Republic of Iraq - Ministry of Higher Education and Scientific Research

University of Thi-Qar

Bachelor's degree in Petroleum anf Gas Engineering (First cycle)

Four years (Eight semesters) - 240 ECTS credits - 1 ECTS = 25 hr

Program Curriculum (2023 - 2024)

جمهورية العراق - وزارة التعليم العالي والبحث العلمي

جامعة ذي قار

بكالوريوس في هندسة النفط والغاز (الدورة الأولى)

أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة اوربية - كل وحدة اوربية = ٢٥ ساعة

المنهاج الدراسي للعام ٢٠٢٣-٢٠٢٤

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
							CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)							
UGI	One	1	PGE101	Engineering Mechanics	الميكانيك الهندسي	English	7	2			2		3	168	57	225	9.00	C	
		2	ER104	General Geology	علم الأرض	English	1	1	2		2		4	94	6	100	4.00	B	
		3	ER106	Engineering Drawing	الرسم الهندسي	English	2	2		4			3	123	52	175	7.00	B	
		4	ER101	Chemistry	الكيمياء	English	2						4	34	66	100	4.00	B	
		5	ER107	Computer science	علم الحاسبات	English	4		2				4	94	6	100	4.00	B	
		6	UR101	arabic language skills	اللغة العربية	English	1	1					3	33	17	50	2.00	S	
						Total	17	6	4	4	4	0	21	546	204	750	30.00		
UGI	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
							CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)							
	Two	1	PGE 111	Stratigraphy and Structural Geol	الجيولوجيا التطبيقية والتركيبية	English	7	2	2				4	169	31	200	8.00	C	
		2	PGE 112	Petroleum Chemistry	كيمياء النفط	English	7	1	2				4	154	21	175	7.00	C	
		3	PGE 113	Electric	الكهرباء	English	3	1	2		2		4	124	6	130	5.20	C	
		4	ER108	Engineering WorkShop	الورش الهندسية	English	1	1			0		3	33	17	50	2.00	B	
		5	ER105	Calculus	التفاضل والتكامل	English	5	1					3	93	52	145	5.80	B	
		6	UR102	Basics of english language	اللغة الإنكليزية	Arabic	1	1					3	33	17	50	2.00	S	
						Total	24	7	6	0	2	0	21	606	144	750	30.00		
UGII	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
							CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)							
	Three	1	PGE201	Petroleum Geology	جيولوجيا النفط	English	6	2	2		2		4	184	16	200	8.00	C	
		2	PGE202	Reservoir Petrophysics	بترفيزياء المكامن	English	7	2			2		3	168	7	175	7.00	C	
		3	PGE203	Petroleum Properties	خواص النفط	English	2	1	2		2		4	109	16	125	5.00	C	
		4	PGE204	Fluid Mechanics	ميكانيك الموائع	English	2	1	2		1		4	94	6	100	4.00	C	
		5	ER207	Computer Programming	برمجة الحاسبات	English	2		3				3	78	22	100	4.00	B	
		6	UR201	Human rights and democracy	حقوق الانسان والديمقراطية	Arabic	1	1					3	33	17	50	2.00	S	
						Total	20	7	9	0	7	0	21	666	84	750	30.00		
UGII	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
							CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)							
	Four	1	PGE211	Petroleum and Gas Pipeline Sy	أنظمة انابيب النفط والغاز	English	6	2			2		3	153	22	175	7.00	C	
		2	PGE212	Engineering Statistics	الإحصاء الهندسي	English	2	1			1		3	63	12	75	3.00	C	
		3	PGE213	Fundamentals of P.E.	اساسيات هندسة النفط	English	7	2			2		3	168	32	200	8.00	C	
		4	PGE214	polution Risk and Safety Manag	التلوث وإدارة المخاطر	English	1	1					3	33	17	50	2.00	C	
		5	ER205	Applied Mathematics	الرياضيات التطبيقية	English	5	1			2		3	123	52	175	7.00	B	
		6	UR202	English language skills	مهارات اللغة الإنكليزية	English	1	1					3	33	17	50	2.00	S	
						Total	22	8	0	0	7	0	18	573	152	725	29.00		
UGIII	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
							CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)							
	Five	1	PGE301	Drilling Engineering	هندسة حفر الابار النفطية	English	5	1	2		2		4	154	21	175	7.00	C	
		2	PGE302	Petroleum and Gas Production	انتاج النفط والغاز	English	5	2			3		3	153	22	175	7.00	C	
		3	PGE303	Nanotechnology	النانو تكنولوجي	English	2	1			2		3	78	22	100	4.00	C	
		4	PGE304	Analytical and numerical analys	تحليلات نظرية وعددية	English	3	1			2		3	93	7	100	4.00	C	
		5	PGE305	Well Logging	جس الابار	English	4	1			2		3	108	17	125	5.00	C	
		6	PGE306	Petroleum Economy	اقتصاد النفط	English	3	1			1		3	78	22	100	4.00	C	
						Total	22	7	2	0	12	0	19	664	111	775	31.00		
UGIII	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
							CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)							
	Six	1	PGE311	Drilling Operations	عمليات حفر الابار النفطية	English	4	1	2		2		4	139	11	150	6.00	C	
		2	PGE312	Advanced Petroleum and Gas P	انتاج النفط والغاز متقدم	English	4	2			2		3	123	27	150	6.00	C	
		3	PGE313	Reservoir	المكامن	English	4	1	2		2		4	139	11	150	6.00	C	
		4	PGE314	Geophysics	جيوفيزياء	English	4	1			2		3	108	17	125	5.00	C	
		5	PGE315	formation Evaluation	تقييم الطبقات	English	3	1			1		3	78	22	100	4.00	C	
		6	PGE316	Renewable Energy	الطاقة المتجددة	English	2	1			1		3	63	12	75	3.00	C	
		7	PGE317	Summer Training	التدريب الصيفي													C	
						Total	21	7	4	0	10	0	20	650	100	750	30.00		
UGIV	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
							CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)							
	Seven	1	PGE401	Engineering Project 1	مشروع التخرج	English	1	1	1			1	2	47	28	75	3.00	C	
		2	PGE402	Petroleum Reservoir Engineerir	هندسة المكامن النفطية	English	4	1	2		2		4	139	11	150	6.00	C	
		3	PGE403	Well Testing	فحص الابار	English	4	2			2		3	123	27	150	6.00	C	
		4	PGE404	Enhanced Oil Recovery	استخلاص النفط	English	4	2			2		3	123	27	150	6.00	C	
		5	CR405	Well Control and drilling optime	السيطرة على الابار والحفر الأمثل	English	4	1	2		2		4	139	11	150	6.00	C	
		6	PGE406	Natural Gas Engineering	الغاز الطبيعي	English	3	1					3	63	12	75	3.00	C	
						Total	20	8	5	0	8	1	19	634	116	750	30.0		
UGIV	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
							CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)							
	Eight	1	PGE411	Engineering Project 2	مشروع التخرج	English	1	1	1		0	1	2	47	28	75	3.00	C	
		2	PGE412	Advanced Topics in Drilling	مواضيع متقدمة في حفر الابار	English	6	2			2		3	153	22	175	7.00	C	
		3	PGE413	Integrated Reservoir Manageme	الإدارة المكمنية المتكاملة	English	3	2			2		3	108	17	125	5.00	C	
		4	PGE414	Petroleum and Gas Field Proce	العمليات الحقلية للنفط والغاز	English	6	1	2		2		4	169	6	175	7.00	C	
		5	PGE415	Reservoir Simulation	المحاكاة المكمنية	English	2	2	3		2		4	139	11	150	6.00	C	
		6	ER416	Engineering Ethics	الاخلاقيات الهندسية	English	1	1					3	33	17	50	2.00	S	
						Total	19	9	6	0	8	1	19	649	101	750	30.0		
						Total	165	59	36	4	58	2	158	4988	1012	6000	240.0		Must be 240 EC

Note: The student should complete 4 weeks of Summer Internships to fullfil the requirements of the Bachelor's degree

Structured SWL (hr/w) type		
	CL	Class Lecture
	Lab	Laboratory
	Pr	Practical Training
	Tut	Tutorial
	Lect	Online lecture
	Semn	Seminar

Module type		
	B	Basic learning activities
	C	Core learning activity
	S	Suport or related learning activi
	E	Elective learning activity

SWL:	Student Workload
SSWL:	Structured SWL
USSWL:	Unstructured SWL

Note: Columns O, Q and R are progrmaed, protected and should not be edited

جامعة ذي قار

كلية الهندسة

بكالوريوس

هندسة

النفط والغاز

University of Thi-Qar

College of Engineering

Bachelor's degree

(B. Sc.)

Petroleum and Gas Engineering

Table of Contents | جدول المحتويات

1. Mission & Vision Statement

Vision Statement

Petroleum and gas are significantly taking an importance role in the sector of primary energy sources. The concern of this engineering field is exploration, drilling and production of oil and gas. Thus, The academic staff of the Petroleum and Gas department at University of Thi-Qar believe that students come to understand the discipline such field through a combination of course work (basic sciences and core subjects), laboratory experiences, research, and fieldwork. In the Petroleum and Gas Engineering Department, the aim of undergraduate education is to equip the students with knowledge of basic sciences as well as with the tools of rapidly growing technology.

Mission Statement

The Petroleum and Gas Engineering Department mission of the educational process is to provide the students with a knowledge that help them practicing their profession in drilling, production and reservoir engineering topics for underground fluid resources.

In addition, the department seeks to achieve an advancement of knowledge and technology that form the basis of petroleum engineering as well as for finding solutions to the national, international, societal and environmental issues related to petroleum industry.

2. Program Specification

Programme code:	BSc-BIO	**ECTS**	240
Duration:	4 levels, 8 Semesters	**Method of Attendance:**	Full Time

The Department of Petroleum and Gas Engineering (PGE) was established in 2014 as one of five departments of the College of Engineering at the University of Thi-Qar University, one of Iraq's most prestigious universities in the city of Nassiriyah. “Petroleum and Gas Engineering” is a growing and one of the most sought disciplines in the field of engineering study. Currently, there are more 600 full time student spreading across the four stages of the education journey seeking their B.sc degree in Petroleum and Gas Engineering.

To obtain a B.Sc. degree in Petroleum and Gas Engineering, there is only one single track offered by the department. However, the department offers a wide range of up to date technologies through many scientific subjects. These subjects are varying from basic since subjects (physics, mathematics, chemistry and geology) to the core subjects such as (Petroleum Production, Petroleum Reservoir Engineering, Drilling, ...) that supply the engineers with knowledge and skills to work in such field.

In addition, to obtain the B.Sc. degree, the student must complete his summer training Summer training over a period of 30 days excluding weekends and

official holidays, and must be undertaken in companies or establishments accepted by the college. Summer training is supervised by a coordinator in each department and a college training coordinator. The student's performance is evaluated by the training company and by both the Department and College coordinators.

The Petroleum and Gas Engineering department offers morning and evening schedules. Thus, the interested students would have more flexibility to choose join our program depending on their preference, time, and availability.

The Baccalaureate Degree of Petroleum and Gas Engineering program in College of Engineering at Thi-Qar University is compatible with Bologna process. The offered tables of the program match the European Credit Transfer System (ECTS), where 1 ECTS is equivalent to 25 hours per week.

3. Program Objectives

1. Filling the market need of professionals in the area of Petroleum and Gas engineering, mainly because the area of petroleum is the most growing industry sector in Iraq.
2. Satisfying the demand of engineers that can reach administrational positions and decision making levels in the national and international companies.
3. To provide engineers with skills and ethic manners related to engineering.

4. Student Learning Outcomes

The graduates of Petroleum and Gas Engineering Department at college of Engineering of University of Thi Qar are expected to gain the following outcomes :

Outcome 1

By applying principles of engineering, science, and mathematics, the graduate are expected to have the ability to identify, formulate, and solve complex engineering problems.

Outcome 2

The graduate should be able to apply the principle of engineering design theories to create solution for particular problems and satisfying specific engineering needs, taking into account the public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors

Outcome 3

The graduate should gain a professional way to communicate with a wide range of an audience.

Outcome 4

The ability to figure out the ethical and professional responsibilities in engineering situations, and to give decision considering the engineering impact on global, economic, environmental, and social domains.

Outcome 5

The should be able to effectively work in a team, interacting with the other team members to establish goals, plan tasks, and meet objectives.

Outcome 6

Analyzing and interpreting data of engineering experiments and effectively use engineering judgment to conclude.

5. Academic Staff

ت	الاسم الثلاثي	الشهادة	الاختصاص
.1	عبد الله خزعل عكاب	دكتوراه	هندسة نفط وغاز
.2	رحيم عبدالله جباره	دكتوراه	فيزياء
.3	خالد فرهود جسب	دكتوراه	هندسة كيمياوي
.4	خالد عبد الحسين محمد	دكتوراه	هندسة نفط
.5	تقى عبد الرزاق فليح	دكتوراه	هندسة نفط
.6	اقبال خلف عريبي	دكتوراه	هندسة مدني
.7	كاظم جواد عبد الكاظم	دكتوراه	هندسة مدني
.8	احمد مجيد ضايف	دكتوراه	هندسة كيمياوي
.9	نور نجم عبد	دكتوراه	هندسة ميكانيك
.10	سعد جابر نزال	ماجستير	هندسة ميكانيك
.11	حيدر سامي	ماجستير	هندسة مدني
.12	يوسف هاشم جاسم	ماجستير	هندسة مدني
.13	رائد شاكر حامد	ماجستير	هندسة ميكانيك
.14	التفات لازم عيدان	ماجستير	هندسة ميكانيك
.15	بيداء عدنان عبد الحسين	ماجستير	هندسة ميكانيك
.16	اسعد هادي دخيل	ماجستير	تربية
.17	ملاك حريز نعيم	ماجستير	علوم كيمياء
.18	احمد جواد خلف	بكلوريوس	هندسة كيمياوي
.19	حنين كريم كاظم	بكلوريوس	هندسة نفط وغاز
.20	ريام جلال فاخر	بكلوريوس	هندسة مواد

6. Credits, Grading and GPA

Credits

The university of Thi Qar is following the Bologna Process with the European Credit Transfer System (ECTS) credit system. The total degree program number of ECTS is 240, 30 ECTS per semester. 1 ECTS is equivalent to 25 hrs student workload, including structured and unstructured workload.

Grading

Before the evaluation, the results are divided into two subgroups: pass and fail. Therefore, the results are independent of the students who failed a course. The grading system is defined as follows:

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:				
Number 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.				

Calculation of the Cumulative Grade Point Average (CGPA)

1. The CGPA is calculated by the summation of each module score multiplied by its ECTS, all are divided by the program total ECTS.

   CGPA of a 4-year B.Sc. degree:

   CGPA = [(1st ^{m}odule score x ECTS) + (2nd ^{m}odule score x ECTS) + ……] / 240

7. Curriculum/Modules

Semester 1 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
PGE101	Engineering Mechanics	168	57	9.00	C	
ER104	General Geology	94	6	4.00	B	
ER106	Engineering Drawing	123	52	7.00	B	
ER101	Chemistry	79	21	4.00	B	
ER107	Computer science	94	6	4.00	B	
UR101	arabic language skills	33	17	2.00	S	

Semester 2 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
PGE 111	Stratigraphy and Structural Geology	169	31	8.00	C	
PGE 112	Petroleum Chemistry	154	21	7.00	C	
PGE 113	Electric	124	6	5.20	C	
ER108	Engineering WorkShop	33	17	2.00	B	
ER105	Calculus	93	52	5.80	B	
UR102	Basics of english language	33	17	2.00	S	

Semester 3 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
PGE201	Petroleum Geology	184	16	8.00	C	
PGE202	Reservoir Petrophysics	168	7	7.00	C	
PGE203	Petroleum Properties	109	16	5.00	C	
PGE204	Fluid Mechanics	94	6	4.00	C	
ER207	Computer Programming	78	22	4.00	B	
UR201	Human rights and democracy	33	17	2.00	S	

Semester 4 | 29 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
PGE211	Petroleum and Gas Pipeline System	153	22	7.00	C	
PGE212	Engineering Statistics	63	12	3.00	C	
PGE213	Fundamentals of P.E.	168	32	8.00	C	
PGE214	Pollution and Risk Management	33	17	2.00	C	
ER205	Applied Mathematics	123	52	7.00	B	
UR202	English language skills	33	17	2.00	S	

Semester 5 | 31 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
PGE301	Drilling Engineering	139	11	6.00	C	
PGE302	Petroleum and Gas Production Engineering	138	12	6.00	C	
PGE303	Nanotechnology	76	22	4.00	C	
PGE304	Analytical and numerical analysis	93	7	4.00	C	
PGE305	Well Logging	138	12	6.00	C	
PGE306	Petroleum Economy	63	12	3.00	C	

Semester 6 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
PGE311	Drilling Engineering II	139	11	6.00	C	
PGE312	Advanced Petroleum and Gas Production Engineering	123	27	6.00	C	
PGE313	Reservoir	139	11	6.00	C	
PGE314	Geophysics	138	12	6.00	C	
PGE315	formation Evaluation	63	12	3.00	C	
PGE316	Renewable Energy	63	12	3.00	C	
PGE317	Summer Training				C	

Semester 7 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
PGE401	Research Topics	48	27	3.00	C	
PGE402	Petroleum Reservoir Engineering	169	6	7.00	C	
PGE403	Well Testing	153	22	7.00	C	
PGE404	Enhanced oil recovery	63	12	3.00	C	
CR405	Well Control and drilling optimization	169	6	7.00	C	
PGE406	Natural Gas Engineering	63	12	3.00	C	

Semester 8 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
PGE411	Engineering Project	47	28	3.00	C	
PGE412	Advanced Topics in Drilling	153	22	7.00	C	
PGE413	Integrated Reservoir Management	108	17	5.00	C	
PGE414	Petroleum and Gas Field Processing	169	6	7.00	C	
PGE415	Reservoir Simulation	139	11	6.00	C	
ER416	Engineering Ethics	33	17	2.00	S	

8. Contact

Program Manager:

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جامعة ذي قار **كلية الهندسة** **بكالوريوس** **هندسة** **النفط والغاز**	University of Thi-Qar *College of Engineering* *Bachelor's degree* *(B. Sc.)* *Petroleum and Gas Engineering*

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1. Overview

This catalogue is about the courses (modules) given by the program of Petroleum and GasEngineering to gain the Bachelor of Science degree. The program delivers (49) Modules with (6000) total student workload hours and 240 total ECTS. The module delivery is based on the Bologna Process.

