to solve engineering problems, analyze data, and develop software tools for various petroleum engineering tasks. The Computer Programming module provides petroleum engineering students with a strong foundation in programming concepts and techniques, enabling them to leverage computational tools and algorithms to solve industry-specific problems efficiently. By acquiring programming skills, students enhance their problem-solving abilities and become well-equipped to navigate the digital landscape of the petroleum industry.
Indicative Contents المحتويات الإرشادية	Lecture titles • Understand the reason behind studying computer parts and its main applications. • Review the basics of MS PowerPoint • Custom animation • Add photos, videos and sound effects • Save as a webpage • Print presentations as handouts • Embed YouTube videos • create slideshows composed of text, graphics, and other objects. • which can be displayed on-screen and shown by the presenter or printed out on transparencies or slides. • review the main purpose of MS word • An overview of the interface features • Creating documents • Setting the printing options • Formatting text, styles, and paragraphs • Creating Lists and Constructing Advanced Tables • Creating bulleted and numbered lists • Creating tables • Editing and formatting tables • Creating Professional Documents • Word-referencing features • Creating and updating the TOC • Using citations to build a bibliography • Adding citation sources • Generating the bibliography • Editing the citation style • Working with master documents or subdocuments • Customizing page layouts • Inserting a cover page quick part • Converting text into columns • Inserting and modifying section breaks • Adding section breaks • Headers and footers • Inserting page numbers

	• Choosing a different first page • Numbering from a specific page number • Different header and footer sections • Introduction to Microsoft Excel • identify the main parts of the Excel window. • Identify the purpose of the commands on the menu bar. • Work with the buttons on the toolbar. • Explain the purpose of options available for printing a spreadsheet. • Enter and format text and numbers into cells. • Successfully move from one cell to another containing formulas and text. • Copy, Cut and Paste text and formulas • excel charts
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students. * Lectures are conducted by face-to-face education in the classroom, two hours per week, and students' technical reports. * Conducting dialogues and discussions with the request Methods of assessment for students. * Quarterly exams. * Discussions and assignments. *The overall assessment for this course is as follows: Annual pursuit of 50 points from the total mark, which includes assignments and oral examinations and quarterly in addition to presentations. *50 marks for the final exam

Student Workload (SWL) الحمل الدراسي للطالب محسوب ل 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 / Lab.	2	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1,2	• Introduction to computer parts • Understand the reason behind studying computer parts and its main applications. • Review the basics of MS PowerPoint • Custom animation • Add photos, videos and sound effects
Week 3	• Save as a webpage • Print presentations as handouts • Embed YouTube videos • create slideshows composed of text, graphics, and other objects. • which can be displayed on-screen and shown by the presenter or printed out on transparencies or slides.
Week 4	• review the main purpose of MS word • An overview of the interface features • Creating documents • Setting the printing options • Formatting text, styles, and paragraphs • Creating Lists and Constructing Advanced Tables
Week 5	• Creating bulleted and numbered lists • Creating tables • Editing and formatting tables • Creating Professional Documents • Word-referencing features • Creating and updating the TOC • Using citations to build a bibliography • Adding citation sources

Week 6,7	• Generating the bibliography • Editing the citation style • Working with master documents or subdocuments • Customizing page layouts • Inserting a cover page quick part • Converting text into columns • Inserting and modifying section breaks • Adding section breaks • Headers and footers • Inserting page numbers • Choosing a different first page • Numbering from a specific page number • Different header and footer sections
Week 8	• Introduction to Microsoft Excel • identify the main parts of the Excel window. • Identify the purpose of the commands on the menu bar. • Work with the buttons on the toolbar.
Week 9,10	• Explain the purpose of options available for printing a spreadsheet. • Enter and format text and numbers into cells. • Successfully move from one cell to another containing formulas and text. • Copy, Cut and Paste text and formulas
Week 11,12	• Using Formulas and Functions • Using Operators in Formulas • Using Cell References in Formulas • Entering Formulas • Displaying Formulas • Using Functions in Formulas • Using the AutoSum Button • Inserting Functions • Using Formula AutoComplete
Week 13,14	• Working with Charts • Creating Charts • Selecting Chart Elements • Changing the Chart Type • Changing the Chart Data • Changing the Chart Layout • Formatting Charts • Moving Charts • Deleting Charts • Using Formulas and Functions • Using Cell References in Formulas
Week 15	• Internet :types of networks • search tools, method of search • E-mail; Web page

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Curriculum and textbook	Yes
Recommended Texts	- L. Foulke, "Learn Microsoft Office 2019 : a guide to getting started with Word, PowerPoint, Excel, Access, and Outlook." p. 111, 2020.	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	General Geology		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	PENG116		
ECTS Credits	8		
SWL (hr/sem)	200		
Module Level	1	Semester of Delivery	
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	e-mail		
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date		Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	The General Geology module provides students with a fundamental understanding of the Earth's structure, composition, and geological processes. The module covers a wide range of topics, including the Earth's position in space, its shape, and surface relief. Students will learn about the properties and classification of minerals, as well as the formation and characteristics of igneous, sedimentary, and metamorphic rocks. The module also explores the processes of weathering, erosion, transportation, and deposition that shape the Earth's surface. Students will gain knowledge of geological time and the formation of geological features such as mountains, valleys, and geological hazards.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of the module, students will be able to: 1. Understand the Earth's position in space and its relationship to the solar system. 2. Describe the shape and surface relief of the Earth, including the major landforms and features. 3. Identify and classify minerals based on their properties and characteristics. 4. Explain the processes of rock formation, including the origin and classification of igneous, sedimentary, and metamorphic rocks. 5. Understand the concepts of weathering and soil formation, and their significance in geological processes. 6. Describe the processes of erosion, transportation, and deposition, and their role in shaping the Earth's surface. 7. Interpret geological maps, cross-sections, and stratigraphic columns to analyze the geological history of an area. 8. Explain the concept of geological time and the principles of relative and absolute dating.
Indicative Contents المحتويات الإرشادية	Earth in Space and Shape (15 hours) Introduction to the solar system and Earth's position in it Celestial bodies and their characteristics Earth's rotation, revolution, and seasons Measurement and shape of the Earth Major landforms: mountains, plateaus, plains, and valleys Earth's internal structure and its impact on surface features Minerals and Rocks (30 hours) Introduction to matter and atomic structure Chemical bonding and crystal structures Properties and identification of minerals Mineral classification and occurrence in different geological environments Formation of igneous rocks: magma, crystallization, and textures Sedimentary rock formation: weathering, erosion, deposition, and lithification

	Metamorphic rock formation: types, processes, and factors influencing metamorphism Weathering, Soils, and Sediments (20 hours) Weathering processes: physical and chemical weathering Factors influencing weathering rates Soil formation and soil profiles Sediment transport and deposition Sedimentary structures and their interpretation Earth's Surface Processes (25 hours) Erosion processes: water, wind, ice, and gravity Fluvial processes: river systems, drainage patterns, and erosion features Glacial processes: glacier formation, movement, and landforms Aeolian processes: wind erosion and deposition, dunes Coastal processes: wave action, coastal landforms, erosion, and deposition Geological Time and Dating Methods (15 hours) Principles of relative dating: superposition, original horizontality, and cross-cutting relationships Fossils and their importance in dating and correlating rocks Absolute dating methods: radiometric dating, carbon dating, and other techniques Geological time scale and major divisions of Earth's history Geological Maps and Interpretation (20 hours) Introduction to geological maps and their symbols Reading and interpreting geological maps and cross-sections Stratigraphic columns and their use in reconstructing geological history Geological structures: folds, faults, and unconformities Introduction to geophysical methods in geological mapping Earthquakes and Volcanoes (25 hours) Plate tectonics and the theory of continental drift Earthquakes: causes, seismic waves, measurement, and effects Volcanic processes: types of volcanoes, volcanic eruptions, and volcanic landforms Volcanic hazards and their mitigation Geological Hazards and Environmental Geology (20 hours) Landslides, avalanches, and subsidence: causes, types, and prevention Coastal hazards: erosion, coastal flooding, and sea-level rise Geological hazards and their impact on human activities Environmental geology: geologic resources, land use planning, and sustainability Geology and Human Civilization (15 hours) Geology in natural resource exploration and extraction Geological factors in engineering projects: dams, tunnels, and foundations
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	Geological considerations in urban planning and development Geology and climate change: past climate records and future predictions Field Excursions and Practical Sessions (20 hours) Field trips to geological sites for observation and interpretation Practical sessions on mineral and rock identification Laboratory exercises on sediment analysis and geological mapping Case Studies and Applications
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Lectures: Traditional lectures can be used to deliver foundational knowledge and concepts related to each topic. This provides students with a comprehensive understanding of the subject matter. Visual Aids: Utilize visual aids such as PowerPoint presentations, diagrams, maps, and videos to enhance understanding and engage students visually. Interactive Discussions: Encourage active participation through interactive discussions and Q&A sessions. This promotes critical thinking and allows students to clarify their doubts and deepen their understanding. Laboratory and Fieldwork: Organize laboratory sessions and field trips to give students hands-on experience in mineral and rock identification, sediment analysis, and geological mapping. This provides practical exposure to geological techniques and promotes field observation skills. Group Activities: Assign group projects or activities that require students to work together to solve geological problems. This promotes teamwork, collaboration, and the sharing of ideas and perspectives. Guest Speakers: Invite guest speakers from the industry or research community to share their experiences and expertise. This provides students with insights into real-world applications of geology and exposes them to diverse perspectives. Formative Assessments: Conduct regular formative assessments, such as quizzes, short assignments, or class discussions, to evaluate students' understanding and identify areas that need further clarification. Field Excursions: Plan field excursions to geological sites of interest to provide students with firsthand exposure to geological features and processes. This helps bridge the gap between theory and practice.

	Independent Research Projects: Assign independent research projects that require students to investigate specific geological topics in-depth. This encourages independent thinking, research skills, and a deeper understanding of selected areas. Technology Integration: Utilize technology tools and software for data analysis, geological modeling, and virtual simulations. This allows students to explore complex geological phenomena and develop practical skills. Online Resources and Discussion Forums: Use online platforms and resources to supplement learning materials, provide additional readings, and facilitate discussions and collaboration among students.
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Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	109	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	91	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	• Introduction to Geology and Earth Sciences • Earth in Space and Shape
Week 2	• Minerals and Rocks: Properties and Classification • Igneous Rocks: Formation and Types
Week 3	• Sedimentary Rocks: Formation and Classification • Metamorphic Rocks: Processes and Types
Week 4	• Weathering and Soils • Sediments and Sedimentary Structures
Week 5	• Earth's Surface Processes: Erosion, Transportation, and Deposition • Fluvial Processes and Landform
Week 6	• Glacial Processes and Landforms • Aeolian Processes and Landforms
Week 7	• Coastal Processes and Landforms • Geological Time and Dating Methods
Week 8	• Geological Maps and Interpretation • Structural Geology: Folds, Faults, and Unconformities
Week 9	• Earthquakes: Causes and Effects • Volcanoes: Types and Eruptions
Week 10	• Geological Hazards: Landslides and Subsidence • Geological Hazards: Coastal Hazards and Climate Change
Week 11	• Geology and Natural Resources • Geology and Engineering Projects
Week 12	• Field Excursion: Geological Site Visit and Observation • Case Studies and Applications in Geology
Week 13	• Environmental Geology: Land Use Planning and Sustainability • Geology and Human Civilization
Week 14	• Review of Key Concepts and Topics (Tutorial) • Practice Problem-Solving Exercises (Tutorial)
Week 15	• Final Assessment, including Problem-Solving Questions and Application-Based Scenarios
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Introduction to Laboratory Safety and Procedures
Week 2	Mineral Identification: Physical and Optical Properties
Week 3	Rock Identification: Igneous Rocks

Week 4	Thin Section Analysis: Petrographic Microscopy
Week 5	Rock Identification: Sedimentary Rocks
Week 6	Sediment Analysis: Grain Size Distribution and Sedimentary Structures
Week 7	Rock Identification: Metamorphic Rocks Hand Specimen and Thin Section Analysis

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts		No
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	Mathematics I		Module Delivery	
Module Type	Basic		☒ Theory ☒ Lecture ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	CENG 114			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	1	Semester of Delivery		First
Administering Department	PENG	College	CENG	
Module Leader	Dr. Qahtan Adnan Abdul Aziz		e-mail	Qahtan.aziz@coeng.uobaghdad.edu.iq
Module Leader's Acad. Title	lecturer	Module Leader's Qualification	Ph.D.	
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	Name		e-mail	E-mail
Scientific Committee Approval Date	017/06/2023	Version Number	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	This course 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 shifts, 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.
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Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	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	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	5% (5)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	----	----	-----	-----
	Report	1	5% (5)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 to #7
	Final Exam	3hr	70% (70)	15	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 scaling graphs
Week 8	Module 8: Transformation functions
Week 9	Module 9: Period, Horizontal and Vertical shifts, and Amplitude

Week 10	Module 10: The quick method of drawing trigonometric 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

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	الديمقراطية وحقوق الانسان Democracy and Human Rights		Module Delivery	
Module Type	Support		☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	GE 121			
ECTS Credits	2			
SWL (hr/sem)	33			
Module Level	1	Semester of Delivery		Second
Administering Department	Petroleum	College	Engineering	
Module Leader	Hayder Zuhair Jasim		e-mail	h.alwaeli@uobaghdad.coeng.edu.iq
Module Leader's Acad. Title	Assist. Professor		Module Leader's Qualification	Ph.D.
Module Tutor	Hayder Zuhair Jasim		e-mail	h.alwaeli@uobaghdad.coeng.edu.iq
Peer Reviewer Name	None		e-mail	none
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	None		Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. للتعريف بالديمقراطية ونشأتها وما المقصود بحقوق الانسان وكيفية ممارستها. 2. مقارنة بين النظم الديمقراطية وما توفرها الديمقراطية من اجل ممارسة حقوق الانسان بحرية دون قيود. 3. التعريف بخصائص وسمات حقوق الانسان. 4. توضيح الوثائق الدولية والمنظمات الدولية التي ارسى مبادئ حقوق الانسان. 5. التعرف على النظم الانتخابية التي تمارسها الدول في اختيار الحكومات الديمقراطية. 6. التعرف على القوانين الدولية التي تحمي وتضمن ممارسة حقوق الانسان في المجتمعات كافة. 7. المقارنة بين النظم الديمقراطية والنظم الدكتاتورية في تطبيق وممارسة حقوق الانسان 8. تعريف ما حقوق المرأة وتوضيح المقصود بالتعايش السلمي.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. فهم ما تعني الديمقراطية وما هي حقوق الانسان. 2. جعل الطالب يدرك اهمية السياق التاريخي وكيف تطورت الممارسات الشعبية من اجل ارساء نظام حكم ديمقراطي يكفل المساواة في الحقوق والالتزامات. 3. معرفة الطالب بحقوقه الاساسية التي يمكن ان يمارسها بحرية ، والالتزامات التي يجب عليه اتباعها دون المساس بالنظام الديمقراطي. 4. ارشاد الطالب الى ممارسة حقوقه حسب القوانين الدولية والدستور العراقي . 5. تعليم الطالب كيفية ممارسة حقه في الانتخابات حسب نوع النظام المعتمد . 6. جعل الطالب يدرك اهمية النظام الديمقراطي ودوره في حماية حقوق الانسان. 7. ضمان ظهور جيل متعلم واعي يساهم في نشر حقوق الانسان في المجتمع . 8. المساواة في الحقوق بين الجنسين في مختلف الممارسات الديمقراطية دون تميز. 9. الوصول الى تطبيقات وممارسات مجتمعية تضمن التعايش السلمي في المجتمع الواحد.
Indicative Contents المحتويات الإرشادية	الديمقراطية وحقوق الانسان تتكون هذه المفردات من مادتين هما الديمقراطية وحقوق الانسان وهما حقلين مختلفين في المعنى والاختصاص والتطبيق ، لكن احدهما يكمل الآخر كونهما من ضمن العلوم الاجتماعية لا سيما حقل العلوم السياسية. فبدون النظام الديمقراطي لا يمكن ممارسة حقوق الانسان ولا يوجد لها ذكر اصلا ، وتكون مجهولة بالنسبة للمجتمعات التي تحكمها النظم الاستبدادية والاتوقراطية تلك التي تقييد الحقوق والحريات. لذلك ستحدد لمادة الديمقراطية (25) ساعة. وستحدد لحقوق الانسان (25) ساعة.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. شرح معنى المفردات التي تتضمنها المادة من الاستاذ. 2. اعطاء دور للطلبة لممارسة حقوقهم في ابداء الرأي من دون تعصب واحترام الرأي الآخر. 3. تنظيم ممارسات داخل القاعات لمحاكاة تجربة انتخابية او تناول قضية معينة تحتاج وضع حلول مناسبة لها عن طريق تقسيم الطلبة الى مجموعات واعطاء ادوار لهم فيها. 4. عرض محتويات فيديو تساهم في كسر الروتين في القاء المحاضرة. 5. القيام بزيارات ميدانية لأبرز المنظمات الراعية لحقوق الانسان كاللجنة الدولية لحقوق الانسان و فرع منظمة العفو الدولية في العراق والمفوضية العليا لحقوق الانسان ومؤسسات الدولة الاخرى.

6. تكليف الطلبة بالعمل الميداني والتطوعي في رعاية حقوق الانسان كـرعاية دور الايتام او دار كبار السن او دور المرأة، او المساهمة بفعالية مجتمعية توعوية....الخ هدفها ارساء مبدأ التكافل الاجتماعي والتعايش السلمي وتقوية الاواصر المجتمعية.	
7. تكليف الطلبة بعمل تقرير من اختياره من ضمن عدة مواضيع تعرض عليهم تكون قابلة للتطبيق في المجتمع او تعالج حالة انسانية معينة.	

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

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	20% (20)	4, 11	LO# 1,2,3, 4
	Assignments	2	10% (10)	5, 12	LO# 4, 5 , 8 ,9
	Projects / Lab.				
	Report	1	10% (10)	12	LO# 8, 9
Summative assessment	Midterm Exam	2hr	10% (10)	8	1-9
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	مفهوم الديمقراطية والتطور التاريخي لممارساتها في حضارة وادي الرافدين وادي النيل
Week 2	الديمقراطية في الحضارات القديمة الاخرى
Week 3	الديمقراطية في الاسلام والديانة المسيحية

Week 4	انواع الديمقراطية
Week 5	الانتخاب ونظمه
Week 6	امتحان
Week 7	معنى حقوق الانسان وابرز خصائصه
Week 8	التعريف بالقانون الدولي الانساني والقانون الدولي لحقوق الانسان
Week 9	زيارة ميدانية
Week 10	مصادر القانون الدولي لحقوق الانسان
Week 11	انواع حقوق الانسان والمواثيق الدولية لحقوق الانسان
Week 12	التجارب الحديثة لحقوق الانسان
Week 13	حقوق المرأة والتعايش السلمي
Week 14	المنظمات الرائدة لحقوق الانسان
Week 15	حقوق الانسان في الدستور العراقي
Week 16	امتحان

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1- رياض عزيز هادي، حقوق الانسان تطورها -مضامينها- حمايتها 2- مصادر متنوعة من الانترنت	Yes
Recommended Texts	صالح جواد الكاظم، علي غالب العاني، الانظمة السياسية، كلية القانون، بغداد، ط 2 ، 2007	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 Drawing and Descriptive geometry		Module Delivery
Module Type	Basic		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	CENG122		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	1	Semester of Delivery	
Administering Department	PE	College	Type College Code
Module Leader	Dr. Amel Allami & Estabraq Shawqi		e-mail
		Amel@coeng.uobagdad.edu.iq estabraq.shawqi1200c@iurp.uobaghdad.edu.iq	
Module Leader's Acad. Title	teacher	Module Leader's Qualification	Dr. Msc.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	22/06/2023	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	Descriptive geometry is a science that looks for ways to represent different geometric objects on a flat surface such as the surface of a drawing paper (or on a computer screen). As Gaspard Monge says, "The main purpose of descriptive geometry is to accurately show three-dimensional shapes by means of two-dimensional drawings subject to strict definitions." In Monge's definition there is also a second goal, which is "to derive from the precise description of solids all their subsequent shapes and positions, and in this sense, descriptive geometry." It is a means of searching for scientific truth and gives examples of the permanent transition from the known to the unknown. This course aims to help students understand the basics of engineering drawing methods and techniques. It enables them to be able to imagine and visualize spaces and volumes in reality, as they will become engineers in the future.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Bisect a rectangular line. 2. Divide the line into several equal lines. 3. Draw a line parallel to another straight line. 4. Bisecting an angle into two equal halves. 5. Divide an angle into a number of equal parts. 6. Move angle. 7. Draw a regular pentagon. 8. Draw a pentagon outside a circle. 9. Draw a pentagon inside a given circle. 10. Draw a hexagon outside a circle. 11. Draw a hexagon inside a circle. 12. Draw an octagonal shape.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - Applied Geometry+ (point ,line plane represented)</u> Dimensions & lettering, drawing paper layout, Lines in engineering drawing, Various exercises for training in drawing types of lines, Orthographic Drawing & sketching. Bisect a rectangular line, Divide the line into several equal lines, Draw a line parallel to another straight line, Bisecting an angle into two equal halves, Divide an angle into a number of equal parts, Move angle, Draw a regular pentagon, Draw a pentagon outside a circle, Draw a pentagon inside a given circle, Draw a hexagon outside a circle, Draw a hexagon inside a circle, Draw an octagonal shape [18 hrs]. Draw an arc tangent to two straight lines, Draw an arc tangent to an arc and a straight line, Draw an arc that touches two other arcs, Steps to draw an oval from knowing the lengths of two perpendicular sides, Draw an ellipse using the four-center method [12 hrs].

	Part B - Pictorial Drawing + (projection and angles)[12 hrs]. Part C- (Projections+ 2D+ 3D Represented) [9 hrs] Definition of projections, Parallel projection, Orthogonal projection, Projection in the first corner, Projection into the third corner
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Descriptive geometry is a branch of synthetic geometry or axiomatic geometry, which seeks through different projection methods ((central, parallel)), to show the mutual geometric relationships between points, lines, levels and volumes, with the aim of reaching, through research continuous scientific and various projective procedures (alternative to analytic geometry), to help the designer translate his ideas into unambiguous spatial forms. Thus, it helps the determined student to: - Develop his conceptual skills of the geometric space. Accurately describe geometric space through 2D drawings or 3D modeling. - Solving linear and angle measurement problems. - Solve cognitive problems (perspective) of different geometric shapes. The engineering drawing module is designed to provide students with the necessary skills and knowledge to create and interpret technical drawings related to petroleum engineering, Students learn about the different drawing tools, instruments, and software used in creating engineering drawings. They are introduced to concepts such as scales, lines, dimensions, and symbols commonly used in technical drawings. Through the engineering drawing module, petroleum engineering students gain the necessary skills to visualize, communicate, and document engineering designs and concepts effectively. These skills are crucial for various aspects of their future careers, such as equipment design, facility planning, and project management in the petroleum industry

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	4	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	12	10% (10)	1-12	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	1.5hr	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	Understand the reason behind studying engineering Drawing and its main applications. Introduction, instructions and their use + (<i>general concepts of Descriptive geometry</i>)
Week 2	- Dimensions & lettering. - Drawing paper layout. - Lines in engineering drawing + (<i>Definitions of point, line, plane, types of even angles and types of planes Descriptive geometry</i>)
Week 3	- Various exercises for training in drawing types of lines. - Orthographic Drawing & sketching. - Bisect a rectangular line. - Divide the line into several equal lines.+ (<i>Point representation in the binary and triple plane Descriptive geometry</i>)
Week 4	- Draw a line parallel to another straight line. - Bisecting an angle into two equal halves. - Divide an angle into a number of equal parts.+ (<i>Special cases of a point representation of descriptive geometry</i>)
Week 5	- Draw an arc tangent to two straight lines. - Draw an arc tangent to an arc and a straight line.+ (<i>Representation of the rectilinear case and the special representation of the rectilinear descriptive geometry</i>)
Week 6	- Draw an arc that touches two other arcs. - Steps to draw an oval from knowing the lengths of two perpendicular sides + <i>Plane representation (descriptive geometry)</i>

Week 7	Draw an ellipse using the four-center method. <i>+Special cases of level representation (descriptive geometry)</i>
Week 8	Sketching auxiliary view + <i>The difference between the two-dimensional and the three-dimensional polyhedron with Euclid's theories (descriptive geometry)</i>
Week 9	Multiple exercises applications for engineering operations.
Week 10	- Definition of projections. - Parallel projection.+ <i>Projection and its types (descriptive geometry)</i>
Week 11	Orthogonal projection.+ <i>Representation of solids in planes (descriptive geometry)</i>
Week 12	Projection in the first corner.+ <i>AutoCAD program (basics) descriptive engineering</i>
Week 13	Projection into the third corner. <i>AutoCAD program (its role in facilitating the representation of shapes) descriptive engineering</i>
Week 14	<i>AutoCAD program (the most important commands used in the program theoretically) descriptive geometry</i>
Week 15	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Text book (descriptive geometry) Abd-alrasool Alkhaffaf, Engineering Drawing , second Edition,1990.	Yes
Recommended Texts	- Abd-alrasool Alkhaffaf, Engineering Drawing , second Edition,1990. - David A. Madsin, Engineering Drawing and Design, fifth Edition, 2012.	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	Physics and thermodynamics		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☒ Seminar	
Module Code	CENG125			
ECTS Credits	7			
SWL (hr/sem)	175			
Module Level	1	Semester of Delivery		Second
Administering Department	PENG	College	CENG	
Module Leader	Haider Hussein Hamad		e-mail	haider.hussein@coeng.uobaghdad.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.	
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	Name		e-mail	E-mail
Scientific Committee Approval Date	01/06/2023	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. Introduce the basic principles of energy, work, power 2. Introduce the basic principles of matter in solid, liquid and gas 3. Introduce the basic principles internal energy, heat, and temperature 4. Introduce the basic principles of types of energy 5. Introduce the basic principles conservation of energy 6. Introduce the basic principles of system and phase change 7. Introduce the first law of thermodynamic 8. Introduce the second law of thermodynamic 9. Introduce the application of second law of thermodynamic
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. understanding the concept of energy 2. understanding the basic concept of matter 3. understanding the basic principles of phase change 4. understanding the basic principles of energy conservation 5. understanding the types of systems 6. understanding the first law of thermodynamic 7. understanding the application of first low of thermodynamic 8. understanding the second law of thermodynamic 9. understanding the application of second law of thermodynamic
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Weeks 1-2: Introduction to physics (2 hours) Definition and objectives of thermodynamic (2 hours)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Direct instruction
	Solving problems

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	93	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	82	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	175		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	5% (5)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	5% (5)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.				
	Report				
Summative assessment	Midterm Exam	2hr	20% (20)	7	LO #1 - #7
	Final Exam	3hr	70% (70)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Energy , work, power
Week 2	Conservation of energy
Week 3	Heat, temperature
Week 4	matter
Week 5	Phase change
Week 6	Energy types
Week 7	Systems types
Week 8	First law of thermodynamic
Week 9	Application of first law of thermodynamic for closed system
Week 10	Enthalpy and specific heat
Week 11	Second law of thermodynamics

Week 12	entropy
Week 13	Application of second law of thermodynamic
Week 14	Heat reservoir
Week 15	Heat pumps
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المناهج 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	Engineering thermodynamics	Yes
Recommended Texts	Engineering mechanics by cengel	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	Chemistry		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	PENG124			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	1	Semester of Delivery		Second
Administering Department	PENG	College	CENG	
Module Leader	Hussaien Hadi		e-mail	hussaien@coeng.uob.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	M.Sc.	
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	Name		e-mail	E-mail
Scientific Committee Approval Date	18/06/2023	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	Analytical Chemistry: Analytical Chemistry is a module within the petroleum engineering department that focuses on the principles and techniques used to analyze and characterize various substances related to the oil and gas industry. It provides students with a strong foundation in chemical analysis methods that are essential for understanding and solving problems in petroleum engineering. The Analytical Chemistry module equips petroleum engineering students with the necessary skills to analyze and interpret chemical data relevant to the oil and gas industry. It enables them to evaluate the quality of petroleum products, assess environmental impacts, and make informed decisions based on analytical results.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The course covers economic and petroleum science which can be used to analyze oil resource, oil markets, oil companies, alternative energy prices, students will engage in the field of petroleum strategy research, oil marketing, Types of oil in the world, oil reserves in the world Also global energy strategy. Petroleum Engineering Economics is a module within the petroleum engineering department that focuses on the economic analysis and decision-making processes involved in the oil and gas industry. This module combines principles of economics with the technical aspects of petroleum engineering to evaluate the financial viability of exploration, production, and development projects. Petroleum Engineering Economics equips students with the necessary skills to analyze the financial aspects of petroleum projects, evaluate investment opportunities, and make informed decisions in the oil and gas industry. It provides a valuable foundation for professionals involved in project management, investment analysis, and economic planning within the petroleum engineering field.
Indicative Contents المحتويات الإرشادية	The course of petroleum engineering economics refers to the economic growth, redistribution of income, price stability, the course objective is to get interview and basic understanding of the economic size of petroleum field, net present value and other indications on whether an investment will be profitable, petroleum fiscal system and how the value of oil is shared between companies and government, also exploiting petroleum resources also development of production economy. Student will study all the above paragraphs. Lecture titles FIRST TERM - Oil and gas reserve - Organization of petroleum exporting and importing countries - International supply and demand of petroleum - Classification of petroleum - Petroleum pricing - Alternative energy - International strategy of energy - Time value of money - Types of interest rate - Rate of return

	Methods of engineering decisions Depreciation Depletion Amortization Lecture titles SECOND TERM Inflation Sensitivity analysis of engineering projects Risk analysis Production decline curve Evaluation of future production of oil and gas and well sand Expenditure and net present value Total drilling cost Total drilling cost examples Fixed cost calculations Cost of producing blast hole Total drilling cost break down Marginal cost & sunk cost Economic Efficiency Locational Economics Determination of lower cost site
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students. * Lectures are conducted by face-to-face education in the classroom, two hours per week, and students' technical reports. * Conducting dialogues and discussions with the request Methods of assessment for students. * Quarterly exams. * Discussions and assignments. *The overall assessment for this course is as follows: Annual pursuit of 30 points from the total mark, which includes assignments and oral examinations and quarterly in addition to presentations. *70 marks for the final exam

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	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	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
	Lab.	2	20% (20)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
	Final Exam	2.5hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction
Week 2	Review of concepts chemistry
Week 3	. Stoichiometry . chemical reaction and heat
Week 4,5,6,7	- organic chemistry - fuels International strategy of energy - various batteries and electronic cells
Week 8	principles of corrosion
Week 9,10,11	water for domestic uses

Week 12,13,14	industrial water
Week 15	atmospheric pollution

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي العملي	
	Material Covered
Week 1	Introduction
Week 2	Review of concepts chemistry
Week 3	. titration
Week 4,5,6,7	acid base titration
Week 8	indicators
Week 9,10,11	preparation in chemical
Week 12,13,14	petroleum chemistry
Week 15	electric chemical

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	chemistry textbook	Yes
Recommended Texts	-Chemistry and Chemical Reactivity, 2nd Ed., Saunders College, 1991. -Matthews, C. K., van Holde, K.E., and Ahern, K. G., Biochemistry, 3rd Ed., Addison Wesley Longman, 2000	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	Mathematics II		Module Delivery	
Module Type	Basic		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	CENG 123			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	1	Semester of Delivery		Second
Administering Department	PENG	College	CENG	
Module Leader	Dr. Qahtan Adnan Abdul Aziz		e-mail	Qahtan.aziz@coeng.uobaghdad.edu.iq
Module Leader's Acad. Title	lecturer	Module Leader's Qualification	Ph.D.	
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	Name		e-mail	E-mail
Scientific Committee Approval Date	017/06/2023	Version Number	1.0	

Relation with other Modules				
العلاقة مع المواد الدراسية الأخرى				
Prerequisite module	CENG114, Mathematics I		Semester	First
Co-requisites module			Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	This course 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 shifts, 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.
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Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	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	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	5% (5)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	----	----	-----	-----
	Report	1	5% (5)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 to #7
	Final Exam	3hr	70% (70)	15	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

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	Strength of materials		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	PENG126		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	1	Semester of Delivery	
Administering Department	PENG	College	CENG
Module Leader			e-mail
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date		Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives

أهداف المادة الدراسية

1. Understand the fundamental concepts of mechanics of materials and their applications in petroleum engineering.
 - Define stress, strain, and deformation in materials.
 - Explain the relationship between stress and strain using Hooke's Law.
 - Understand the significance of material properties in engineering design and analysis.
2. Analyze and calculate the internal forces and stresses in structural members.
 - Apply equilibrium principles to determine internal forces in simple structural systems.
 - Calculate normal, shear, and bending stresses in beams and columns.
 - Determine stress distributions in statically determinate structures.
3. Determine the mechanical behavior of materials under different loading conditions.
 - Explain the concepts of elastic, plastic, and elastic-plastic deformation.
 - Analyze the stress-strain behavior of materials using stress-strain curves.
 - Understand the concepts of yield strength, ultimate strength, and fracture toughness.
4. Evaluate the stability and failure of structural members.
 - Assess the stability of columns and beams under various loading conditions.
 - Analyze the factors contributing to structural instability and buckling.
 - Understand the modes of failure and factors influencing material fracture.
5. Apply the principles of mechanics of materials in practical engineering applications.
 - Analyze and design simple structural components and systems.
 - Evaluate the strength and performance of materials used in petroleum engineering applications.
 - Apply safety factors and design codes in engineering design and structural analysis.
6. Understand the behavior of materials under different temperature and environmental conditions.
 - Analyze the effects of temperature on material properties and behavior.
 - Evaluate the impact of environmental factors, such as corrosion and fatigue, on material performance.
 - Consider material selection criteria for specific petroleum engineering applications.
7. Develop problem-solving and critical thinking skills through practical examples and case studies.

	• Solve engineering problems related to the strength and stability of materials. • Apply theoretical concepts to real-world scenarios in petroleum engineering. • Analyze and interpret experimental data to validate theoretical predictions.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of the module, students will be able to: 1. Demonstrate a solid understanding of the fundamental concepts of mechanics of materials and their applications in petroleum engineering. 2. Analyze and calculate internal forces and stresses in structural members, including beams and columns, under various loading conditions. 3. Evaluate the mechanical behavior of materials, including elastic, plastic, and elastic-plastic deformation, using stress-strain relationships. 4. Assess the stability and failure of structural members, considering factors such as buckling, instability, and fracture. 5. Apply the principles of mechanics of materials to practical engineering applications, including the analysis and design of simple structural components and systems. 6. Understand the behavior of materials under different temperature and environmental conditions, including the effects of temperature, corrosion, and fatigue. 7. Develop problem-solving and critical thinking skills through practical examples and case studies related to the strength and stability of materials. 8. Apply appropriate safety factors and design codes in engineering design and structural analysis. 9. Demonstrate effective communication of technical concepts related to the strength of materials, both in written and oral forms. 10. Work collaboratively in groups to solve engineering problems and present findings. 11. Apply theoretical knowledge to interpret and analyze experimental data related to the strength and stability of materials. 12. Recognize the importance of ethical considerations in engineering design and analysis, including considerations of safety and environmental impact.
Indicative Contents المحتويات الإرشادية	This Strength of Materials module is designed to provide Year 1 Petroleum Engineering students with a comprehensive understanding of the fundamental principles and applications of mechanics of materials. The following indicative contents outline the major topics covered throughout the 16-week duration: Week 1: Introduction to Strength of Materials • Definition and importance of strength of materials in engineering • Overview of the module content and learning outcomes • Introduction to basic concepts: stress, strain, and deformation Week 2: Mechanical Properties of Materials • Classification of materials based on mechanical properties • Stress-strain relationships and material behavior • Elasticity, plasticity, and viscoelasticity

	Week 3: Axial Loading and Stress Analysis • Normal stress and strain in axial loaded members • Stress distribution and deformation in tension and compression • Shear stress and strain in shear-loaded members Week 4: Torsion and Torsional Deformation • Torsional loading and shear stress distribution • Torsional deformation and stress-strain relationships • Power transmission and design considerations Week 5: Bending and Flexural Analysis • Introduction to bending moments and flexural stress • Bending stress distribution in beams • Moment-curvature relationships and flexural deformation Week 6: Shear Forces and Shear Stresses in Beams • Shear force distribution in beams • Shear stress distribution and shear flow • Shear stress in beams of different cross-sections Week 7: Combined Stresses and Mohr's Circle • Principle of superposition and combined stress analysis • Mohr's circle for plane stress analysis • Analysis of complex stress states Week 8: Beam Deflection and Structural Stability • Calculation of beam deflections using methods such as double integration and area-moment theorems • Stability analysis of columns and Euler's buckling formula Week 9: Material Fracture and Failure Analysis • Modes of material fracture: brittle, ductile, and fatigue • Fracture toughness and stress intensity factor • Failure analysis and safety considerations Week 10-12: Design of Structural Members • Design principles and considerations for different types of structural members • Design of beams, columns, and shafts • Application of design codes and safety factors Week 13-14: Temperature Effects and Environmental Considerations • Thermal stresses and strains in materials • Thermal expansion and contraction in structural design • Corrosion and fatigue considerations in material selection Week 15-16: Case Studies and Practical Applications • Analysis and design of real-world engineering problems related to strength of materials • Case studies from the petroleum engineering industry • Group projects involving the application of strength of materials principles to solve engineering challenges This indicative content provides a framework for the Strength of Materials module, allowing students to develop a strong foundation in the principles and applications of
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	mechanics of materials. It enables them to analyze and design structural members, consider temperature and environmental effects, and apply their knowledge to real-world engineering scenarios. The module incorporates case studies and practical applications to enhance problem-solving skills and facilitate a deeper understanding of the subject matter.
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Learning and Teaching Strategies for Strength of Materials Module (16 weeks): 1. Lectures: Conduct interactive lectures to introduce and explain key concepts, theories, and principles of strength of materials. Use visual aids, examples, and real-life applications to enhance understanding. 2. Problem-solving Sessions: Organize regular problem-solving sessions where students can apply the learned concepts to solve numerical and analytical problems related to strength of materials. Encourage group discussions and collaboration to promote critical thinking and problem-solving skills. 3. Laboratory Sessions: Conduct laboratory sessions to provide hands-on experience with material testing and analysis. Allow students to perform experiments to measure material properties, such as stress-strain behavior and mechanical properties. Emphasize proper laboratory techniques and data interpretation. 4. Tutorials and Workshops: Arrange tutorials and workshops to address specific topics or challenging concepts in strength of materials. Provide additional guidance and support to students who may require extra assistance. Encourage active participation and discussions during these sessions. 5. Case Studies and Real-world Examples: Integrate case studies and real-world examples from the petroleum engineering industry to illustrate the practical applications of strength of materials. Discuss how materials are selected, tested, and used in various engineering scenarios. 6. Computer Simulations and Modeling: Utilize computer simulations and modeling software to demonstrate the behavior of materials under different loading conditions. Allow students to interact with simulations to visualize stress distribution, deformation, and failure modes. 7. Guest Lectures and Industry Experts: Invite guest lecturers and industry experts to share their experiences and insights related to strength of materials in the petroleum engineering context. This provides students with practical perspectives and a deeper understanding of the subject matter. 8. Assignments and Assessments: Assign regular homework and assessments, including problem-solving exercises, case studies, and theoretical questions. Provide timely feedback to students to monitor their progress and address any misconceptions.

	9. Group Projects: Assign group projects where students can collaborate to solve complex engineering problems using the principles of strength of materials. This promotes teamwork, research skills, and critical thinking, while allowing students to apply their knowledge to practical scenarios. 10. Field Trips and Industry Visits: Organize field trips or visits to engineering sites, manufacturing facilities, or laboratories to expose students to real-world applications of strength of materials. This helps students connect theoretical concepts to practical applications. 11. Online Resources and Learning Platforms: Utilize online resources, educational platforms, and multimedia tools to supplement classroom learning. Provide access to relevant textbooks, articles, videos, and interactive simulations for self-study and review. 12. Class Discussions and Debates: Encourage class discussions, debates, and presentations to promote active engagement and foster a deeper understanding of strength of materials. Encourage students to express their opinions, ask questions, and challenge concepts for a comprehensive learning experience. It is important to tailor the learning and teaching strategies to the specific needs and learning styles of the students. Incorporate a variety of strategies to cater to different learning preferences and create an engaging and inclusive learning environment.
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Student Workload (SWL)			
الحمل الدراسي للطلاب محسوب ل ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	125		

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

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Strength of Materials - Lecture: Provide an overview of the module and its importance in petroleum engineering. - Discussion: Engage students in a discussion on the relevance of strength of materials in the petroleum industry. - Case Study: Present a case study highlighting the role of material strength in a real-world petroleum engineering project.
Week 2	Stress and Strain - Lecture: Explain the concepts of stress and strain and their relationship. - Numerical Problems: Assign problem-solving exercises related to stress and strain calculations.
Week 3	Mechanical Properties of Materials - Lecture: Discuss mechanical properties such as elasticity, plasticity, and viscoelasticity. - Group Activities: Divide students into groups and assign each group a specific mechanical property to research and present to the class. - Industry Guest Lecture: Invite a guest speaker from the petroleum industry to share their experience on material selection based on mechanical properties.
Week 4	Axial Loading and Stress Analysis - Lecture: Teach the concept of axial loading and its effect on stress distribution. - Tutorial: Guide students through calculations of stress in axially loaded members. - Virtual Simulation: Use computer simulations to demonstrate stress distribution in axially loaded members.
Week 5	Torsion and Torsional Deformation - Lecture: Explain torsion and its effect on shear stress and deformation. - Problem-solving Session: Assign numerical problems related to torsion and torsional deformation. - Hands-on Activity: Provide physical models for students to manipulate and observe torsional deformation.
Week 6	Bending and Flexural Analysis - Lecture: Introduce the concept of bending moments and flexural stress. - Class Discussion: Discuss the importance of flexural analysis in designing structures for the petroleum industry. - Design Project: Assign a design project where students analyze and design a beam subjected to bending loads.
Week 7	Shear Forces and Shear Stresses in Beams Lecture: Explain shear force distribution in beams and its relation to shear stress.

	- Group Activity: Divide students into groups and assign each group a specific beam configuration to analyze and calculate shear stresses. - Case Study: Present a case study involving shear forces and stresses in a petroleum engineering structure.
Week 8	Combined Stresses and Mohr's Circle - Lecture: Teach the concept of combined stresses and introduce Mohr's circle. - Problem-solving Session: Assign problems involving the use of Mohr's circle to analyze combined stresses. - Interactive App: Utilize an interactive app or software to allow students to explore and construct Mohr's circles.
Week 9	Beam Deflection and Structural Stability - Lecture: Discuss beam deflection and stability concepts. - Numerical Problems: Assign problems related to beam deflection and stability calculations.
Week 10	Material Fracture and Failure Analysis - Lecture: Cover different modes of material fracture and failure. - Case Study Analysis: Analyze a case study involving material failure in a petroleum engineering context. - Guest Lecture: Invite an expert in materials engineering to deliver a guest lecture on material fracture and failure.
Week 11	Design of Structural Members - Lectures: Cover design principles and considerations for various structural members. - Design Project: Assign a comprehensive design project where students apply design principles to analyze and design a structural member.
Week 12	Design of Structural Members Design Software: Introduce design software tools for structural analysis and design.
Week 13	Temperature Effects and Environmental Considerations Lecture: Discuss the effects of temperature on material behavior and structural design.
Week 14	Temperature Effects and Environmental Considerations Case Studies: Present case studies involving temperature effects in petroleum engineering structures.
Week 15	Case Studies and Practical Applications - Case Studies: Present and discuss real-world case studies related to strength of materials in the petroleum industry. - Group Projects: Assign group projects where students analyze and propose solutions to challenging engineering problems involving strength of materials. - Presentations: Provide an opportunity for groups to present their findings and solutions to the class.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
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Week 1	1: Introduction to Strength of Materials and Lab Safety • Lab Safety Briefing: Discuss safety protocols, equipment handling, and laboratory etiquette. • Introduction to Lab Equipment: Familiarize students with the materials testing equipment, including universal testing machines, strain gauges, and extensometers. • Demonstration: Perform a demonstration of a tensile test to showcase the equipment and measurement techniques.
Week 2	Tensile Testing • Pre-lab Discussion: Review the principles of tensile testing, stress-strain curves, and mechanical properties. • Lab Experiment: Conduct a tensile test on different materials, such as steel, aluminum, or polymers, to determine their mechanical properties. • Data Analysis: Guide students in analyzing the test results, calculating stress and strain, and constructing stress-strain curves.
Week 3	Bending and Flexural Testing • Pre-lab Discussion: Explain the principles of bending and flexural testing, moment-curvature relationships, and beam behavior. • Lab Experiment: Perform bending and flexural tests on beam specimens of various materials to determine their flexural strength and stiffness. • Data Analysis: Assist students in analyzing the test data, calculating bending moments, and determining the modulus of elasticity for different materials.
Week 4	Torsion Testing • Pre-lab Discussion: Discuss the concepts of torsion, shear stress, shear strain, and torsional deformation. • Lab Experiment: Conduct torsion tests on cylindrical or solid specimens to measure torsional strength and shear modulus. • Data Analysis: Guide students in analyzing the test data, calculating torsional stresses and strains, and determining material properties.
Week 5	Hardness Testing • Pre-lab Discussion: Introduce hardness testing methods, including Brinell, Vickers, and Rockwell hardness tests.

	- Lab Experiment: Perform hardness tests on selected materials using different hardness testing techniques. - Data Analysis: Assist students in interpreting hardness values and relating them to material strength and properties.
Week 6	Fatigue Testing - Pre-lab Discussion: Explain the concept of fatigue, fatigue life, and fatigue strength. - Lab Experiment: Conduct fatigue tests on specimens under cyclic loading to observe fatigue behavior and determine fatigue strength. - Data Analysis: Guide students in analyzing the fatigue test results, plotting S-N curves, and discussing the implications of fatigue failure in materials.
Week 7	Non-Destructive Testing - Pre-lab Discussion: Introduce non-destructive testing methods, such as ultrasonic testing, magnetic particle testing, and dye penetrant testing. - Lab Experiment: Demonstrate non-destructive testing techniques on selected materials to detect defects or discontinuities. - Analysis and Interpretation: Assist students in interpreting the results of non-destructive testing and discussing their significance in material evaluation.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	A TEXTBOOK OF STRENGTH OF MATERIALS, Sixth Edition by Dr. R. K. Bansal	No
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	Computer Science II		Module Delivery	
Module Type	Support		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	GE 212			
ECTS Credits	4			
SWL (hr/sem)	100			
Module Level	2	Semester of Delivery		Third
Administering Department	Type Dept. Code	College	Type College Code	
Module Leader	Zena F. Rasheed		e-mail	Zena.fouad@coeng.uob.edu.iq
Module Leader's Acad. Title	Ass. Lecturer		Module Leader's Qualification	M.Sc
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	Name		e-mail	E-mail
Scientific Committee Approval Date	17/06/2023		Version Number	1.0

Relation with other Modules				
العلاقة مع المواد الدراسية الأخرى				
Prerequisite module	Computer Science I, GE112		Semester	First
Co-requisites module			Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	MATLAB: Starting with MATLAB, Variables, Input and Output, 2-dimensional plot, Matrices, Functions, Polynomials, Polynomial derivative, Curve fitting, Interpolation, Numerical integration, IF statement, Loops.
Module Learning Outcomes	The Computer Science module is designed to equip petroleum engineering students with the essential programming skills and knowledge required to leverage computational

مخرجات التعلم للمادة الدراسية	tools and software for various tasks in the industry. It enables them to develop software solutions, analyze large datasets, and automate repetitive tasks, enhancing their efficiency and productivity in their future careers. Additionally, programming skills are becoming increasingly valuable in the petroleum industry as technology and digitalization play a more significant role in optimizing operations and decision-making processes.
Indicative Contents المحتويات الإرشادية	Lecture titles • Understand the reason behind studying Matlab programming language. • Introduction to Matlab • A minimum MATLAB session • Getting started • Mathematical functions • Matrix generation • Basic plotting

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

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	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 / Lab.	2	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1-3	• Introduction to MATLAB • Basic features • A minimum MATLAB session • Starting MATLAB • Using MATLAB as a calculator • Creating MATLAB variables • Overwriting variable . • Error messages • Making corrections • Mathematical functions • Examples
Week 4,5	• Arrays • Array Terminology • Declarations • Array Conformance • Array Element Ordering • Array Syntax • Whole Array Expressions • Visualizing Array Sections • Array Sections • Printing Arrays • Input of Arrays • Array I/O Example • Array Inquiry Intrinsic • Array Constructors • The RESHAPE Intrinsic Function • Array Constructors in Initialization Statements • Allocatable Arrays • Deallocating Arrays

Week 6-8	• Matrix generation • Entering a vector • Entering a matrix • Matrix indexing • Colon operator • Linear spacing • Colon operator in a matrix • Creating a sub-matrix • Deleting row or column • Dimension • Continuation • Transposing a matrix • Concatenating matrices • Matrix generators • Special matrices • Matrix arithmetic operations • Array arithmetic operations • Solving linear equations • Matrix inverse • Matrix functions
Week 9,11	• Control flow and operators • Introduction • Control flow • The `if...end` structure • Relational and logical operators • The ``for...end`` loop • The ``while...end`` loop • Other flow structures • Operator precedence • Saving output to a file • Exercises
Week 12,13	• M-File Scripts • Examples • Script side-effects • M-File functions • Anatomy of a M-File function • Input and output arguments • Input to a script file • Output commands

	Exercises
Week 14,15	- Basic plotting - overview - Creating simple plots - Adding titles, axis labels, and annotations - Multiple data sets in one plot - Specifying line styles and colors - Exercises

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Curriculum and textbook	Yes
Recommended Texts	[1] D. Houcque, "Introduction To Matlab for Engineering Students," <i>School of Engineering & Applied Science</i> , no. August. pp. 1–74, 2005.	No
Websites	https://www.mathworks.com (for learning matlab)	

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	Fluid Mechanics		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	PENG214			
ECTS Credits	4			
SWL (hr/sem)	100			
Module Level	2	Semester of Delivery		Third
Administering Department	Type Dept. Code	College	Type College Code	
Module Leader	Dr. Usama Alameedy		e-mail	usama.sahib@coeng.uobaghdad.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.	
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	Name		e-mail	E-mail
Scientific Committee Approval Date	01/06/2023	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. Provide an overview of fluid properties and behavior relevant to petroleum engineering. 2. Introduce the principles of fluid statics and fluid dynamics. 3. Explain the flow of fluids through porous media, particularly in the context of reservoir engineering. 4. Familiarize students with fluid flow equations and their application in petroleum engineering. 5. Explore different flow regimes and their significance in wellbore and pipeline hydraulics. 6. Discuss multiphase flow phenomena and their implications in oil and gas production. 7. Highlight the importance of fluid mechanics in well design, drilling operations, and production optimization.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of the module, students should be able to: 1. Understand the fundamental principles of fluid mechanics and their application in petroleum engineering. 2. Analyze and solve problems related to fluid statics, including pressure distribution, buoyancy, and hydrostatic forces. 3. Apply the principles of fluid dynamics to analyze fluid flow in pipelines, wells, and reservoirs. 4. Calculate and interpret properties of fluid flow, including velocity, flow rate, and pressure drop, using conservation equations and Bernoulli's equation. 5. Evaluate the behavior of fluids in porous media, including single-phase and multiphase flow in reservoirs. 6. Apply principles of fluid mechanics to solve problems related to flow through pipes and wellbore hydraulics. 7. Understand the principles and applications of fluid flow measurement techniques in petroleum engineering, such as flow meters and pressure transducers. 8. Understand the principles and calculations related to fluid flow in wellbore, including flow regimes and pressure profiles.
Indicative Contents المحتويات الإرشادية	Here is an indicative content breakdown for the "Fluid Mechanics in Petroleum Engineering" module, with a total of 125 hours allocated: Weeks 1-2: Introduction to Fluid Mechanics and Properties of Fluids (8 hours) Definition and scope of fluid mechanics (2 hours) Properties of fluids: density, viscosity, and surface tension (2 hours) Fluid statics: pressure distribution, buoyancy, and hydrostatic forces (4 hours) Weeks 3-4: Fluid Dynamics and Flow in Pipes (12 hours)