نظره عامه

يتناول هذا الدليل المواد الدراسية التي يقدمها برنامج هندسة النفط والغاز للحصول على درجة بكالوريوس في هندسة النفط والغاز. يقدم البرنامج (49) مادة دراسية، على سبيل المثال، مع (٦٠٠٠) إجمالي ساعات حمل الطالب و ٢٤٠ إجمالي وحدات أوروبية. يعتمد تقديم المواد الدراسية على عملية بولونيا.

2. Undergraduate Courses 2023-2024

Module 1

Code	Course/Module Title	ECTS	Semester
PGE101	Engineering Mechanics	9	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
7	4	168	57
Description			
Mechanical Engineering is a branch of engineering that deals with the design, analysis, manufacturing, and maintenance of mechanical systems. It involves the application of principles of physics, mathematics, and materials science to create and improve machines, devices, and systems. Mechanical engineers work in a variety of industries, including automotive, aerospace, energy, manufacturing, and robotics. They design and develop products ranging from small components to large systems, such as			

engines, turbines, and vehicles. Mechanical engineering students learn about topics such as mechanics, thermodynamics, materials science, and manufacturing processes. They also develop skills in problem-solving, critical thinking, and project management.

Module 2

Code	Course/Module Title	ECTS	Semester
ER104	General Geology	4	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
1	5	94	6
Description			
General Geology is a branch of Earth Science that studies the physical and chemical processes that shape the Earth's surface and interior. It involves the study of rocks, minerals, fossils, and the processes that form them. Geologists use a variety of tools and techniques to study the Earth, including fieldwork, laboratory analysis, and computer modeling. Students of General Geology learn about topics such as plate tectonics, mineralogy, petrology, sedimentology, and geophysics. They also develop skills in observation, data analysis, and critical thinking. General Geology is an important field of study for understanding natural hazards, resource exploration, and environmental management.			

Module 3

Code	Course/Module Title	ECTS	Semester
ER106	Engineering Drawing	7	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	6	123	52
Description			
engineering Drawing is a branch of engineering that involves the creation of technical drawings and diagrams used to communicate design ideas and specifications. It is a fundamental skill for engineers, architects, and designers, as it allows them to convey complex information in a clear and concise manner. Engineering Drawing involves the use of drafting tools and computer-aided design (CAD) software to create 2D and 3D models of objects and systems. Students of Engineering Drawing learn about topics such as geometric construction, orthographic projection, dimensioning, and tolerancing. They also develop skills in visualization, spatial reasoning, and communication. Engineering Drawing is an essential skill for anyone involved in the design and manufacturing of products and systems.			

Module 4

Code	Course/Module Title	ECTS	Semester
ER101	Chemistry	4	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0	34	66
Description			
Introduction – Definitions and fundamental concepts Concretions of solutions Dilution Law, normality and molarity calculation Acid-Base Equilibrium Buffers Solutions Volumetric analysis			

Modul 5

Code	Course/Module Title	ECTS	Semester
ER107	Computer science	4	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	2	94	6
Description			
Computer Science is a field of study that focuses on the theory, design, and application of computer technology. It involves the study of algorithms, programming languages, software development, computer architecture, and artificial intelligence. Students of Computer Science learn how to design and develop software applications, analyze and solve complex problems, and work with cutting-edge technologies. They also develop skills in critical thinking, problem-solving, and communication. Computer Science is an essential field of study for anyone interested in pursuing a career in technology, as it provides a strong foundation in the principles and practices of computing. It is also a rapidly growing field with many exciting opportunities for innovation and discovery.			

Module 6

Code	Course/Module Title	ECTS	Semester
UR101	Arabic language skills	2	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
1	1	33	17
Description			
Arabic Language Skills is the study of the Arabic language, which is one of the most widely spoken languages in the world. It involves learning the Arabic alphabet, grammar, vocabulary, and pronunciation. Students of Arabic Language Skills also learn about the culture and history of the Arab world, which is rich and diverse. Arabic Language Skills is an essential skill for anyone interested in working in the Middle East or North Africa, as it is the primary language spoken in these regions. It is also a valuable skill for anyone interested in learning about Islamic culture and history. Arabic Language Skills can open up many opportunities for personal and professional growth, as well as cultural exchange and understanding.			

Module 7

Code	Course/Module Title	ECTS	Semester
PGE 111	Stratigraphy and Structural Geology	8	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
7	4	169	31
Description			
Stratigraphy and Structural Geology is the study of the Earth's geological history and the processes that have shaped its structure. It involves the analysis of rock layers, fossils, and other geological features to understand the history of the Earth's surface. Students of Stratigraphy and Structural Geology also learn about the forces that have shaped the Earth's crust, including tectonic activity, erosion, and sedimentation. This field of study is essential for anyone interested in working in the oil and gas industry, as it provides a strong foundation in the principles of geology. It is also a fascinating field of study for anyone interested in understanding the history of our planet and the processes that have shaped it over millions of years.			

Module 8

Code	Course/Module Title	ECTS	Semester
PGE 112	Petroleum Chemistry	7	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
7	3	154	21
Description			
An introduction to Organic and Hydrocarbon Chemistry. An introduction to Alkane: Nomenclature, Chemical and physical properties, chemical reactions and synthesis of alkane An introduction to Alkene: Nomenclature, Chemical and physical properties, chemical reactions and preparation An introduction to Alkyne: Nomenclature, Chemical and physical properties, chemical reactions and preparation. An introduction to Haloalkanes: Nomenclature, Chemical and physical properties, chemical reactions and synthesis of alkyl halides. An introduction to Alcohols: Nomenclature, Chemical and physical properties, chemical reactions and synthesis of alkane.			

Module 9

Code	Course/Module Title	ECTS	Semester
PGE 113	Electric	5.2	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	3	124	6
Description			
Electrical Engineering is the study of the design, development, and maintenance of electrical systems and equipment. It involves the application of principles of physics and mathematics to develop new technologies and improve existing ones. Students of Electrical Engineering learn about circuits, electronics, power systems, and control systems. They also learn about the design and implementation of electrical systems for a wide range of applications, including telecommunications, transportation, and renewable energy. Electrical Engineering is an essential field of study for anyone interested in working in the technology industry, as it provides a strong foundation in the principles of electrical systems and their applications. It is also a fascinating field of study for anyone interested in understanding the technology that powers our modern world.			

Module 10

Code	Course/Module Title	ECTS	Semester
ER108	Engineering WorkShop	2	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
1	1	33	17
Description			
Engineering Workshop is a practical course that provides students with hands-on experience in the design, construction, and testing of mechanical systems. It involves the use of various tools and equipment to create prototypes and models of machines and devices. Students of Engineering Workshop learn about the principles of mechanics, materials science, and manufacturing processes. They also learn about safety procedures and the importance of quality control in the production of mechanical systems. Engineering Workshop is an essential course for anyone interested in pursuing a career in mechanical engineering, as it provides practical experience in the design and construction of mechanical systems. It is also a fascinating course for anyone interested in understanding the mechanics of machines and devices.			

Module 11

Code	Course/Module Title	ECTS	Semester
ER105	Calculus	5.80	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
5	1	93	52
Description			
Calculus is a branch of mathematics that deals with the study of rates of change and the accumulation of small quantities. It involves the use of mathematical concepts such as limits, derivatives, and integrals to solve problems related to motion, optimization, and change. Students of Calculus learn about functions, limits, differentiation, and integration. They also learn about the applications of Calculus in various fields such as physics, engineering, and economics. Calculus is an essential course for anyone interested in pursuing a career in mathematics, science, or engineering, as it provides a strong foundation in the principles of mathematical analysis. It is also a fascinating course for anyone interested in understanding the fundamental concepts of change and motion.			

Module 12

Code	Course/Module Title	ECTS	Semester
UR102	Basics of English language	2	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
1	1	33	17
Description			
Basics of English language is a course that provides students with a foundation in the fundamental principles of English grammar, vocabulary, and communication skills. It involves the study of basic grammar rules, sentence structure, and common English idioms and expressions. Students of Basics of English language learn about the different parts of speech, verb tenses, and sentence construction. They also learn about the importance of effective communication skills, including listening, speaking, reading, and writing. Basics of English language is an essential course for anyone interested in improving their English language proficiency, whether for academic, professional, or personal reasons. It is also a fascinating course for anyone interested in the study of language and communication.			

Module 13

Code	Course/Module Title	ECTS	Semester
PGE201	Petroleum Geology	8	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
6	6	184	16
Description			
Petroleum Geology is a branch of geology that deals with the study of the origin, occurrence, and exploration of hydrocarbons, including oil and gas. It involves the use of geological principles and techniques to locate and extract petroleum resources from the earth's subsurface. Students of Petroleum Geology learn about the geological processes that lead to the formation of oil and gas reservoirs, as well as the methods used to explore and evaluate these resources. They also learn about the environmental and economic impacts of petroleum exploration and production. Petroleum Geology is an essential course for anyone interested in pursuing a career in the oil and gas industry, as it provides a strong foundation in the principles of petroleum exploration and production.			

Module 14

Code	Course/Module Title	ECTS	Semester
PGE202	Reservoir Petrophysics	7	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
7	4	168	7
Description			
1.Recognize the origin of oil by two main theories' (organic and in organic) ,oil migration from source rocks toward reservoir rocks Type of petroleum trapes and its advantages and dis advantages Understand the concept of porosity and the types of porosity Distinguish the porosity of reservoir rocks by lab measurement methods and log methods Distinguish the permeability of reservoir rocks by lab and log methods Understand the concept of Darcy law which describe the fluids flow in porous medium			

Module 15

Code	Course/Module Title	ECTS	Semester
PGE203	Petroleum Properties	5	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	5	109	16
Description			
Petroleum Properties is a course that focuses on the physical and chemical properties of petroleum and its products. It involves the study of the characteristics of crude oil, natural gas, and refined petroleum products, including their composition, density, viscosity, and flammability. Students of Petroleum Properties learn about the methods used to measure and analyze these properties, as well as the factors that affect them. They also learn about the importance of these properties in the production, transportation, and storage of petroleum products. Petroleum Properties is an essential course for anyone interested in pursuing a career in the oil and gas industry, as it provides a strong foundation in the properties of petroleum and its products.			

Module 16

Code	Course/Module Title	ECTS	Semester
PGE204	Fluid Mechanics	4	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	4	94	6
Description			
Fluid Mechanics is a branch of physics that deals with the study of fluids, including liquids and gases, and their behavior under different conditions. It involves the application of mathematical and physical principles to understand the motion and properties of fluids. Students of Fluid Mechanics learn about the fundamental concepts of fluid flow, such as viscosity, pressure, and turbulence, as well as the equations that govern fluid behavior. They also learn about the practical applications of fluid mechanics in engineering, such as the design of pumps, turbines, and pipelines. Fluid Mechanics is an essential course for anyone interested in pursuing a career in engineering, physics, or related fields, as it provides a strong foundation in the principles of fluid behavior.			

Module 17

Code	Course/Module Title	ECTS	Semester
ER207	Computer Programming	4	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	78	22
Description			
Computer Programming is a course that teaches students how to write code and create software applications. It involves learning programming languages such as Java, Python, and C++, as well as the principles of software design and development. Students of Computer Programming learn how to write algorithms, debug code, and create user interfaces. They also learn about data structures, algorithms, and software testing. Computer Programming is an essential course for anyone interested in pursuing a career in software development, computer science, or related fields, as it provides a strong foundation in the principles of programming and software development. It is also a valuable skill for anyone interested in technology and innovation.			

Module 18

Code	Course/Module Title	ECTS	Semester
UR201	Human rights and democracy	2	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
1	1	33	17
Description			
Human Rights and Democracy is a course that explores the fundamental principles of human rights and democratic governance. It involves learning about the history and evolution of human rights, as well as the legal frameworks that protect them. Students of Human Rights and Democracy also learn about the principles of democratic governance, including the rule of law, accountability, and transparency. They study the role of civil society, media, and international organizations in promoting human rights and democratic values. This course is essential for anyone interested in pursuing a career in law, politics, international relations, or human rights advocacy, as it provides a strong foundation in the principles of human rights and democratic governance.			

Module 19

Code	Course/Module Title	ECTS	Semester
PGE211	Petroleum and Gas Pipeline System	7	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
6	4	153	22
Description			
Importance of pipelines: pipelines as element of infrastructure, economical comparison of pipelines with other transportation systems, safety of pipelines, transportation tasks and dimensioning of pipelines, profitability investigation of pipelines. Planning and designing of pipelines: right of way, pipelines, stations, and execution of pipeline projects. Calculation of pipelines: pressure losses and flow rates, energy demand, pressure surge calculations, pipe strength calculations. Line pipes and fittings: line pipe materials, fabrication of line pipes, fittings, line pipe testing and inspection. Construction works and corrosion protection of pipelines.			

Module 20

Code	Course/Module Title	ECTS	Semester
PGE212	Engineering Statistics	3	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	12
Description			
Engineering Statistics is a course that teaches students how to apply statistical methods to solve engineering problems. It involves learning about probability theory, statistical inference, and experimental design. Students of Engineering Statistics also learn how to use statistical software to analyze data and make informed decisions. They study the principles of quality control, reliability analysis, and statistical process control. This course is essential for anyone interested in pursuing a career in engineering, as it provides a strong foundation in the principles of statistical analysis and data-driven decision making. It is also a valuable skill for anyone interested in research and development, as it provides the tools to analyze and interpret data in a meaningful way			

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Module 21

Code	Course/Module Title	ECTS	Semester
PGE213	Fundamentals of P.E.	8	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
7	4	168	32
Description			
1. Recognize the exploration of petroleum traps by geological evidence as well as geophysics methods. 2.Drilling decisions and drilling planning as well as the description of contributors of drilling program (offshore and onshore drilling rig) The drilling rig components (position and function of every component) Drilling of oil or gas well procedure			

Drilling problems and their solutions

Oil well cementing and cement properties measurement

Module 22

Code	Course/Module Title	ECTS	Semester
PGE214	pollution Risk and Safety Management	2	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
1	1	33	17
Description			
Pollution Risk and Safety Management is a course that focuses on identifying, assessing, and managing risks associated with pollution and hazardous materials. It involves learning about the sources and types of pollution, as well as the health and environmental impacts of exposure to pollutants. Students of Pollution Risk and Safety Management also learn about risk assessment and management techniques, including hazard identification, risk analysis, and risk communication. They study the principles of safety management, including emergency response planning, incident investigation, and regulatory compliance. This course is essential for anyone interested in pursuing a career in environmental management, public health, or occupational safety, as it provides a strong foundation in the principles of pollution risk and safety management.			

Module 23

Code	Course/Module Title	ECTS	Semester
ER205	Applied Mathematics	7	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
5	3	123	52
Description			
Applied Mathematics is a course that teaches students how to apply mathematical concepts and techniques to solve real-world problems. It involves learning about mathematical modeling, optimization, and numerical analysis. Students of Applied Mathematics also learn how to use mathematical software to analyze data and make informed decisions. They study the principles of differential equations, linear algebra, and probability theory. This course is essential for anyone interested in pursuing a career in engineering, finance, or science, as it provides a strong foundation in the principles of mathematical analysis and problem-solving. It is also a valuable skill for anyone interested in research and development, as it provides the tools to analyze and interpret data in a meaningful way.			

Module 24

Code	Course/Module Title	ECTS	Semester
UR202	English language skills	2	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
1	1	33	17
Description			
English Language Skills is a course that focuses on developing proficiency in the English language. It involves learning about grammar, vocabulary, pronunciation, and communication skills. Students of English Language Skills also learn how to read, write, and speak English fluently and confidently. They study the principles of effective communication, including listening and speaking skills, as well as reading and writing strategies. This course is essential for anyone interested in pursuing a career in fields such as journalism, public relations, or teaching, as it provides a strong foundation in the principles of effective communication. It is also a valuable skill for anyone interested in traveling or living in English-speaking countries, as it provides the ability to communicate effectively with native speakers.			

Module 25

Code	Course/Module Title	ECTS	Semester
PGE301	Drilling Engineering	6	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	5	139	11
Description			
Drilling Well Petroleum Engineering is a course that teaches students about the principles and practices of drilling oil and gas wells. It involves learning about the drilling process, including drilling equipment, drilling fluids, and drilling techniques. Students of Drilling Well Petroleum Engineering also learn about well completion, production, and reservoir engineering. They study the principles of geology, geophysics, and petrophysics, as well as the environmental and safety considerations associated with drilling operations. This course is essential for anyone interested in pursuing a career in the oil and gas industry, as it provides a strong foundation in the principles of drilling and production engineering. It is also a valuable skill for anyone interested in energy exploration and production.			

Module 26

Code	Course/Module Title	ECTS	Semester
PGE302	Petroleum and Gas Production Engineering	6	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	5	138	12
Description			
Review of casing design concepts. Well completions: various completion designs, reservoir and mechanical considerations. Perforations, production packers, tubing strings, liners, subsurface completions, production control equipments and completion fluids. Wellhead and subsurface components installation. Surface production facilities. Piping systems, valves, chokes, fittings, separators, stock tanks, gathering systems and individual well flow rate allocation. . Fluid Separators: separator components, types and factors influencing separator capacity. Tubing and flow line behavior: Tubing size, maximum possible flow rate and flow line size. Sand control procedures			

Module 27

Code	Course/Module Title	ECTS	Semester
PGE303	Nanotechnology	4	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	78	22
Description			
a nanotechnology course typically covers the fundamentals of nanotechnology, including its history, properties of nanomaterials, and their applications in various fields such as medicine, electronics, and energy. The course may also delve into the fabrication and characterization techniques used in nanotechnology, such as scanning electron microscopy and atomic force microscopy. Students may also learn about the ethical and societal implications of nanotechnology. The course may include hands-on laboratory experiments and projects, allowing students to apply their knowledge and skills in a practical setting. Overall, a nanotechnology course provides students with a			

comprehensive understanding of this rapidly growing field and prepares them for careers in research, development, and innovation.

Module 28

Code	Course/Module Title	ECTS	Semester
PGE304	Analytical and numerical analysis	4	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	1	93	7
Description			
Analytical and Numerical Analysis is a course that teaches students about the principles and techniques of mathematical analysis. It involves learning about the methods used to solve complex mathematical problems, including differential equations, partial differential equations, and numerical methods. Students of Analytical and Numerical Analysis also learn about the principles of calculus, linear algebra, and probability theory, as well as the techniques used to model and analyze physical systems. They study the principles of numerical analysis, including error analysis and convergence, as well as the applications of numerical methods in engineering and science. This course is essential for anyone interested in pursuing a career in engineering, science, or mathematics, as it provides a strong foundation in the principles of mathematical analysis and modeling.			

Module 29

Code	Course/Module Title	ECTS	Semester
PGE305	Well Logging	5	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	1	108	17
Description			
Well Logging is a course that focuses on the study of the physical properties of rocks and fluids in subsurface formations. It involves learning about the principles and techniques used to measure and analyze the properties of rocks and fluids using well logging tools. Students of Well Logging also learn about the principles of geology, petrophysics, and reservoir engineering, as well as the applications of well logging in the oil and gas industry. They study the principles of well logging tool design, data acquisition, and interpretation, as well as the environmental and safety considerations associated with well logging operations. This course is essential for anyone interested in pursuing a career in the oil and gas industry, as it provides a strong foundation in the principles of well logging and subsurface characterization.			

Module 30

Code	Course/Module Title	ECTS	Semester
PGE306	Petroleum Economy	4	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	2	78	22
Description			
Petroleum Economy is a course that focuses on the study of the economic principles and practices of the petroleum industry. It involves learning about the principles of supply and demand, market analysis, and pricing mechanisms, as well as the economic factors that influence the production, distribution, and consumption of petroleum products. Students of Petroleum Economy also learn about the principles of energy policy, environmental regulation, and international trade, as well as the applications of economic analysis in the petroleum industry. They study the principles of petroleum exploration and production, refining and marketing, and the economics of alternative energy sources. This course is essential for anyone interested in pursuing a career in the petroleum industry, as it provides a strong foundation in the economic principles and practices of the industry.			

Module 31

Code	Course/Module Title	ECTS	Semester
PGE311	Drilling Operations	6	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	5	139	11
Description			
Drilling Operations is a course that focuses on the study of the principles and practices of drilling oil and gas wells. It involves learning about the drilling process, including the design and operation of drilling equipment, drilling fluids, and well control systems. Students of Drilling Operations also learn about the principles of wellbore stability, formation evaluation, and drilling optimization, as well as the environmental and safety considerations associated with drilling operations. They study the principles of drilling rig design, drilling bit selection, and drilling parameter optimization, as well as the applications of drilling technology in the oil and gas industry. This course is essential for anyone interested in pursuing a career in the drilling industry, as it provides a strong foundation in the principles and practices of drilling operations.			

Module 32

Code	Course/Module Title	ECTS	Semester
PGE312	Advanced Petroleum and Gas Production Engineering II	6	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	4	123	27
Description			
Causes of low well productivity: Reservoir dominated factors, well bore dominated factors and mechanical failures. Well Diagnostics: Production test, deliverability tests, transient tests (PLT, PSP) and near wellbore damage characterization. Problem well analysis: Well Performance Prediction; Decline curve analysis, Material balance method and reservoir simulators and Remedies. Well services and work over jobs; squeeze jobs, re-perforation and well cleaning. Stimulation Techniques: Hydraulic Fracturing; Introduction, inducing fractures, productivity ratio, fracture area, fracturing fluid coefficient, fracture efficiency, fracturing hydraulics, fracture design and calculations. Acidizing: Introduction, types of treatment, acid-fracturing design. Production system analysis and design for single/multiphase fluid flow performance relationship.			

Module 33

Code	Course/Module Title	ECTS	Semester
PGE313	Reservoir	6	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	5	139	11
Description			
Reservoir Engineering is a course that focuses on the study of the principles and practices of reservoir management in the oil and gas industry. It involves learning about the geological and physical properties of reservoirs, including their porosity, permeability, and fluid flow characteristics. Students of Reservoir Engineering also learn about the principles of reservoir simulation, reservoir performance analysis, and reservoir management strategies, as well as the environmental and safety considerations associated with reservoir operations. They study the principles of reservoir characterization, reservoir modeling, and reservoir production optimization, as well as the applications of reservoir engineering in the oil and			

gas industry. This course is essential for anyone interested in pursuing a career in reservoir engineering or reservoir management, as it provides a strong foundation in the principles and practices of reservoir engineering. So a course that focuses on the study of fluids in petroleum reservoirs. It involves learning about the properties of reservoir fluids, including their behavior under different conditions of temperature and pressure. Students of Reservoir Petroleum Fluids also learn about the principles of fluid flow in porous media, as well as the techniques used to measure and analyze reservoir fluids. They study the principles of thermodynamics, phase behavior, and fluid mechanics, as well as the environmental and safety considerations associated with fluid production and handling. This course is essential for anyone interested in pursuing a career in the oil and gas industry, as it provides a strong foundation in the principles of reservoir engineering and fluid dynamics. It is also a valuable skill

Module 34

Code	Course/Module Title	ECTS	Semester
PGE314	Geophysics	5	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	3	108	17
Description			
Geophysics is a course that focuses on the study of the physical properties of the Earth and its subsurface using various geophysical methods. It involves learning about the principles of seismic, gravity, magnetic, and electromagnetic methods, as well as their applications in the exploration and production of oil and gas. Students of Geophysics also learn about the principles of data acquisition, processing, and interpretation, as well as the environmental and safety considerations associated with geophysical operations. They study the principles of geophysical imaging, geophysical inversion, and geophysical modeling, as well as the applications of geophysics in the oil and gas industry. This course is essential for anyone interested in pursuing a career in geophysics or geophysical exploration, as it provides a strong foundation in the principles and practices of geophysics.			

Module 35

Code	Course/Module Title	ECTS	Semester
PGE315	formation Evaluation	4	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	2	78	22
Description			
Formation Evaluation is a course that focuses on the study of the physical and chemical properties of rocks and fluids in the subsurface, with the aim of determining the potential for hydrocarbon production. It involves learning about the principles of well logging, core analysis, and fluid sampling, as well as their applications in the exploration and production of oil and gas. Students of Formation Evaluation also learn about the principles of petrophysics, reservoir characterization, and reservoir			

modeling, as well as the environmental and safety considerations associated with formation evaluation operations. This course is essential for anyone interested in pursuing a career in formation evaluation or reservoir engineering, as it provides a strong foundation in the principles and practices of formation evaluation.

Module 36

Code	Course/Module Title	ECTS	Semester
PGE316	Renewable Energy	3	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	12
Description			
Renewable Energy is a course that focuses on the study of development of renewable energy technologies. It involves learning about the principles, renewable energy sources, and their applications in the development of solar cells, fuel cells, and batteries. Students and Renewable Energy also learn about the principles of energy conversion, energy storage, and energy efficiency, as well as the environmental and economic considerations associated with renewable energy technologies. This course is essential for anyone interested in pursuing a career in renewable energy research or development, as it provides a strong foundation in the principles and practices of renewable energy.			

Module 37

Code	Course/Module Title	ECTS	Semester
PGE317	Summer Training		6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
Description			
Summer Training for students in college is an essential part of their academic curriculum. It provides students with an opportunity to gain practical knowledge and hands-on experience in their field of study. Summer training programs are designed to help students develop their skills, enhance their knowledge, and gain exposure to real-world scenarios. It also helps students to understand the industry			

requirements and expectations, which can help them to prepare for their future careers. Summer training programs also provide students with an opportunity to network with professionals in their field, which can be beneficial for their future job prospects. Overall, summer training programs are an excellent way for students to gain practical experience, enhance their skills, and prepare for their future careers.

Module 38

Code	Course/Module Title	ECTS	Semester
PGE401	Engineering Project 1	3	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
1	2	47	28
Description			
Engineering projects for students in college are an essential part of their academic curriculum. These projects provide students with an opportunity to apply the theoretical knowledge they have gained in their coursework to real-world problems. Engineering projects help students to develop their problem-solving skills, critical thinking abilities, and creativity. They also help students to gain practical experience in their field of study, which can be beneficial for their future careers. Engineering projects also provide students with an opportunity to work in teams, which can help them to develop their communication and collaboration skills. Overall, engineering projects are an excellent way for students to gain practical experience, enhance their skills, and prepare for their future careers in the engineering field.			

Module 39

Code	Course/Module Title	ECTS	Semester
PGE402	Petroleum Reservoir Engineering	6	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	5	139	11

Description
Petroleum Reservoir Engineering is a specialized field of study that focuses on the exploration, development, and production of oil and gas reservoirs. It involves the application of various engineering principles and techniques to optimize the recovery of hydrocarbons from subsurface reservoirs. Students who study Petroleum Reservoir Engineering learn about the geological and physical properties of reservoirs, reservoir modeling, well testing, and production optimization. They also gain knowledge about drilling and completion techniques, reservoir simulation, and enhanced oil recovery methods. Petroleum Reservoir Engineering is a highly specialized field that offers excellent career opportunities in the oil and gas industry. Graduates can work as reservoir engineers, production engineers, drilling engineers, or in other related roles.

Module 40

Code	Course/Module Title	ECTS	Semester
PGE403	Well Testing	6	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	4	123	27
Description			
Well testing is a critical process in the oil and gas industry that involves measuring the flow rate and pressure of fluids from a wellbore. It is used to evaluate the productivity and performance of a well, as well as to determine the properties of the reservoir. Students who study well testing learn about the different types of tests that can be performed, such as drill stem testing, wireline testing, and production testing. They also gain knowledge about the equipment and tools used in well testing, data analysis, and interpretation. Well testing is an essential part of the oil and gas industry, and graduates can work as well testing engineers, production engineers, or in other related roles.			

Module 41

Code	Course/Module Title	ECTS	Semester
PGE404	Enhanced Oil Recovery	6	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	4	123	27
Description			
Enhanced Oil Recovery (EOR) is a specialized field of study that focuses on the application of various techniques to increase the recovery of oil from reservoirs. It involves the use of advanced technologies and methods to improve the efficiency of oil production. Students who study EOR learn about the different types of EOR methods, such as thermal, chemical, and gas injection. They also gain knowledge			

about the properties of reservoirs, reservoir modeling, and simulation. EOR is a critical area of study in the oil and gas industry, and graduates can work as EOR engineers, reservoir engineers, production engineers, or in other related roles.

Module 42

Code	Course/Module Title	ECTS	Semester
CR405	Well Control and drilling optimization	6	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	5	139	11
Description			
Well Control and Drilling Optimization is a specialized field of study that focuses on the safe and efficient drilling of oil and gas wells. It involves the application of advanced techniques and technologies to minimize risks and maximize productivity. Students who study Well Control and Drilling Optimization learn about the different types of drilling operations, drilling equipment, and drilling fluids. They also gain knowledge about well control techniques, such as blowout prevention and well control procedures. This field of study is critical in the oil and gas industry, and graduates can work as drilling engineers, well control specialists, or in other related roles.			

Module 43

Code	Course/Module Title	ECTS	Semester
PGE406	Natural Gas Engineering	3	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	1	63	12
Description			
Natural Gas Engineering is a specialized field of study that focuses on the exploration, production, and transportation of natural gas. It involves the application of advanced technologies and methods to extract natural gas from reservoirs and transport it to consumers. Students who study Natural Gas Engineering learn about the properties of natural gas, gas reservoir engineering, gas processing, and gas transportation. They also gain knowledge about the environmental impact of natural gas production			

and the regulations governing the industry. Natural Gas Engineering is a critical area of study in the energy industry, and graduates can work as natural gas engineers, gas processing engineers, or in other related roles.

Module 44

Code	Course/Module Title	ECTS	Semester
PGE411	Engineering Project	3	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
1	2	47	28
Description			
Engineering projects for students in college are an essential part of their academic curriculum. These projects provide students with an opportunity to apply the theoretical knowledge they have gained in their coursework to real-world problems. Engineering projects help students to develop their problem-solving skills, critical thinking abilities, and creativity. They also help students to gain practical experience in their field of study, which can be beneficial for their future careers. Engineering projects also provide students with an opportunity to work in teams, which can help them to develop their communication and collaboration skills. Overall, engineering projects are an excellent way for students to gain practical experience, enhance their skills, and prepare for their future careers in the engineering field.			

Module 45

Code	Course/Module Title	ECTS	Semester
PGE412	Advanced Topics in Drilling	7	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
6	4	153	22
Description			
Advanced Topics in Drilling is a specialized field of study that focuses on the latest techniques and technologies used in drilling operations. It involves the application of advanced drilling methods to improve drilling efficiency, reduce costs, and minimize risks. Students who study Advanced Topics in Drilling learn about the latest drilling technologies, such as directional drilling, underbalanced drilling, and managed pressure drilling. They also gain knowledge about drilling optimization, drilling automation, and drilling data analytics. This field of study is critical in the oil and gas industry, and graduates can work as drilling engineers, drilling optimization specialists, or in other related roles.			

Module 46

Code	Course/Module Title	ECTS	Semester
PGE413	Integrated Reservoir Management	5	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	4	108	17
Description			
Integrated Reservoir Management is a specialized field of study that focuses on the management of oil and gas reservoirs. It involves the integration of various disciplines, such as geology, reservoir engineering, and production engineering, to optimize the recovery of hydrocarbons from reservoirs. Students who study Integrated Reservoir Management learn about reservoir characterization, reservoir simulation, reservoir monitoring, and reservoir management strategies. They also gain knowledge about the latest technologies used in reservoir management, such as intelligent wells and enhanced oil recovery techniques. This field of study is critical in the oil and gas industry, and graduates can work as reservoir engineers, production engineers, or in other related roles.			

Module 47

Code	Course/Module Title	ECTS	Semester
PGE414	Petroleum and Gas Field Processing	7	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
6	5	169	6
Description			
Petroleum and Gas Field Processing is a specialized field of study that focuses on the processing of crude			

oil and natural gas from the wellhead to the refinery. It involves the application of various techniques and technologies to separate, purify, and transform crude oil and natural gas into valuable products such as gasoline, diesel, and petrochemicals. Students who study Petroleum and Gas Field Processing learn about the various processes involved in oil and gas processing, such as separation, dehydration, sweetening, and fractionation. They also gain knowledge about the latest technologies used in oil and gas processing, such as membrane separation and molecular sieves. This field of study is critical in the oil and gas industry, and graduates can work as process engineers, plant operators, or in other related roles.

Module 48

Code	Course/Module Title	ECTS	Semester
PGE415	Reservoir Simulation	6	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	7	139	11
Description			
Reservoir Simulation is a specialized field of study that focuses on the use of computer models to simulate the behavior of oil and gas reservoirs. It involves the integration of various disciplines, such as geology, reservoir engineering, and computer science, to create accurate models of reservoirs. Students who study Reservoir Simulation learn about the various techniques and software used to create and analyze reservoir models, such as finite difference, finite element, and streamline simulation. They also gain knowledge about the latest technologies used in reservoir simulation, such as history matching and uncertainty analysis. This field of study is critical in the oil and gas industry, and graduates can work as reservoir engineers, simulation engineers, or in other related roles.			