	Fluid dynamics: conservation equations, continuity equation, and Bernoulli's equation (4 hours) Flow in pipes: laminar and turbulent flow, pressure drop calculations (4 hours) Flow measurement techniques in petroleum engineering (4 hours) Weeks 5-7: Flow in Porous Media and Reservoir Engineering (18 hours) Single-phase flow in porous media: Darcy's law, permeability, and flow equations (6 hours) Multiphase flow in reservoirs: relative permeability, capillary pressure, and phase behavior (6 hours) Pressure transient tests and well testing analysis (6 hours) Weeks 8-10: Flow through Wellbores and Production Systems (18 hours) Flow regimes and pressure profiles in wellbores (6 hours) Wellbore hydraulics: pressure drop, flow rate calculations, and well completion (6 hours) Artificial lift methods: gas lift, ESP, and sucker rod pumps (6 hours) Weeks 11-13: Fluid Mechanics in Petroleum Operations (18 hours) Drilling fluid mechanics: rheology, pressure control, and mud circulation (6 hours) Cementing and wellbore integrity: displacement calculations and cement slurry flow (6 hours) Hydraulic fracturing: fluid behavior, fracture design, and proppant transport (6 hours) Weeks 14-15: Review, Practice, and Assessment (15 hours) Review of key concepts and topics (5 hours) Practice problem-solving exercises and case studies (5 hours) Final assessment, including problem-solving questions and application-based scenarios (5 hours) Additional Hours for Discussions, Activities, and Assessments: 36 hours
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Learning and teaching strategies for the "Fluid Mechanics in Petroleum Engineering" module can include a combination of the following approaches: 1. Lectures: Traditional lectures can be used to introduce new concepts, theories, and equations. Lectures can provide a foundation of knowledge and theory for students to build upon. 2. Interactive Discussions: Engage students in discussions to promote critical thinking and deeper understanding of the material. Encourage students to

	ask questions, participate in group discussions, and share their perspectives on fluid mechanics topics. 3. Problem-Solving Sessions: Allocate dedicated time for problem-solving sessions where students can apply fluid mechanics principles to solve practical problems. Provide them with a variety of problem sets that cover different aspects of fluid mechanics in petroleum engineering. 4. Laboratory Sessions: Conduct laboratory sessions or demonstrations to illustrate fluid mechanics principles. Hands-on experiments, such as flow measurements or pressure tests, can enhance students' understanding of fluid behavior and properties. 5. Group Projects: Assign group projects that require students to analyze and solve fluid mechanics problems related to petroleum engineering. This promotes teamwork, collaboration, and research skills. 6. Multimedia Resources: Incorporate multimedia resources such as videos, animations, and online simulations to enhance students' visual understanding of fluid mechanics concepts. 7. Assessment Methods: Use a variety of assessment methods, including quizzes, exams, problem-solving assignments, and presentations, to evaluate students' understanding of fluid mechanics principles and their ability to apply them to petroleum engineering scenarios.
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Student Workload (SWL)			
الحمل الدراسي للطلاب محسوب ل ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	37	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	125		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative 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 Fluid Mechanics and Properties of Fluids (Lecture) - Fluid Statics: Pressure Distribution and Hydrostatic Forces (Lecture)
Week 2	- Fluid Dynamics: Conservation Equations and Continuity Equation (Lecture) - Flow in Pipes: Laminar and Turbulent Flow (Lecture)
Week 3	- Flow in Pipes: Pressure Drop Calculations (Lecture) - Flow Measurement Techniques in Petroleum Engineering (Lecture)
Week 4	- Single-Phase Flow in Porous Media: Darcy's Law and Flow Equations (Lecture) - Multiphase Flow in Reservoirs: Relative Permeability and Phase Behavior (Lecture)
Week 5	- Pressure Transient Tests and Well Testing Analysis (Lecture) - Flow Regimes and Pressure Profiles in Wellbores (Lecture)
Week 6	Wellbore Hydraulics: Pressure Drop and Flow Rate Calculations (Lecture)
Week 7	Drilling Fluid Mechanics: Rheology and Pressure Control (Lecture)
Week 8	Mid-Semester Review and Problem-Solving Session (Tutorial)
Week 9	- Flow Measurement Techniques in Petroleum Engineering (Lab Session) - Flow in Pipes: Pressure Drop Calculations (Problem-Solving Session)
Week 10	Single-Phase Flow in Porous Media: Darcy's Law and Flow Equations (Problem-Solving Session)
Week 11	Multiphase Flow in Reservoirs: Relative Permeability and Phase Behavior (Problem-Solving Session)
Week 12	- Pressure Transient Tests and Well Testing Analysis (Problem-Solving Session) - Flow Regimes and Pressure Profiles in Wellbores (Problem-Solving Session)
Week 13	Drilling Fluid Mechanics: Rheology and Pressure Control (Problem-Solving Session)
Week 14	- Review of Key Concepts and Topics (Tutorial) - Practice Problem-Solving Exercises (Tutorial)
Week 15	Final Assessment, including Problem-Solving Questions and Application-Based Scenarios

Week 16	Preparatory week before the final Exam
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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	Fluid Mechanics and Hydraulic Machines	No
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	Fundamental of Petroleum Engineering		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	PENG215		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	2	Semester of Delivery	Third
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Dr. Qahtan Adnan Abdul Aziz		e-mail
Module Leader's Acad. Title	lecture	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	017/06/2023	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	1. To develop problem solving skills and understanding of petroleum Engineering through the application of techniques. 2. Gives insights into the role of petroleum engineering in the search and application. 3. The module covers a number of measurement methods and how these are used . to determine important fundamentals parameters such as Bulk volume, grain volume, pore volume and porosity concept 4. This is the basic subject for all petrophysical properties. 5. To understand permeability ,capillary pressure , wettability. 6. To perform sp-log and gamma ray analysis.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Recognize how A geophysicist adds to the information of a geologist by studying the physics of the earth. 2. List the Petroleum exploration: a process of determining the location of petroleum reservoir. This process, Direct indications ,Geological methods, Geophysical methods 3. physical measurement of subsurface condition made from surface location. There are three types of methods, which are: • Gravitational (gravity survey)• Magnetic survey• Seismic survey. 4. Summarize what is meant by a Migration of Petroleum. 5. Discuss the Parameters Controlling Petroleum Occurrence . 6. Describe Lithology of Petroleum Reservoirs t. 7. classified Petroleum Traps. 8. Classification of reservoirs fluid types 9. Drilling rig A modern rotary rig as consists of several systems but the power system. hoisting system. rotation system. circulation system. well control (blowout prevention system). 10. What is well completion . 11. Porosity Logs - General.
Indicative Contents المحتويات الإرشادية	This course is a "must have" for anyone working with the subsurface within the life application. Students will understand and employ the scientific method of inquiry to draw conclusions based on verifiable evidence. Students will explain the impact of scientific theories, discoveries, or technological changes on society. Students will demonstrate critical thinking skills in the analysis of scientific data. understand that real data can be uncertain and that one has to use common sense and understanding in order to find good answers to the interpretation problems

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Teaching/Learning Strategies include:
	1- Direct Instruction in classroom, 2 hrs per week. 2- Classroom Discussions 3- tests, quizzes, class participation, projects, homework assignments, presentations. Methods of assessment for students. 1- Compulsory exercises 2- Quarterly exams. 3- Discussions and assignments for project. *The overall assessment for this course is as follows: Annual pursuit of 30 points from the total mark, which includes assignments, oral examinations and quarterly in addition to presentations. *70 marks for the final exam

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	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	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 – of petroleum engineering
Week 2	Origin of petroleum
Week 3	Learn the students the importance of learning the rock science
Week 4	Understanding the exploration methods including gravity, magnetic, and seismic methods
Week 5	. Applications of Porosity . Variation of porosity with depth
Week 6	Saturation
Week 7	Permeability . Permeability Classification , Darcy's law
Week 8	Rock compressibility , Wettability , capillary pressure
Week 9	Oil PVT Properties , Gas PVT Properties, Compressibility Factor (Z-Factor)
Week 10	Recovery. Reservoir Drive Mechanisms . Secondary Recovery. Tertiary Recovery (EOR)
Week 11	Reservoir type -Binary system
Week 12	Drilling Engineering. Type of rig , type of drilling fluid ,hosting system, rotary system
Week 13	Well completion. Completion Design criteria. Well completion equipments
Week 14	Well log . Resistivity and Measurement Concept. Resistivity Application
Week 15	WELL LOGGING – PART 3 [SP, GR, CAL]

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	" Fundamentals of petroleum engineering collage of Eng	Yes
Recommended Texts	1- Fundamentals of petrol textbook 2- Fundamentals of petroleum engineering	No
Websites	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	Mathematics III		Module Delivery
Module Type	Basic		☐ ☒ Theory ☐ ☒ Lecture ☐ Lab ☐ ☒ Tutorial ☐ ☐ Practical ☐ ☒ Seminar
Module Code	CENG213		
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	Ass. Prof. Dr. Nagham Jasim		e-mail naghamjasim@coeng.uobaghdad.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	17/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	GENG123 Mathematics -II		Semester Second

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

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

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Type something like: The main strategy that will be adopted in delivering this module
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	is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students. * Lectures are conducted by face-to-face education in the classroom, two hours per week, and students' technical reports. * Conducting dialogues and discussions with the request Methods of assessment for students. * Quarterly exams. * Discussions and assignments. *The overall assessment for this course is as follows: Annual pursuit of 30 points from the total mark, which includes assignments and oral examinations and quarterly in addition to presentations. *70 marks for the final exam
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Student Workload (SWL) الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	87	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية				
	Time/Number	Weight (Marks)	Week Due	Relevant Learning

					Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / 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. 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 SpaceThree-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	Functions of Several Variables, Limits and Continuity in Higher Dimensions , Partial Derivatives , The Chain Rule , Directional Derivatives and Gradient Vectors , Tangent Planes and Differentials ,

12,13,14	Extreme Values and Saddle Points , Lagrange Multipliers , Taylor's Formula for Two Variables , Partial Derivatives with Constrained Variables Functions of Several Variables, Limits and Continuity in Higher Dimensions , Partial Derivatives , The Chain Rule , Directional Derivatives and Gradient Vectors , Tangent Planes and Differentials , Extreme Values and Saddle Points , Lagrange Multipliers , Taylor's Formula for Two Variables , Partial Derivatives with Constrained Variables
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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

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Structural Geology		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	PENG216		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level	2	Semester of Delivery	
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	e-mail		
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date		Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	PENG126, Geology II	Semester	Second
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 understand the fundamental concepts of strike and dip and their significance in the interpretation of geological structures. 2. To develop the skills to construct and interpret geological maps, including the identification and representation of structural features. 3. To comprehend the forces and stresses acting on rocks and their role in deformation processes. 4. To apply the principles of Mohr circles and stress analysis in determining stress states and their implications for rock behavior. 5. To recognize and differentiate between various types of brittle deformation structures, such as joints and veins. 6. To gain knowledge of fault types, their classification, and their significance in the Earth's crust. 7. To understand the processes of faulting and the factors influencing fault development and displacement. 8. To interpret focal mechanisms and understand their use in determining fault orientations and earthquake mechanisms. 9. To examine the concepts and techniques of hydraulic fracturing, focusing on its application to the Marcellus Shale. 10. To analyze and interpret strain in rocks, including the measurement and characterization of deformation. 11. To comprehend the processes and characteristics of ductile deformation in rocks. 12. To identify, classify, and interpret different types of folds and understand their implications in structural geology. 13. To analyze and interpret deformation fabrics, including lineations and foliations, and their significance in rock deformation. 14. To gain knowledge of the tectonic history and processes related to the formation of the Appalachian Mountains. 15. To critically evaluate the Müller & Chapin article and understand its relevance to the broader concepts of structural geology
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of the module, students will be able to: 1. Understand and apply the concepts of strike and dip in the interpretation of geological structures. 2. Interpret and construct geological maps to represent structural features and their spatial relationships. 3. Demonstrate knowledge of forces and stresses acting on rocks and their role in deformation processes. 4. Analyze and interpret Mohr circles to determine stress states and their implications for rock behavior. 5. Identify and describe various types of brittle deformation structures, including joints and veins.

	6. Explain the formation, classification, and characteristics of faults and their role in the Earth's crust. 7. Understand the principles of faulting and the processes involved in fault development and displacement. 8. Interpret focal mechanisms to determine the orientation and nature of faulting in earthquake studies. 9. Evaluate the concepts and techniques of hydraulic fracturing, particularly in the context of the Marcellus Shale. 10. Analyze and interpret strain in rocks, including the measurement and characterization of deformation. 11. Understand the processes and characteristics of ductile deformation in rocks. 12. Identify, classify, and interpret different types of folds and their significance in structural geology. 13. Describe and interpret deformation fabrics in rocks, including lineations and foliations. 14. Analyze and understand the tectonic history and processes related to the Appalachian Mountains. 15. Critically review and discuss the Müller & Chapin article, relating it to the broader concepts of structural geology.
Indicative Contents المحتويات الإرشادية	Introduction to Structural Geology (5 hours) • Basic concepts and terminology in structural geology • Importance and applications of structural geology Strike and Dip (10 hours) • Definition and measurement of strike and dip • Stereonets and their use in representing orientation data • Interpretation of strike and dip in geological structures Geological Maps and Cross-Sections (15 hours) • Interpretation and construction of geological maps • Techniques for creating cross-sections and their interpretation • Integration of maps and cross-sections for structural analysis Forces and Stress (15 hours) • Types of forces acting on rocks • Stress tensors and their components • Stress analysis and determination of principal stresses Mohr Circles and Rock Mechanics (10 hours) • Construction and interpretation of Mohr circles • Applications of Mohr circles in rock mechanics • Strength properties of rocks and failure criteria Brittle Deformation: Joints and Veins (15 hours) • Formation and classification of joints

	• Vein formation and types of veins • Analysis and interpretation of joint and vein patterns Faults and Faulting (20 hours) • Types of faults and fault classification • Fault geometry, kinematics, and displacement • Structural analysis of fault zones Focal Mechanisms and Earthquakes (10 hours) • Focal mechanism solutions and their interpretation • Relationship between focal mechanisms and faulting • Applications of focal mechanisms in earthquake studies Hydraulic Fracturing and Marcellus Shale (10 hours) • Introduction to hydraulic fracturing techniques • Application of hydraulic fracturing in the extraction of Marcellus Shale gas • Environmental considerations and challenges Strain and Ductile Deformation (20 hours) • Types of strain and measurement techniques • Rheology of rocks and ductile deformation processes • Analysis and interpretation of ductile structures Folds and Fold Analysis (20 hours) • Types of folds and fold classification • Fold geometry, anatomy, and terminology • Techniques for fold analysis and interpretation Deformation Fabrics and Tectonic Fabrics (15 hours) • Lineations and foliations in deformed rocks • Fabric analysis techniques and interpretation • Tectonic fabrics and their significance Appalachian Tectonics (10 hours) • Overview of the tectonic history of the Appalachian Mountains • Structural features and geological evolution of the Appalachian region Müller & Chapin Article (10 hours) • Reading and critical analysis of the selected article • Discussion of the article's contribution to structural geology Review and Integration (10 hours) • Recapitulation of key concepts and topics covered in the module • Integration of knowledge and skills through practical exercises and case studies Preparation for assessments and final evaluation
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	94	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	81	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب 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	- Introduction to Structural Geology - Strike and Dip
Week 2	- Geological Maps and Cross-Sections - Forces and Stress
Week 3	- Mohr Circles and Rock Mechanics - Brittle Deformation: Joints & Veins
Week 4	- Faults and Faulting - Focal Mechanisms and Earthquakes
Week 5	- Hydraulic Fracturing and Marcellus Shale - Strain and Ductile Deformation
Week 6	- Folds and Fold Analysis - Deformation Fabrics and Tectonic Fabrics
Week 7	- Appalachian Tectonics - Müller & Chapin Article Discussion
Week 8	Review and Integration

Week 9	Case Studies in Structural Geology
Week 10	Field Trip or Virtual Field Experience
Week 11	Guest Speaker Session on Current Research in Structural Geology
Week 12	Practical Exercises and Data Analysis
Week 13	Student Presentations on Research Projects
Week 14	Exam Preparation and Revision
Week 15	Final Exam or Assessment

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts		No
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	English Language II		Module Delivery
Module Type	Support		☒ Theory Lecture ☒ Lab ☐ Tutorial Practical ☐ Seminar
Module Code	GE211		
ECTS Credits	4		
SWL (h/sem)	100		
Module Level	2	Semester of Delivery	Third
Administering Department	PENG	College	CENG
Module Leader		e-mail	
Module Leader's Acad. Title		Module Leader's Qualification	
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date		Version Number	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	English Language I, GE111	Semester	First
Co-requisites module	none	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1- The aim of this course is to empower students with the language and life skills 2- The integrated skills approach of the course develops the student's self-confidence 3- succeed in professional and social encounters within an English-speaking global environment 4- using language to express knowledge of Environment and health impacts hazards
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	A1) Find and understand information about vocabulary, pronunciation, usage, and grammar in reference texts, online resources, and English language dictionaries, (A2) Develop conversational English skills necessary for becoming a contributing participant in small group activities, large group discussions, and oral presentations, (A3) Understand texts using effective learning strategies for reading and vocabulary building,
Indicative Contents المحتويات الإرشادية	Speaking, reading and writing

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Lecture and classroom discussion
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem): الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w): الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem): الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	Unstructured SWL (h/w): الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem): الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	20% (20)	5, 10	1,2
	Assignments	2	10% (10)	2, 12	3,1
	Projects / Lab.	0	0	0	0
	Essay	1	10% (10)	13	3,1
Summative assessment	Midterm Exam	2 hr	10% (10)	7	1,2
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Unit 1,2
Week 2	Unit 3,4
Week 3	Unit 5,6
Week 4	Unit 7
Week 5	Unit 8
Week 6	Unit 9
Week 7	Unit 10,11
Week 8	Unit 12,13
Week 9	Unit 14
Week 10	Essay Writing
Week 11	General discussion
Week 12	English for Specific Purposes
Week 13	English for Specific Purposes
Week 14	English for Specific Purposes
Week 15	English for Specific Purposes
Week 16	General discussions

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	(1) <u>New Headway Plus</u> [Pre-intermediate] by John and Liz Soars, Oxford: Oxford University Press (2006), (2) Modern scientific articles from the news related to the students' specialty, and (3) Internet links and videos related to the topics discussed in General English and English for Specific Purposes lectures.	No
Recommended Texts	Morphy, A.J (1983) English Grammar in use. Cambridge: CUP	No
Websites	https://yoast.com/the-passive-voice-what-is-it-and-how-to-avoid-it/ https://www.ego4u.com/en/cram-up/grammar/passive https://en.wikipedia.org/wiki/English_passive_voice https://www.grammarly.com/blog/verb-tenses/?gclid=CjwKCAiAgc-ABhA7EiwAjev-j8Z8k1bheBN1ntkPThBC2aHSpRd_W9bqT5Q7ER	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
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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
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Petroleum Properties		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	PENG225			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	2	Semester of Delivery		Fourth
Administering Department	Type Dept. Code	College	Type College Code	
Module Leader	Hussaien Hadi		e-mail	hussaien@coeng.uob.edu.iq
Module Leader's Acad. Title	teacher		Module Leader's Qualification	M.Sc.
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	Name		e-mail	E-mail
Scientific Committee Approval Date	21/06/2023		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	1. To develop problem solving skills and understanding of petroleum 2. To understand the nature of petroleum. 3. This course deals with the basic properties of petroleum. 4.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize how petroleum nature 2. List the various terms associated with petroleum. 3. Summarize what is meant by a basic properties. 4. Discuss the reaction in petroleum. 5. Describe the density, viscosity 6. Define properties.
Indicative Contents المحتويات الإرشادية	

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

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب ل 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	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
	Lab.	2	20% (20)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
	Final Exam	2.5hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Crude Oils (chemical composition, classification, properties)
Week 2	. Density . specific gravity and coefficient of expansion . Viscosity . vapor pressure . specific heat
Week 3	. molecular weight . latent heat . heat of combustion
Week 4,5,6,7	. boiling range, . flash point pour point . sulfur content . aniline point

Week 8	.penetration umber . softening point
Week 9,10,11	.crude oil evaluation
Week 12,13,14	• fractional distillation and TBP curve • analysis of fraction • dehydration of crude oil
Week 15	. natural gas properties . oilfield water properties.

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي العملي	
	Material Covered
Week 1	Introduction
Week 2	Density
Week 3	. viscosity
Week 4,5,6,7	• distillation
Week 8	• pour point
Week 9,10,11	• flash point • water content
Week 12,13,14	• carbon residue • ash content
Week 15	• water content

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts		Yes
Recommended Texts	-petroleum properties.	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	Electrical Technology		Module Delivery	
Module Type	Basic		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	CENG222			
ECTS Credits	4			
SWL (hr/sem)	100			
Module Level	2	Semester of Delivery		Fourth
Administering Department	Type Dept. Code	College	Type College Code	
Module Leader	Hussaien Hadi		e-mail	hussaien@coeng.uob.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	M.Sc.	
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	Name		e-mail	E-mail
Scientific Committee Approval Date	21/06/2023	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	1. To develop problem solving skills and understanding of circuit theory through the application of techniques. 2. To understand voltage, current and power from a given circuit. 3. This course deals with the basic concept of electrical circuits. 4. This is the basic subject for all electrical and electronic circuits. 5. To understand Kirchhoff's current and voltage Laws problems. 6. To perform mesh and Nodal analysis.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Recognize how electricity works in electrical circuits. 2. List the various terms associated with electrical circuits. 3. Summarize what is meant by a basic electric circuit. 4. Discuss the reaction and involvement of atoms in electric circuits. 5. Describe electrical power, charge, and current. 6. Define Ohm's law. 7. Identify the basic circuit elements and their applications. 8. Discuss the operations of sinusoid and phasors in an electric circuit. 9. Discuss the various properties of resistors, capacitors, and inductors. 10. Explain the two Kirchhoff's laws used in circuit analysis. Identify the capacitor and inductor phasor relationship with respect to voltage and current.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - Circuit Theory</u> DC circuits – Current and voltage definitions, Passive sign convention and circuit elements, Combining resistive elements in series and parallel. Kirchhoff's laws and Ohm's law. Anatomy of a circuit, Network reduction, Introduction to mesh and nodal analysis. AC circuits I – Time dependent signals, average and RMS values. Capacitance and inductance, energy storage elements, simple AC steady-state sinusoidal analysis. RL, RC and RLC circuits - Frequency response of RLC circuits, simple filter and band-pass circuits, resonance and Q-factor, use of Bode plots, use of differential equations and their solutions. Time response (natural and step responses). Introduction to second order circuits. Depletion <u>Part B - Analogue Electronics</u>

	Fundamentals Resistive networks, voltage and current sources, Thevenin and Norton equivalent circuits, current and voltage division, input resistance, output resistance, coupling and decoupling capacitors, maximum power transfer, RMS and power dissipation, current limiting and over voltage protection Components and active devices – Components vs elements and circuit modeling, real and ideal elements. Introduction to sensors and actuators, self-generating vs modulating type sensors, simple circuit interfacing.
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students. * Lectures are conducted by face-to-face education in the classroom, two hours per week, and students' technical reports. * Conducting dialogues and discussions with the request Methods of assessment for students. * Quarterly exams. * Discussions and assignments. *The overall assessment for this course is as follows: Annual pursuit of 30 points from the total mark, which includes assignments and oral examinations and quarterly in addition to presentations. *70 marks for the final exam

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	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
	Lab.	2	20% (20)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
	Final Exam	2.5hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction
Week 2	D.C. circuits
Week 3	A.C. circuits
Week 4,5,6,7	magnetic circuits
Week 8	D.C. Machines
Week 9,10,11	Transformers & induction motors
Week 12,13,14	various batteries and electronic cells
Week 15	Measuring instruments; Voltage, Current, Resistance Power and Temperature

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي العملي	
	Material Covered
Week 1	Introduction
Week 2	Ohms law

Week 3	. Kirchhoff's law
Week 4,5,6,7	• superposition
Week 8	• Thevinens law
Week 9,10,11	• Mesh law
Week 12,13,14	• Nodal law
Week 15	• D.C motors

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

Recommended Texts	-Theraja Electrical Technology 1960. -Boylested introductory circuits Analysis - DC Electrical Circuit Analysis: A Practical Approach Copyright Year: 2020, dissidents	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	Geostatistics		Module Delivery
Module Type	Basic		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	CENG223		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	2	Semester of Delivery	
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	e-mail		
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date		Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	1. Understand the fundamental principles and concepts of geostatistics and its applications in petroleum engineering. 2. Develop proficiency in analyzing and interpreting spatial data in the context of reservoir characterization and modeling. 3. Learn various geostatistical methods for estimation, interpolation, and simulation of reservoir properties. 4. Gain knowledge of different variogram models and their significance in characterizing spatial variability. 5. Acquire skills in data quality control and geostatistical data analysis techniques. 6. Apply geostatistical techniques to assess uncertainty and risk in reservoir modeling and decision-making processes. 7. Understand the integration of geostatistical methods with other reservoir engineering techniques for reservoir characterization and simulation. 8. Familiarize with commercial software tools used in geostatistical analysis and interpretation. 9. Develop critical thinking and problem-solving skills by applying geostatistical methods to real-world petroleum engineering challenges. 10. Enhance communication skills through effective presentation and visualization of geostatistical results and findings.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of the module, students will be able to: 1. Apply geostatistical principles and techniques to analyze and interpret spatial data in the context of petroleum engineering. 2. Demonstrate proficiency in using geostatistical methods for estimation, interpolation, and simulation of reservoir properties. 3. Assess and quantify uncertainty and risk associated with reservoir modeling using geostatistical techniques. 4. Evaluate the quality of data and perform data analysis using geostatistical tools. 5. Integrate geostatistical methods with other reservoir engineering techniques for reservoir characterization and simulation. 6. Utilize commercial software tools for geostatistical analysis and interpretation. 7. Communicate effectively the results and findings of geostatistical analyses through written reports and oral presentations. 8. Critically analyze and evaluate geostatistical models and their applicability to real-world petroleum engineering problems. 9. Apply geostatistical techniques to make informed decisions in reservoir characterization and development planning. 10. Demonstrate an understanding of the ethical and environmental considerations in the application of geostatistics in petroleum engineering.

Indicative Contents المحتويات الإرشادية	Introduction to Geostatistics and its Applications in Petroleum Engineering (10 hours) • Overview of geostatistics and its relevance in petroleum engineering • Introduction to spatial data analysis and its importance in reservoir characterization Spatial Data Analysis and Visualization (15 hours) • Types of spatial data in petroleum engineering • Data quality control and preprocessing techniques • Exploratory data analysis and visualization methods Variogram Analysis and Modeling (20 hours) • Definition and interpretation of variograms • Experimental variogram calculation and analysis • Variogram modeling techniques and selection of appropriate models Spatial Interpolation Techniques (25 hours) • Deterministic interpolation methods (e.g., kriging, inverse distance weighting) • Stochastic interpolation methods (e.g., conditional simulation, sequential simulation) • Comparison and evaluation of interpolation techniques Geostatistical Reservoir Modeling (30 hours) • Integration of geostatistics with reservoir engineering concepts • Building 3D geological models using geostatistical methods • Uncertainty analysis and risk assessment in reservoir modeling Geostatistical Simulation Methods (20 hours) • Sequential Gaussian simulation (SGS) • Multiple-point statistics (MPS) simulation • Hybrid simulation techniques Geostatistical Data Analysis and Reservoir Characterization (20 hours) • Integration of well data, seismic data, and production data • Reservoir property estimation and characterization using geostatistical analysis • Reservoir performance prediction and production optimization Geostatistical Software Applications (10 hours) • Hands-on training on commercial geostatistical software tools • Application of software tools for data analysis, interpolation, and modeling Case Studies and Industry Applications (20 hours) • Review of geostatistical case studies in petroleum engineering • Analysis of real-world reservoir characterization and modeling challenges • Discussion on current industry trends and applications of geostatistics Project Work and Presentations (10 hours) • Individual or group projects applying geostatistical techniques to a specific petroleum engineering problem • Presentation and discussion of project findings and results
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies

Lectures: Engage students through interactive lectures that introduce and explain key concepts, theories, and methods of geostatistics. Incorporate real-world examples and case studies to demonstrate the practical application of geostatistics in petroleum engineering.

Hands-on Practical Exercises: Provide students with opportunities to apply geostatistical techniques through hands-on practical exercises. Use software tools and datasets to allow students to practice data analysis, variogram modeling, spatial interpolation, and reservoir modeling. Encourage active participation and problem-solving during these exercises.

Case Studies: Present real-world case studies to illustrate the application of geostatistics in petroleum engineering. Analyze and discuss the challenges faced in these case studies, the geostatistical approaches used, and the outcomes achieved. Encourage students to critically evaluate and discuss alternative approaches and potential improvements.

Individual or Group Projects: Assign individual or group projects where students can apply geostatistical techniques to solve specific petroleum engineering problems. Encourage independent research, data analysis, and interpretation, and provide guidance and feedback throughout the project.

Assessment Methods: Utilize a variety of assessment methods, such as quizzes, assignments, practical exams, and project presentations, to evaluate students' understanding and application of geostatistical concepts. Provide timely feedback to support their learning progress.

Resources and References: Provide students with a list of recommended resources, including textbooks, research papers, software manuals, and online tutorials, to enhance their understanding and provide additional learning opportunities.

Collaborative Learning and Peer-to-Peer Interaction: Encourage peer-to-peer interaction through group activities, discussions, and collaborative projects. This facilitates knowledge sharing, promotes teamwork, and enhances students' communication and problem-solving skills.

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	125		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative 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 Geostatistics and its Applications in Petroleum Engineering - Types of spatial data and their significance in reservoir characterization
Week 2	- Data Quality Control and Preprocessing Techniques - Exploratory Data Analysis and Visualization Methods
Week 3	- Variogram Analysis: Definition, Calculation, and Interpretation - Experimental Variogram Analysis and Model Selection
Week 4	- Deterministic Interpolation Methods: Kriging - Practical Exercise: Kriging Interpolation
Week 5	- Stochastic Interpolation Methods: Conditional Simulation - Practical Exercise: Conditional Simulation
Week 6	- Stochastic Interpolation Methods: Sequential Simulation - Practical Exercise: Sequential Simulation

Week 7	• Geostatistical Reservoir Modeling: Integration with Reservoir Engineering Concepts • Building 3D Geological Models using Geostatistical Methods
Week 8	• Uncertainty Analysis and Risk Assessment in Reservoir Modeling • Practical Exercise: Uncertainty Analysis
Week 9	• Geostatistical Data Analysis and Reservoir Characterization • Integration of Well Data, Seismic Data, and Production Data
Week 10	• Reservoir Performance Prediction and Production Optimization • Practical Exercise: Reservoir Characterization and Performance Prediction
Week 11	• Geostatistical Software Applications • Hands-on Training on Commercial Geostatistical Software Tools
Week 12	• Case Studies in Geostatistics: Real-World Applications in Petroleum Engineering • Analysis and Discussion of Case Studies
Week 13	• Project Work: Application of Geostatistical Techniques to a Petroleum Engineering Problem • Guidance and Feedback on Project Progress
Week 14	• Project Work: Data Analysis, Interpretation, and Reporting • Preparation for Project Presentations
Week 15	• Project Presentations and Discussion • Review of Key Concepts and Summary of the Module

Delivery Plan (Weekly Lab. Syllabus) المناهج 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		No
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	Mathematics IV		Module Delivery
Module Type	Basic		☐ ☒ Theory ☐ ☒ Lecture ☐ Lab ☐ ☒ Tutorial ☐ ☐ Practical ☐ ☒ Seminar
Module Code	CENG224		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	1	Semester of Delivery	Fourth
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Ass. Prof. Dr. Nagham Jasim		e-mail naghamjasim@coeng.uobaghdad.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	17/06/2023	Version Number	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	CENG213 Math II	Semester	1 AND 2
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Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

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

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	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	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 1,2,3	Double and Iterated Integrals over Rectangles , Double Integrals over General Regions , Area by Double Integration , Double Integrals in Polar Form , Triple Integrals in Rectangular Coordinates , Moments and Centers of Mass , Triple Integrals in Cylindrical and Spherical Coordinates , Substitutions in Multiple Integrals Analyze microwave circuits that involve microwave hybrids (magic T) and directional couplers in terms of input and output powers from all their portsDouble and Iterated Integrals over Rectangles ,
Week 4,5,6,7	Double Integrals over General Regions , Area by Double Integration , Double Integrals in Polar Form , Triple Integrals in Rectangular Coordinates , Moments and Centers of Mass , Triple Integrals in Cylindrical and Spherical Coordinates , Substitutions in Multiple Integrals Analyze microwave circuits that involve microwave hybrids (magic T) and directional couplers in terms of input and output powers from all their ports
Week 8	Inflation

Week 9,10,11	Line Integrals , Vector Fields and Line Integrals: Work, Circulation, and Flux , Path Independence, Conservative Fields, and Potential Functions , Green's Theorem in the Plane , Surfaces and Area , Surface Integrals
Week 12,13,14,15	Second-Order partial differential Equations , Nonhomogeneous Linear Equations , Applications , Euler Equations , Power Series Solution

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

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Petroleum Geology		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	PENG226		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level	2	Semester of Delivery	
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	e-mail		
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date		Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	PENG216, Structural Geology	Semester	Third
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives

أهداف المادة الدراسية

1. Understand the formation processes of petroleum:
 - Explain the geological processes involved in the formation of petroleum.
 - Describe the organic matter accumulation and preservation in sedimentary basins.
2. Comprehend the concept of sedimentary basins:
 - Identify the types and characteristics of sedimentary basins.
 - Explain the tectonic and sedimentary processes that contribute to basin formation.
3. Analyze the role of source rocks in petroleum generation:
 - Identify the types of source rocks and their depositional environments.
 - Understand the geochemical processes involved in the generation of hydrocarbons.
4. Examine the mechanisms of migration of petroleum:
 - Describe the various mechanisms of petroleum migration within sedimentary basins.
 - Understand the factors influencing migration pathways and distances.
5. Evaluate the characteristics and properties of reservoir rocks:
 - Identify the types of reservoir rocks and their geological properties.
 - Understand the principles of reservoir characterization and evaluation.
6. Identify the different types of traps in petroleum exploration:
 - Describe the geological features and structures that form traps.
 - Understand the types of traps, including structural, stratigraphic, and combination traps.
7. Understand the techniques and methods used in petroleum exploration:
 - Explain the exploration process, including prospect generation, seismic surveys, and well drilling.
 - Identify the different exploration methods, such as geological mapping, seismic interpretation, and well logging.
8. Gain knowledge of petroleum production:
 - Understand the concepts of reservoir engineering and production optimization.
 - Identify the methods and technologies used in petroleum production, such as drilling, well completion, and enhanced oil recovery.
9. Address environmental considerations in petroleum geology:
 - Identify the potential environmental impacts of petroleum exploration and production.
 - Understand the principles and practices of environmental management in the petroleum industry.
10. Apply critical thinking and problem-solving skills to petroleum geology:
 - Analyze geological data and interpret geological maps, seismic data, and well logs.

	Apply geological knowledge to make informed decisions and solve geological problems related to petroleum exploration and production.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of the module, students will be able to: 1. Explain the geological processes involved in the formation of petroleum and understand the factors contributing to its accumulation in sedimentary basins. 2. Identify and classify different types of sedimentary basins and describe their characteristics and formation mechanisms. 3. Analyze the characteristics of source rocks and understand their role in the generation and preservation of hydrocarbons. 4. Describe the mechanisms of petroleum migration within sedimentary basins and understand the factors influencing migration pathways and distances. 5. Evaluate the properties and characteristics of reservoir rocks and apply principles of reservoir characterization for effective resource assessment. 6. Identify and describe various types of traps and understand their geological features and structures. 7. Explain the exploration process in petroleum geology, including prospect generation, seismic surveys, and drilling techniques. 8. Understand the principles and methods of petroleum production, including well drilling, completion, and enhanced oil recovery techniques. 9. Recognize the environmental considerations associated with petroleum exploration and production, and apply principles of environmental management in the industry. 10. Apply critical thinking and problem-solving skills to analyze geological data, interpret geological maps, seismic data, and well logs in the context of petroleum geology. 11. Communicate effectively and present geological concepts related to petroleum geology using appropriate terminology and formats. 12. Demonstrate an understanding of the ethical and professional responsibilities in the field of petroleum geology, including adherence to safety standards and ethical conduct.
Indicative Contents المحتويات الإرشادية	Introduction to Petroleum Geology (10 hours) - Overview of petroleum geology and its significance in the energy industry - Historical developments and key discoveries in petroleum exploration Formation of Petroleum (15 hours) - Organic matter accumulation and preservation in sedimentary basins - Thermal maturation and generation of hydrocarbons Migration and accumulation of petroleum Sedimentary Basins (20 hours) - Classification and characteristics of sedimentary basins - Tectonic and sedimentary processes influencing basin formation - Basin analysis techniques and subsurface mapping Source Rocks (20 hours) - Types and properties of source rocks

	- Organic matter deposition and maturation - Geochemical techniques for source rock evaluation Migration of Petroleum (15 hours) - Mechanisms and pathways of petroleum migration - Trapping mechanisms and factors influencing migration distances - Migration models and case studies Reservoirs (25 hours) - Reservoir rock properties and classification - Porosity, permeability, and fluid saturation - Reservoir characterization techniques and evaluation Traps and Trap Analysis (20 hours) - Structural traps: fault traps, fold traps, and anticlinal traps - Stratigraphic traps: pinch-out, unconformity, and lithological traps - Trap analysis methods and case studies Exploration and Production (25 hours) - Petroleum exploration techniques: seismic surveys, well logging, and core analysis - Drilling and completion techniques - Enhanced oil recovery methods and production optimization Environmental Considerations (15 hours) - Environmental impacts of petroleum exploration and production - Environmental regulations and best practices - Sustainable practices and technologies in the petroleum industry Case Studies and Field Trips (10 hours) - Analysis of real-world petroleum geology case studies - Field trips to petroleum-producing regions or geological sites of interest Assessment and Revision (10 hours) - Review of key concepts and topics covered in the module - Assessment of student learning through quizzes, assignments, and exams
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Lectures: Conduct engaging and interactive lectures to introduce and explain key concepts, theories, and principles of petroleum geology. Use visual aids, multimedia resources, and real-life examples to enhance understanding. Case Studies: Incorporate case studies of successful exploration and production projects to provide practical insights into the application of petroleum geology concepts. Analyze reservoir data, geological maps, and seismic data to illustrate exploration and production techniques.

	Laboratory Work: Conduct hands-on laboratory sessions to allow students to examine rock samples, conduct experiments, and analyze geological data. This helps reinforce learning and develop practical skills in reservoir characterization and analysis. Field Trips: Organize field trips to petroleum-producing regions or geological sites of interest to provide students with firsthand exposure to the geology of oil and gas reservoirs. This allows them to observe geological features, sedimentary basins, and structural formations. Group Discussions: Facilitate group discussions and debates on topics such as environmental considerations, sustainable practices, and ethical issues in petroleum geology. Encourage students to critically analyze and express their opinions, fostering a deeper understanding of the subject matter. Assignments and Projects: Assign individual or group projects that require students to apply their knowledge of petroleum geology to solve practical problems or analyze real data. This helps develop critical thinking, research skills, and the ability to work collaboratively. Computer Simulations and Modeling: Utilize computer-based simulations and modeling software to simulate geological processes, reservoir behavior, and exploration scenarios. This allows students to gain practical experience in reservoir modeling and prediction.
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Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	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	- Introduction to Petroleum Geology - Formation of Petroleum
Week 2	Sedimentary Basins: Types and Characteristics
Week 3	Sedimentary Basins: Tectonic and Sedimentary Processes
Week 4	Source Rocks: Types and Properties
Week 5	Source Rocks: Organic Matter Deposition and Maturation
Week 6	Migration of Petroleum
Week 7	Reservoirs: Properties and Classification
Week 8	Reservoirs: Reservoir Characterization Techniques
Week 9	Traps and Trap Analysis
Week 10	Exploration Techniques: Seismic Surveys and Well Logging
Week 11	Drilling and Completion Techniques
Week 12	Enhanced Oil Recovery Methods
Week 13	Environmental Considerations in Petroleum Geology
Week 14	Case Studies and Field Trips
Week 15	Review and Assessment
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

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

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts		No
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	Arabic Language		Module Delivery
Module Type	Support or related learning activity		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	GE221		
ECTS Credits	4		
SSWL (hr/sem)	33		
USSWL (hr/sem)	17		
SWL (hr/sem)	50		
Module Level	2	Semester of Delivery	
Administering Department	PENG	College	CENG
Module Leader	أفراح ذياب صالح	e-mail	Afrah.t@uobaghdad.edu.iq
Module Leader's Acad. Title	مدرس	Module Leader's Qualification	ماجستير
Module Tutor	-	e-mail	-
Peer Reviewer Name	-	e-mail	-
Scientific Committee Approval Date	13/06/2023	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	1. العمل على النهوض باللغة العربية والمحافظة عليها من الخطأ 2. معرفة الطالب جمالية الأسلوب القرآني وإعجازه البلاغي ليكون النموذج الأمثل في الصياغة والتعبير 3. تنمية مهارات الطالب الإملائية 4. مساعدة الطالب على معرفة الطريقة الصحيحة في كتابة الاعداد وقراءتها وكتابة الهمزة بأنواعها 5. مراجعة قواعد اللغة العربية لتجنب وقوع الطالب في الغلط النحوي 6. تنمية مهارات الطالب على تدقيق جمال التعبير الأدبي ومحاكاة النصوص الجميلة في الكتابة 7. مساعدة الطالب على تمييز الأغلاط اللغوية الشائعة وإرشاده الى تصويبها 8. تنمية مهارة الحفظ والإلقاء
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. حب الطالب للغة العربية والاعتزاز بها 2. اكتساب الطالب القدرة على فهم الاعجاز اللغوي في النصوص القرآنية والإحساس بجمالياتها 3. معرفة الطالب طريقة التفريق بين أنواع الهمزة الأولية و المتوسطة والمنتبهة والقدرة على كتابتها بالشكل الصحي دون الوقوع في الخطأ 4. قدرة الطالب على التفريق بين الضاء والصاد وعدم الوقوع في إشكالية الخلط بينهما 5. قدرة الطالب على الكتابة دون الوقوع في الخطأ الإملائي والنحوي 6. تمكن الطالب من قراءة النصوص الأدبية بلغة فصحة صحيحة ومضبوطة بالحركات 7. القدرة على التعبير الأدبي بلغة جميلة سليمة 8. تمكن الطالب من معرفة أكثر من خمسين خطأ شائعاً ومعرفة تصويبها
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعاً

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	32	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	18	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	1
Total SWL (h/sem)	50		

الحمل الدراسي الكلي للطالب خلال الفصل	
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Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	15		1,2,3,4
	Assignments	2	15		5,6,7,8
	Projects / Lab.				
	Report				
Summative assessment	Midterm Exam	1hr	30% (10)		
	Final Exam	2hr	70% (50)		all
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	درس بيان أهمية اللغة العربية بصورة عامة وأهميتها لطلاب غير الاختصاص
Week 2	أقسام الكلام والمعرّب والمبني من الأسماء والأفعال
Week 3	المتنى والملحق به
Week 4	أنواع الجموع وما يلحق بها
Week 5	الأسماء الخمسة
Week 6	كتابة الأعداد
Week 7	الهمزة الأولية – همزتا القطع والوصل
Week 8	الهمزة المتوسطة والمنتبهة
Week 9	الإعجاز اللغوي في القرآن الكريم نماذج وتطبيقات
Week 10	الأسماء الخمسة
Week 11	الأفعال الخمسة
Week 12	الأغلاط اللغوية الشائعة
Week 13	كتابة الضاء والصاد والتاء المربوطة والهاء
Week 14	درس التعبير ونماذج من أساليب أشهر الكتاب الأدبية
Week 15	قصيدة لشاعر قديم ولشاعر حديث
Week 16	درس الإلقاء

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	النحو الواضح / علي الجارم لمسات بيانبة/ فاضل السامرائي منهج اللغة العربية للأقسام غير الاختصاص	نعم
Recommended Texts	معجم الأخطاء اللغوية والنحوية الشائعة / خضر أبو العينين معاني النحو / فاضل السامرائي الأعمال الشعرية الكاملة / نازك الملائكة / المعلقات	نعم
Websites	https://ketabpedia.com	

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	Drilling Engineering I		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	PE315		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level	3	Semester of Delivery	
Administering Department	Petroleum Engineering	College	Engineering college
Module Leader	Dr. Faleh H.M. Almahdawi	e-mail	dr.f.h.m.almahdawi@coeng.uobaghdad.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	17/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	PENG215, Fundamental of Petroleum Engineering	Semester	Third
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 oil well drilling through the application of techniques. 2. gives insights into the role of borehole stability in the search for and evaluation the drilling problems 3. The module covers a number of measurement methods, and how these are used to determine important factors effect on drilling operation. 4. This module deals with the fundamental drilling concepts and equations. How does the composition of the drilling mud effect on the density and the rheological properties of drilling mud. 5. The module covers the design concepts , string design and casing design 6. The measurement of pressure drop during oil well drilling 7. Find how the cement properties effect of the whole drilling operations 8. The best methods to select suitable drilling bits,
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Know the drilling operations and data acquisition for oil well drilling . 2- Know the physics of various drilling rig tools and equipment . 3- Describe different mud properties such as viscosity , density and filtration based on basic definition. 4- Select the best drilling fluids 5- Select the best drilling bits 6- Estimate and calculation the suitable mud weight and volume 7- Know the main applications and limitations of the different drilling mud 8- Perform a quick methods to predict the kick and blowout phenomena. 9- The students are expected to understand and to make complex oil well casing design and oil well cementing . 10- As a General competence: During group work the students learn to cooperate and to take responsibility for their part of the assignments given. By working with real data from the field, they learn to 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 drilling problems.
Indicative Contents المحتويات الإرشادية	This course is a "must have" for all petroleum engineers,the drilling engineering module focuses on the design, planning, and execution of drilling operations to extract oil and gas from underground reservoirs. It covers various aspects of drilling, including well planning, equipment selection, drilling techniques, and wellbore stability. Overall, the drilling engineering module equips students with the knowledge and skills necessary to design, plan, and execute drilling operations effectively and safely. It prepares them to handle the technical and operational challenges encountered in the field of drilling engineering within the petroleum industry.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Teaching/Learning Strategies include: 1- Direct Instruction in classroom, 4 hrs per week. 2- Classroom Discussions 3- Group Design Projects 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 lab . *50 marks for the final exam
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	94	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	81	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.	2	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10

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

Delivery Plan (Weekly Syllabus) المناهج الاسبوعي النظري	
	Material Covered
Week 1	Introduction
Week 2,3	Drilling methods
Week 4,5,6,	Types of mud
Week 7,8	Drilling problems
Week 9	Bit types
Week10,11,12	Drilling mud calculations
Week 13	Rig hydraulics
Week 14,15	Calculations of hydraulic pressure loss

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Text book "Drilling Engineering I "	Yes
Recommended Texts	1-Rig hydraulic 2-Applied drilling Engineering 3- drilling mud technology	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	Engineering Analysis I		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	CEN312			
ECTS Credits	4			
SWL (hr/sem)	100			
Module Level	3	Semester of Delivery		Fifth
Administering Department	PENG	College	CENG	
Module Leader	Dr. Farqad Ali Hadi		e-mail	farqadali@coeng.uob.edu.iq
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	Name		e-mail	E-mail
Scientific Committee Approval Date	17/06/2023		Version Number	1.0

Relation with other Modules				
العلاقة مع المواد الدراسية الأخرى				
Prerequisite module	CENG224 (Mathematics IV)		Semester	Fourth
Co-requisites module	None		Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	This module is intended to expose the students to understand the basic ideas of differential equations (DE) combined with its definition, types, orders, and degrees. It provides a comprehensive understanding of solving differential equations with 1st order and nth order using different approaches. This module is a fundamental module that provides students with the mathematical skills and knowledge necessary for solving engineering problems in the petroleum industry. It covers a range of mathematical concepts and techniques applicable to various engineering disciplines, including petroleum engineering. Engineering Analysis Module (I) provides students with a solid foundation in mathematical principles and problem-solving techniques necessary for understanding and analyzing complex engineering problems in petroleum engineering.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	At the end of this module, students will be able to: 1- Understand the fundamentals of differential equations. 2- Classify the differential equations based on its type, order, and degree. This will help to identify the best method for solving the differential equations. 3- Solve the 1st order of DE using different methods including separable, exact, homogenous, linear, Bernoulli, and Ricatti's methods. 4- Apply of 1st DE for solving different physical problems including Cooling Problems, Falling Bodies, Growth and Decay, and Dilution Problems. 5- Solve the nth order of LDE with constant coefficients using two methods: Undetermined Coefficients and Variation of Parameters. Then, applying that on Spring-Mass System. 6- Solve the 2nd DE with variable coefficient using different methods such as Power-series method, Tayler, Frobenius, and Bessel's function methods.
Indicative Contents المحتويات الإرشادية	The Module of Engineering Analysis I is an important course to understand the fundamentals of differential of differential equations and how it can be solved. It covers various aspects and applications of differential equations. It can help students to learn how to translate the physical problems into differential equations which can be then solved based on the initial and boundary conditions of this DE. This model will also deeply help the students to understand the numerical methods which can be used for simulating the reservoir

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 discussion in class and quick quizzes. This will be achieved through classes, interactive tutorials and by considering a simple type of strategy involving some examples related to petroleum industry that have been solved and understood using differential equations.
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	* Lectures are conducted by face-to-face education in the classroom, two hours per week, and students' technical reports. * Conducting dialogues and discussions with the request. Methods of assessment for students. * Quarterly exams. * Discussions and assignments. *The overall assessment for this course is as follows: Annual pursuit of 30 points from the total mark, which includes quizzes, assignments in addition to presentation. *70 marks for the final exam
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Student Workload (SWL) الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	37	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	100		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Exams	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	5% (5)	2 and 12	LO #3, #4 and #6, #7
	Presentation	1	5% (5)	13	All
	Report	None	None	None	-----
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 and LO #7
	Final Exam	3hr	70% (70)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
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المناهج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Ordinary Differential Equations: Review of Fundamental Concepts
Week 2, 3	1 ST Order Linear Differential Equations: Types and Solutions
Week 4,5	Application of 1 st Order Linear Differential Equations
Week 6,7	Solution of nth order of LDE using Undetermined Coefficients
Week 8	Solution of Nth order of LDE using Variation of Parameters
Week 9	Solution of Linear Differential Equations with Variable Coefficients/ Cauchy-Euler Method
Week 10,11	Solution of 2 nd Order DE with variable coefficients using Power-Series Method
Week 12	Solution of 2 nd Order DE with variable coefficients using Tayler-Series Method
Week 13, 14	Solution of 2 nd Order DE with variable coefficients using Frobenius Method/ Three Cases
Week 15	Preparation and Help Session for the Final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Curriculum and textbook	Yes
Recommended Texts	- Engineering Mathematics”, by John Bird, 5th edition, Elsevier Ltd., 2007 - Advanced Engineering Mathematics”, by Peter V. O’Neil, 7th Edition, Cengage Learning, 2012	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	Gas Technology		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	PENG311			
ECTS Credits	4			
SWL (hr/sem)	100			
Module Level	3	Semester of Delivery		Fifth
Administering Department	Type Dept. Code	College	Type College Code	
Module Leader	Dr. Usama Alameedy		e-mail	usama.sahib@coeng.uobaghdad.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.	
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	Name		e-mail	E-mail
Scientific Committee Approval Date	01/06/2023	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	PENG215, Fundamentals of Petroleum Engineering	Semester	Third
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 Gas Production Technology module provides an in-depth understanding of the principles, processes, and technologies involved in the production of natural gas. Students will explore the various stages of gas production, from reservoir characterization and well design to gas gathering and processing. The module will cover both theoretical concepts and practical applications, equipping students with the knowledge and skills necessary to optimize gas production operations. Topics covered include gas reservoir engineering, well completion techniques, production logging, gas processing, and surface facilities design.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of the module, students will be able to: 1. Understand the fundamentals of gas production systems, including gas reservoir properties, behavior, and performance. 2. Analyze and evaluate gas reservoirs using reservoir engineering techniques and methods. 3. Design and optimize well completion strategies for efficient gas production. 4. Identify and implement appropriate gas gathering and transportation systems. 5. Comprehend the principles and processes involved in gas processing and treatment. 6. Design and optimize surface facilities for gas production and processing operations. 7. Analyze and solve problems related to gas production systems, considering technical, economic, and environmental factors.
Indicative Contents المحتويات الإرشادية	Weeks 1-2: Introduction to Gas Production Technology (8 hours) • Overview of the natural gas industry (2 hours) • Gas reservoir types and properties (2 hours) • Gas production life cycle and challenges (4 hours) Weeks 3-4: Gas Reservoir Engineering (16 hours) • Reservoir characterization and evaluation (6 hours) • Gas reservoir performance analysis (6 hours) • Gas well deliverability and decline curve analysis (4 hours) Weeks 5-6: Well Completion Techniques (16 hours) • Wellbore design and completion strategies (6 hours) • Perforation techniques and considerations (4 hours) • Hydraulic fracturing for gas production (6 hours) Weeks 7-8: Production Logging and Surveillance (16 hours) • Types and interpretation of production logs (6 hours) • Well testing and flow rate determination (4 hours) • Pressure transient analysis for gas wells (6 hours) Weeks 9-10: Gas Gathering and Transportation Systems (16 hours) • Gas gathering networks and pipelines (6 hours)

	• Compression and pressure control in gas transportation (4 hours) • Gas storage and underground reservoirs (6 hours) Weeks 11-12: Gas Processing and Treatment (16 hours) • Gas separation and purification processes (6 hours) • Dehydration and sweetening techniques (4 hours) • Sulfur recovery and disposal methods (6 hours) Weeks 13-14: Surface Facilities Design for Gas Production (16 hours) • Gas wellhead equipment and facilities (6 hours) • Separation and gas treatment facilities (4 hours) • Safety considerations and emergency response (6 hours) Weeks 15-16: Economic and Environmental Considerations (15 hours) • Cost analysis and optimization of gas production operations (5 hours) • Environmental impact assessment and mitigation measures (5 hours) • Regulatory compliance and sustainability in gas production (5 hours) Week 17: Review, Practice, and Assessment (9 hours) • Review of key concepts and topics (3 hours) • Practice problem-solving exercises and case studies (3 hours) • Final assessment, including problem-solving questions and application-based scenarios (3 hours) • Additional Hours for Discussions, Activities, and Assessments: 6 hours
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Learning and teaching strategies for the "Gas Production Technology" module can include a combination of the following approaches: • Lectures: Traditional lectures can be used to introduce key concepts, theories, and principles of gas production technology. Lectures should provide a foundation of knowledge and theory for students to build upon. • Case Studies: Present real-world case studies that highlight practical applications of gas production technology. This helps students connect theoretical knowledge to industry practices and challenges. • Group Discussions: Engage students in group discussions to foster critical thinking and deeper understanding of gas production concepts. Encourage students to analyze and evaluate different approaches and solutions. • Problem-Solving Sessions: Allocate dedicated time for problem-solving sessions where students can apply gas production technology principles to solve practical problems. Provide them with real-world scenarios and data to analyze and propose solutions.