Module 49

Code	Course/Module Title	ECTS	Semester
ER416	Engineering Ethics	2	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
1	1	33	17
Description			

Engineering Ethics is a specialized field of study that focuses on the ethical considerations and responsibilities of engineers in their professional practice. It involves the study of moral principles and values that guide the behavior of engineers in their work, such as honesty, integrity, and accountability. Students who study Engineering Ethics learn about the various ethical dilemmas that engineers may face in their work, such as conflicts of interest, safety concerns, and environmental impact. They also gain knowledge about the legal and regulatory frameworks that govern engineering practice, such as codes of ethics and professional standards. This field of study is critical in ensuring that engineers act in the best interests of society and the environment, and graduates can work as ethical consultants, compliance officers, or in other related roles.

Contact

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Chemistry**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☒**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**ER101**				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level		1	**Semester of Delivery**		1
Administering Department		Petroleum and Gas engineering	**College**	Collage of Engineering	
Module Leader	Name Ahmed Majeed Daife		**e-mail**	E-mail: ahmed.alketife@utq.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		13/06/2023	**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. To acquire a reasonable level of knowledge in chemical in accordance with what is given among the different universities around the world, especially the high ranked ones. 2. To understanding of the basic topics in chemistry and its applications in the field of laboratories with knowledge Appropriate on different chemistry axes. 3. To gain good knowledge of the fields of using chemical methods in different fields of knowledge and the ability to diagnosis of the problems he faces and how to address them in order to be qualified to work in the industries of society. 4. Outstanding students are eligible to complete their higher studies inside and outside the country and to be high qualified Engineer. The objective of the course is to strengthen the level scientific for students on the principles of chemistry.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize how use chemical concentrations to work with chemicals. 2. List the various methods of measuring chemical concentrations. 3. Summarize what is meaning of mole, molar mass, calculations in garms and mole. 4. Define solution preparation, molarity, normality, formality, PH, POH, solubility. 5. Chemical equilibrium and chemical equations. 6. Explain the introduction about acids and based, and buffers solution. 7. Acid-base reactions equilibrium 8. Analytical methods: qualitative analysis. 9. Analytical methods: Titration. 10. Forward titration. 11. backward titration. 12. Complex titration using ETDA.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Introduction to chemistry and measuring methods</u>

	This chapter a details deception and introduction will be provided about the different kinds of available breached of chemistry sciences and the field that Petroleum and Gas Engineering are focused on and why? The available measuring methods of concertation used in the chemistry will be given and discussed in details including some relevant information about the importance of these measurements in oil and gas engineering. [10hrs] Mole and Molar mass –mass mole causations for elements and substances; Mole measurement calculation, using different methods for liquid and solid [10hrs] Molarity – Define the other methods of measuring the concentration, including molarity and normality and identify the relation between them, knowing how to measure PH and POH. [10 hrs] Chemical Equations – types of chemical equation; chemical stoichiometric, chemical equation equilibrium. [10hrs] Revision problem classes [6 hrs] <u>Part B Acid base</u> Acid –Base – equilibrium and buffers solution, specification of buffer solution, the calculations of acid based solutions; equivalent point [10 hrs] Titration: An introduction to titration; tools; phenomena; applciations . [7 hrs] Types of titrations: Backwards; forward; and complex [10 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	21	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	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 – Definitions and fundamental concepts
Week 2	Concretions of solutions
Week 3	Dilution Law, normality and molarity calculation
Week 4	Acid-Base Equilibrium
Week 5	Buffers Solutions
Week 6	Volumetric analysis
Week 7	Mid-term Exam + Quiz day

Week 8	Titration
Week 9	End Points and Equivalent Point
Week 10	Forward Titration
Week 11	Backward Titration
Week 12	Complex Titration using EDTA
Week 13	Presentation Students Day
Week 14	Seminar Day
Week 15	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to chemical concertation calculation: Solubility.
Week 2	Lab 2: Acid – Based equilibrium
Week 3	Lab 3: volumetric analysis and Titration
Week 4	Lab 4: Buffer solutions
Week 5	Lab 5: Forward Titration
Week 6	Lab 6: Backward Titration
Week 7	Lab 7: Complex Titration

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	[1] Analytical_Chemistry_7e_by_Gary_D._Chris	Yes
Recommended Texts	[2] Fundamentals_of_Analytical_Chemistry_Ed Copyright Year: 2020, dissidents.	No
Websites	[3] Harris_-_Quantitative_Chemical_Analysis_-_8th_edition	

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 Circuits**			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☒**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**Ur101**				
ECTS Credits	**8**				
SWL (hr/sem)	**200**				
Module Level		1	**Semester of Delivery**		1
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Name		**e-mail**	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		01/06/2023	**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى

نرى ان اللغة العربية هي لغة بينية ومتداخلة وذات صلة بجميع العلوم الاخرى لا سيما وانها اكتسبت قداستها لارتباطها الوثيق بالقرآن الكريم, وقال ابن كثير معللاً اختيار العربية لغة للقرآن الكريم: «وذلك لأن لغة العرب أفصح اللغات وأبينها وأوسعها، وأكثرها تأدية للمعاني التي تقوم بالنفوس؛ فلهذا أنزل أشرف الكتب بأشرف اللغات»[4]. كما أن «اختيار الله للعربية، أو اللسان العربي، ليكون أداة التوصيل، ووسيلة الإبانة، ووعاء التفكير لها .

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. التعرّف على مواطن الجمال في اللّغة العربيّة وآدابها، وأن يكتسب الطالب القدرة على دراسة فروع اللّغة العربيّة. 2. تنمية الذوق الأدبي لدى الطالب حتى يدرك النواحي الجمالية في أساليب الكلام 3. تمكين الطالب من القراءة الصحيحة، وأن يكتسب القدرة على استعمال اللغة استعمالاً صحيحاً في الاتّصال مع الآخرين؛ كالسرعة وجودة الإلقاء وحسن التعبير. 4. تعويد الطالب التعبيرات السليمة الواضحة عن أفكاره وما يقع تحت حواسه نطقاً وكتابة وحسن استخدام علامات الترقيم 5. تنمية قدرة ومهارة الطالب الإملائية والخطية بحيث يستطيع الكتابة الصحيحة من جميع النواحي. 6. تعويد الطلاب على قواعد الحديث واحترام الرأي الآخر وكذلك التغلب على عامل الخجل.
Module Learning Outcomes	1. الاهداف المعرفية 2. تذكر المعلومات التي درسها واستدعاؤها عند الحاجة 3. فهم المعلومات والشروح التي تفسر بعض الظواهر اللغوية والأدبية 4. تطبيق جميع ما تعلمه ودرسه الطلبة في حياتهم العملية

مخرجات التعلم للمادة الدراسية	تحليل المشكلة او الموضوع الذي يتالف من اجزاء مختلفة ودراستها .5 تركيب اجزاء الجملة لمعرفة معنى كل جزء على حدة مع الاطلاع على المفاهيم الأدبية والأغراض الشعرية .6
Indicative Contents المحتويات الإرشادية	اللغة العربيّة أو لغة الضاد هي واحدة من أكثر اللغات انتشاراً ضمن مجموعة اللغات الساميّة، في دول الوطن العربي إضافةً للعديد من المناطق الأخرى مثل تركيّا، والأحواز، ومالي وتشاد، والسنغال، وإثيوبيا، وأريتيريا، وإيران، وجنوبي السودان. اللغة العربيّة تعتبر لغةً مقدسة على اعتبار أنها لغة القرآن، حيث لا تتم الصلاة والعبادات الأخرى في الدين الإسلامي إلا بإتقان اللغة العربيّة، كما أنها لغة شعائريّة لدى عددٍ من الكنائس المسيحيّة على امتداد الوطن العربي، وقد تمّت كتابة العديد من الأعمال الفكريّة والدينيّة اليهوديّة بها وتحديداً في العصور الوسطى. كان لانتشار الدين الإسلامي تأثيراً مباشراً وغير مباشر في رفع شأن ومكانة اللغة العربيّة، حيث أصبحت لغة العلم والأدب والسياسة لأزمنةٍ طويلة في الديار التي حكمها المسلمون، بالإضافة لهذا فقد كان للغة العربيّة تأثيرٌ كبير على عددٍ من اللغات الأخرى على امتداد العالم الإسلامي.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. إثارة اسئلة متنوعة يمكن عبرها استدعاء المعلومات 2. شرح موضوع ما عبر مصادر متنوعة ومحاولة ربط المصادر بعضها ببعض 3. مشاهدة بعض البرامج والندوات العلمية والمؤتمرات العلمية والتربوية

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	60	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	40	**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)		

Learning and Teaching Resources

مصادر التعلم والتدريس

1. شرح ابن عقيل
2. معجم اللغة العربية
3. شذا العرف في فن الصرف
4. كتب الادب والشعر

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.

	Ministry of Higher Education and Scientific Research - Iraq University of Thi-Qar College of Engineering Department of Mechanical Engineering	

MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information

معلومات المادة الدراسية

Module Title	**Basics of english language**			**Module Delivery**	
Module Type	**Suplement**			**Theory** **Lecture** **Tutorial** **Seminar**	
Module Code	**UR 102**				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level	1		**Semester of Delivery**	2	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Sarah Rabeea Nashee		**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**	Ph.D.	
Module Tutor	None		**e-mail**	Sara.rabee@utq.edu.iq	
Peer Reviewer Name	Ahmed j. Shkara		**e-mail**		
Review Committee Approval	03/06/2023		**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 Aims أهداف المادة الدراسية	1. To develop students' English language skills 2. To strengthen speaking and listening in English 3. Facilitate the learning of engineering specialization by mastering the English language to accept many educational resources related to engineering.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Develops speaking and discussion skills in English 2. The ability to form complete sentences in different tenses and to suit the dialogue time 3. Writing formal and informal letters 4. Mastering English grammar with the correct spelling of words
Indicative Contents المحتويات الإرشادية	Indicative content includes the following.

	Parts of speech (nouns, pronouns, verbs, adverbs, prepositions, conjunctions, with learning the structure of the sentences, quiz 4 hour interjections); kinds of sentences (simple, compound, complex); subordinate clauses; 4 hour change of sentences from simple to compound and vice versa; tenses; ; direct and indirect speech. 4 hour Modal verbs 2 hour prefixes and suffixes 2 hour Politely request 2 hour Conjuctions 2 hour
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

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

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	5% (5)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	none			
	Report	1	5% (5)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	20% (20)	7	LO # 1-7
	Final Exam	3hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Parts of speech (nouns, pronouns, verbs, adverbs, prepositions L1
Week 2	Parts of speech (nouns, pronouns, verbs, adverbs, prepositions L2
Week 3	Interjections l1
Week 4	Interjections L2
Week 5	change of sentences from simple to compound and vice versa; tenses; ; direct and indirect speech. L1
Week 6	change of sentences from simple to compound and vice versa; tenses; ; direct and indirect speech. L2
Week 7	Verbs
Week 8	Mid-term Exam
Week 9	Writing the essay or article l1
Week 10	Writing the essay or article l1
Week 11	Modal verbs
Week 12	prefixes and suffixes
Week 13	Politely request
Week 14	Conjunctions
Week 15	**Preparatory Week**
Week 16	**Final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	English Grammar, Raymond murfy, 1985	No
Recommended Texts	English structure , 2020	No
Websites	https://www.examveda.com/competitive-english/practice-mcq-question-on-grammar/	

APPENDIX:

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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB 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	**Stratigraphy Geology & Structural Geology**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory**	
Module Code	**111**			☒ **Lecture**	
ECTS Credits	**4**			☒ **Lab**	
SWL (hr/sem)	**100**			☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Level	1		**Semester of Delivery**	1	
Administering Department	Petroleum and Gas engineering		**College**	Collage of Engineering	
Module Leader	Ahmed Jalal Fakher		**e-mail**	E-mail: ahmed.fakher@sci.utq.edu.iq	
Module Leader's Acad. Title	Professor		**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	13/06/2023		**Version Number**	1.0	

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	General Geology	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	5. To Understand the basic principles of how rock layers (sedimentary rocks) are formed. 6. To Understand the basic principles of forming primary and secondary structures. 7. To understand the relationship between Structural Geology and other sciences. 8. To Understand the basic principles of how multiple forces affect the sedimentary layers 9. To acquire on how an oil reservoir is formed 10. To learn how to read the essential elements of secondary structures such as the slope and the strike
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	13. Introduction to structural geology. 14. Force, Stress , Strain and Tectonics. 15. The importance of structural geology to some branches of geology. 16. Primary and secondary structural 17. Bedding, lamination, cross bedding, Graded bedding, Ripples marks and Mud cracks. 18. Folds, Faults, Joints and Unconformities. 19. Modes of deformation of rocks: Elastic, Plastic and Elastic limit. 20. Strike and Dip 21. Factors That Control Rock Behavior
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.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	21	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

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

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Principles of stratigraphy: Concepts of geological time and its scale
Week 2	Correlation techniques
Week 3	Isostasy and continental drift
Week 4	Stratigraphy of Iraq with emphasis on salt range
Week 5	Stratigraphy of Iraq with emphasis on salt range
Week 6	Introduction to structural geology and its objectives
Week 7	Mid-term Exam + Quiz day
Week 8	Primary and secondary structures of sedimentary rocks
Week 9	Determination of dip, strike and thickness of beds
Week 10	Determination of dip, strike and thickness of beds
Week 11	Completion of outcrops and construction of cross sections
Week 12	Completion of outcrops and construction of cross sections
Week 13	Modes of deformation of rocks, parts
Week 14	Presentation Students Day
Week 15	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Relative dating principle
Week 2	Lab 2: Relative dating principle
Week 3	Lab 3: Attitude of bed (Strike and Dip)
Week 4	Lab 4: Attitude of bed (Strike and Dip)
Week 5	Lab 5: The three-point problem
Week 6	Lab 6: The three-point problem
Week 7	Lab 7: Exercises

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	[1] Introduction to Structural Geology. A. R. Bhattacharya, 2022	No
Recommended Texts	[2] Introduction to Petroleum engineering. John R. Fanchi and Richard L. Christiansen	No
Websites	[3]	

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	**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	**Petroleum Chemistry**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**PGE112**				
ECTS Credits	**7**				
SWL (hr/sem)	**175**				
Module Level		2	**Semester of Delivery**		1
Administering Department		Petroleum and Gas Department	**College**	Collage of Engineering	
Module Leader	Name Ahmed Majeed Daife		**e-mail**	E-mail: ahmed.alketife@utq.edu.iq	
Module Leader's Acad. Title		Assistance 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	13/06/2023	**Version Number**	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. 1.To acquire a reasonable level of knowledge in Petroleum Chemistry in accordance with what is given among the different universities around the world, especially the high ranked ones. 2. To understanding of the basic topics in Petroleum Chemistry and its applications in the field of laboratories with knowledge Appropriate on different chemistry axes. 3. To gain good knowledge of the fields of using chemical methods in different fields of knowledge and the ability to diagnosis of the problems he faces and how to address them in order to be qualified to work in the industries of society. 4. 4. Outstanding students are eligible to complete their higher studies inside and outside the country and to be high qualified Engineer. The objective of the course is to strengthen the level scientific for students on the principles of Petroleum Chemistry.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. An introduction to Organic and Hydrocarbon Chemistry. 2. An introduction to Alkane: Nomenclature, Chemical and physical properties, chemical reactions and synthesis of alkane 3. An introduction to Alkene: Nomenclature, Chemical and physical properties, chemical reactions and preparation

	4. An introduction to Alkyne: Nomenclature, Chemical and physical properties, chemical reactions and preparation. 5. An introduction to Haloalkanes: Nomenclature, Chemical and physical properties, chemical reactions and synthesis of alkyl halides. 6. An introduction to Alcohols: Nomenclature, Chemical and physical properties, chemical reactions and synthesis of alkane. 7. The benefits of alcohols components, especially in oil and gas industry. 8. Hydrocarbon Derivatives including Ether, Carboxylic Acid, Ketones, Amines, Amide, and Amino Acid. Part 1 9. Hydrocarbon Derivatives: Part 2 10. The application of hydrocarbon derivatives in oil and gas industry. 11. Hydrocarbons and Petroleum. 12. Polymerization.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Introduction to Organic Chemistry and Hydrocarbon Chemistry This chapter a details deception and introduction will be provided about the different kinds of available breached of organic chemistry and hydrocarbon and the field that Petroleum and Gas Engineering are focused on and why? The available measuring methods of concertation used in the chemistry will be given and discussed in details including some relevant information about the importance of these components in oil and gas engineering. [12hrs] Introduction to Alkanes – A details introduction will be provided about these hydrocarbon components and their exists in petroleum and gas oil industry and this will be included as well Nomenclature, Chemical and physical properties, chemical reactions and synthesis of alkane [15hrs] Introduction to Alkenes – A details introduction will be provided about these hydrocarbon components and their exists in petroleum and gas oil industry and this will be included as well Nomenclature, Chemical and physical properties, chemical reactions and synthesis of Alkenes [15hrs] Introduction to Alkyne – A details introduction will be provided about these hydrocarbon components and their exists in petroleum and gas oil industry and this will be included as well Nomenclature, Chemical and physical properties, chemical reactions and synthesis of Alkyne [15hrs] Revision problem classes [8 hrs]

	Introduction to Haloalkanes – A details introduction will be provided about these hydrocarbon components and their exists in petroleum and gas oil industry and this will be included as well Nomenclature, Chemical and physical properties, chemical reactions and synthesis of Haloalkanes [15hrs] Introduction to Alcohols – A details introduction will be provided about these hydrocarbon components and their exists in petroleum and gas oil industry and this will be included as well Nomenclature, Chemical and physical properties, chemical reactions and synthesis of Alcohols [15hrs] Hydrocarbon Derivatives including Ether, Carboxylic Acid, Ketones, Amines, Amide, and Amino Acid. Part 1 . [9 hrs] Hydrocarbon Derivatives including Ether, Carboxylic Acid, Ketones, Amines, Amide, and Amino Acid. Part 1 . [9 hrs] The application of hydrocarbon derivatives in oil and gas industry[9 hrs] Hydrocarbons and Petroleum.[17 hrs] Polymerization. [17]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem)	154	**Structured SWL (h/w)**	10.2

الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	21	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.4
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 #11, #12
	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 9#,#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	An introduction to Organic and Hydrocarbon Chemistry.
Week 2	An introduction to Alkane: Nomenclature, Chemical and physical properties, chemical reactions and synthesis of alkane
Week 3	An introduction to Alkene: Nomenclature, Chemical and physical properties, chemical reactions and preparation

Week 4	An introduction to Alkyne: Nomenclature, Chemical and physical properties, chemical reactions and preparation.
Week 5	An introduction to Haloalkanes: Nomenclature, Chemical and physical properties, chemical reactions and synthesis of alkyl halides.
Week 6	An introduction to Alcohols: Nomenclature, Chemical and physical properties, chemical reactions and synthesis of alkane.
Week 7	Mid-term Exam + Quiz
Week 8	The benefits of alcohols components, especially in oil and gas industry.
Week 9	Hydrocarbon Derivatives including Ether, Carboxylic Acid, Ketones, Amines, Amide, and Amino Acid. Part 1
Week 10	Hydrocarbon Derivatives: Part 2
Week 11	The application of hydrocarbon derivatives in oil and gas industry.
Week 12	Hydrocarbons and Petroleum.
Week 13	Presentation Day
Week 14	Seminar Day
Week 15	Materials revision and students feedback
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Mole, volume and weight percentage calculations
Week 2	Lab 2: Solubility measurement
Week 3	Lab 3: Hydrocarbons experiment
Week 4	Lab 4: Hydrocarbon Products experiment
Week 5	Lab 5: Boiling Point experiment
Week 6	Lab 6: Normal Distillation

Week 7	Lab 7: Differential distillation

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Graham Solomons. Organic Chemistry, 7th Edition. John Wiley & Sons 0-471-41803-X.	Yes
Recommended Texts	Robert Atkins & Francis Carey. Organic Chemistry: A Course Brief. McGraw Hill0-07-112162-5.	No
Websites	Janice Gorzynski Smith. Organic Chemistry. McGraw Hill. 0-07-111662-1.	