	Multimedia Resources: Incorporate multimedia resources such as videos, animations, and interactive simulations to enhance students' visual understanding of gas production technology concepts.
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Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	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 / 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 Gas Production Technology - Gas Reservoir Types and Properties
Week 2	- Gas Production Life Cycle and Challenges - Reservoir Characterization and Evaluation
Week 3	Gas Reservoir Performance Analysis

	Gas Well Deliverability and Decline Curve Analysis
Week 4	Wellbore Design and Completion Strategies
Week 5	- Hydraulic Fracturing for Gas Production - Types and Interpretation of Production Logs
Week 6	Well Testing and Flow Rate Determination
Week 7	- Gas Gathering Networks and Pipelines - Compression and Pressure Control in Gas Transportation
Week 8	- Gas Storage and Underground Reservoirs - Gas Separation and Purification Processes
Week 9	- Flow Measurement Techniques in Petroleum Engineering (Lab Session) - Flow in Pipes: Pressure Drop Calculations (Problem-Solving Session)
Week 10	- Dehydration and Sweetening Techniques (Lecture) - Sulfur Recovery and Disposal Methods (Lecture)
Week 11	- Gas Wellhead Equipment and Facilities - Separation and Gas Treatment Facilities
Week 12	Regulatory Compliance and Sustainability in Gas Production
Week 13	Drilling Fluid Mechanics: Rheology and Pressure Control (Problem-Solving Session)
Week 14	- Review of Key Concepts and Topics (Tutorial) - Practice Problem-Solving Exercises (Tutorial)
Week 15	Final Assessment, including Problem-Solving Questions and Application-Based Scenarios
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?
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Required Texts	Gas Reservoir Engineering, Dejbbar Tiab	No
Recommended Texts	Gas Reservoir Engineering, John Lee	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	Production Engineering I		Module Delivery
Module Type	core		☐ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	PENG314		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	3	Semester of Delivery	Fifth
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Ass. Prof. Dr. Nagham Jasim		e-mail naghamjasim@coeng.uobaghdad.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	17/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	PENG 215, Fundamentals of Petroleum Engineering	Semester	Third
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	This course aims to help the students understanding the basics of Production engineering theories, methods and techniques. It also intends to introduce the applications of petroleum production in oil and gas field applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The course profile of petroleum engineering science can be used to analyze oil resource, oil markets, oil companies, alternative energy prices, students will engage in the field of petroleum strategy research, oil marketing, Types of oil in the world, oil reserves in the world Also global energy strategy. Production Engineering equips students with the necessary skills to analyze the financial aspects of petroleum projects, evaluate investment opportunities, and make informed decisions in the oil and gas industry. It provides a valuable foundation for professionals involved in project management, investment analysis, and economic planning within the petroleum engineering field.
Indicative Contents المحتويات الإرشادية	The course of production engineering refers to the recent growth in oil industry, redistribution of equipment, the course objective is to get interview and basic understanding of production engineering size of petroleum field, net present value and other indications on whether an investment will be profitable, petroleum fiscal system and how the value of oil is shared between companies and government, also exploiting petroleum resources also development of production economy. Student will study all the above paragraphs. Oil and gas reserve Organization of petroleum exploration International supply and demand of petroleum Classification of petroleum Petroleum devices Alternative energy International strategy of energy Methods of engineering decisions Depreciation Depletion

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	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 / 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 production engineering
Week 3	Oil and gas reserve Understand the reason behind studying Petroleum production engineering and its main applications.
Week 4,5,6	- COMPLETION STRING COMPONENTS. - Types of completion - WELL COMPLETION DESIGNS - WORKOVER EQUIPMENT AND TECHNIQUES - Pipes, chocks, and valves - Well Stimulation

Week 7 & 8	• DRILL STEM TESTING METHODS review • Equipment required • Production performance IPR • Build up test • Draw down test Estimating reservoir permeability, skin and pressure
Week 9,10,11	• Definition of coning problem • Water coning • Gas coning • Calculation of critical oil flow rate
Week 12,13,14,15	• Wellbore flow performance • Pump assisted lift • Subsurface flow system

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Curriculum and textbook	Yes
Recommended Texts	• Tarek Ahmed, Reservoir Engineering handbook, fifth Edition, 2019 • Ken Arnold and Maurice Stewart, Surface Production Operations, 1999	No
Websites	none	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group	A - Excellent	امتياز	90 - 100	Outstanding Performance

(50 - 100)	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	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
(0 – 49)	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	Reservoir Engineering 1 and rock mechanics		Module Delivery
Module Type	Core		☐ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	PENG316		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level	3	Semester of Delivery	Fifth
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Dr. Ghanim M. Farman		e-mail: ghanimzubaidy@uobaghdad.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	17/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	PENG215, Fundamental of Petroleum Engineering	Semester	Third

Co-requisites module		Semester	
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Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	The Students will get the principles knowledge of essential subjects in petroleum reservoir Engineering and some details for the reservoir rock and fluid properties; in addition and how to deal with field operation; as following details
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The course profile of petroleum engineering science can be used to analyze oil resource, oil markets, oil companies, alternative energy prices, students will engage in the field of petroleum strategy research, oil marketing, Types of oil in the world, oil reserves in the world Also global energy strategy. Production Engineering equips students with the necessary skills to analyze the financial aspects of petroleum projects, evaluate investment opportunities, and make informed decisions in the oil and gas industry. It provides a valuable foundation for professionals involved in project management, investment analysis, and economic planning within the petroleum engineering field.
Indicative Contents المحتويات الإرشادية	Reservoir Engineering is an introductory module that focuses on the fundamental concepts and principles of reservoir engineering in the oil and gas industry. The module provides students with a solid foundation in understanding reservoir characteristics, behavior, and management. Reservoir Engineering provides students with the necessary knowledge and skills to analyze reservoir behavior, predict performance, and make informed decisions related to reservoir development and management. It serves as a foundation for more advanced reservoir engineering modules and prepares students for practical applications in the oil and gas industry. Lecture titles FIRST TERM Types of traps Types of oil reservoirs Porosity, compressibility; and permeability Poueseli law, Kozeny Equation Darcy's law; measurements of permeability Klinkenberg effect; Gas flow equation

	Radial flow Productivity equation average permeability for stratified reservoirs Flow through channels and fractures Saturation; Capillary pressure; and Wettability Multiphase flow through porous media; Linear flow (piston like, leaky piston) Fractional flow equation; BuckleyLeverett equation
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	94	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	81	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	None	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered FIRST SEMISTER (15 WEEKS)
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Week 1	Introduction
Week 2	Basics of Reservoir Engineering
Week 3	Types of traps and Types of oil reservoirs Understand the reason behind studying Petroleum Reservoir engineering and its main applications.
Week 4,5,6	- Porosity, compressibility; and permeability - Poueseli law, Kozeny Equation - Darcy's law; measurements of permeability - Klinkenberg effect; Gas flow equation
Week 7 & 8	- Radial flow - Productivity equation - average permeability for stratified reservoirs - Flow through channels and fractures - Saturation; Capillary pressure; and Wettability
Week 9,10,11	- Multiphase flow through porous media; Linear flow (piston like, leaky piston) - Fractional flow equation; BuckleyLeverett equation
Week 12,13,14,15	- Gas properties (Boyle and Charles laws; Avogadro law; Dalton law, equation of state) - compressibility factor

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Curriculum and textbook	Yes
Recommended Texts	Tarek Ahmed, Reservoir Engineering handbook, fifth Edition,2019	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	Well Logging and Formation Evaluation		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☒ Seminar
Module Code	PENG313		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	3	Semester of Delivery	1
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Usama Alameedy	e-mail	usama.sahib@coeng.uobaghdad.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	PENG215, Fundamental of Petroleum Engineering	Semester	Third
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. Introduce the basic principles and theories underlying well logging techniques. 2. Familiarize students with different types of well logging tools and their functions. 3. Explain the procedures and best practices for data acquisition during well logging operations. 4. Explore the various types of well logs and their applications in reservoir characterization. 5. Provide hands-on experience with log interpretation and formation evaluation techniques. 6. Discuss the integration of well log data with other subsurface data sources for a comprehensive reservoir analysis. 7. Highlight the limitations and challenges associated with well logging and potential solutions.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. By the end of the module, students should be able to: 1. Understand the fundamental principles and objectives of well logging and its significance in the exploration and production of hydrocarbon reservoirs. 2. Identify and describe the different types of well logging tools and equipment used in wireline logging and logging-while-drilling (LWD) operations. 3. Interpret and analyze well log data, including gamma-ray, resistivity, neutron, and density logs, to identify lithology, estimate porosity, and evaluate fluid properties. 4. Apply cross-plotting techniques and log interpretation workflows to integrate multiple well logs and derive meaningful petrophysical properties of the reservoir. 5. Apply well log data in the construction of reservoir models, estimation of reservoir properties, and formation evaluation. 6. Critically analyze and interpret well log data in the context of reservoir characterization, making informed decisions and recommendations for reservoir development and production optimization. 7. Effectively communicate and present well log interpretation results and findings to technical and non-technical audiences.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Weeks 1-2: Introduction to Well Logging (8 hours) Definition and objectives of well logging (2 hours) Historical development and evolution of well logging techniques (2 hours) Role of well logs in the exploration and production cycle (2 hours) Overview of different types of well logs (2 hours) Weeks 3-4: Well Logging Tools and Equipment (12 hours)

	Wireline logging tools: gamma-ray, resistivity, neutron, and density tools (4 hours) Logging-while-drilling (LWD) tools: mud resistivity, formation density, and gamma-ray tools (4 hours) Tool functions and principles of operation (4 hours) Weeks 5-7: Data Acquisition, Processing, and Interpretation (20 hours) Well preparation and logging program design (4 hours) Logging operations: setup, tool deployment, and data acquisition (4 hours) Data recording, transmission, and storage (4 hours) Data quality control and validation techniques (4 hours) Interpretation of gamma-ray logs (2 hours) Interpretation of resistivity logs (2 hours) Weeks 8-10: Petrophysics and Formation Evaluation (18 hours) Petrophysical properties: porosity, permeability, and saturation (4 hours) Log-derived rock properties and lithology identification (4 hours) Introduction to core analysis and correlation with well logs (4 hours) Fluid identification and estimation of fluid saturations (4 hours) Formation evaluation using well log data (2 hours) Weeks 11-13: Integration and Advanced Techniques (18 hours) Integration of well log data across multiple wells (4 hours) Integration of well log data with other subsurface data sources (seismic data) (4 hours) Building reservoir models and estimating reservoir properties (4 hours) Formation pressure evaluation and testing techniques (4 hours) Advanced well logging techniques: NMR, acoustic, and image logs (2 hours) Weeks 14-15: Review, Practice, and Assessment (15 hours) Review of key concepts and topics (5 hours) Practice log interpretation exercises and problem-solving scenarios (5 hours) Final assessment, including log interpretation and application-based questions (5 hours) Additional Hours for Discussions, Activities, and Assessments: 34 hours
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Conceptual Understanding: Begin by providing a comprehensive overview of well logging, its objectives, and its importance in the petroleum industry. Help students develop a solid conceptual understanding of the purpose and benefits of well logging.

	2. Visual Aids and Demonstrations: Utilize visual aids, such as diagrams, charts, and videos, to illustrate the principles of well logging and the operation of logging tools. Conduct live demonstrations or use virtual simulations to showcase the deployment and data acquisition process. 3. Hands-on Practice: Provide opportunities for students to gain practical experience with well logging tools and equipment. Consider organizing field visits to expose students to real logging operations and data acquisition procedures. 4. Case Studies and Real-world Examples: Present case studies and real-world examples that demonstrate the application of well logging in various reservoir scenarios. Show how well logs are used for reservoir characterization, evaluation, and decision-making in the oil and gas industry. 5. Interactive Discussions: Encourage interactive discussions and student engagement by asking questions, promoting peer-to-peer discussions, and facilitating group activities. Encourage students to share their insights, ask questions, and relate the concepts to their own experiences or research. 6. Problem-solving Exercises: Assign problem-solving exercises that require students to analyze and interpret well log data. Provide datasets or synthetic log examples for students to practice log interpretation and petrophysical analysis. Offer feedback and guidance to help them develop their skills. 7. Software and Tools: Introduce students to industry-standard well log interpretation software and visualization tools. Provide hands-on training on using these tools for log analysis, interpretation, and visualization. Allow students to work with real well log data or simulated datasets. 8. Guest Speakers and Industry Collaboration: Invite guest speakers from the industry who have expertise in well logging to share their experiences and insights. Collaborate with industry professionals or research organizations to provide workshops or guest lectures on specific topics or advanced well logging techniques. 9. Assessment Methods: Use a variety of assessment methods to evaluate students' understanding and mastery of well logging fundamentals. This can include quizzes, assignments, log interpretation exercises, and exams that assess both theoretical knowledge and practical application. 10. Continuous Learning and Updates: Emphasize the importance of continuous learning and staying updated with advancements in well logging technology and practices. Encourage students to explore recent research papers, industry publications, and attend relevant conferences or workshops. 11. Communication Skills: Include activities that develop students' communication skills, such as presenting their log interpretation results or
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	writing technical reports summarizing their findings. Provide constructive feedback on their communication abilities and help them improve their presentation and technical writing skills.
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Student Workload (SWL)			
الحمل الدراسي للطلاب محسوب ل ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	37	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	100		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	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 well logging - Historical development and evolution of well logging techniques
Week 2	- Well logging tools and equipment: wireline logging and logging-while-drilling (LWD) - Tool functions and principles of operation
Week 3	- Data acquisition and processing: well preparation and logging program design - Logging operations: setup, tool deployment, and data acquisition

Week 4	• Data recording, transmission, and storage • Data quality control and validation techniques
Week 5	• Interpretation of gamma-ray logs: lithology identification and shale volume estimation • Introduction to resistivity logs: porosity determination and fluid identification
Week 6	• Interpretation of resistivity logs: water saturation evaluation and lithology discrimination • Neutron and density logs: porosity determination and lithology identification
Week 7	• Cross-plotting techniques and log interpretation workflows • Introduction to log analysis software and visualization tools
Week 8	• Petrophysical properties: porosity, permeability, and saturation • Log-derived rock properties and lithology identification
Week 9	• Introduction to core analysis and correlation with well logs • Fluid identification and estimation of fluid saturations
Week 10	• Integration of well log data across multiple wells
Week 11	• Formation evaluation using well log data
Week 12	• Integration of well log data with other subsurface data sources
Week 13	• Building reservoir models and estimating reservoir properties
Week 14	• Review and revision of key concepts and topics • Practice log interpretation exercises and problem-solving scenarios
Week 15	• Final assessment, including log interpretation and application-based questions • Student presentations on log interpretation results
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?
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Required Texts	Theory, Measurement, and Interpretation of Well Logs, Zaki Bassiouni, Henry L. Doherty Memorial Fund of AIME Society of Petroleum Engineers	Yes
Recommended Texts	Basic Well Log Analysis, G. Asquith, AAPG.	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	Drilling Engineering II		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	PE325			
ECTS Credits	7			
SWL (hr/sem)	175			
Module Level	3	Semester of Delivery		Sixth
Administering Department	Petroleum Engineering	College	Engineering college	
Module Leader	Dr. Faleh H.M. Almahdawi		e-mail	dr.f.h.m.almahdawi@coeng.uobaghdad.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.	
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	Name		e-mail	E-mail
Scientific Committee Approval Date	17/06/2023	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	PENG315, Drilling Engineering I	Semester	Fifth
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 oil well drilling through the application of techniques. 2. gives insights into the role of borehole stability in the search for and evaluation the drilling problems 3. The module covers a number of measurement methods, and how these are used to determine important factors effect on drilling operation. 4. This module deals with the fundamental drilling concepts and equations. How does the composition of the drilling mud effect on the density and the rheological properties of drilling mud. 5. The module covers the design concepts , string design and casing design 6. The measurement of pressure drop during oil well drilling 7. Find how the cement properties effect of the whole drilling operations 8. The best methods to select suitable drilling bits,
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Know the drilling operations and data acquisition for oil well drilling . 2- Know the physics of various drilling rig tools and equipment . 3- Describe different mud properties such as viscosity , density and filtration based on basic definition. 4- Select the best drilling fluids 5- Select the best drilling bits 6- Estimate and calculation the suitable mud weight and volume 7- Know the main applications and limitations of the different drilling mud 8- Perform a quick methods to predict the kick and blowout phenomena. 9- The students are expected to understand and to make complex oil well casing design and oil well cementing . 10- As a General competence: During group work the students learn to cooperate and to take responsibility for their part of the assignments given. By working with real data from the field, they learn to 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 drilling problems.
Indicative Contents المحتويات الإرشادية	This course is a "must have" for all petroleum engineers,the drilling engineering module focuses on the design, planning, and execution of drilling operations to extract oil and gas from underground reservoirs. It covers various aspects of drilling, including well planning, equipment selection, drilling techniques, and wellbore stability. Overall, the drilling engineering module equips students with the knowledge and skills necessary to design, plan, and execute drilling operations effectively and safely. It prepares them to handle the technical and operational challenges encountered in the field of drilling engineering within the petroleum industry.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Teaching/Learning Strategies include:
	1- Direct Instruction in classroom, 4 hrs per week. 2- Classroom Discussions 3- Group Design Projects 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 lab . *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	94	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	81	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus) المناهج الاسبوعي النظري	
	Material Covered
Week 1,2,3	Design of the drill string and its equipment
Week 4	Serge and swab pressure calculations
Week 5,6,7	Casing design and bit selection
Week 8,9,10	Methods for Complex oil well design
Week 11,12	Cementing operations and calculations for cementing operations
Week13,14,15	Hydraulic of cementing job

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Text book "Drilling Engineering I "	Yes
Recommended Texts	1-Rig hydraulic 2-Applied drilling Engineering 3- drilling mud technology	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	Engineering Analysis II and Partial Differential Equations		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	CEN321		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	3	Semester of Delivery	Sixth
Administering Department	PENG	College	CENG
Module Leader	Dr. Farqad Ali Hadi	e-mail	farqadali@coeng.uob.edu.iq
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	17/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CENG312 (Engineering Analysis I)	Semester	Fifth
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	This module provides students with a solid foundation in mathematical principles and problem-solving techniques necessary for understanding and analyzing complex engineering problems in petroleum engineering. It is intended to expose the students to understand the basic ideas of differential equations (DE) combined with its solutions using Bessel's function, Gamma function, and Laplace Transforms. This module is also aimed to understand how to solve the differential equations using numerical methods. By understanding the fundamentals of numerical methods, the results of numerical methods in solving the DE can be compared with the analytical solution which represents the exact solution. Partial differential equations with its properties and how the initial value problems can be analyzed and solved will be covered in this module. This module is a fundamental module that provides students with the mathematical skills and knowledge necessary for solving engineering problems in the petroleum industry. It covers a range of mathematical concepts and techniques applicable to various engineering disciplines, including petroleum engineering. As overall as, scientists and engineers must know how to model the world in terms of differential equations.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	At the end of this module, students will be able to: 1- Solve the 2nd DE with variable coefficients using different functions and methods such as Bessel's function, and Gamma function. 2- Understand the importance of Laplace Transforms in solving the DEs. 3- Understand the definition of Laplace Transforms, transform of Elementary functions such as Trigonometric, Exponential, and Polynomial functions, as well as properties of Laplace Transforms. Inverse Laplace Transforms will also be applied to reach the solution of differential equations. 4- Understand the basic functioning of numerical methods including Basic and Modified Euler methods and compare that with the analytical exact solution. 5- Understand the basic of partial differential equations and how it can be used to solve the initial-value problems.
Indicative Contents المحتويات الإرشادية	The Module of Engineering Analysis II is Solve the 2nd DE with variable coefficients using different functions and methods such as Bessel's function, and Gamma function. Understand the importance of Laplace Transforms in solving the DEs. Understand the definition of Laplace Transforms, transform of Elementary functions such as Trigonometric, Exponential, and Polynomial functions, as well as properties of Laplace Transforms. Inverse Laplace Transforms will also be applied to reach the solution of differential equations. Understand the basic functioning of numerical methods including Basic and Modified Euler methods and compare that with the analytical exact solution. Understand the basic of partial differential equations and how it can be used to solve the initial-value problems.

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 discussion in class and quick quizzes. This will be achieved through classes, interactive tutorials and by considering a simple type of strategy involving some of examples related to petroleum industry that have been solved and understood using differential equations. * Lectures are conducted by face-to-face education in the classroom, two hours per week, and students' technical reports. * Conducting dialogues and discussions with the request.
	Methods of assessment for students. * Quarterly exams. * Discussions and assignments. *The overall assessment for this course is as follows: Annual pursuit of 30 points from the total mark, which includes quizzes, assignments in addition to presentation. *70 marks for the final exam

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

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Exams	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	5% (5)	2 and 12	LO #3, #4 and #6, #7
	Presentation	1	5% (5)	13	All
	Report	None	None	None	-----
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 and LO #7
	Final Exam	3hr	70% (70)	15	All

Total assessment	100% (100 Marks)		
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Delivery Plan (Weekly Syllabus) المناهج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Ordinary Differential Equations and Partial Differential Equations.
Week 2	Introduction to the Laplace Transforms
Week 2, 3	Understanding the transformation of Elementary functions such as Trigonometric, Exponential, and Polynomial functions, as well as properties of Laplace Transforms.
Week 4,5	Learn students how to apply the Inverse Laplace Transforms characteristics by which the differential equation can be solved.
Week 6,7	Understand the definition of Laplace Transforms, transform of Elementary functions such as Trigonometric, Exponential, and Polynomial functions, as well as properties of Laplace Transforms. Inverse Laplace Transforms will also be applied to reach the solution of differential equations.
Week 8,9	Applications of numerical methods to solve the differential equations and perform a comparison between the numerical methods and exact solutions.
Week 9	Fourier Series
Week 10,11	Fourier Sine and cosine series.
Week 12	Solution of the Diffusion equation.
Week 13, 14	Solution of the wave equation.
Week 15	Preparation and Help Session for the Final Exam.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Curriculum and textbook	Yes
Recommended Texts	- Engineering Mathematics", by John Bird, 5th edition, Elsevier Ltd., 2007 - Advanced Engineering Mathematics", by Peter V. O'Neil, 7th Edition, Cengage Learning, 2012	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	Engineering Economic		Module Delivery	
Module Type	Basic		☒ Theory ☒ Lecture Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	PE322			
ECTS Credits	3			
SWL (hr/sem)	75			
Module Level	3	Semester of Delivery		Sixth
Administering Department	Type Dept. Code	College	Type College Code	
Module Leader	Dr. Amel habeeb assi Al-Lami		e-mail	amel@coeng.uob.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.	
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	Name		e-mail	E-mail
Scientific Committee Approval Date	17/06/2023	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	A subset of economics concerned with the use and application of economic principles in the analysis of engineering decisions. It is based on the systematic evaluation of the cost and benefits of proposed technical project. ENGINEERING. The discipline, art, and profession of acquiring and applying scientific, mathematical, economic, social, and practical knowledge to design and build structures, machines, devices, systems, materials, and processes that safely realize improvements to the lives of people. ECONOMICS. The social science that analyzes the production, distribution and consumption of goods and services.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The course covers economic and petroleum science which can be used to analyze oil resource, oil markets, oil companies, alternative energy prices, students will engage in the field of petroleum strategy research, oil marketing, Types of oil in the world, oil reserves in the world Also global energy strategy. Petroleum Engineering Economics is a module within the petroleum engineering department that focuses on the economic analysis and decision-making processes involved in the oil and gas industry. This module combines principles of economics with the technical aspects of petroleum engineering to evaluate the financial viability of exploration, production, and development projects. Petroleum Engineering Economics equips students with the necessary skills to analyze the financial aspects of petroleum projects, evaluate investment opportunities, and make informed decisions in the oil and gas industry. It provides a valuable foundation for professionals involved in project management, investment analysis, and economic planning within the petroleum engineering field.
Indicative Contents المحتويات الإرشادية	The course of petroleum engineering economics refers to the economic growth, redistribution of income, price stability, the course objective is to get interview and basic understanding of the economic size of petroleum field, net present value and other indications on whether an investment will be profitable, petroleum fiscal system and how the value of oil is shared between companies and government, also exploiting petroleum resources also development of production economy. Student will study all the above paragraphs. Lecture titles FIRST TERM - Oil and gas reserve - Organization of petroleum exporting and importing countries - International supply and demand of petroleum - Classification of petroleum - Petroleum pricing - Alternative energy - International strategy of energy - Time value of money - Types of interest rate - Rate of return - Methods of engineering decisions - Depreciation

	Depletion Amortization Lecture titles SECOND TERM Inflation Sensitivity analysis of engineering projects Risk analysis Production decline curve Evaluation of future production of oil and gas and well sand Expenditure and net present value Total drilling cost Total drilling cost examples Fixed cost calculations Cost of producing blast hole Total drilling cost break down Marginal cost & sunk cost Economic Efficiency Locational Economics Determination of lower cost site
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students. * Lectures are conducted by face-to-face education in the classroom, two hours per week, and students' technical reports. * Conducting dialogues and discussions with the request Methods of assessment for students. * Quarterly exams. * Discussions and assignments. *The overall assessment for this course is as follows: Annual pursuit of 30 points from the total mark, which includes assignments and oral examinations and quarterly in addition to presentations. *70 marks for the final exam

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	12	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
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	Introduction
Week 2	Basics of economic
Week 3	- Oil and gas reserve - Organization of petroleum exporting and importing countries
Week 4,5,6,7	- Alternative energy - International strategy of energy - Time value of money - Types of interest rate - Rate of return - Methods of engineering decisions - Depreciation - Depletion

	Amortization
Week 8	• International supply and demand of petroleum • Classification of petroleum Petroleum pricing
Week 9,10,11	• Total drilling cost break down • Marginal cost & sunk cost • Economic Efficiency • Locational Economics Determination of lower cost site
Week 12,13,14	• Evaluation of future production of oil and gas and well sand • Expenditure and net present value Total drilling cost
Week 15,16,17	• Total drilling cost examples • Fixed cost calculations Cost of producing blast hole
Week 18	• Sensitivity analysis of engineering projects • Risk analysis Production decline curve
Week 19	Inflation
Week 20	• Oil and gas reserve Organization of petroleum exporting and importing countries
Week 21,22,23,24,25	• Alternative energy • International strategy of energy • Time value of money • Types of interest rate • Rate of return • Methods of engineering decisions • Depreciation • Depletion Amortization
Week 26	• International supply and demand of petroleum • Classification of petroleum Petroleum pricing
Week 27,28	• Total drilling cost break down • Marginal cost & sunk cost • Economic Efficiency • Locational Economics Determination of lower cost site
Week 29	• Evaluation of future production of oil and gas and well sand • Expenditure and net present value Total drilling cost
Week 30	• Total drilling cost examples • Fixed cost calculations Cost of producing blast hole

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Curriculum and textbook	Yes
Recommended Texts	-Engineering Economics by R. Panneerselvam Thirteenth Printing, January, 2012 Published by Asoke K. Ghosh, PHI Learning Private Limited, M-97, Connaught	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
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	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 (فقد 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

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Geophysics		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	PENG323		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	3	Semester of Delivery	
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	e-mail		
Module Leader's Acad. Title	Assist Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	PENG215: Fundamentals of Petroleum Engineering	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives

أهداف المادة الدراسية

1. Understand the principles and concepts of geophysics and its relevance to the petroleum industry.
 - Define geophysics and its role in petroleum exploration and production.
 - Explain the fundamental principles of geophysical methods used in the petroleum industry.
2. Develop a working knowledge of seismic data acquisition, processing, and interpretation techniques.
 - Describe the various techniques used in seismic data acquisition.
 - Explain the basic principles of seismic data processing and its importance in extracting meaningful information.
 - Interpret seismic data to identify subsurface structures, faults, and hydrocarbon reservoirs.
3. Gain proficiency in well logging and its applications in reservoir characterization.
 - Understand the purpose and types of well logging tools and measurements.
 - Interpret well logs to evaluate reservoir properties such as porosity, permeability, and fluid saturations.
 - Apply well log analysis techniques to assess reservoir quality and potential productivity.
4. Familiarize with gravity and magnetic methods and their application in exploration.
 - Explain the principles of gravity and magnetic methods and their utilization in subsurface mapping.
 - Analyze gravity and magnetic data to identify geological features and potential hydrocarbon prospects.
 - Understand the limitations and challenges associated with gravity and magnetic data interpretation.
5. Explore advanced geophysical techniques such as electromagnetic methods and 3D seismic imaging.
 - Describe electromagnetic methods and their applications in delineating reservoir boundaries and identifying fluid types.
 - Understand the principles of 3D seismic imaging and its advantages over conventional 2D seismic data.
 - Analyze electromagnetic and 3D seismic data to extract valuable information for reservoir characterization.
6. Apply geophysical knowledge to practical petroleum engineering problems.
 - Integrate geophysical data with other subsurface data to make informed decisions in reservoir management.
 - Evaluate the risks and uncertainties associated with geophysical interpretations and propose mitigation strategies.