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.

	Ministry of Higher Education and Scientific Research - Iraq University of Thi-Qar College of Engineering Department of Mechanical Engineering	

MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Mathematics**			**Module Delivery**	
Module Type	**Core**			**Theory** **Lecture** **Tutorial** **Seminar**	
Module Code	**er201**				
ECTS Credits	**7**				
SWL (hr/sem)	**175**				
Module Level		1	**Semester of Delivery**		3
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Hayder Abdulhasan Lafta		**e-mail**	hayderlafta@utq.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		M.Sc.
Module Tutor	None		**e-mail**	None	
Peer Reviewer Name		Dr. Ahmed Shkara	**e-mail**	Ahmedshkara@utq.edu.iq	

Review Committee Approval	12/06/2023	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 Aims أهداف المادة الدراسية	1. To develop problem solving skills and understanding of mathematics theory through the application of techniques. 2. To understand how function of several variables. 3. This course deals with the basic concept of multivariable functions and its behavior. 4. This is the basic subject for partial derivatives and its applications. 5. To understand the derivative and integral problems. 6. To perform ordinary differential equations.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize how function of several variable works . 2. Discuss the various problems about the real numbers and equations of lines and inequalities. 3. Summarize what is meant by a basic Algebra. 4. Discuss the analysis of graphs of functions. 5. Describe the series and its applications. 6. Define the ordinary differential equations. 7. Identify the basic of complex numbers. 8. Discuss the operations of integral and numeric integral. 9. Discuss the various problems of numerical solutions of O.D.E. 10. Explain the methods of Euler and Range Cuta.
Indicative Contents المحتويات الإرشادية	None

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 type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	123	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	8.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction – functions of several variables.
Week 2	Limits partial derivatives
Week 3	Limits and continuity
Week 4	Directional Derivative
Week 5	Tangent plane and normal line extra
Week 6	Lagrange multipliers
Week 7	Double and triple integrals
Week 8	Double and triple integrals and its applications
Week 9	Complex numbers
Week 10	Series solutions and power series
Week 11	Ordinary differential equations
Week 12	Linear systems of differential equations
Week 13	Numerical method to solve O.D.E equations
Week 14	Euler and Range cuta method
Week 15	**Preparatory Week**
Week 16	**Final Exam**

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

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

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Thomas, G.B., Finney, R.L., Weir, M.D. and Giordano, F.R., 2003. *Thomas' calculus*. Reading: Addison-Wesley.	Yes
Recommended Texts	Hornsby, J., Lial, M.L. and Rockswold, G.K., 2011. *A Graphical Approach to Algebra and Trigonometry*. Addison Wesley.	No
Websites		

APPENDIX:

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	**FX –** Fail	مقبول بقرار	(45-49)	More work required but credit awarded
(0 – 49)	**F –** Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB 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 Petro physics**	**Module Delivery**
Module Type	**Core**	☒ **Theory**
Module Code	**PGE202**	☒ **Lecture**
ECTS Credits	**7**	☐ **Lab**
SWL (hr/sem)	**175**	☒ **Tutorial** ☐ **Practical** ☐ **Seminar**

Module Level		UGII	**Semester of Delivery**		3
Administering Department		PGE	**College**	ER	
Module Leader	TUQA ABDULRAZZAQ		**e-mail**	Tuqa-a@utq.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	11. To have an idea about oil formation and its origin 12. To know the types of traps and the impact on oil production 13. To develop knowledge about the petro physical properties of reservoir rocks 14. To understand the effect of rock properties on petroleum and gas flow 15. This course deals with the basic concept of rock properties 16. To learn the methods of collecting core samples and its cleaning and measuring its petro physical properties in lab and by mathematical methods or equations

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 22. Recognize the origin of oil by two main theories' (organic and in organic) in addition to oil formation and migration from source rocks to reservoir rocks 23. Type of petroleum trapes and its advantages and dis advantages 24. Understand the concept of porosity and the types of porosity 25. Distinguish the porosity of reservoir rocks by lab measurement methods and log methods 26. Distinguish the permeability of reservoir rocks by lab and log methods 27. Understand the concept of Darcy law which describe the fluids flow in porous medium 28. Saturation and description of its types 29. Relative permeability 30. Describe wettability of reservoir rock in addition to interfacial and surface tension 31. Understand Capillary hysteresis and J-function 32. Distinguish the gas zone –oil zone –water zone –free water level 33. Distinguish the rock compressibility
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. A- The geological concept of oil formation and the geological description of petroleum traps as well as oil migration from source rocks toward reservoir rocks (3weeks) B- Distinguish the petro physical properties of reservoir rocks by lab description as well as log methods in addition to equations and mathematical modules (8weeks) C- Describe the types of reservoir depending on the types of reservoir fluids and the full description of all their characteristics as well as the drive mechanisms that move the reservoir fluids

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.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	168	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	7	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
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	1.Recognize the origin of oil by two main theories' (organic and in organic) ,oil migration from source rocks toward reservoir rocks
Week 2	Type of petroleum trapes and its advantages and dis advantages
Week 3	Understand the concept of porosity and the types of porosity
Week 4	Distinguish the porosity of reservoir rocks by lab measurement methods and log methods
Week 5	Distinguish the permeability of reservoir rocks by lab and log methods
Week 6	Understand the concept of Darcy law which describe the fluids flow in porous medium
Week 7	Mid-term Exam
Week 8	Saturation and description of its types
Week 9	Relative permeability
Week 10	Describe wettability of reservoir rock
Week 11	interfacial and surface tension
Week 12	Understand Capillary hysteresis and J-function
Week 13	Distinguish the gas zone –oil zone –water zone –free water level
Week 14	Distinguish the rock compressibility
Week 15	Reservoir types
Week 16	Drive mechanisms

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	reservoir engineering Tarek Ahmed second edition	Yes
Recommended Texts	fundamentals of reservoir engineering LP. DAKE	No
Websites	https://petrowiki.spe.org/PetroWiki	

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.

	Ministry of Higher Education and Scientific Research - Iraq University of Thi-Qar College of Engineering Department of Mechanical Engineering	

MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية		
Module Title	**Technical English**	**Module Delivery**
Module Type	**Suplement**	**Theory** **Lecture** **Tutorial**
Module Code	**UR 201**	

ECTS Credits	**2**			**Seminar**	
SWL (hr/sem)	**50**				
Module Level	3		**Semester of Delivery**	6	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Sarah Rabeea Nashee		**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**	Ph.D.	
Module Tutor	None		**e-mail**	Sara.rabee@utq.edu.iq	
Peer Reviewer Name	Ahmed j. Shkara		**e-mail**		
Review Committee Approval	03/06/2023		**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 Aims أهداف المادة الدراسية	4. To develop students' English language skills 5. To strengthen speaking and listening in English 6. Facilitate the learning of engineering specialization by mastering the English language to accept many educational resources related to engineering.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	5. Develops speaking and discussion skills in English 6. The ability to form complete sentences in different tenses and to suit the dialogue time 7. Writing formal and informal letters 8. Mastering English grammar with the correct spelling of words
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Tenses The first part is the tenses and the grammar of the tenses

	How to build sentences in all tenses in accordance with the rules of the English language for each tense 6 hours Writing the essay or article Its purpose is to learn to write a composition according to the formulas given and the rules of the English language With a daily exam 4 hours Voices Learn to pronounce English words and the rules followed for pronunciation with a daily exam 4 hours The questions Study the structure of the affirmative sentence through the affirmative question With daily exam and homework 2 hours Question tag A detailed lecture on all interrogative tools, interrogative methods, and how to formulate an interrogative sentence 2 hours The passive and the active voices How to convert between the two sentences according to five rules With homework in two stages The first is to give a sentence for each rule, and the second is to transfer the sentences given as homework from the active voice to the passive voice 4 hours
Learning and Teaching Strategies	

استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	102	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	98	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	5% (5)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	none			
	Report	1	5% (5)	13	LO # 5, 8 and 10
	Midterm Exam	2 hr	20% (20)	7	LO # 1-7

Summative assessment	**Final Exam**	3hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	The tenses (present and past simple tense and future) L1
Week 2	The tenses (perfect tenses (present an past perfect tens) L2
Week 3	Present continuous tense L3
Week 4	Writing the essay or article L1
Week 5	Writing the essay or article l2
Week 6	Voices L1
Week 7	Voices L2
Week 8	Mid-term Exam
Week 9	The equations
Week 10	Question tag
Week 11	Active voice
Week 12	Passive voice
Week 13	The introducing L1
Week 14	The introducing L2
Week 15	**Preparatory Week**
Week 16	**Final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	English Grammar, Raymond murfy, 1985	no
Recommended Texts	English structure 2020, dissidents.	No
Websites	https://www.examveda.com/competitive-english/practice-mcq-question-on-grammar/	

APPENDIX:

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	**FX –** Fail	مقبول بقرار	(45-49)	More work required but credit awarded
(0 – 49)	**F –** Fail	راسب	(0-44)	Considerable amount of work required

Note:
NB 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 and Scientific Research - Iraq University of Thi-Qar College of Engineering Department of Mechanical Engineering	

MODULE DESCRIPTOR FORM

Module Information			
Module Title	**Human rights and democr**	**Module Delivery**	
Module Type	**Suplement**	**Theory Lecture Tutorial Practical Seminar**	
Module Code	**UR201**		
ECTS Credits	**1**		
SWL (hr/sem)	**50**		
Module Level	**UGII**	**Semester of Delivery**	**4**

Administering Department	**Department of Biomedical Engineering. UGV**	**College**	**Engineering College**
Module Leader	**Msc. Saad azeez**	**e-mail**	**Saad azeez 97@utq.edu.iq**
Module Leader's Acad. Title	**Msc.**	**Module Leader's Qualification**	**Msc.**
Module Tutor		**e-mail**	
Peer Reviewer Name		**e-mail**	
Review Committee Approval	**20/6/2023**	**Version Number**	

Relation With Other Modules			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	تعريف الطلبة بحقوقهم في كافة المجالات السياسية والاجتماعية والاقتصادية والدينية والثقافية وعرفة حدوده في المطالبة بتلك الحقوق على ان لا يضر ذلك بحقوق الاخرين وحرياتهم . مستندا بذلك على المواثيق الدولية والاقليمية والوطنية المتمثلة بالهياة الامم المتحدة ذات العلاقة والاعلان العالمي لحقوق الانسان سنة 1940 والعهدين الدوليين لسنة 1966 .
Module Learning Outcomes	On successful completion of this module the student will be able to: 1- قدرة الطالب على فهم حقوق الانسان. 2- المساهمة الفعالة الفرد في المجتمع من خلال مشاركته في الانتخابات. 3- التمييز لين المرشحين للانتخابات واختيار الافضل منهز للتمثيل الشعبي في مجلس النواب 4- معرفة الحقوق الخاصة والعامة بما لا يضر مع حقوق الاخرين واحترام

	توجهاتهم وعقائدهم وافكارهم وعدم المساس بها . 5- العمل في منظمات المجتمع المدني بشكل طوعي وبإرادته الحرة للمساهمة في بناء وطن حر ودولة ملتزمة بالقانون 6- المطالبة بالحقوق والحريات وفق الاليات الدستورية و القوانين التي كفلت احرامها 7- احترام القوانين والسير بها وعدم تجاوزها 8- عدم المساس بكرامة الاخرين والتجاوز على حرياتهم والممتلكات العامة والخاصة
Indicative Contents	**Indicative content includes the following.** 1. مقدمة عن حقوق الانسان. (hrs.5) 2. الجذور التاريخية للديمقراطية وحقوق الانسان. (hrs.5) 3. التعريف بحق الفرد بالانتخابات . (hrs4) 4. معرفة الاصلح من المرشحين للتمثيل الشعبي . (hrs3) 5. معرفة الفرد لحقوقه وحقوق الاخرين . (hrs3) 6. سيادة القانون وعلاقته بالمنظمات المدنية . (hrs3) 7. الاليات التي كفلها الدستور لاحترام الحقوق والحريات . (hrs6) 8. مبدا احترام حقوق الاخرين وعدم التجاوز عليها . (hrs4) 9. الحقوق السياسية والاجتماعية والاقتصادية والثقافية والدينية للفرد. (hrs5)
Learning and Teaching Strategies	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	40	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	10	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	0.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	1, 2	LO #1, 3, 4
	Assignments	2	5% (5)	2, 5	LO # 3, 4, and 5
	Projects	1	5% (5)	Continuous	
	Report	1	10% (10)	6	LO # 4, 6
Summative assessment	**Midterm Exam**	2 hr	10% (10)	6	LO # 1-5
	Final Exam	2hr	60% (60)	14	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	مقدمة عن حقوق الانسان
Week 2	الجذور التاريخية للديمقراطية وحقوق الانسان
Week 3	الجذور التاريخية للديمقراطية وحقوق الانسان
Week 4	التعريف بحق الفرد بالانتخابات
Week 5	معرفة الاصلح من المرشحين للتمثيل الشعبي
Week 6	معرفة الاصلح من المرشحين للتمثيل الشعبي
Week 7	معرفة الفرد لحقوقه وحقوق وحريات الاخرين
Week 8	معرفة الفرد لحقوقه وحقوق الاخرين
Week 9	سيادة القانون وعلاقته بالمنظمات المدنية
Week 10	سيادة القانون وعلاقته بالمنظمات المدنية
Week 11	مبدا احترام حقوق الاخرين وعدم التجاوز عليها
Week 12	الحقوق السياسية والاجتماعية والاقتصادية والثقافية والدينية للفرد
Week 13	الحقوق السياسية والاجتماعية والاقتصادية والثقافية والدينية للفرد
Week 14	الحقوق السياسية والاجتماعية والاقتصادية والثقافية والدينية للفرد
Week 15	**Preparatory Week**
Week 16	**Final Exam**

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	ميثاق الامم المتحدة (1945)	No
Recommended Texts	الاعلان العالمي لحقوق الانسان (1948)	No
Websites	Headley, J. M. (2008). The Europeanization of the world: On the origins of human rights and democracy. Princeton University Press.	

APPENDIX

GRADING SCHEME				
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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

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.