	• Apply geophysical techniques to locate potential drilling targets and optimize reservoir production. 7. Develop critical thinking and problem-solving skills through geophysical case studies and projects. • Analyze real-world geophysical data sets and interpret the findings. • Collaborate in groups to solve geophysical challenges and present the results effectively. • Apply geophysical principles to propose innovative solutions for complex petroleum engineering problems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the fundamental principles and concepts of geophysics and its applications in the petroleum industry. • Define geophysics and its relevance to petroleum exploration and production. • Explain the basic principles of geophysical methods used in the petroleum industry. 2. Demonstrate proficiency in seismic data acquisition, processing, and interpretation techniques. • Describe the techniques employed in seismic data acquisition. • Apply seismic data processing techniques to enhance the quality of seismic data. • Interpret seismic data to identify subsurface structures, faults, and hydrocarbon reservoirs. 3. Analyze well logs and evaluate reservoir properties using well log interpretation techniques. • Describe the purpose and types of well logging tools and measurements. • Interpret well logs to estimate reservoir properties such as porosity, permeability, and fluid saturations. • Evaluate reservoir quality and potential productivity based on well log analysis. 4. Apply gravity and magnetic methods to geological mapping and hydrocarbon exploration. • Explain the principles of gravity and magnetic methods and their role in subsurface mapping. • Analyze gravity and magnetic data to identify geological features and potential hydrocarbon prospects. • Assess the limitations and challenges associated with gravity and magnetic data interpretation. 5. Apply advanced geophysical techniques, such as electromagnetic methods and 3D seismic imaging, in reservoir characterization. • Describe the principles and applications of electromagnetic methods in reservoir delineation and fluid identification. • Understand the advantages and challenges of 3D seismic imaging compared to 2D seismic data. • Analyze electromagnetic and 3D seismic data to extract valuable information for reservoir characterization.

	6. Integrate geophysical knowledge with other subsurface data to make informed decisions in reservoir management. • Utilize geophysical data in conjunction with geological and reservoir engineering data for reservoir characterization. • Evaluate the uncertainties and risks associated with geophysical interpretations and propose mitigation strategies. • Apply geophysical techniques to optimize reservoir production and locate potential drilling targets. 7. Develop critical thinking and problem-solving skills through geophysical case studies and projects. • Analyze real-world geophysical data sets and interpret the results. • Collaborate effectively in groups to solve geophysical challenges and present the findings. • Apply geophysical principles to propose innovative solutions for complex petroleum engineering problems.
Indicative Contents المحتويات الإرشادية	The Geophysics course for Year 3 Petroleum Engineering students provides an in-depth exploration of the principles, techniques, and applications of geophysics in the petroleum industry. Building upon the prerequisite module, Fundamentals of Petroleum Engineering, the course aims to equip students with a comprehensive understanding of geophysical methods and their role in reservoir characterization and management. The course begins with an introduction to geophysics and its relevance to the petroleum industry, emphasizing the integration of geophysical data with other disciplines. Students will delve into seismic data acquisition, learning about the principles, techniques, and parameters involved in obtaining high-quality seismic data. Subsequently, they will explore seismic data processing techniques, including data quality control, noise reduction, and migration, to enhance the imaging of subsurface structures. The interpretation of seismic data is a crucial aspect of geophysics, and students will develop the skills to identify seismic reflections, faults, and stratigraphic features. Through mapping subsurface structures and hydrocarbon reservoirs using seismic data, students will gain valuable insights into reservoir characterization and potential drilling targets. Well logging principles and interpretation form another significant component of the course. Students will learn about well logging tools and measurements, and how to interpret well logs to estimate reservoir properties such as porosity, permeability, and fluid saturations. This knowledge will enable them to evaluate reservoir quality and potential productivity. The course also covers gravity and magnetic methods used in exploration. Students will understand the principles and applications of these methods, including data acquisition and interpretation techniques. By mapping geological structures and potential hydrocarbon prospects using gravity and magnetic data, students will gain insights into subsurface mapping. Additionally, students will be introduced to advanced geophysical techniques such as electromagnetic methods and 3D seismic imaging. They will explore the principles

	behind electromagnetic surveys, including time-domain and frequency-domain techniques, and learn how to interpret electromagnetic data for reservoir delineation and fluid identification. The advantages and interpretation of 3D seismic imaging for reservoir characterization will also be explored. Integration of geophysical data in reservoir management will be emphasized, with a focus on the integration of geophysical data with geological and reservoir engineering data. Students will analyze uncertainties and risks associated with geophysical interpretations and propose mitigation strategies. They will also learn to apply geophysical techniques for reservoir monitoring and production optimization. The course will feature case studies and practical applications, allowing students to analyze and interpret real-world geophysical data sets. Through group projects, students will apply geophysical techniques to solve petroleum engineering problems, showcasing the practical applications of geophysics in reservoir characterization and management. Overall, the Geophysics course aims to provide Year 3 Petroleum Engineering students with a comprehensive understanding of geophysical principles, methods, and their applications in the petroleum industry. By mastering seismic data acquisition, processing, and interpretation, well logging, gravity and magnetic methods, advanced geophysical techniques, and integration of geophysical data, students will be prepared to tackle complex challenges in reservoir characterization and management.
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Certainly! Here are suggested learning and teaching strategies for the "Reservoir Characterization" course for the Petroleum Engineering Department (Year 4), considering the prerequisites PENG 316: Reservoir Engineering I and Rock Mechanics, and PENG 326: Reservoir Engineering II and FFTPM: 1. Lectures: The course will involve interactive lectures delivered by experienced instructors. These lectures will cover the fundamental concepts, theories, and methodologies of reservoir characterization. Students will have the opportunity to ask questions, participate in discussions, and deepen their understanding of the subject matter. 2. Practical Sessions: Practical sessions will provide hands-on experience in using software tools and applications commonly used in reservoir characterization. Students will work on real-life case studies, analyze data sets, and apply reservoir characterization techniques under the guidance of instructors. This will enhance their technical skills and problem-solving abilities. 3. Laboratory Work: Laboratory work will involve analyzing and interpreting core samples, well logs, and seismic data. Students will have access to state-of-the-art laboratory facilities to conduct experiments and gain practical

	insights into reservoir properties. This hands-on approach will reinforce theoretical concepts and develop critical thinking skills. 4. Group Projects: Collaborative group projects will be assigned to encourage teamwork and foster communication and collaboration among students. Working in teams, students will apply reservoir characterization techniques to solve complex problems and present their findings. This will enhance their ability to work in multidisciplinary teams and improve their presentation and communication skills. 5. Case Studies: In-depth case studies will be presented to illustrate real-world reservoir characterization challenges and solutions. Students will analyze and discuss these case studies, allowing them to develop a deeper understanding of practical applications and industry best practices. This will help bridge the gap between theory and practice. 6. Guest Lectures: Inviting industry professionals and experts as guest lecturers will provide students with valuable insights into current trends, technologies, and challenges in reservoir characterization. Guest lectures will offer a real-world perspective and expose students to industry practices, enhancing their understanding of the subject matter. 7. Field Trips: Organizing field trips to reservoir sites or industry facilities will provide students with firsthand exposure to reservoir characterization techniques in action. Students will witness data acquisition methods, data analysis processes, and gain practical insights into reservoir characterization challenges faced by the industry. This experiential learning opportunity will deepen their understanding and appreciation of the course material. 8. Self-directed Learning: Students will be encouraged to engage in self-directed learning, including independent research, literature reviews, and exploration of additional resources. This will foster their ability to take ownership of their learning and develop lifelong learning skills. 9. Assessment Methods: A variety of assessment methods will be used, including assignments, quizzes, examinations, and project presentations. These assessments will evaluate students' knowledge, understanding, problem-solving abilities, and practical application of reservoir characterization techniques. By employing these learning and teaching strategies, students will actively engage with the course material, develop critical thinking and practical skills, and gain a comprehensive understanding of reservoir characterization. The combination of theoretical knowledge, practical experience, and industry insights will prepare students for successful careers in petroleum engineering with a specialization in reservoir characterization.
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Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	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 / 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 Geophysics and its Applications in Petroleum Engineering - Definition and scope of geophysics in the petroleum industry - Overview of geophysical methods used for petroleum exploration and production - Importance of integrating geophysics with other disciplines in reservoir characterization
Week 2	Seismic Data Acquisition - Principles and techniques of seismic data acquisition - Types of seismic sources and receivers - Survey design considerations and acquisition parameters
Week 3	Seismic Data Processing

	• Preprocessing steps: data quality control, noise reduction, and data enhancement • Time and depth conversion techniques • Migration and velocity analysis for imaging subsurface structures
Week 4	Seismic Data Interpretation • Basic concepts of seismic interpretation • Identifying seismic reflections, faults, and stratigraphic features • Mapping subsurface structures and hydrocarbon reservoirs using seismic data
Week 5	Well Logging Principles and Interpretation • Introduction to well logging tools and measurements • Interpretation of well logs for reservoir characterization • Estimating reservoir properties such as porosity, permeability, and fluid saturations
Week 6	Well Logging Principles and Interpretation • Estimating reservoir properties such as porosity, permeability, and fluid saturations
Week 7	Gravity and Magnetic Methods in Exploration • Principles and applications of gravity and magnetic methods • Data acquisition and interpretation techniques • Mapping geological structures and potential hydrocarbon prospects using gravity and magnetic data
Week 8	Electromagnetic Methods for Reservoir Delineation • Introduction to electromagnetic methods and their applications • Time-domain and frequency-domain electromagnetic surveys • Interpretation of electromagnetic data for reservoir delineation and fluid identification
Week 9	Advanced Geophysical Techniques: 3D Seismic Imaging • Principles and advantages of 3D seismic imaging • Seismic data acquisition and processing for 3D surveys • Interpretation and visualization of 3D seismic data for reservoir characterization
Week 10	Geophysical Case Studies and Interpretation • Analyzing and interpreting real-world geophysical data sets • Case studies showcasing the application of geophysics in reservoir characterization and management
Week 11	Geophysical Case Studies and Interpretation • Hands-on exercises for students to practice geophysical interpretation techniques
Week 12	Group Project: Geophysical Analysis and Interpretation • Students form groups to work on a comprehensive geophysical project

	- Each group will be assigned a dataset to analyze and interpret - Students will apply geophysical techniques learned throughout the course to solve a specific problem or answer a research question
Week 13	Group Project: Geophysical Analysis and Interpretation - Students form groups to work on a comprehensive geophysical project - Each group will be assigned a dataset to analyze and interpret - Students will apply geophysical techniques learned throughout the course to solve a specific problem or answer a research question
Week 14	Project Presentations and Course Wrap-up - Groups present their project findings and interpretations - Class discussion and feedback on the projects
Week 15	Wrap-up of the course, highlighting key concepts and takeaways
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المناهج 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	Aminzadeh, F., & Dasgupta, S. N. (2013). <i>Geophysics for petroleum engineers</i>. Newnes.	Yes
Recommended Texts	Kundu, S. N. (2023). <i>Geoscience for Petroleum Engineers</i>. Springer Nature.	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	Reservoir Engineering II and FFTPM		Module Delivery
Module Type	Core		☐ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	PENG326		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level	3	Semester of Delivery	Sixth
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Dr. Ghanim M. Farman		e-mail
Module Leader's Acad. Title		Lecturer	Module Leader's Qualification
Module Tutor		Name (if available)	e-mail
Peer Reviewer Name		Name	e-mail
Scientific Committee Approval Date	17/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	PENG 316 , Reservoir Engineering I and Roch 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	The Students will get the principles knowledge of essential subjects in petroleum reservoir Engineering and some details for the reservoir rock and fluid properties; in addition and how to deal with field operation; as following details
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The course profile of petroleum engineering science can be used to analyze oil resource, oil markets, oil companies, alternative energy prices, students will engage in the field of petroleum strategy research, oil marketing, Types of oil in the world, oil reserves in the world Also global energy strategy. Production Engineering equips students with the necessary skills to analyze the financial aspects of petroleum projects, evaluate investment opportunities, and make informed decisions in the oil and gas industry. It provides a valuable foundation for professionals involved in project management, investment analysis, and economic planning within the petroleum engineering field.
Indicative Contents المحتويات الإرشادية	Reservoir Engineering is an introductory module that focuses on the fundamental concepts and principles of reservoir engineering in the oil and gas industry. The module provides students with a solid foundation in understanding reservoir characteristics, behavior, and management. Reservoir Engineering provides students with the necessary knowledge and skills to analyze reservoir behavior, predict performance, and make informed decisions related to reservoir development and management. It serves as a foundation for more advanced reservoir engineering modules and prepares students for practical applications in the oil and gas industry. Gas properties (Boyle and Charles laws; Avogadro law; Dalton law, equation of state) compressibility factor liquids properties (PVT) and fluid viscosity classification of reservoirs according to P-T diagram Phase behavior; calculation of bubble point and dew point behavior of non-ideal liquids flash and differential degassing; determination of reservoir liquids Material balance equation

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	94	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	81	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	None	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	liquids properties (PVT) and fluid viscosity
Week 2	classification of reservoirs according to P-T diagram
Week 3	Methods of calculation
Week 4,5,6	Phase behavior; calculation of bubble point and dew point
Week 7 & 8	behavior of non-ideal liquids
Week 9,10,11	flash and differential degassing; determination of reservoir liquids
Week 12,13,14,15	Material balance equation

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Curriculum and textbook	Yes
Recommended Texts	Tarek Ahmed, Reservoir Engineering handbook, fifth Edition, 2019	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	Production Engineering II		Module Delivery	
Module Type	core		☐ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	PENG324			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	3	Semester of Delivery		sixth
Administering Department	Type Dept. Code	College	Type College Code	
Module Leader	Ass. Prof. Dr. Nagham Jasim		e-mail	naghamjasim@coeng.uobaghdad.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification		Ph.D.
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	Name		e-mail	E-mail
Scientific Committee Approval Date	17/06/2023		Version Number	1.0

Relation with other Modules				
العلاقة مع المواد الدراسية الأخرى				
Prerequisite module	PENG 314, Production I		Semester	Fifth
Co-requisites module			Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	This course aims to help the students understanding the basics of Production engineering theories, methods and techniques. It also intends to introduce the applications of petroleum production in oil and gas field applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The course profile of petroleum engineering science can be used to analyze oil resource, oil markets, oil companies, alternative energy prices, students will engage in the field of petroleum strategy research, oil marketing, Types of oil in the world, oil reserves in the world Also global energy strategy. Production Engineering equips students with the necessary skills to analyze the financial aspects of petroleum projects, evaluate investment opportunities, and make informed decisions in the oil and gas industry. It provides a valuable foundation for professionals involved in project management, investment analysis, and economic planning within the petroleum engineering field.
Indicative Contents المحتويات الإرشادية	The course of production engineering refers to the recent growth in oil industry, redistribution of equipment, the course objective is to get interview and basic understanding of production engineering size of petroleum field, net present value and other indications on whether an investment will be profitable, petroleum fiscal system and how the value of oil is shared between companies and government, also exploiting petroleum resources also development of production economy. Student will study all the above paragraphs. Lecture titles FIRST TERM Oil and gas reserve Organization of petroleum exploration International supply and demand of petroleum Classification of petroleum Petroleum devices Alternative energy International strategy of energy Methods of engineering decisions

	Depreciation Depletion Lecture titles SECOND TERM Inflation Sensitivity analysis of engineering projects Risk analysis Production decline curve Evaluation of future production of oil and gas and well sand Expenditure and net present value Cost of producing blast hole
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students. * Lectures are conducted by face-to-face education in the classroom, two hours per week, and students' technical reports. * Conducting dialogues and discussions with the request Methods of assessment for students. * Quarterly exams. * Discussions and assignments. *The overall assessment for this course is as follows: Annual pursuit of 30 points from the total mark, which includes assignments and oral examinations and quarterly in addition to presentations. *70 marks for the final exam

Student Workload (SWL)

الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب 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)

المناهج الاسبوعي النظري

	Material Covered
Week 1	• Types of damage •
Week 2	• Definition of Damage
Week 3	• Stimulation process Methods of calculation
Week 4,5,6	• Sensitivity analysis of engineering projects • Risk analysis • Production decline curve
Week 7 & 8	• Inflation
Week 9,10,11	• Organization of petroleum exporting and importing countries
Week 12,13,14,15	• Two phase separators • Three phase separators • Horizontal separator • Vertical separator • Spherical separator • Separator design parameters • Pressure and temperature

Learning and Teaching Resources

مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Curriculum and textbook	Yes
Recommended Texts	- Tarek Ahmed, Reservoir Engineering handbook, fifth Edition, 2019 - Ken Arnold and Maurice Stewart, Surface Production Operations, 1999	No
Websites	none	

Grading Scheme				
مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
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	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.				

Ministry of Higher Education

AL-Farabi University Collage

Petroleum Engineering Department



Numerical Method and Reservoir Simulation

Syllabus

- 1. Interpolation.**
(Linear, Lagrange).
- 2. Matrices.**
(review of matrix properties, determinants, inverse of matrix).
- 3. Solution of System of Linear Equations.**
(Gaussian Elimination, Gauss Jordan Method).
- 4. Iterative Methods.**
(Jacobi and , Gauss Seidel methods).
- 5. Least Squares Method.**
(Linear, Polynomial)
- 6. Reservoir Simulation.**
(Introduction)
- 7. Principles of Fluid Flow through Porous Medium.**
- 8. Flow Equation.**
- 9. Finite Difference methods.**
(Taylor Series, Forward Difference, Backward Difference, Central Difference
Central Difference, concepts of explicit and implicit methods)
- 10. Solution of System of Difference Equations.**
(tridiagonal algorithm)
- 11. Irregular gridding.**
- 12. Transmissibility, the Finite Difference form of flow equation in terms of transmissibility.**
- 13. Averaging**

1. Institution Name	Al-Farabi University College
2. Department Name	Petroleum Engineering Department
3. Course Code & Name	PE408 Numerical Method and Reservoir Simulation
4. Lecture Type	Hard and Soft
5. Semester/Year	Annual / 2020-2021
6. No. of credit hours	120 hr (4 hr/week)
7. Instructor Name	Assistant Lecturer : Mohammed Gassab Shamikh

8. Course Objectives:

1. Learning how to derive the partial differential equations that governing the flow in porous media.
2. Learning how to solve numerically the partial differential equations that governing the flow in porous media.
3. Providing an introduction to differential equations and their solutions and statistics.
4. Bringing the knowledge gained and making the connection between theoretical knowledge taught in textbooks/homework problems.

9. Student Learning Outcomes, Teaching/Learning Methods, and Assessment

A. Knowledge Outcomes:

Upon completion of the course, students should be able to:

- Applying reservoir simulation techniques to predict future behaviour of petroleum reservoirs.

B. Skills Outcomes:

Upon completion of the course, students should be able to:

- The students will gain insight into the workings of today's reservoir simulation software, their formulation and solution methods.
- The students will be able to communicate this know how to others and pursue further his/her own development within the subject.

Teaching/learning methods

1. Lectures.
2. Class problem solving.
3. Video lectures
4. Online discussion

Assessment methods

1. Homework problem.
2. Monthly exam.
3. Quizzes.

C. Affective value outcomes:

Upon completion of the course, students should be able to apply:

1. Selecting and applying general rules correctly to solve problems including those in real-life contexts.

2. Developing mathematical curiosity and use inductive and deductive reasoning when solving problems.
3. Analytical methods in solving problems.

Teaching/learning methods

1. Brain storming.
2. Encourage Critical thinking.
3. Encourage analytical thinking strategy.
4. Introduce correct research methodologies.

Assessment methods

1. Exams.
2. Student feedback.
3. Problem recognition type.
4. Assessing skill in problem solving.

Life learning outcomes:

Upon completion of the course, students should be able to:

1. Think critically, research and reason.
2. Apply analytical and theoretical skills to model and solve mathematical problems.
3. Describe the various difference methods which are used to solve the transport equations applied in reservoir simulation software.
4. Describe the different linear equation solvers solution methods used in reservoir simulators.
5. Argue for the consequence for stability and dispersion when applying reservoir simulation software.

10. Grading

1. Quizzes	5 %
2. Monthly Exams	20 %
3. Home Works	5 %
4. Lab.	20%
5. Final Exam	50 %

11. Course Content			
Week No.	No. of hours	Reference	Topic
1 - 3	12	Petroleum Reservoir Simulation A Basic Approach by Abou-Kassem J. H., Farouq Ali S. M. and Islam M. R.	Interpolation (Linear, Lagrange).
4-5	8	Petroleum Reservoir Simulation A Basic Approach by Abou-Kassem J. H., Farouq Ali S. M. and Islam M. R.	Matrices.
6-7	8	Petroleum Reservoir Simulation A Basic Approach by Abou-Kassem J. H., Farouq Ali S. M. and Islam M. R.	Solution of System of Linear Equations.
8	4	Petroleum Reservoir Simulation A Basic Approach by Abou-Kassem J. H., Farouq Ali S. M. and Islam M. R.	Iterative Methods.
9-10	8	Petroleum Reservoir Simulation A Basic Approach by Abou-Kassem J. H., Farouq Ali S. M. and Islam M. R.	Least Squares Method.
11-12	8	Petroleum Reservoir Simulation A Basic Approach by Abou-Kassem J. H., Farouq Ali S. M. and Islam M. R.	Reservoir Simulation.
13-14	8	Petroleum Reservoir Simulation A Basic Approach by Abou-Kassem J. H., Farouq Ali S. M. and Islam M. R.	Principles of Fluid Flow through Porous Medium
15	4	-	Lessons Reviews + Monthly Exam
16-17	8	Petroleum Reservoir Simulation A Basic Approach by Abou-Kassem J. H., Farouq Ali S. M. and Islam M. R.	Flow Equation.
18-19	8	Petroleum Reservoir Simulation A Basic Approach by Abou-Kassem J. H., Farouq Ali S. M. and Islam M. R.	Finite Difference methods.
20	4	Petroleum Reservoir Simulation A Basic Approach by Abou-Kassem J. H., Farouq Ali S. M. and Islam M. R.	Solution of System of Difference Equations.
21	4	Petroleum Reservoir Simulation A Basic Approach by Abou-Kassem J. H., Farouq Ali S. M. and Islam M. R.	Irregular gridding.
22-24	12	Petroleum Reservoir Simulation A Basic Approach by Abou-Kassem J. H., Farouq Ali S. M. and Islam M. R.	Transmissibility, the Finite Difference form of flow equation in terms of transmissibility.

25-27	12	Petroleum Reservoir Simulation A Basic Approach by Abou- Kassem J. H., Farouq Ali S. M. and Islam M. R.	Averaging
28-29	8	-	Lessons Reviews
30	4	-	Monthly Exam

12. References

1. Textbooks	- Petroleum Reservoir Simulation A Basic Approach by Abou-Kassem J. H., Farouq Ali S. M. and Islam M. R.
2. References	- Basic Applied Reservoir Simulation by Ertekin T., Abou-Kassem J.H. and King G. R.
3. Electronic/ Online references (Available upon request)	https://www.ntnu.edu/studies/courses/TPG4160#tab=omEmnet

13. Course improvement plan

1. Increasing the number of textbooks so that every student can have one.
2. Inserting the electronic education as an external activity.