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	**PGE203**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	2		**Semester of Delivery**	1	
Administering Department	Petroleum and Gas Department		**College**	Collage of Engineering	
Module Leader	Name Ahmed Majeed Daife		**e-mail**	E-mail: ahmed.alketife@utq.edu.iq	
Module Leader's Acad. Title	Assistance 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	13/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	General Chemistry	**Semester**	2
Co-requisites module	Petroleum chemistry	**Semester**	1

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	5. 1.To acquire a reasonable level of knowledge in Petroleum Properties in accordance with what is given among the different universities around the world, especially the high ranked ones. 6. To understanding of the basic topics in Petroleum Properties and its applications in the field of laboratories with knowledge Appropriate on different chemistry axes. 7. To gain good knowledge of the fields of using chemical, physical, and thermal properties in different fields of knowledge and the ability to diagnosis of the problems he faces and how to address them in order to be qualified to work in the industries of society. 8. Outstanding students are eligible to complete their higher studies inside and outside the country and to be high qualified Petroleum and Gas Engineer. The objective of the course is to strengthen the level scientific for students on the principles of Petroleum Properties. 9. Familiarization with various crude oil quality and the assessment of these petroleum for enhancing their quality market. 10. Gain a wide knowledge of the influence of using various treatment method for escalating the quality market of crude oil based on tis specification. 11. Suggested the correct method of petroleum and gas storge and transportation based on the crude oil specification and suggested the required treatment method for safe handling and storage.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	13. An introduction to Petroleum Properties and Petroleum Origin Theories. 14. World-Wide Petroleum Types and classifications. 15. API gravity and Expansion coefficient. 16. Viscosity and fluid viscosity relationship. 17. Viscosity and Petroleum Chemical Properties. 18. Viscosity and temperature relationship. 19. Viscosity Index Dean and Davis Scale. 20. Volatility, Boiling Point, Flash and Fire Points. 21. Ignition Points and Distillation 22. Aniline Point, Sulfur Content, Diesel index. 23. Freezing and Melting Points, Congealing Point, Cloud Point, Pure

	Point, and Melting Point. 24. Water Oilfield 25. Asphalt Specifications, Manufacturing, Source and Composition, the Specifications of Iraq Asphalt 26. Manner of manufacturing asphalt and Production in Iraq.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – An introduction to Petroleum Properties and Petroleum Origin Theories. This chapter a details deception and introduction will be provided about the different kinds of available Petroleum Origin Theory and Inorganic and Organic Components that involved in the composition of crude oil. [9 hrs] World-Wide Petroleum Types and classifications will be given and discussed in details including some relevant information about the importance of these components in oil and gas engineering. [9 hrs] Measuring API gravity and Expansion coefficient, and Viscosity and fluid viscosity relationship. Studying the Viscosity and Petroleum Chemical Properties, Viscosity and temperature relationship, Viscosity Index Dean and Davis Scale. [9 hrs] The measuring of Volatility, Boiling Point, Flash and Fire Points of crude oil the influence of these characterizes on the quality of petroleum. [9 hrs] Ignition Points and Distillation including normal and fractional distillation on studying the of the petroleum properties of certain crude oil on the market demand. [9 hrs] Aniline Point, Sulfur Content, and Diesel index measuring for evaluating the quality of crude oil and the influence this on the price of petroleum on the global market. Using these characteristics for enhancing and improving the quality of crude oil.[9 hrs] Revision problem classes [10 hrs] Freezing and Melting Points, Congealing Point, Cloud Point, Pure Point, and Melting Point. A details introduction will be provided about these properties their influence on petroleum and gas oil industry and this will be included the improvement of the properties of crude oil. [9 hrs]

	Water Oilfield quality and processing. The specific properties of this water used to improve the treatment of crude oil with standards engineering specifications. [9 hrs] Asphalt Specifications, Manufacturing, Source and Composition, the Specifications of Iraq Asphalt. [9 hrs] Manner of manufacturing asphalt and Production in Iraq.[9 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	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	**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 #11, #12
	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 9#,#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	An introduction to Petroleum Properties and Petroleum Origin Theories.
Week 2	World-Wide Petroleum Types and classifications.
Week 3	API gravity and Expansion coefficient.
Week 4	Viscosity and fluid viscosity relationship.
Week 5	Viscosity and Petroleum Chemical Properties.
Week 6	Viscosity and temperature relationship.
Week 7	Viscosity Index Dean and Davis Scale.
Week 8	Volatility, Boiling Point, Flash and Fire Points.
Week 9	Ignition Points and Distillation
Week 10	Aniline Point, Sulfur Content, Diesel index.
Week 11	Freezing and Melting Points, Congealing Point, Cloud Point, Pure Point, and Melting Point.

Week12	Midterm and Quiz
Week 13	Water Oilfield
Week 14	Asphalt Specifications, Manufacturing, Source and Composition, the Specifications of Iraq Asphalt
Week15	Manner of manufacturing asphalt and Production in Iraq.
Week 16	Presentation and Seminar Day
Week 17	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Weight Density of Hydrocarbon Experiment.
Week 2	Lab 2: Measuring Density Using Hydrometer
Week 3	Lab 3: API gravity identification of Crude and its products.
Week 4	Lab 4: Viscosity measurement using Viscometer.
Week 5	Lab 5: Viscosity measurement using falling ball experiment.
Week 6	Lab 6: Fire and Flash Point Experiment
Week 7	Lab 7: Normal Distillation
Week 8	Lab 8: Fractional Distillation
Week 9	Revision and Feedback.
Week 10	Lab 9: Asphalt Softening Point Identification
Week 11	Lab 10: Asphalt Cloud Point Identification

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

Required Texts	The Properties of Petroleum Fluids, second addition, By William D. McCAIN, Jr, 1993.	Yes
Recommended Texts	The Chemistry and Technology of Petroleum, by James G. Speight, 2013.	No
Websites	https://education.nationalgeographic.org/resource/petroleum/	

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Applied Mathematics**			**Module Delivery**	
Module Type	**Core**			☒ **Theory**	
Module Code	**ER205**			☒ **Lecture**	
ECTS Credits	**7**			☒ **Lab**	
SWL (hr/sem)	**175**			☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Level	2		**Semester of Delivery**	2	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Raheem Abdallah		**e-mail**	Rahim-abdallah@utq.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	17. Gain in-depth knowledge of advanced topics in applied mathematics 18. Conducting advanced research and projects to serve the community. 19. Propose solutions to an applied problem in the real world using mathematical background. 20. Preparing the student to receive other sciences, as this subject is the basis for the student in advanced topics in his specialization 21. Enable the student to move from the theoretical side to the applied side
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	34. Teach the student how to be able to think logically. 35. The ability to suggest the appropriate mathematical method to solve the scientific problem related to the research. 36. The ability to work mentally and personally for the student in the specialization, as it is an important part of his specialization. 37. The student acquires how to develop creative thinking and innovation skills. in the field of specialization by building mathematical models for society and finding solutions to its problems. 38. The student will be able to use modern technologies. 39. The student will be able to work in a research team. 40. The student shall have the ability to solve mathematical problems related to its applications. 41. The ability to suggest the appropriate mathematical method to solve the scientific problem related to the research.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **Part A – Matrices and Determinants** Types of matrices. addition, subtraction and multiplication of matrices. Determinant of matrices. Invers of matrix. Rankl of matrix. Solving linear system by matrices and determinants. [15 hrs] **Part B – Polar Coordinates**

	Coordinate conversion Cartesian/polar. Graph of polar equation. Length of polar curve. Area in polar coordinates.[12 hrs] **Part C – Vectors** Represent point in space. Unit vectors. Addition and subtraction of vectors. Multiplying vectors (dot product and cross product). Lines and planes in space. Vector valued function. Differentiation and integration of vector valued function. [15 hrs] **Part D – Functions of several variables (partial derivatives)** Limits and continuity. Partial derivative. Second order partial derivative. The directional derivative and gradient vector. Gradient, divergence, and curl operators. Graph of the functions in three dimensions. [15 hrs] **Part E – Multiple Integral** Double integral over general region. Finding area by double integral. Double integrals in polar coordinates. Triple integral in rectangular region. Triple integrals in cylindrical and spherical coordinates. Substitutions in multiple integrals. . [15 hrs] **Part F – Infinite Sequence and series** Sequences. Convergence and divergence. Infinite series. Geometric series combining series. Power series. Taylor and McLaren series. . [12 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Encouraging students to participate in solving exercises in class and through homework, and rewarding participating students. 2.Encourage the students to ask questions and participate in their thinking about solving them 3. Improving students' thinking skills by asking deductive questions. 4. Divide the students into small groups, and these groups are responsible for re-explaining the material through presentation

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	123	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
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%	5 and 10	
	Assignments	2	10%	2 and 12	
	Projects / Lab.				
	Report	1	10%	14	
Summative assessment	**Midterm Exam**	1	20%	7	1-8
	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 matrix , Types of matrices. addition, subtraction and multiplication of matrices. Determinant of matrices.,
Week 2	Invers of matrix. Rankl of matrix. Solving linear system by matrices and determinants.
Week 3	Coordinate conversion Cartesian/polar. Graph of polar equation.
Week 4	Length of polar curve. Area in polar coordinates.
Week 5	Represent point in space. Unit vectors. Addition and subtraction of vectors. Multiplying vectors (dot product and cross product).
Week 6	Lines and planes in space. Vector valued function. Differentiation and integration of vector valued function.
Week 7	Limits and continuity. Partial derivative. Second order partial derivative. The directional derivative and gradient vector.
Week 8	. Gradient, divergence, and curl operators. Graph of the functions in three dimensions.
Week 9	Double integral over general region. Finding area by double integral
Week 10	Double integrals in polar coordinates. Area in polar coordinate by double integral
Week 11	Triple integral in rectangular region. Volume and average value in triple integral
Week 12	Triple integrals in cylindrical and spherical coordinates.
Week 13	Substitutions in multiple integrals.
Week 14	Sequences. Convergence and divergence. Infinite series.
Week 15	Geometric series combining series. Power series. Taylor and McLaren series.
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Calculus , twelfth edition	Yes

Recommended Texts	ملخصات شوم في التفاضل والتكامل – الرياضيات الجامعية	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

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 Programming**	**Module Delivery**	
Module Type	**Basic**		☒ **Theory**
Module Code	**ER207**		☒ **Lecture**
ECTS Credits	**4**		☒ **Lab**
SWL (hr/sem)	**100**		☐ **Tutorial**
			☐ **Practical**
			☐ **Seminar**

Module Level	2	**Semester of Delivery**	1
Administering Department	Petroleum and Gas Engineering	**College**	Collage of Engineering
Module Leader	Dr. Ahmed Majeed Daife	**e-mail**	Ahmed.alketife@utq.edu.iq
Module Leader's Acad. Title	Assistance 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	Computer Science	**Semester**	1
Co-requisites module	English Language	**Semester**	2

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	22. To acquire a reasonable level of knowledge in chemical in accordance with what is given among the different universities around the world, especially the high ranked ones. 23. To understanding of the basic topics in computer programming and its applications in the field of Petroleum and Gas Engineering with knowledge Appropriate on different chemistry axes. 24. To gain good knowledge of the fields of using various programming methods in different fields of Petroleum and Gas Engineering and the ability to diagnosis of the problems he faces and how to address them in order to be qualified to work in the industries of society. 25. Outstanding students are eligible to complete their higher studies inside and outside the country and to be high qualified Engineer. The objective of the course is to strengthen the level scientific for students on the principles of computer programming.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	42. To know what is Computer Programming? An Introduction to MATLAB. 43. To gain some important information about basics of this program including MATLAB expressions, variable, numbers, operators, and functions 44. To identify the different and similarity between the User function and creating m.file, single and nested functions 45. To gain the required knowledge for using Vectors, Matrices and Arrays systems in MATLAB- Part I. 46. To gain information about the use of Vectors, Matrices and Arrays in Oil and gas Engineering- Part II. 47. To gain shill about Graphics in MATLAB- Part I. 48. Represent and manipulated data via Graphics in MATLAB- Part II. 49. To know and gain knowledge about Control flow Part I. 50. Knowing how use this statements in Engineering Control flow Part II 51. To gain knowledge about Advance terms Control statement for oil and Gas Engineering- Part III. 52. To understand what is the MATLAB Simulink Part I. 53. To gain knowledge how use MATLAB Simulink in this field of science-Part II. 54. Solving Integration and differential in MATLAB Part I.

	55. Solving problems applications in Oil and Gas Engineering that relies on Integration and differential in MATLAB Part II. 56. Gain advance information about Integration and differential in MATLAB Part III.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. An introduction to MATLAB: Introduction to MATLAB system programing, including program; historical background; starting MATLAB; MATLAB Desktop; command window, history, workspace; editor debugger; controlling command window; and formatting command; command line editing [7 hrs]. MATLAB Expressions: Like most other programming languages, MATLAB provides mathematical expressions, but unlike most programming languages, these expressions involve entire matrices. The building blocks of expressions are: (i) Variables;(ii) Numbers (ii) Operators;(ii) Functions. [7 hrs] Functions in MATLAB: This chapter will studied the single and user, and nested functions in MATLAB compared with build in function in MATLAB and the using of m.file. [7 hrs] Vectors, Matrices and Arrays in MATLAB: The use of Vectors, Matrices and Arrays in MATLAB to solve various mathematical and engineering problems especially in oil and gas engineering, including; vector; matrices, arithmetic operation on matrices; subscripts; colon operators; concatenation; matrices mathematical operation; generating matrices; arrays; arrays operations; and arrays table; [7 hrs] Graphics in MATLAB: MATLAB has extensive facilities for displaying vectors and matrices as graphs, as well as annotating and printing these graphs. This chapter describes a few of the most important graphics functions and provides examples of some typical applications. This chapter will be studied; Creating a Plot; Multiple Data Sets in One Graph; Specifying Line Styles and Colors; Imaginary and Complex Data; Adding Plots to an Existing Graph; Figure Windows; Controlling the Axes; Multiple Plots in One Figure; 3-D Plots; Visualizing functions of two variables (mesh function): Colored Surface Plots (surf function): . [10hrs]

	Revision problem classes [10hrs] Control Statements MATLAB has several flow control constructs: • if statement;• if- else statement • if- elseif statement;• switch and case statements;• for loops;• while loops • continue statement;• break statement; Fundamentals. This will include as well, relational and logical operators; switch and case statements; and continuous and break statement; [7 hrs] MATLAB Simulink Simulink is a software package for modeling, simulating, and analyzing dynamic systems. It supports linear and nonlinear systems, modeled in continuous time, sampled time, or a hybrid of the two. This chapter will investigated; staring Simulink; sinks liberally; continuous linearly; discrete linearly; creating a new model; connecting locks; connecting group of blocks; drawing the lines between blocks; selecting objects; using the scope block; using retune variable; using to the workspace block; starting and stopping simulation; modelling systems; [10 hrs] MATLAB Integration and differential: Solving different integration and differential equations using MALTAB. [10 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	22	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	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	What is Computer Programming? An Introduction to MATLAB.
Week 2	MATLAB expressions, variable, numbers, operators, and functions
Week 3	the User function and creating m.file, single and nested functions
Week 4	Vectors, Matrices and Arrays systems in MATLAB- Part I.
Week 5	Vectors, Matrices and Arrays in Oil and gas Engineering- Part II.
Week 6	Graphics in MATLAB- Part I.
Week 7	**Mid-term Exam + Quizzes**
Week 8	Graphics in MATLAB- Part II.
Week 9	Control flow Part I.
Week 10	Using this statements in Engineering Control flow Part II
Week 11	Advance terms Control statement for oil and Gas Engineering- Part III.
Week 12	what is the MATLAB Simulink Part I.
Week 13	MATLAB Simulink in this field of science-Part II.
Week 14	Solving Integration and differential in MATLAB Part I.
Week 15	Solving problems applications in Oil and Gas Engineering that relies on Integration and differential in MATLAB Part II.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: An Introduction to MATLAB.
Week 2	Lab 2: MATLAB expressions
Week 3	Lab 3: Vectors, Matrices and Arrays systems in MATLAB
Week 4	Lab 4: Graphics in MATLAB

Week 5	Lab 5: Control flow
Week 6	Lab 6: MATLAB Simulink
Week 7	Lab 7: Solving Integration and differential in MATLAB Part I

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	MATLAB for Engineers, 6th edition, by Holly Moore	Yes
Recommended Texts	Introduction to MATLAB for Chemical & Petroleum Engineering 2nd Edition 2nd Edition, by Sam Toan (Author), Hertanto Adidharma (Author), 2017.	No
Websites	https://www.mathworks.com/products/matlab.html	

Grading Scheme

مخطط الدرجات

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

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

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Engineering Statistics**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**PGE212**				
ECTS Credits	**3**				
SWL (hr/sem)	**75**				
Module Level		2	**Semester of Delivery**		1
Administering Department		PGE	**College**	College of Engineering	
Module Leader	Saad Jabber Nazal		**e-mail**	Saad.alsreefi@gmail.com	
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	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	26. Introducing the students to the fundamental concepts of probability, random variables and their distributions. 27. Showing that how the ideas above provide the theoretical foundation for data analysis through statistical modeling, estimation and hypothesis testing. 28. Applying statistical theory to make informed decisions and predictions relevant to engineering. 29. This is the basic subject for all electrical and electronic circuits. 30. To understand Kirchhoff's current and voltage Laws problems. 31. To perform mesh and Nodal analysis.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On completion of this course, the should be able to : 57. Explain the basic concepts underlying probability and hypothesis testing. 58. Understand the differences between probability and statistics 59. Explain the underlying assumptions and the applicability of each of the approaches studied. 60. Apply statistical models and statistical concepts including probability and hypothesis testing to solve engineering problems. 61. Apply linear algebra concepts and methods to statistical models. 62. Demonstrate an enhanced analytical ability.

Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Basic Probability, Random variables and probability distribution, Measures of central tendency, Measures of dispersion, Frequency distribution binomial normal, Poisson, Cauchy, Gamma, Beta, Chi-square, Student's s-t, and F-distribution. Bivariate Normal Distribution, Estimation and hypothesis testing, Analysis of Variance. Curve fitting, Regression and Correlation, Auto and Cross correlation. Analysis of time series.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The strategy that will be adopted in delivering this module is to cultivates the students scientific mindset as well as a habit of working systematically. Encourage the students to participate in the exercises in order to have thoughtful interaction with mathematical concepts as well as teamwork. Motivate the students to take an active role in dealing with mathematical concepts to refine and expand their critical thinking skills. This will be achieved through classes, interactive tutorials and exercises.

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	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	12	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
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	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	Basic Probability
Week 2	Random variables and probability distribution
Week 3	Measures of central tendency
Week 4	Measures of dispersion
Week 5	Frequency distribution binomial normal
Week 6	Poisson, Cauchy, Gamma, Beta, Chi-square, Student's s-t, and F-distribution
Week 7	Poisson, Cauchy, Gamma, Beta, Chi-square, Student's s-t, and F-distribution
Week 8	Poisson, Cauchy, Gamma, Beta, Chi-square, Student's s-t, and F-distribution
Week 9	Bivariate Normal Distribution

Week 10	Estimation and hypothesis testing
Week 11	Analysis of Variance
Week 12	Curve fitting
Week 13	Curve fitting
Week 14	Regression and Correlation, Auto and Cross correlation
Week 15	Analysis of time series
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Introduction to Probability and Statistics for Engineers and Scientists, Fifth Edition, Sheldon M. Ross, 2014	Yes
Recommended Texts	Introduction to Statistics, Jim Frost 2020	No

Websites	https://www.coursera.org

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Fundamentals of P.E**			**Module Delivery**	
Module Type	**Core**			☒ **Theory**	
Module Code	**PGE213**			☒ **Lecture**	
ECTS Credits	**8**			☐ **Lab**	
SWL (hr/sem)	**200**			☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Level	UGII		**Semester of Delivery**	4	
Administering Department	PGE		**College**	ER	
Module Leader	TUQA ABDULRAZZAQ		**e-mail**	Tuqa-a@utq.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	32. To have an idea about petroleum exploration by geophysical methods 33. To understand the criteria of drilling decision 34. To develop knowledge about the drilling rig component and the rule of all the parts of the rig 35. To have an idea about drilling procedure 36. To describe the drilling fluids and their composition in addition to the methods of measure their properties (density, viscosity, filtration, gel strength, mud cake) 37. To learn the procedure of casing and cementing and casing design criteria's) 38. To have an idea about well logging and well test procedure 39. To learn about the surface facilities as well as production procedure
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 63. Recognize the exploration of petroleum traps by geological evidence as well as geophysics methods. 64. Drilling decisions and drilling plan as well as the description of contributors of drilling program (offshore and onshore drilling rig) 65. The drilling rig components (position and function of every component) 66. Drilling of oil or gas well procedure 67. Drilling problems and their solutions. 68. Oil well cementing and cement properties measurement

	69. The importance of drilling fluids and characteristic measurement of this fluids 70. Describe the types of casing according to the depth as well as casing design and selection methods of casing 71. Introduction about well logging 72. Logging tools and principle of their work 73. Well test description 74. Introduction about oil and gas production 75. Surface facilities Gas and oil Separators (shapes, designs, sizes)
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. D- The geophysical concept of oil exploration and the geological evidence about petroleum traps (2weeks) E- Introduction about well drilling, drilling rig components, drilling fluids and cementing as well as casing design and drilling problems (6weeks) F- Introduction to well logging and well test, logging tools and their principles G- Introduction about oil and gas production, Surface facilities Gas and oil Separators (shapes, designs, sizes)

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.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	168	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	32	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**200**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / 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	1. Recognize the exploration of petroleum traps by geological evidence as well as geophysics methods.
Week 2	2.Drilling decisions and drilling planning as well as the description of contributors of drilling program (offshore and onshore drilling rig)
Week 3	The drilling rig components (position and function of every component)
Week 4	Drilling of oil or gas well procedure
Week 5	Drilling problems and their solutions
Week 6	Oil well cementing and cement properties measurement
Week 7	Mid-term Exam
Week 8	Drilling fluids types and preparing
Week 9	The importance of drilling fluids and characteristic measurement of this fluids
Week 10	Describe the types of casing according to the depth as well as casing design and selection methods of casing
Week 11	Introduction to well logging
Week 12	Logging tools and principle of their work
Week 13	Well test description
Week 14	Introduction about oil and gas production
Week 15	Tubing, penetration ,valves ,chocks
Week 16	Surface facilities Gas and oil Separators (shapes, designs, sizes)

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	Drilling engineering Heriot watt university textbook , reservoir engineering Tarek Ahmed second edition	Yes
Recommended Texts	Fundamentals of Drilling Engineering Robert F. Mitchell Halliburton Stefan Z. Miska University of Tulsa	No
Websites	https://petrowiki.spe.org/PetroWiki	

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	**Pollution and Risk Management**			**Module Delivery**	
Module Type	**Core**			☒ **Theory**	
Module Code	**PGE214**			☒ **Lecture**	
ECTS Credits	**2**			**Lab**	
SWL (hr/sem)	**50**			☐ **Tutorial**	
				☐ **Practical**	
				☐ **Seminar**	
Module Level	2		**Semester of Delivery**	1	
Administering Department	PGE		**College**	College of Engineering	
Module Leader	Noor Najm Abd		**e-mail**	noornajm@utq.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	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	40. Introducing the students to the fundamental tools that they can use to predict risk. 41. Learn and practice how to consistently and constructively manage risk to deliver on all your organization's relevant primary objectives. 42. Applying statistical theory to make informed decisions and predictions relevant to engineering. 43. Recognize how to spot and avoid common errors when reviewing existing risk management.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On completion of this course, the student should be able to : 76. Identify the core types of project risks. 77. Use qualitative and quantitative risk assessment methods. 78. Competently use risk simulation techniques and other risk analysis. tools/methods and work in a group to create a risk management plan. 79. Identify a range of risk management issues/challenges and the risks within systems and be competent to initiate potential actions in response. 80. Demonstrate continued learning and personal development. 81. Recognize ethical, social and cultural issues and their importance for project

	managers.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. This course develops a foundation of safety and health concepts and skateholders, risk assessment of engineering development, hazards identifications and protection methods, Business Continuity Planning (BCP), and management of safety and health in oil and gas industry.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The strategy that will be adopted in delivering this module is to cultivates the students scientific mindset as well as a habit of working systematically. This will be achieved through classes, case studies, presentation, assignments and questioners

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
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	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	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	
Week 8	
Week 9	
Week 10	
Week 11	

Week 12	
Week 13	
Week 14	
Week 15	
Week 16	

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Introduction to Probability and Statistics for Engineers and Scientists, Fifth Edition, Sheldon M. Ross, 2014	Yes
Recommended Texts	Introduction to Statistics, Jim Frost 2020	No
Websites	https://www.coursera.org	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية		
Module Title	Nanotechnology	**Module Delivery**
Module Type	**Core**	☒ **Theory** ☒ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical**
Module Code	**PGE303**	
ECTS Credits	**4**	
SWL (hr/sem)	**78**	

			☐ **Seminar**		
Module Level		UGIII	**Semester of Delivery**		5
Administering Department		PGE	**College**	ER	
Module Leader	TUQA ABDULRAZZAQ		**e-mail**	Tuqa-a@utq.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	44. To have an idea about gas and oil properties from more than one concept (thermodynamic, chemically, physically) 45. To know the method of collecting samples from the well 46. To develop knowledge about the PVT analysis 47. To learn about the tools that used to collect fluid samples from the well as well as the procedure, mechanism of these tools 48. To distinguish the advantage and disadvantage of these tools 49. To learn about the methods of collecting the samples according to the type of reservoir in addition to the separator test 50. To understand the concept of flash liberation and differential liberation 51. To study the properties of natural gas and crude oil (molecular weight, apparent molecular weight, viscosity, density, Z factor value, gas solubility gas and oil compressibility, formation volume factor of oil and gas

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 82. Understand the Chemistry of petroleum 83. review of thermodynamic concept as related to petroleum reservoirs 84. Basic concept of phase behavior (single, binary, multi component 85. Equation of state for real fluids 86. Determining of reservoir fluid properties fluid from field data, laboratory analysis, correlations and equations 87. Study and distinguish the difference between ideal and Natural gas 88. Understand the calculation and equation to find molecular weight and apparent molecular weight of gas and natural gas in addition to specific gravity of the gas 89. How to calculate gas density and viscosity by equation and z factor value by charts 90. Understand the effect of non-hydrocarbon components on the properties of natural gas 91. Understand the concept of FVF of gas and oil and gas compressibility 92. Understand modules that deal with crude oil (black oil model and compositional model) 93. How to calculate Oil viscosity, density, compressibility in addition to gas solubility
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. H- The chemical and thermodynamic concept of oil and gas systems as well as the types of hydrocarbons (2weeks) I- PVT meaning and benefits as well as methods, tools, procedure of collecting samples from the well and from separator (5weeks) J- Describe the natural gas (hydrocarbon gases) and all needed equations and correlations (apparent molecular weight, gas density, specific gravity, viscosity, Z Factor, gas compressibility, gas formation volume factor) (4weeks) K- Describe the crude oil and all needed equations and correlations (oil density, specific gravity, viscosity, oil compressibility, oil formation volume factor oil models (black oil and compositional model) gas solubility in black oil, bubble point pressure distinguishing) (4weeks)

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.

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	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	22	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
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	Understand the Chemistry of petroleum
Week 2	review of thermodynamic concept as related to petroleum reservoirs
Week 3	Basic concept of phase behavior (single, binary, multi component
Week 4	Equation of state for real fluids

Week 5	Determining of reservoir fluid properties fluid from field data, laboratory analysis, correlations and equations
Week 6	Study and distinguish the difference between ideal and Natural gas
Week 7	Mid-term Exam
Week 8	Understand the calculation and equation to find molecular weight and apparent molecular weight of gas and natural gas in addition to specific gravity of the gas
Week 9	How to calculate gas density and viscosity by equation and z factor value by charts
Week 10	Understand the effect of non-hydrocarbon components on the properties of natural gas
Week 11	Understand the concept of FVF of gas and oil and gas compressibility
Week 12	Understand modules that deal with crude oil (black oil model and compositional model)
Week 13	How to calculate Oil viscosity and density
Week 14	Oil compressibility calculation gas solubility
Week 15	Gas solubility correlation
Week 16	Bubble point pressure and methods of determination

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	CORE CLEANING AND DRY
Week 2	POROSITY
Week 3	DETERMINATION POROSITY BY MERCURY INJECTION
Week 4	PERMEABILITY
Week 5	VISCOSITY
Week 6	OIL RECOVERY FACTOR
Week 7	FLUID SATURATION

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	reservoir engineering Tarek Ahmed second edition	Yes
Recommended Texts	fundamentals of reservoir engineering LP. DAKE	No
Websites	https://petrowiki.spe.org/PetroWiki	

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**			**Module Delivery**	
Module Type	**Core**			☒ **Theory**	
Module Code	**PGEE305**			☒ **Lecture**	
ECTS Credits	**6**			☐ **Lab**	
SWL (hr/sem)	**150**			☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Level	3		**Semester of Delivery**	5	
Administering Department	Petroleum and Gas Engineering		**College**	Collage of Engineering	
Module Leader	Dr. Ahmed Majeed Daife		**e-mail**	Ahmed.alketife@utq.edu.iq	
Module Leader's Acad. Title	Assistance 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	Fundamentals of P.E	**Semester**	3
Co-requisites module	Reservoir Petrophysics	**Semester**	4

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	52. To acquire a reasonable level of knowledge in Petroleum Engineering in accordance with what is given among the different universities around the world, especially the high ranked ones. 53. To understanding of the basic topics in Well logging and its applications in the field of Petroleum and Gas Engineering with knowledge Appropriate on different chemistry axes. 54. To gain good knowledge of the fields of Well logging using various methods of in different fields of Petroleum and Gas Engineering and the ability to diagnosis of the problems he faces and how to address them in order to be qualified to work in the industries of society. 55. Outstanding students are eligible to complete their higher studies inside and outside the country and to be high qualified Petroleum Engineering. The objective of the course is to strengthen the level scientific for students on the principles of Well Logging programming.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	94. To estimate the porosity and permeability. 95. To detect reservoir type (lithology) and thickness. 96. To determine clay volume from well logging data. 97. To determine fluid type present in the pores and saturation level. 98. To find the prospective zones of hydrocarbon. 99. To economically establish the existence of producible hydrocarbon reservoirs (oil and gas).
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Formation Evaluation:</u> Steps of Reservoir Evaluation; Field and Well Selection; Core Analysis and Digitizing Logging Data; The Coring Process; Plug Sampling and Cleaning (Unpreserved Core); Digitizing Logging Data; Depth Matching; Environmental Corrections. [15 hrs]. <u>Determination of Petrophysical Properties</u> Porosity; Controls on Porosity; Laboratory Determinations of Porosity; Density Methods; Petrographic Methods; Other Techniques; Bulk Volume Measurement; Porosity Determination from Well Logs. [15 hrs] <u>Clay Volume and Clay Distribution:</u> Clay Volume; Single Clay Indicators; Neutron log; The resistivity; Double Clay Indicators; The density – neutron; Density – Acoustic cross-plot; Clay Types Distribution ; [15 hrs]

	Lithology: Density and Neutron Cross-plot; Ternary Porosity Mode; Permeability and Relative Permeability; Sources of Permeability Data; Permeability from Well Logs Based on Empirical Correlations; [15 hrs] Reservoir Fluid Saturation: Water Saturation in Clean Sands; Archie Equations; Determination of Archie Parameters n, m, and a; Shaly Sands ; Waxman-Smits Model; Simandoux Equation; Poupon-Leveaux Equation; The Dual-Water Model; Hydrocarbon Reserve Estimation ; [15hrs] Revision problem classes [11.5hrs] DETERMINATION Of INITIAL OIL AND GAS IN PLACE Initial Oil in Place; Initial Gas in Place; Free Gas in Place; Fracture Porosity Determination; Porosity Partitioning Coefficient; [15 hrs] Hingle and Pickett Methods Formation fluid saturation; Hingle plot ; Pickett Method; Pickett plot ; [15 hrs] Net Pay with Cut-offs Introduction; Determination the Net Pay with Cut-offs; Selecting Cut-offs; How to compute Net-Pay with IP software; [15 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	138	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	9.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	12	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	0.6
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 / Tut.	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	Formation Evaluation Part I
Week 2	Formation Evaluation Part I
Week 3	Determination of Petrophysical Properties
Week 4	Clay Volume and Clay Distribution Part I
Week 5	Clay Volume and Clay Distribution Part II
Week 6	Reservoir Fluid Saturation
Week 7	DETERMINATION Of INITIAL OIL AND GAS IN PLACE Part I
Week 8	DETERMINATION Of INITIAL OIL AND GAS IN PLACE Part II
Week 9	Hingle and Pickett Methods Part I
Week 10	**Mid-term Exam + Quizzes**
Week 11	Hingle and Pickett Methods Part II
Week 12	Net Pay with Cut-offs Part I
Week 13	Net Pay with Cut-offs Part II
Week 14	Presentation Day
Week 15	Seminar Day
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Tutorial. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Tut. 1: Formation Evaluation.
Week 2	Tut. 2: Determination of Petrophysical Properties

Week 3	Tut. 3: Clay Volume and Clay Distribution
Week 4	Tut. 4: Reservoir Fluid Saturation
Week 5	Tut. 5: DETERMINATION Of INITIAL OIL AND GAS IN PLACE
Week 6	Tut. 6: Hingle and Pickett Methods
Week 7	Tut. 7: Net Pay with Cut-offs

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Richard Bateman, "Open-hole Log Analysis and Formation Evaluation", IHRDC Publishers New York	Yes
Recommended Texts	Hilchie, D. W. (1982). Applied open-hole log interpretation (for geologists and engineers), USA DW Hilchie	No
Books Required	Serra, O. (2008). Well logging handbook. Editions Technip.	

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

Well Drilling

Module Information معلومات المادة الدراسية					
Module Title	**Well Drilling**			**Module Delivery**	
Module Type	**Core**				
Module Code	**PGE311**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	GIII		**Semester of Delivery**	5	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Khalid Abdulhussain Mohammed		**e-mail**	Dr.khalid@utq.edu.iq	
Module Leader's Acad. Title	Assist. Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**	E-mail	
Peer Reviewer 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	56. To provide students with a comprehensive understanding of the principles and practices involved in drilling engineering. 57. To develop the skills necessary to plan, design, and execute drilling operations efficiently and safely. 58. To enable students to analyze and solve drilling-related problems using engineering principles and industry best practices. 59. To boost an understanding of the environmental and economic considerations associated with drilling operations.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of the module, students should be able to: 1. Understand the fundamental concepts and theories related to drilling engineering 2. Analyze geological data to select appropriate drilling methods and techniques. 3. Apply engineering principles to design drilling programs, considering well objectives, geological formations, and drilling constraints. 4. Evaluate and select drilling equipment and technologies based on operational requirements and cost-effectiveness. 5. Assess and manage risks associated with drilling operations, including well control, drilling fluids, and wellbore stability. 6. Understand the environmental impact of drilling activities and implement practices to mitigate negative effects.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **1. Part A - Introduction to Drilling Engineering: .**

	• Overview of drilling industry and its significance. [15 hrs] • Drilling engineering challenges and objectives[15 hrs] • Drilling project life cycle. [15 hrs] • Revision problem classes [6 hrs] **2. Part B- Drilling Rig and Equipment:** • Types and components of drilling rigs. [15 hrs]. • Hoisting systems and equipment. [15 hrs]. • Rotating systems and equipment. [15 hrs]. • Circulating systems and equipment. [15 hrs] • Revision problem classes [6 hrs] **3. Part C- Well Planning and Design:** • Well trajectory planning and design. [15 hrs] • Drilling fluid. [15 hrs] • Drill bit selection. [15 hrs] • Revision problem classes [6 hrs]
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The primary approach employed to deliver this module involves fostering student engagement in exercises and enhancing their critical thinking abilities. This will be accomplished through a combination of classes, interactive tutorials, and the incorporation of captivating experiments and sampling activities that align with students' interests.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	139	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	9
Unstructured SWL (h/sem)	11	**Unstructured SWL (h/w)**	

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

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	5% (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	20% (10)	Continuous	All
	Report	1	5% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	20% (20)	7	LO #1 - #7
	Final Exam	3hr	40% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to drilling methods. Rotary drilling operations
Week 2	Rig components and their functions.
Week 3	Bit type selection and evaluation
Week 4	Drilling fluids: functions, types, and compositions.
Week 5	Mud properties and calculations.