Republic of Iraq

Ministry of Higher Education and
Scientific Research

AL-Farabi University Collage

Petroleum Engineering Department



جمهورية العراق

وزارة التعليم العالي والبحث العلمي

كلية الفارابي الجامعة

قسم هندسة النفط

(Secondary Oil Recovery)

Syllabus

Course Description: (This course explains the secondary and tertiary oil production methods. Choose the most appropriate methods. Determining the amount of oil recovery through each method)

1. Institution Name	Al-Farabi University College
2. Department Name	Petroleum Engineering Department
3. Course Code & Name	PE406 Secondary Oil Recovery
4. Lecture Type	Theoretical
5. Semester/Year	year
6. No. of credit hours	3
7. Instructor Name	Ghassan Husham jani

8. Course Objectives:

1. Learn about secondary and tertiary methods
2. Choosing the best possible method
3. Recognize the efficiency of each method
- 4.
- etc.,

9. Student Learning Outcomes, Teaching/Learning Methods, and Assessment

A. Knowledge Outcomes: Upon completion of the course, students should be able to:

1. Distinguish between secondary and tertiary methods of oil production
2. Know the determinants of each method
3. Ability to distinguish the amount of extraction possible by using each method

B. Skills Outcomes: Upon completion of the course, students should be able to:

1. Distinguish between secondary and tertiary methods of oil production
2. Know the determinants of each method
3. Ability to distinguish the amount of extraction possible by using each method

Teaching/learning methods (put your methods of teaching)

1. Lectures.
2. Class problem solving.
3. Discussion

Assessment methods (write your assessment methods)

1. homework problem sets,
2. exams
3. reports

C. Affective value outcomes: Upon completion of the course, students should be able to apply:

1. best methods to study natural sciences
2. Critical Thinking
3. Analytical methods in solving problems
4. The ability to discuss and accept opinions to choose the best methods
5. The ability to cooperate and participate in the decision

Teaching/learning methods

1. Lectures.
2. Class problem solving.
3. Discussion

Assessment methods

1. Discussion
2. oral exam
3. the exam
4. periodic reports

D. Life learning outcomes: Upon completion of the course, students should be able to:

1. Distinguish between secondary and tertiary methods of oil production
2. Know the determinants of each method
3. Ability to distinguish the amount of extraction possible by using each method

10. Grading

- 1.
 - 2.
 - 3.
 - 4.
- etc.,

11. Course Content

Week No.	No. of hours	Reference	Topic
1	3	Enhanced oil recovery	Principles and definitions choice of proper methods for enhanced oil recovery
2	3	Enhanced oil recovery	Recovery by water displacement, Buckley-Leverett method, Welge method, Stiles method
3	3	Enhanced oil recovery	Original and improved Dykstra-Parsons method, Pattern of flooding
4	3	Enhanced oil recovery	Sweep efficiency
5	3	Enhanced oil recovery	Properties of injected water, Injected pressures
6	3	Enhanced oil recovery	Recovery by immiscible gas
7	3	Enhanced oil recovery	Turner method, Muskat method, Recovery by miscible gas
8	3	Applied Petroleum Reservoir Engineering by Ronald	Dry gas injection, Enriched gas injection
9	3	Applied Petroleum Reservoir Engineering by Ronald	CO ₂ injection, N ₂ injection
10	3	Applied Petroleum Reservoir Engineering by Ronald	Thermal recovery, heat flow through rocks
11	3	Applied Petroleum Reservoir Engineering by Ronald	Steam injection
12	3	Applied Petroleum Reservoir Engineering by Ronald	In-situ combustion
13	3	Applied Petroleum Reservoir Engineering by	Tertiary oil recovery

		Ronald	
14	3	Applied Petroleum Reservoir Engineering by Ronald	Surfactant flooding, Solvent injection
15	3	Applied Petroleum Reservoir Engineering by Ronald	Polymer injection.

12. References

1. Textbooks	1. Enhanced oil recovery [Green,_Don_W.;_Willhite,_G._Paul] 2. 3. etc.,
2. References	1. Applied Petroleum Reservoir Engineering by Ronald E. Terry, J. Brandon Rogers 2. The reservoir engineering aspects of waterflooding 3. Enhanced oil recovery [Marcel_Latil] etc.,
3. Recommended readings	Applied Petroleum Reservoir Engineering by Ronald E. Terry, J. Brandon Rogers
4. Electronic/ Online references (Available upon request)	1. 2. 3. etc.,

13. Course improvement plan

1. Adding an oil injection laboratory to practically test the roads

Republic of Iraq

Ministry of Higher Education and
Scientific Research

AL-Farabi University Collage

Petroleum Engineering Department



جمهورية العراق

وزارة التعليم العالي والبحث العلمي

كلية الفارابي الجامعة

قسم هندسة النفط

(4th year **ENGLISH LANGUAGE**)

Syllabus

Course Description: studding language, vocabulary, reading, speaking and writing of some advanced English literature.

1. Institution Name	Al-Farabi University College
2. Department Name	Petroleum Engineering Department
3. Course Code & Name	English language
4. Lecture Type	theoretical
5. Semester/Year	Year
6. No. of credit hours	One
7. Instructor Name	Dr. Zuhair D. AL shaikh

8. Course Objectives:

1. To study advance scientific work
 - 2.
 - 3.
 - 4.
- etc.,

9. Student Learning Outcomes, Teaching/Learning Methods, and Assessment

A. Knowledge Outcomes: Upon completion of the course, students should be able to:

1. To enable students to read and understand scientific papers .
 - 2.
 - 3.
- etc.,

B. Skills Outcomes: Upon completion of the course, students should be able to:

1. To write summary of the papers they read
 - 2.
 - 3.
 - 4.
- etc.,

Teaching/learning methods All methods

1. Lectures.
 2. Class problem solving.
 3. Discussion
 - 4.
- etc., >

Assessment. (All methods)

1. homework problem sets,
 2. exams
 3. lab reports
 - 4.
- etc.,

C. Affective value outcomes: Upon completion of the course, students should be able to apply:

1. **best methods to study natural sciences**

Teaching/learning methods (as above)

- 1.
 - 2.
 - 3.
 - 4.
- etc.,

Assessment methods (as above)

- 1.
 - 2.
 - 3.
 - 4.
- etc.,

D. Life learning outcomes: Upon completion of the course, students should be able to: (

1. As above
 - 2.
 - 3.
 - 4.
- etc.,

10. Grading

1. 30 % yearly
 2. 70% final exam
 - 3.
 - 4.
- etc.,

11. Course Content

Week No.	No. of hours	Reference	Topic
1	15	1	
2			
3			
4			From unit one to unit four
5			
6			
7			
8			
9			
10			From unit five to unit ten
11			
12			
13			
14			
15			

12. References

1. Textbooks	1. Headway plus (upper intermediate) by John and Liz Soars 2. 3. etc.,
2. References	1. 2. 3. etc.,
3. Recommended readings	
4. Electronic/ Online references (Available upon request)	1. 2. 3. etc.,

13. Course improvement plan

- 1. Adding an extra units.**
- 2.**
- 3.**
- 4.**
- etc.,**

Republic of Iraq

Ministry of Higher Education and
Scientific Research

AL-Farabi University Collage

Petroleum Engineering Department



جمهورية العراق

وزارة التعليم العالي والبحث العلمي

كلية الفارابي الجامعة

قسم هندسة النفط

(Gas technology)

Syllabus

Course Description

Gas technology course provide the students information about the types of the natural gases , type of the gas reservoirs , gas pipe lines , flow performance of gas reservoirs and the methods of removing liquid from gas wells , in addition , methods of calculating the wellhead pressure and bottom hole pressure

1. Institution Name	Al-Farabi University College
2. Department Name	Petroleum Engineering Department
3. Course Code & Name	PE401-gas technology
4. Lecture Type	Theoretical lectures
5. Semester/Year	Semester
6. No. of credit hours	3 hrs
7. Instructor Name	Layla Sideeq Mohammed

8. Course Objectives:

1. To make students familiar with problem of unconventional reservoirs
2. To give students information about the method of increasing gas recovery

9. Student Learning Outcomes, Teaching/Learning Methods, and Assessment

A. Knowledge Outcomes: Upon completion of the course, students should be able to:

1. Students will be able to solve the urgent problems in the fields
2. Student have an ability to work as a team
- 3.

B. Skills Outcomes: Upon completion of the course, students should be able to:

1. Thinking quickly and effectively
2. Giving a practical decisions in the field
- 3.

Teaching/learning methods (put your methods of teaching)

1. Lectures.
 2. Class problem solving.
 3. Discussion
 - 4.
- etc.,

Assessment methods (write your assessment methods)

1. homework problem sets,
 2. exams
 3. lab reports
 - 4.
- etc.,

C. Affective value outcomes: Upon completion of the course, students should be able to apply:

1. best methods to study natural sciences
 2. Critical Thinking
 3. Analytical methods in solving problems
 - 4.
- etc.,

Teaching/learning methods
1. data show 2. videos 3.
Assessment methods
1. oral exams 2. discussion in the class 3. daily exams
D. Life learning outcomes: Upon completion of the course, students should be able to: 1. best methods to study natural sciences 2. Critical Thinking 3. Analytical methods in solving problems

10. Grading
1. 1. 30% daily exams, attendance and monthly exams 2. 70% final exams

11. Course Content

Week No.	No. of hours	Reference	Topic
1	3	Natural gas engineering, Xiuli Wang and Michael	Properties of Gases
2	3	Natural gas engineering, Xiuli Wang and Michael	Properties of Gases
3	3	Natural gas engineering, Xiuli Wang and Michael	Gas System Analysis
4	3	Natural gas engineering, Xiuli Wang and Michael	Gas System Analysis
5	3	Natural gas engineering, Xiuli Wang and Michael	gasflow through in P.M
6	3	Natural gas engineering, Xiuli Wang and Michael	gasflow through in P.M
7	3	Natural gas engineering, Xiuli Wang and Michael	gasflow through in P.M
8	3	Natural gas engineering, Xiuli Wang and Michael	gasflow through in P.M
9	3	Natural gas engineering, Xiuli Wang and Michael	gas transportation
10	3	Natural gas engineering, Xiuli Wang and Michael	gas transportation
11	3	Gas production operation , H. Dale	Gas Treatment and liquefaction
12	3	Gas production operation , H. Dale	Gas Treatment and liquefaction
13	3	Gas production operation , H. Dale	Gas Treatment and liquefaction
14	3	Gas production operation , H. Dale	Gas Sweetening and Dehydration
15	3	Gas production operation , H. Dale	Gas Sweetening and Dehydration

12. References

1. Textbooks	1. 2. 3. etc.,
2. References	Gas production operation , H. Dale
3. Recommended readings	
4. Electronic/ Online references (Available upon request)	1. 2. 3. etc.,

13. Course improvement plan

Gas technology is developed by arranging experimental work lectures through laboratory to study the gas inflow performance by core experiments.

Republic of Iraq

Ministry of Higher Education and
Scientific Research

AL-Farabi University Collage

Petroleum Engineering Department



جمهورية العراق

وزارة التعليم العالي والبحث العلمي

كلية الفارابي الجامعة

قسم هندسة النفط

(production engineering)

Syllabus

Course Description: petroleum production engineering provide the students with the basics of drive mechanisms , reservoir types, IPR , fluid flow through pipes, well testing , wells productivity stimulation and artificial lift methods

1. Institution Name	Al-Farabi University College
2. Department Name	Petroleum Engineering Department
3. Course Code & Name	PE404 - petroleum production engineering
4. Lecture Type	Theoretical lectures
5. Semester/Year	yearly
6. No. of credit hours	5 hrs- 6 units
7. Instructor Name	Layla Sideeq Mohammed

8. Course Objectives:

1. To make student familiar with the production operation
2. To give an opportunity for students to learn the advanced stimulation methods
3. Learning the students the most modern methods of artificial methods

9. Student Learning Outcomes, Teaching/Learning Methods, and Assessment

A. Knowledge Outcomes: Upon completion of the course, students should be able to:

1. Work as a team effectively
2. Solving practical problems
- 3.

B. Skills Outcomes: Upon completion of the course, students should be able to:

1. Dealing with urgent problems in the field
2. Giving suitable quick and decision in the field

Teaching/learning methods (put your methods of teaching)

1. Lectures.
 2. Class problem solving.
 3. Discussion
 - 4.
- etc.,

Assessment methods (write your assessment methods)

1. homework problem sets,
 2. exams
 3. lab reports
 - 4.
- etc.,

C. Affective value outcomes: Upon completion of the course, students should be able to apply:

1. best methods to study natural sciences
 2. Critical Thinking
 3. Analytical methods in solving problems
 - 4.
- etc.,

Teaching/learning methods
1. Lectures. 2. Class problem solving. 3. Discussion
Assessment methods
1.discussion 2.exams 3. oral exams 4.reports
D. Life learning outcomes: Upon completion of the course, students should be able to: 1. best methods to study natural sciences 2. Critical Thinking 3. Analytical methods in solving problems 4. work as a team

10. Grading
1. 30% daily exams, attendance and monthly exams 2. 70% final exams

11. Course Content

Week No.	No. of hours	Reference	Topic
1.	5	The technology of artificial lift , Kermit E Brown	Types of drive mechanism
2.		The technology of artificial lift , Kermit E Brown	Darcy equation
3.	5	The technology of artificial lift , Kermit E Brown	Vogel method
4.	5	The technology of artificial lift , Kermit E Brown	Standing method
5.	5	The technology of artificial lift , Kermit E Brown	Standing method
6.	5	The technology of artificial lift , Kermit E Brown	Couto method
7.	5	The technology of artificial lift , Kermit E Brown	Future IPR
8.	5	The technology of artificial lift , Kermit E Brown	Future IPR
9.	5	The technology of artificial lift , Kermit E Brown	Fluid flow through tubing
10.	5	The technology of artificial lift , Kermit E Brown	Fluid flow through tubing
11.	5	The technology of artificial lift , Kermit E Brown	Fluid flow through tubing
12.	5	The technology of artificial lift , Kermit E Brown	Fluid flow through tubing
13.	5	The technology of artificial lift , Kermit E Brown	Fluid flow through tubing
14.	5	The technology of artificial lift , Kermit E Brown	Well test
15.	5	The technology	Well test

		of artificial lift , Kermit E Brown	
12. References			
1. Textbooks	1. 2. 3. etc.,		
2. References	1- The technology of artificial lift , Kermit E Brown		
3. Recommended readings			
4. Electronic/ Online references (Available upon request)	1. 2. 3. etc.,		

13. Course improvement plan

1. the main development the contribute to advance the subject is to arrange an academic trips to the oilfields to be familiar with the latest advanced production technologies.

Ministry of Higher Education

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جمهورية العراق

وزارة التعليم العالي والبحث العلمي

كلية الفارابي الجامعة

قسم هندسة النفط

Petroleum Drilling Engineering II

Syllabus

Course Description:

Initially, in this course, students will be introduced to the directional drilling history, applications, calculations, and planning directional wells, students will analyse the factors that affect the Rate of Penetration. discussed hole problems in general and concentrate on the stuck pipe and loss circulation during drilling oil and gas wells.in addition, continue to calculate hydraulic calculations. Finally, study well control basic steps and methods.

1. Institution Name	Al-Farabi University College
2. Department Name	Petroleum Engineering
3. Course Code & Name	Petroleum Drilling Engineering II- PE402
4. Lecture Type	5-hr lecture/wk
5. Semester/Year	Two semesters 2021-2022
6. No. of credit hours	
7. Instructor Name	Dr. ABDULLAH JALAL MOHAMMED

8. Course Objectives:

1. To develop advanced drilling engineer practice-level.
2. To have students become familiar with types of oil and gas wells.
3. Develop time management skills and teamwork spirit in students

9. Student Learning Outcomes, Teaching/Learning Methods, and Assessment

1. Demonstrate the ability to analyze and solve advanced drilling engineer problems.
2. Demonstrate the ability to communicate analysis in a professional manner.
3. Exhibit the ability to work in teams/groups effectively

B. Skills Outcomes: Upon completion of the course, students should be able to:

1. Analyze the nature of the problem during drilling the oil wells.
2. Planning directional oil wells.
3. well control during when Kick occurs.
4. knowing the factors that affect the Rate of Penetration.
5. Present problem solutions in a professional manner.

Teaching/learning methods

1. Lectures.
2. Class problem solving.
3. Discussion

Assessment methods

1. Assignment problem sets,
2. Exams
3. Quizzes

C. Affective value outcomes: Upon completion of the course, students should be able to apply:

1. Best methods to study drilling Eng.
2. Critical Thinking
3. Analytical methods in solving problems

Teaching/learning methods

1. Brainstorming
2. Encourage Critical thinking
3. Encourage analytical thinking strategy
4. Introduce correct research methodologies

Assessment methods

- | |
|---|
| <ol style="list-style-type: none">1.Exams2. Student feedback3. body language4. Discussions and presentations |
|---|

D. Life learning outcomes: Upon completion of the course, students should be able to:

- | |
|--|
| <ol style="list-style-type: none">1. Work within teams2. Write academic reports3. Analyse and verify scientific facts4. Plan and organize time of study5. Initiate new ideas and motivate others6. conduct targeted searches of scholarly literature. |
|--|

10. Grading

Quizzes (3 X 3)	10%
E-learning participation	5%
Midterm Exam	15%
Final Exam	70%

11. Course Content

Week No.	No. of hours	Reference	Topic
1	5	TB1: Ch1 TB2: Ch1	Lecture 1: Directional drilling
2	5	TB1: Ch1 TB2: Ch1	Lecture 2: Directional drilling
3	5	TB1: Ch1 TB2: Ch1	Lecture 3: Directional drilling Quiz1
4	5	TB1: Ch1 TB2: Ch1	Lecture 4: Directional drilling
5	5	TB1: Ch1 TB2: Ch1	Lecture 5: Directional drilling
6	5	TB1: Ch1 TB2: Ch1	Lecture 6: Directional drilling
7	5	TB1: Ch1 TB2: Ch1	Lecture 7: Directional drilling
8	2		EXAM
9	5	TB1: Ch2 TB2: Ch2	Lecture 8: Hole problem
10	5	TB2: Ch2	Lecture9: Hole problem
11	5	TB1: Ch2 TB2: Ch2	Lecture10: Hole problem
12	5	TB1: Ch2	Lecture11: Hole problem
13	5	TB1: Ch2	Lecture12: Hole problem
14	5	TB1:Ch2	Lecture13: Hole problem
15	2		MID EXAM
16	5	TB2: Ch3	Lecture 14: ROP
17	5	TB2: Ch3	Lecture 15: ROP
18	5	TB2: Ch3	Lecture 16: ROP
19	5	TB2: Ch3	Lecture 17: ROP
20	5	TB2: Ch3	Lecture 18: ROP+QUIZ
21	5	TB2: Ch4	Lecture 19: well control
22	5	TB2: Ch4	Lecture 20: well control
23	5	TB2: Ch4	Lecture 21: well control+ quiz
24	5	TB2: Ch4	Lecture 22: well control
25	5	TB2: Ch4	Lecture 23: well control
26	5	TB1: Ch4	Lecture 24: well control+ quiz
27	5	TB2: Ch5	Lecture 19: hydraulic
28	5	TB1: Ch5	Lecture 19: hydraulic
29	5	TB2: Ch5	Lecture 19: hydraulic

30	3	FAINAL EXAM	
12. References			

13. Course improvement plan

- 1 .The course syllabus doesn't include the has the latest practice of drilling engineers.
2. This course is based on literature information problems without any use of computer software.

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Petroleum Engineering Department



جمهورية العراق

وزارة التعليم العالي والبحث العلمي

كلية الفارابي الجامعة

قسم هندسة النفط

(reservoir engineering II)

Syllabus

Course Description: (Write a Brief Description of the course)

- Studying the important topics in reservoir engineering.
- Understanding the classification of hydrocarbon reservoirs using the P-T diagram.
- Derive the material balance equation and practice the related calculations.
- Studying the different types of hydrocarbon reservoirs and their related calculations.
- The water drive reservoirs types and calculations.

1. Institution Name	Al-Farabi University College
2. Department Name	Petroleum Engineering Department
3. Course Code & Name	Reservoir engineering II- PE400
4. Lecture Type	Theoretical
5. Semester/Year	year

6. No. of credit hours	five
7. Instructor Name	Ahmed Jubair Mahmood

8. Course Objectives:

1. Studying the important topics in reservoir engineering.
2. Understanding the classification of hydrocarbon reservoirs using the P-T diagram.
3. Derive the material balance equation and practice the related calculations.
4. Studying the different types of hydrocarbon reservoirs and their related calculations.
5. The water drive reservoirs types and calculations.

9. Student Learning Outcomes, Teaching/Learning Methods, and Assessment

Knowledge Outcomes: Upon completion of the course, students should be able to:

1. Classify the hydrocarbon reservoirs and their driving mechanism.
2. Derivation of the material balance equation and calculation.
3. Calculation of oil and gas in place, recovery, produced oil and gas and the remaining of oil and gas for all the types of hydrocarbon reservoirs.
4. Calculating the volume of water encroached using different methods.

B. Skills Outcomes: Upon completion of the course, students should be able to:

1. Deal with all kinds of reservoir.
2. Perform calculations regarding the different types of hydrocarbon reservoirs.
3. Make decisions about the driving mechanisms.

Teaching/learning methods (put your methods of teaching)

1. Lectures. ✓
2. Class problem solving. ✓
3. Discussion. ✓

Assessment methods (write your assessment methods)

1. homework problem sets, ✓
2. exams ✓

C. Affective value outcomes: Upon completion of the course, students should be able to apply:

1. best methods to study natural sciences ✓
2. Critical Thinking ✓
3. Analytical methods in solving problems ✓

Teaching/learning methods

1. Brain storming
2. Encourage Critical thinking
3. Encourage analytical thinking strategy



Assessment methods

- 1.Exams
2. Student feedback



D. Life learning outcomes: Upon completion of the course, students should be able to:

1. Work within teams
2. Write academic reports
3. Analyse and verify scientific facts
4. Plan and organize time of study
5. Initiate new ideas and motivate others

10. Grading

- 1.
 - 2.
 - 3.
 - 4.
- etc.,

11. Course Content

Week No.	No. of hours	Reference	Topic
1	5		Review of the important topics and definitions in reservoir engineering.
2	5		Reservoir fluids properties, gas oil and water. $B_o, B_g, R_s, \mu_o, \mu_g$ relations with pressure and temperature.
3	5		Calculations related to the reservoir fluids properties.
4			continued
5	5		Classification of the petroleum reservoirs according the P-T relation.
6	5		Types of natural driving mechanisms, liquid expansion, depletion, gas cap, water and combination drive.
7	5		Material balance derivation.
8			continued
9	5		Calculations using the material balance.
10	5		Material balance as a straight line.
11	5		Gas reservoir, dry gas reservoirs-properties and MB calculations.
12	5		Gas storage reservoirs, wet gas reservoirs.
13			continued
14	5		Calculations related to dry gas, wet gas and storage gas reservoirs.
15	5		continued
16			Retrograde gas reservoirs.
17			Continued.
18			Solution of problems for retrograde gas reservoirs gas res.
19			Under saturated oil res., volumetric calculations.
20			Under saturated oil res., material balance calculations.
21			Under saturated oil res., including formation and water Compressibility.
22			Solution of problems.
23			Saturated oil reservoirs
24			Application of material balance for sat. oil res.
25			Solution of problems
26			Water influx, steady state method.
27			Van -Everdingin method.
28			Fetchovich method

29			evaluation
30			Exams.

12. References

1. Textbooks	Applied petroleum reservoir engineering by Craft and Hawkins
2. References	Reservoir Engineering Handbook by Tarek Ahmed
3. Recommended readings	Fundamentals of Reservoir Engineering by L.P.Dake
4. Electronic/ Online references (Available upon request)	1. 2. 3. etc.,

13. Course improvement plan

- 1.**
 - 2.**
 - 3.**
 - 4.**
- etc.,**

الفصل الأول

انتهاكات الحقوق والحريات

تسعى الدول الديمقراطية إلى ضمان تمتع الافراد بالحقوق والحريات، وتعمل بموجب قوانين هيئات الحكم الثلاث (التشريعية، التنفيذية، القضائية) على حمايتها، وعلى خلاف ذلك تعمل الدولة الاستبدادية أو الدكتاتورية على مصادرة تلك الحقوق والحريات أو تقييدها والعمل على انتهاكها في ضوء الأفعال والإمتناعات التي تمثل انتهاكات خطيرة وجسيمة سواء أكانت تلك الحقوق طبيعية أم شخصية، أم سياسية، أم إجتماعية، أم فكرية، أم ثقافية.

ومع بداية تأسيس الدولة العراقية في العام ١٩٢١ أُسس نظامٌ للحكم الملكي شهد العديد من الأحداث، لكنها عموماً أحداث لم تؤثر كثيراً في الحقوق والحريات على الرغم من بساطة الحياة وعدم تعقيدها، وإن الأحداث التي شهدتها العراق منذ العام ١٩٢١ إلى العام ١٩٥٨ كانت مستقرة نسبياً قياساً بما كان حاصلًا بعد العام ١٩٥٨.

وقد شهد العراق بعد إنقلاب ١٧/ تموز/ ١٩٦٨ انتهاكات خطيرة لحقوق الافراد وحرياتهم طوال مدة حكم حزب البعث. وقد تنوعت مظاهر هذه الانتهاكات بين القتل، والتعذيب، والإعتقالات، والتجهير، والحرمان من العديد من الحقوق الفكرية والثقافية لفئات كثيرة من أبناء الشعب العراقي ممّا ألزم - بعد العام ٢٠٠٣ - إيجاد معالجات لتلك الانتهاكات الخطيرة التي عانى منها الشعب، وإنصاف الضحايا وذويهم، وضمان حقوقهم عن طريق أنظمة العدالة الانتقالية، ووسائلها التي تستدعي كشفًا إستدلاليًا لحقيقة تلك الأنظمة السياسية التي حكمت العراق منذ العام ١٩٢١ إلى العام ٢٠٠٣، ثم توضيحًا للإنتهاكات التي تعرّض لها الافراد في ظل نظام حكم البعث، وتوضيحًا لأثر سلوكيات ذلك النظام في المجتمع العراقي، موازنةً بأثر نظام العدالة الانتقالية في معالجة تلك الآثار السلبية المترتبة على توالي نظام البعث للحكم منذ العام ١٩٦٨ حتى العام ٢٠٠٣. ويتألف هذا الفصل من مباحث أربعة فيما يأتي كشف مضامينها:

المبحث الأول: نبذة وصفية عن الأنظمة السياسية في العراق (١٩٢١-٢٠٠٣)

شهد العراق في العام ١٩٢١ تأسيس أول حكومة عراقية بعد قيام ثورة العشرين العراقية إذ تم إنشاء المجلس التأسيسي من شخصيات عراقية معروفة ولها مكانتها في المجتمع. وقد تم تتويج (الملك فيصل) في (٢٣/ ٨/ ١٩٢١) ملكاً على العراق، ثم تسلم حكم العراق فيما بعد كل من (الملك غازي، والملك فيصل الثاني).



منهاج جرائم حزب البعث البائد المحظور

وفي العام ١٩٥٨ وقع إنقلاب عسكري بزعامة عدد من الضباط لم يستمرّ طويلاً حتى سيطر نظام البعث على البلاد في انقلاب (١٧/تموز/١٩٦٨) الذي استمرّ يحكّم بالبطش حتى إسقاطه باحتلال العراق في العام ٢٠٠٣. ومن أجل الإحاطة خُبْرًا بتلك الأنظمة السياسية التي حكمت العراق منذ التأسيس إلى العام ٢٠٠٣ سنعرّض نبذة وصفية عنها في محاور ثلاثة:

المحور الأول: النظام الملكي (١٩٢١-١٩٥٨)

على أثر الثورة الشعبية العراقية الكبرى (ثورة العشرين) التي حصلت في العراق بـ(إتفاقٍ، وفتوى، وتوجيه) عراقيّ خالصٍ تمّ تأليفُ المجلس التأسيسي من شخصيات عراقية معروفة ومشهورة - كما أشرنا قبل قليل - وبعد ذلك تم تنصيب (الملك فيصل الأول) ملكاً على العراق في (٢٣/٨/١٩٢١)، وألّفت أول حكومة عراقية برئاسة (عبد الرحمن الكيلاني النقيب) الذي استقال بعد سنة فخلفه (عبد المحسن السعدون).

ومن أظهر المواضيع التي حصلت في مدة حكم النظام الملكي وضعُ دستورٍ في العام ١٩٢٥، وإقراره رسمياً. وقد سُمي بـ(القانون الأساسي) الذي صدّقه الملك بتاريخ ٢١/ آذار/ ١٩٢٥.

وقد تكوّن هذا القانون من مقدمة وعشرة أبواب اشتملت على (١٢٥ مئة وخمسة وعشرين) مادةً، واتخذ بموجبها هذا الدستورُ الملكيّةً نظامًا للحكم عندما جعل (سيادة المملكة العراقية الدستورية للأمة هي وديعة الشعب للملك (فيصل بن الحسين) ثم لورثته من بعده).

بعدها توالى الحكومات العراقية متعاقبةً حتى العام ١٩٥٨ بانتهاء الملكية، وحلول النظام الجمهوري محلّها بانقلابٍ ثورة (١٤/ تموز/ ١٩٥٨).

وقد شهد العراق طوَالَ مدة الحكم الملكي العديد من الأحداث السياسية والعسكرية والإقتصادية المؤثرة في النظام السياسي؛ فقد انضم العراق إلى عصبة الأمم في العام ١٩٣٢؛ فأعلن إستقلاله الرسمي عن المملكة المتحدة (بريطانيا العظمى). وحدثت في العام ١٩٣٦ الثورة العربية الكبرى في سوريا والأردن، وإنقلاب (بكر صدقي) في العراق. وشهدت البلاد حركات عسكرية لمجموعة من الضباط أشهرها (حركة مايس) في العام ١٩٤١. ونشبت عدّة حروبٍ متعاقبةٍ منها حربُ ١٩٤٨، ثم حرب ١٩٥٦ ضد (مصر) بعدوان ثلاثي.

ومن الإنجازات الظاهرة التي تمت في العهد الملكي (إنشاء مجلس الإعمار) الذي ما تزال العديد من منجزاته شاخصة إلى الآن.



منهاج جرائم حزب البعث البائد المحظور

وقد إنتهى النظام الملكي في العراق بعد إنقلاب ١٩٥٨ الذي قتل فيه (الملك فيصل الثاني) وعدد من أفراد أسرته وحاشيته، وعدد من المسؤولين في الحكومة. وبذلك بدأت حقبة زمنية و نظام سياسي جديد.

المحور الثاني: العهد الجمهوري (١٩٥٨-١٩٦٨)

بدأ العهد الجمهوري الأول في العراق بإنقلاب (١٤/ تموز/ ١٩٥٨) الذي قام به عدد من الضباط العسكريين. وقد تولى الزعيم (عبد الكريم قاسم) وعدد من الضباط العسكريين مقاليد الحكم في العراق، وتم إلغاء القانون الأساسي لعام ١٩٢٥، وأصدرت الجهة القائمة بالانقلاب دستورا مؤقتا في (٢٧/ تموز/ ١٩٥٨) أمضى عليه رئيس الوزراء؛ فأعلن رسميا، وكان مكونا من (٢٧ سبع وعشرين) مادة، ثم أُضيفت إليه ثلاث مواد؛ فأصبح مكونا من (٣٠ ثلاثين) مادة.

واستمر ذلك حتى وقوع انقلاب (٨/ شباط/ ١٩٦٣) عندما حصلت أحداث أدت إلى مقتل الزعيم (عبد الكريم قاسم)، وتولّى البعثيين السلطة، وتم اختيار (عبد السلام محمد عارف) رئيسا للجمهورية، وتحصل إصدار دستور (٤/ نيسان/ ١٩٦٣) الذي تكون من (٢٠ عشرين) مادة.

وكانت السيادة للمجلس الوطني، ثم صدر دستور (٢٢/ نيسان/ ١٩٦٣)، ثم دستور (٢٩/ نيسان/ ١٩٦٤). وقد استمر حكم (عبد السلام محمد عارف) حتى وفاته في (١٣/ نيسان/ ١٩٦٦) نتيجة سقوط الطائرة التي كانت تقله مع عدد من الوزراء والضباط والمراتب بين مدينة البصرة والقرنة؛ فتولى الحكم بعده أخوه (عبد الرحمن محمد عارف) الذي كان رئيسا لأركان الجيش، وابتدأ حكمه من (١٦/ نيسان/ ١٩٦٦) حتى إجباره على التنحي بأمر الانقلابيين في ١٧/ تموز/ ١٩٦٨، والسفر إلى تركيا تاركا الظهور السياسي تماما.

المحور الثالث: العهد الجمهوري (البعثي ١٩٦٨-٢٠٠٣)

بدأ هذا العهد بإنقلاب (١٧/ تموز/ ١٩٦٨) الذي قاده مجموعة من الضباط البعثيين؛ فأجبروا الرئيس آنذاك (عبد الرحمن محمد عارف) على التنحي مقابل ضمان حياته وحياة إبنه. وقد كان نظام الحكم شموليا تفرد فيه نظام الحزب الواحد إذ منعت الأحزاب من ممارسة النشاطات السياسية، ومسك زمام الحكم، ومقاليد حزب البعث البائد.



منهاج جرائم حزب البعث البائد المحظور

وألف مجلسٌ لقيادة الثورة جمع بيده السلطتين التشريعية، والتنفيذية حتى إنشاء المجلس الوطني الذي كان صُورًا يمثل السلطة التشريعية التي كانت في حقيقة الأمر بيد رئيس مجلس قيادة الثورة وهو رئيس الجمهورية نفسه الذي كان في بعض الأحداث والمواقف يتسّم منصب رئيس الوزراء أيضًا.

لقد شهدت هذه الحقبة الزمنية من حكم البعث التضييق على الحقوق، والحريات، ومحاربة التيارات الدينية، وغير الدينية، ومنع أي نشاط سياسي أو حزبي لها، وزجّ قادتها وأعضائها في المعتقلات والسجون تحت تهم كاذبة وغير صحيحة.

وقد استمر هذا النظام بسياسته هذه حتى إسقاطه بدخول قوات الاحتلال الأجنبي إلى العراق في (٢٠٠٣/٤/٩)؛ فتم إصدار (قانون الدولة) للمرحلة الانتقالية في العام ٢٠٠٤، ثم صدر دستور العراق في العام ٢٠٠٥ الذي أصبح نافذاً بعد التصويت عليه بالاستفتاء الشعبي الدستوري؛ فتمّ تأليف الحكومة بموجبه.

المبحث الثاني: إنتهاكات النظام البعثي للحقوق والحريات العامة

إستولى حزب البعث على زمام السلطة في العراق بعد الانقلاب الذي قاده ضد الرئيس (عبد الرحمن محمد عارف) في (١٧/ تموز/ ١٩٦٨) كما مرّ سابقًا، وبدأ عهد جديد في العراق لم تصن فيه مبادئ حقوق الإنسان والحريات العامة التي أقرتها المواثيق والمعاهدات الدولية، ولم تحفظ فيه الحقوق الاجتماعية والاقتصادية. ولتبين ذلك سنعرضُ هذا المبحث في محورين رئيسيين هما:

المحور الأول: إنتهاك الحقوق الفكرية والحريات العامة

بعد إنقلاب العام ١٩٦٨ وضع قادة حزب البعث (البائد) دستوراً جديداً لتنظيم سلطتهم إذ تولى الحزب زمام الحكم، وأحكم سيطرته عليه بعد إبعاد الجهات التي تحالفت معه للإطاحة بالرئيس (عبد الرحمن عارف)، وأصدر الحزب في ١٩٦٨/٩/٢١ دستوراً مؤقتاً لم تختلف فيه المواد التي عالجت حقوق الإنسان المدنية، والسياسية عما ورد في دستور العام ١٩٦٤ إذ جاءت الحقوق تكراراً لما سبق مع ملاحظة أنه على الرغم من ورود قانون لتأسيس الأحزاب، والاعتراف بها فإنه لم يتم تأليف أي حزب سياسي في هذه المدة. وإن حرية الصحافة بقيت محكومة بمبدأ الترخيص، إذ يجبُ استحصال موافقة (وزير الثقافة والإعلام) قبل إصدار أي مطبوع.



وُمُنِحَ رئيس الجمهورية الحقَّ في إصدار القرارات التي لها قوة القانون من دون وجود ضوابط أو جهة تملك الرقابة عليه فضلا على عدم خضوع الإجراءات المتخذة من الرئيس للطعن أمام القضاء مما ولّد انتهاكا لحقوق الإنسان نتيجة عدم توافر ضمانات كافية للأفراد بهذا الخصوص ولا سيما مع النص على استحداث محاكم لأمن الدولة تنظر في القضايا الناشئة عن حالة الطوارئ مما ولّد انتهاكا للحقوق الدستورية للأفراد.

وقد إنتهى العمل بدستور العام ١٩٦٨ المؤقت بصدر دستور جديد بتاريخ ١٦/٧/١٩٧٠ مؤقت استمر تطبيقه قرابة (٣٣ ثلاث وثلاثين) سنة. وقد احتوى على نصوص عديدة تضمنت مبادئ دستورية مهمة إلا أن آلية وضع دستور العام ١٩٧٠ المؤقت لم تأخذ بأية طريقة ديمقراطية لنشأة الدساتير؛ فمسودة الدستور لم يتم إعدادها ولا إقرارها من أي مجلس تأسيسي منتخب^(١). وسنعرّض هذا المحور على أفرع هي:

الفرع الأول إنتهاكات الحقوق الفكرية

على الرغم من أن دستور العام ١٩٧٠ قد نص على بعض الحقوق السياسية ، وكفلها للمواطن العراقي فإن هذه الحقوق قد صيغت على وفق مفهوم (حزب البعث) للحقوق السياسية، وللديمقراطية التي كان يُريدها هو فقط إذ كان يرفض (الديمقراطية البرلمانية) لأنها ديمقراطية برجوازية لا تتواءم مع الواقع الذي يعيشه المجتمع العراقي - كما ترى القيادة السياسية للحزب ، واتخذ بدلاً منه ما يسمى بـ (الديمقراطية الشعبية) التي كانت بحسب مفهوم حزب البعث تعني ((حق كل الطبقات والفئات الاجتماعية المؤمنة بالوحدة والحرية والاشتراكية)) ؛ فكان هذا شعار حزب البعث البائد في التعبير عن رأيه، والمشاركة في بناء المجتمع وقيادته بسلطة المؤسسات السياسية التي يقف في مقدمتها حزب البعث البائد^(٢).

وهكذا فالحقوق السياسية بحسب مفهوم حزب البعث البائد للديمقراطية كانت تقتصر على الفئات والطبقات التي يمثلها الحزب الحاكم فقط. وهذا المفهوم كما يبدو يتنافى مع أهم المبادئ التي تستند إليها الحقوق السياسية التي هي الحرية والمساواة، وسيادة الشعب للديمقراطية. وكل هذه الجوانب قد أثرت في نطاق ممارسة المواطن لحقوقه السياسية الواردة في دستور العام ١٩٧٠، وكيفية معالجة الأخير لها، إلا أن

(١) احتوى دستور العام (١٩٧٠) المؤقت على (٦٧ سبع وستين) مادة عند صدوره ، وبعد التعديلات عليه طوال مدة إنفاذه (١٩٧٠ - ٢٠٠٣) أصبح عدد مواده (٧٠ سبعين) مادة موزعة على خمسة أبواب وأفصل. وللتفصيل يُنظر: دستور ١٩٩٧ المؤقت.

(٢) قانون إصلاح النظام القانوني رقم ٣٥ لسنة ١٩٧٧ ، وزارة العدل ، رقم الإعلام القانوني ، بغداد / ١٩٧٧ ، الوقائع العراقية: ٤٧.



منهاج جرائم حزب البعث البائد المحظور

النظام قد وضع قيداً لكل هذه الحريات مفاده أن تكون منسجمة مع ما يسمى بـ (خط الثورة القومي التقدمي) وبذلك نسف الحريات مرة واحدة بهذا القيد؛ لأنه مكن السلطة من منع أي حق من الحقوق المنصوص عليها متى رأت أو ادّعت أنه مخالف للخط الذي تسعى لبلوغه.

وفي الواقع كان النظام البائد يعتمد سياسة التطهير العرقي للتخلص من المعارضين لسياسته إذ قام باغتيال المئات من الشخصيات السياسية، والأكاديمية، والعلمية المعارضة للنظام وسياساته، بل إن النظام قام بتصفية كل من يعارض أفكاره، وتوجهاته حتى إن كان من المنتمين لحزب البعث؛ فقد قام بتصفيتهم على مراحل تمثلت بالحكم بإعدام (٢٢ اثنين وعشرين واحداً) منهم، والسجن لـ (ثلاثة وثلاثين) آخرين بمُدَد تتراوح من (سنة واحدة) إلى (خمس عشرة سنة).

وقد نفذ حكم الإعدام بهم صباح يوم (١٩٧٩/٨/٨) بإشراف مباشر من رأس النظام البعثي للتخلص من أعضاء (مجلس قيادة الثورة) الذي جاء أساساً في (١٧ - ٣٠ / تموز ١٩٦٨) بالقتل أو الغدر. ولم يكن في تلك الجمهورية البعثية الظالمة التزام بالمؤسسات الدستورية، ولا قضاء محايد أو مستقل يستند إليه المواطنون في الدفاع عن أنفسهم، وحقوقهم أمام جرائم القتل والاعتداء على الكرامات التي يمارسها حزب البعث ضد المواطنين فضلاً عن مناحهم في كتابة القوانين والقرارات وتطبيقها خلافاً لكل القوانين الإنسانية كقرارات قطع اللسان لكل من انتقد رأس النظام ونظامه، والوشم على الجباه، وقطع الأذن والأيدي والأرجل، وغيرها من القرارات التي تُنتهك فيها حقوق الإنسان؛ فقد أصدر العديد من القرارات التي تنص على إعدام كل من يثبت ولاؤه لغير حزب البعث منها القرار رقم (٤٦١) في (١٩٨٢/٣/٣١) الذي نص على إعدام كل من يثبت انتمائه لـ (حزب الدعوة الإسلامية) وبأثر رجعي، وشملت التصفيات أعضاء في الأحزاب القومية، والشيوعية، والاشتراكية، وغيرها من الأحزاب العلمانية بقرارات الإعدام والتصفيات. وقد أعدم العديد من شخصيات تلك الأحزاب داخل العراق، وطوردت كوادرها التي هاجرت إلى خارج العراق.

إنّ هذا القرار يمثل مخالفة للميثاق العالمي لحقوق الإنسان والاتفاقية الدولية لحقوق المدنية والسياسية الصادرة في العام ١٩٦٦ التي صدّقها النظام نفسه في ١٩٧١/١/٢٥.

وقد مارس رأس النظام، ونظامه أشد أنواع الانتهاكات الصارخة لحقوق الإنسان بتصديه قمعاً لإنفاضة الشعب العراقي في (١٥ / شعبان / ١٤١١ هـ) الموافق للأول من آذار في العام ١٩٩١ التي إشتراك فيها الشعب العراقي في (١٤ / أربع عشرة) محافظة عراقية من أصل (١٨ / ثمانية عشرة) محافظة عراقية.



ومن الانتهاكات الصارخة لحقوق الإنسان التي مورست في قمع الانتفاضة الشعبانية، والمناطق التي شهدت الانتفاضة نذكر ما يأتي:

- أ. الإعدام بدون إجراءات قضائية، بل اعتمد على الظن، والشبهة لتنفيذ الإعدام فوراً في الموقع.
- ب. التعذيب باستعمال الممارسات غير الإنسانية.
- ت. الإحتجاز التعسفي للناس.
- ث. أخذ الرهائن واستعمال النساء والأطفال دروعاً بشرية.
- ج. انتهاك حقوق الممارسات الدينية، والممتلكات.
- ح. قتل المواطنين بدفنهم أحياء في مقابر جماعية على الشبهة والظن.
- خ. حالات الاختفاء الجماعي لعوائل أو جماعات في ظروف غامضة.
- د. التعامل مع المنتفضين بعناوين طائفية، وعنصرية.
- ذ. منع الغذاء والرعاية الصحية للمشكوك بمشاركتهم في الانتفاضة مع عوائلهم.
- ر. التمثيل بجثث القتلى بعد تعذيبهم وقتلهم.
- ز. الإجهاز على الجرحى في المستشفيات.
- س. قتل الشباب أمام ذويهم وأهلهم، وترك جثثهم معلقة أمام بيوتهم.
- ش. قتل المعارضين بربط أيديهم وأرجلهم، ووضع ثقل ورميهم في النهر.
- ص. رمي المعارضين للنظام من علو شاهق بواسطة الطائرات المروحية ليصل إلى الأرض ميتاً^(٣).

الفرع الثاني إنتهاك الحريات العامة

لم ينص دستور العام (١٩٧٠) المؤقت على الحق في المشاركة العامة بشؤون البلد صراحةً وإنما جاء إقراره بهذا الحق إقراراً ضمنياً في المادة (٤٨) منه بالقول: ((يتألف المجلس الوطني من ممثلي الشعب في مختلف قطاعاته السياسية، والاقتصادية، والاجتماعية، ويتم تشكيله وتحديد طريقة العضوية وسير العمل منه وصلاحياته بقانون خاص يسمى قانون المجلس الوطني)).

وبهذا يعد عدم النص صراحةً على هذا الحق من دستور (١٩٧٠) تراجعاً واضحاً عما ورد في دستور (١٩٦٨) المؤقت الذي نص صراحةً في المادة (٤٠) منه على أن ((الانتخاب حق للعراقيين ينظمه القانون... إلخ)). وهذا التراجع كان له أثر كبير في مدى ظهور حق المساهمة والانتخاب - وهو أهم نوع من أنواع الحقوق السياسية - إلى حيز التطبيق والممارسة الفعلية في ظل دستور (١٩٧٠) المؤقت خاصةً وأن المادة (٤٧) منه عندما أشارت

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إلى تأليف المجلس الوطني الذي يمثل مختلف قطاعات الشعب لم تحدد طريقة اختيار أعضاء المجلس فيما إذا كان بالانتخاب، أو بالتعيين وإنما ترك أمر إقرار ذلك إلى قانون خاص.

وعندما أصدر النظام قانون المجلس الوطني رقم (٢٢٨) لعام (١٩٧٠) المعدل بالقانون رقم (٧٢) لسنة (١٩٧٣) فقد اعتمد على مبدأ التعيين في تكوين المجلس الوطني بدلاً من الانتخاب. وهذه صيغة غريبة جداً على مؤسسة تمثيلية يفترض أن تقوم بمنهج الانتخاب الذي ليس سواه من منهج صحيح لإقامة المؤسسات التشريعية التمثيلية؛ لذلك ظلت ممارسة حق المساهمة في الشؤون العامة والحقوق المتفرعة عنه (الانتخاب، التصويت والترشيح) غائبة عن الحياة السياسية العراقية في العهد الجمهوري إلى أن أصدر النظام البعثي في أوائل (١٩٨٠) قانون المجلس الوطني رقم (٥٥) لسنة (١٩٨٠)^(٤). وقد نصت المادة (٢) منه على أنه ((يجري اختيار الأعضاء عن طريق الانتخاب الحر المباشر وبالاقتراع العام السري))، ونصت المادة (١٢) منه على ((أن لكل عراقي أو عراقية أن يكون ناخباً، أو مرشحاً إذا توافرت فيه الشروط المنصوص عليها في هذا القانون)).

وقد أوجب هذا القانون توافر شروط مشددة في الناخب والمرشح، فلم يحظ معظم العراقيين بفرص متساوية لممارسة حقوق (الانتخاب، والتصويت، والترشيح) لأن بعض تلك الشروط كانت عقبة حالت دون ترشيح الكثيرين لعضوية المجلس الوطني مثل (الإيمان بقادسية صدام، وأنها الطريق الذي ليس سواه من طريق للحفاظ على العراق، وأن يكون مؤمناً بالاشتراكية، وذا سلوك اشتراكي).

وقد خضع قانون المجلس الوطني رقم ٥٥ لسنة ١٩٨٠ إلى تعديلات عديدة منذ صدوره شملت العديد من مواده بما يخدم مصلحة النظام وأهدافه الأحادية الجانب، وبقي هذا القانون نافذاً إلى أن أصدر النظام في أواسط التسعينات من القرن الماضي - أي بعد مرور (١٥ / خمسة عشر) عاماً على تشريع القانون رقم ٥٥ لسنة ١٩٨٠ (السابق) - قانون المجلس الوطني رقم ٢٦ لسنة ١٩٩٥ الذي ألغى القانون (السابق) بالمادة ٩٠ منه.

ومن الملاحظ على هذا القانون الجديد أنه لم يغير من الشروط التي أوجبها القانون السابق في الناخب والمرشح، بل وثق شروطاً غريبة زادها على شروط القانون السابق منها ((منع من مارس التجارة خلال مدة الحصار المفروض على العراق منذ ٦/٢٠/١٩٩٠ أن يرشح لعضوية المجلس الوطني. واستمر هذا الحرمان لدورتين متتاليتين بعد رفع الحصار.

(٤) الوقائع العراقية ، العدد ٢٧٦٤ ، ١٩٨٠.



MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Arabic Language		Module Delivery
Module Type	Support or related learning activity		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	GE221		
ECTS Credits	4		
SSWL (hr/sem)	33		
USSWL (hr/sem)	17		
SWL (hr/sem)	50		
Module Level	2	Semester of Delivery	
Administering Department	PENG	College	CENG
Module Leader	أفراح ذياب صالح	e-mail	Afrah.t@uobaghdad.edu.iq
Module Leader's Acad. Title	مدرس	Module Leader's Qualification	ماجستير
Module Tutor	-	e-mail	-
Peer Reviewer Name	-	e-mail	-
Scientific Committee Approval Date	13/06/2023	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	1. العمل على النهوض باللغة العربية والمحافظة عليها من الخطأ 2. معرفة الطالب جمالية الأسلوب القرآني وإعجازه البلاغي ليكون النموذج الأمثل في الصياغة والتعبير 3. تنمية مهارات الطالب الإملائية 4. مساعدة الطالب على معرفة الطريقة الصحيحة في كتابة الاعداد وقراءتها وكتابة الهمزة بأنواعها 5. مراجعة قواعد اللغة العربية لتجنب وقوع الطالب في الغلط النحوي 6. تنمية مهارات الطالب على تدقيق جمال التعبير الأدبي ومحاكاة النصوص الجميلة في الكتابة 7. مساعدة الطالب على تمييز الأغلاط اللغوية الشائعة وإرشاده الى تصويبها 8. تنمية مهارة الحفظ والإلقاء
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. حب الطالب للغة العربية والاعتزاز بها 2. اكتساب الطالب القدرة على فهم الاعجاز اللغوي في النصوص القرآنية والإحساس بجمالياتها 3. معرفة الطالب طريقة التفريق بين أنواع الهمزة الأولية و المتوسطة والمنتبهة والقدرة على كتابتها بالشكل الصحي دون الوقوع في الخطأ 4. قدرة الطالب على التفريق بين الظاء والضاد وعدم الوقوع في إشكالية الخلط بينهما 5. قدرة الطالب على الكتابة دون الوقوع في الخطأ الإملائي والنحوي 6. تمكن الطالب من قراءة النصوص الأدبية بلغة فصحة صحيحة ومضبوطة بالحركات 7. القدرة على التعبير الأدبي بلغة جميلة سليمة 8. تمكن الطالب من معرفة أكثر من خمسين خطأ شائعاً ومعرفة تصويبها
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعاً

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	32	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	18	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	1
Total SWL (h/sem)	50		

الحمل الدراسي الكلي للطالب خلال الفصل	
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Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	15		1,2,3,4
	Assignments	2	15		5,6,7,8
	Projects / Lab.				
	Report				
Summative assessment	Midterm Exam	1hr	30% (10)		
	Final Exam	2hr	70% (50)		all
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	درس بيان أهمية اللغة العربية بصورة عامة وأهميتها لطلاب غير الاختصاص
Week 2	أقسام الكلام والمعرّب والمبني من الأسماء والأفعال
Week 3	المتنى والملحق به
Week 4	أنواع الجموع وما يلحق بها
Week 5	الأسماء الخمسة
Week 6	كتابة الأعداد
Week 7	الهمزة الأولية – همزتا القطع والوصل
Week 8	الهمزة المتوسطة والمنتبهة
Week 9	الإعجاز اللغوي في القرآن الكريم نماذج وتطبيقات
Week 10	الأسماء الخمسة
Week 11	الأفعال الخمسة
Week 12	الأغلاط اللغوية الشائعة
Week 13	كتابة الضاء والصاد والتاء المربوطة والهاء
Week 14	درس التعبير ونماذج من أساليب أشهر الكتاب الأدبية
Week 15	قصيدة لشاعر قديم ولشاعر حديث
Week 16	درس الإلقاء

Delivery Plan (Weekly Lab. Syllabus)	
المناهج الأسبوعي 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	النحو الواضح / علي الجارم لمسات بيانبة / فاضل السامرائي منهج اللغة العربية للأقسام غير الاختصاص	نعم
Recommended Texts	معجم الأخطاء اللغوية والنحوية الشائعة / خضر أبو العينين معاني النحو / فاضل السامرائي الأعمال الشعرية الكاملة / نازك الملائكة / المعلقات	نعم
Websites	https://ketabpedia.com	

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.