Week 6	Mud pumps ratings and horsepower requirements.
Week 7	Mid-term Exam
Week 8	Classifications of Fluids, Rheological Models
Week 9	Rotary Drilling Hydraulics
Week 10	Drilling hazards and their remedies Pressure relationship in the formation and bore hole The
Week 11	Jet Hydraulic Optimizing and Maximizing – Circulations Rate
Week 12	Selection Drill Bit – Jet Sizing –
Week 13	hydrostatic fluid head including mud and cement slurries Equivalent Circulations Density
Week 14	Equivalent Circulations Density
Week 15	Hole Cleaning. Theory.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to Drilling fluids
Week 2	Mud Weight Control
Week 3	Mud Rheology Test
Week 4	Filtration, Wall Building
Week 5	Resistivity test
Week 6	Drilling Fluid Contamination Test
Week 7	Solid, Liquid Content
Week 8	Emulsion Oil test
Week 9	Well Cementing Experiments
Week 10	Well Cementing Experiments

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Fundamentals of Drilling Engineering	Yes
Recommended Texts	Drilling Engineering Workbook	Yes
	Drilling Engineering Fundamentals	Yes
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

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 and Gas Pipeline System**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**PGE312**				
ECTS Credits	**7**				
SWL (hr/sem)	**175**				
Module Level	2		**Semester of Delivery**	1	
Administering Department	Petroleum and Gas Engineering PGE		**College**	College of Engineering	
Module Leader	Abdullah K. Okab		**e-mail**	Abdullah.k.okab@utq.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D. Petroleum and Gas	
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	Studying Petroleum and Gas Pipeline System in college of engineering aims to provide students with an in-depth understanding of the design, construction, operation, and maintenance of pipelines used in the transportation of oil and gas. The program is designed to equip students with the knowledge and skills necessary to work in the pipeline industry at an advanced level,
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	100. Analyze and interpret pipeline system design and construction plans and specifications. 101. Design and implement pipeline systems using the latest technologies and techniques to safely and efficiently transport oil and gas. 102. Develop and implement advanced pipeline system operation and maintenance strategies to ensure the safe and reliable transportation of oil and gas. 103. Apply advanced economic and financial analysis to evaluate the feasibility and profitability of pipeline projects. 104. Planning and designing of pipelines: right of way, pipelines, stations, and execution of pipeline projects. 105. line pipe testing and inspection. 106. Construction works and corrosion protection of pipelines.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Pipeline System Design and Construction and fluid flow. 2. Pipeline System Operation and Maintenance 3. Multi phase flow 4. Pipeline System Integrity Management 5. Pipeline System Economics and Management 6. Pipeline System Safety and Environmental Management

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	153	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	10
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	22	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
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	1	10% (10)	2 and 12	LO #3, #4 and #6, #7

	Projects / Lab.	0		Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	20% (20)	10	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	Importance of pipelines:
Week 2	pipelines as element of infrastructure,
Week 3	economical comparison of pipelines with other transportation systems,
Week 4	safety of pipelines,
Week 5	transportation tasks and dimensioning of pipelines,
Week 6	profitability investigation of pipelines.
Week 7	Planning and designing of pipelines: right of way, pipelines
Week 8	Planning and designing of pipelines: stations, and execution of pipeline projects.
Week 9	M.T. Exam
Week 10	Calculation of pipelines: pressure losses and flow rates, energy demand,
Week 11	pressure surge calculations,
Week 12	pipe strength calculations.
Week 13	Line pipes and fittings: line pipe materials, fabrication of line pipes, fittings,
Week 14	line pipe testing and inspection.
Week 15	Construction works and corrosion protection of pipelines.

Week 16	**Preparatory week before the final Exam**

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Oil and Gas Pipelines and Piping Systems** **Design, Construction, Management, and Inspection** **Book • 2017**	**No**
Recommended Texts	**Oil and Gas Pipelines and Piping Systems Design, Construction, Management, and Inspection 2019**	No
Websites	Pipeline Design and Engineering (Chapter 2) - Petroleum Pipelines (cambridge.org) Introduction: Some Basic Facts about Pipelines (Chapter 1) - Petroleum Pipelines (cambridge.org)	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية		
Module Title	**Advanced Petroleum and Gas Production Engineering**	**Module Delivery**
Module Type	**Core**	☒ **Theory** ☒ **Lecture**
Module Code	**PGE312**	
ECTS Credits	**6**	

SWL (hr/sem)	**150**		**Lab** **☒ Tutorial** **☐ Practical** **☐ Seminar**		
Module Level	3		**Semester of Delivery**	2	
Administering Department	Petroleum and Gas Engineering PGE		**College**	College of Engineering	
Module Leader	Abdullah K. Okab		**e-mail**	Abdullah.k.okab@utq.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D. Petroleum and Gas	
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	60. aims to provide students with an in-depth understanding of the latest technologies and practices involved in the exploration, drilling, production, and management of oil and gas resources. The program is designed to equip

	students with the knowledge and skills necessary to work in the petroleum and gas industry at an advanced level
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	107. Recognize Causes of low well productivity 108. List the Reservoir dominated factors and well bore dominated factors and mechanical failures. 109. Summarize Well Diagnostics 110. Identify the basic Stimulation Techniques 111. Acidizing 112. multiphase fluid flow performance relationship.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 7. Advanced Reservoir Engineering 8. Advanced Drilling Engineering 9. Advanced Production Engineering 10. Advanced Petroleum and Gas Economics and Management 11. Advanced Health, Safety, and Environment in Petroleum and Gas Production

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	123	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	8

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	27	**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	1	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	0		Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	20% (20)	10	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	Causes of low well productivity
Week 2	Reservoir dominated factors
Week 3	well bore dominated factors and mechanical failures.
Week 4	Well Diagnostics: Production test,

Week 5	deliverability tests, transient tests (PLT, PSP) and near wellbore damage characterization.
Week 6	Problem well analysis: Well Performance Prediction;
Week 7	Decline curve analysis,
Week 8	Material balance method and reservoir simulators and Remedies.
Week 9	Well services and work over jobs;
Week 10	squeeze jobs, re-perforation and well cleaning.
Week 11	Stimulation Techniques: Hydraulic Fracturing;
Week 12	Introduction, inducing fractures, productivity ratio, fracture area, fracturing fluid coefficient, fracture efficiency,
Week 13	fracturing hydraulics, fracture design and calculations.
Week 14	Acidizing: Introduction, types of treatment, acid-fracturing design.
Week 15	Production system analysis and design for single/multiphase fluid flow performance relationship.
Week 16	**Preparatory week before the final Exam**

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Petroleum Production System 2nd edition 2013	Yes
Recommended Texts	Petroleum Production Engineering 2007	No
Websites	Petroleum_Production_Engineering.pdf	

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	**Formation Evaluation**	**Module Delivery**	
Module Type	**Core**	☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**PGEE315**		
ECTS Credits	~~6~~		
SWL (hr/sem)	~~150~~		

Module Level	3	**Semester of Delivery**	6
Administering Department	Petroleum and Gas Engineering	**College**	Collage of Engineering
Module Leader	Dr. Ahmed Majeed Daife	**e-mail**	Ahmed.alketife@utq.edu.iq
Module Leader's Acad. Title	Assistance 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	Well Logging I	**Semester**	5
Co-requisites module	Reservoir Petrophysics	**Semester**	4

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	61. To acquire a reasonable level of knowledge in Petroleum Engineering in accordance with what is given among the different universities around the world, especially the high ranked ones. 62. To understanding of the basic topics in Well logging II and its applications in the field of Petroleum and Gas Engineering with knowledge Appropriate on different chemistry axes. 63. To gain good knowledge of the fields of Well logging II using various methods of in different fields of Petroleum and Gas Engineering and the ability to diagnosis of the problems he faces and how to address them in order to be qualified to work in the industries of society. 64. Outstanding students are eligible to complete their higher studies inside and outside the country and to be high qualified Petroleum Engineering. The objective of the course is to strengthen the level scientific for students on the principles of Well Logging II programming.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	113. To estimate the Resistivity. 114. To interoperate Resistivity. 115. To determine the production logging or case hole logging. 116. To determine production logging based on temperature measurement. 117. To find the production logging based on based on temperature measurement. 118. To evaluate the well cased using RST and CBL methods.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Resistivity:</u> Introduction; Evolution of electric logs with history**;** Electric logs; Laterologs; LL3 and LL7; Dual Laterolog; The Spherically Focussed Log; Micro-Resistivity Logs; The Microlaterolog; The Proximity Log; 4-The Micro Spherically Focussed Log; Induction logs [15 hrs]. <u>Interoperate of Resistivity</u> Bulk volume; Application of Resistivity logs; Archie equation; invasion saturation; Determine RW and Rmf; RW from ratio method; Sxo and movable oil. [15 hrs] <u>Production logging or case hole logging:</u> Production logging tools; saturation log tool; corrosion log; cement log. [15 hrs] <u>Production logging Temperature measurement:</u> Downhole reservoir temperature; Fluid properties conversion to surface conditions Flow detection behind casing; Gas entry detection. [15 hrs]

	Production logging Pressure and Density Sensors: What is Measured; The pressure measurement is a continuous profile of the pressure in the wellbore; The curve reflects changes in the borehole fluid composition (density); Pressure can also be recorded at stations in the well versus time. [15hrs] Revision problem classes [11.5hrs] Cement Log Tools Function of cement; what is the cement bound log; principles of cement bond logging; Acoustic wave types; Acoustic impedance; cement bound log tools; cement bound log; CBL-VDLAcousticsignal processing; CBL; CBL Tool Advantages and Disadvantages; Bond index [15 hrs] Reservoir Saturation Tools Pulsed Neutron Logging; Principle of RST Measurement; Sigma calculation; Ratio Curve ; Basic Interpretation; Clean Formations; Shaly Formations; Sigma Water; Sigma Oil. [15 hrs] Production Logging PL and Basic sensors field example Production Logging - Principal Activities; PL Applications ; Production Logging Sensors; Flowrate Definitions; Spinner correction factor; Calibration of Spinners; Spinner Calibration; Non-zero flow; PFCS caliper [15 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	138	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	9.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	12	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	0.6
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 / Tut.	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	Resistivity: Part I
Week 2	Resistivity: Part II
Week 3	Interoperate of Resistivity Part I
Week 4	Interoperate of Resistivity Part II
Week 5	Production logging or case hole logging Part I
Week 6	Production logging or case hole logging Part II
Week 7	Production logging Temperature measurement Part I
Week 8	Production logging Temperature measurement Part II
Week 9	Production logging Pressure and Density Sensors Part I
Week 10	**Mid-term Exam + Quizzes**
Week 11	Cement Log Tools
Week 12	Reservoir Saturation Tools
Week 13	Production Logging PL and Basic sensors field example
Week 14	Presentation Day
Week 15	Seminar Day
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Tutorial. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Tut. 1: Resistivity.
Week 2	Tut. 2: Interoperate of Resistivity

Week 3	Tut. 3: Production logging or case hole logging
Week 4	Tut. 4: Cement Log Tools
Week 5	Tut. 5: Production logging Temperature measurement
Week 6	Tut. 6: Hingle and Pickett Methods
Week 7	Tut. 7: Production Logging PL and Basic sensors field example

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Richard Bateman, "Open-hole Log Analysis and Formation Evaluation", IHRDC Publishers New York	Yes
Recommended Texts	Hilchie, D. W. (1982). Applied open-hole log interpretation (for geologists and engineers), USA DW Hilchie	No
Books Required	Serra, O. (2008). Well logging handbook. Editions Technip.	

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	**Renewable Energy**			**Module Delivery**	
Module Type	**Core**			☒ **Theory**	
Module Code	**PGE404**			☒ **Lecture**	
ECTS Credits	**3**			**Lab**	
SWL (hr/sem)	**75**			☐ **Tutorial**	
				☐ **Practical**	
				☐ **Seminar**	
Module Level	4		**Semester of Delivery**	1	
Administering Department	PGE		**College**	College of Engineering	
Module Leader	د. نور نجم عبد		**e-mail**	noornajm@utq.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	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	65. Develop a semi-quantitative understanding of the atom, periodic table, and chemical bonding. 66. Understand the basic physics of bulk materials and relate these properties to nanomaterial and atoms and molecules. 67. Understand the basic ideas associated with miniaturization and demonstrate knowledge of some specific examples of nanotechnology and the science associated with them. 68. Explain the concept of various forms of renewable energy. 69. Analyze the environmental aspects of renewable energy resources. 70. Outline division aspects and utilization of renewable energy sources for both domestics and industrial application.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On completion of this course, the student should be able to understand : 119. Miniaturization through the use scaling Laws applying to physical models. 120. The structure of the atom. Particle technology, particle size and properties, size reduction, and particle size reduction

	121. Applications of nanomaterial, nanoparticle investigation methods 122. Describe the environmental aspects of non-conventional energy resources. In Comparison with various conventional energy systems, their prospects and limitations. 123. Know the need of renewable energy resources, historical and latest developments. 124. Describe the use of solar energy and the various components used in the energy production with respect to applications like - heating, cooling, desalination, power generation, drying, cooking etc.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Particle technology, particle size and properties, Nanotechnology, synthesis of nanomaterial, investigation methods and applications. Crystal and crystalline structure of materials, nanoparticle investigation methods. Theory and classifications of energy resources, solar thermal energy, bioenergy, biomass and biogas, performance and application of collectors, solar thermal power plant, solar water disinfection, geothermal energy, environmental effects of geothermal energy, types of energy management system

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The strategy that will be adopted in delivering this module is to cultivates the students scientific mindset as well as a habit of working systematically. This will be achieved through classes, case studies, presentation, assignments and questioners.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem)	12	**Unstructured SWL (h/w)**	

الحمل الدراسي غير المنتظم للطالب خلال الفصل		الحمل الدراسي غير المنتظم للطالب أسبوعيا	
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	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	
Week 2	
Week 3	
Week 4	
Week 5	

Week 6	
Week 7	
Week 8	
Week 9	
Week 10	
Week 11	
Week 12	
Week 13	
Week 14	
Week 15	
Week 16	

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts		Yes
Recommended Texts		No
Websites		

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

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

MODULE DESCRIPTION FORM

Oil Well Drilling Operations

Module Information معلومات المادة الدراسية					
Module Title	**Oil Well Drilling Operations**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**PGE311**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		GIII	**Semester of Delivery**		6
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Khalid Abdulhussain Mohammed		**e-mail**	Dr.khalid@utq.edu.iq	
Module Leader's Acad. Title		Assist. Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor			**e-mail**	E-mail	
Peer Reviewer 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	The aim of this module is to provide students with a comprehensive understanding of casing design and cementing practices in oil and gas well construction. Students will learn the principles, methods, and considerations involved in designing and implementing effective casing and cementing programs for wellbore integrity and zonal isolation.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of this module, students should be able to: 1. Understand the importance of casing design and cementing in well construction and the role they play in ensuring wellbore integrity and zonal isolation. 2. Analyze and evaluate geological and reservoir data to determine casing and cementing requirements specific to different drilling environments. 3. Apply industry standards, codes, and best practices to design casing strings and cementing programs that meet regulatory and operational requirements. 4. Demonstrate knowledge of casing types, sizes, and materials, and their selection criteria based on well conditions and operational objectives. 5. Evaluate and select appropriate cementing techniques, additives, and slurries to achieve effective zonal isolation and cement bond strength. 6. Understand the principles of centralization and casing accessories, and their significance in proper casing placement and cementing operations. 7. Demonstrate an understanding of cementing quality control measures, including job execution, monitoring, and post-job evaluation techniques. 8. Identify and analyze common challenges and risks associated with casing design and cementing, and develop strategies for mitigating these challenges. 9. Evaluate and select drilling equipment and technologies based on operational requirements and cost-effectiveness. 10. Assess and manage risks associated with drilling operations, including well control, drilling fluids, and wellbore stability. 11. Understand the environmental impact of drilling activities and implement practices to mitigate negative effects.
Indicative Contents المحتويات الإرشادية	**1. Part A - Introduction to Casing Design:** • Importance, objectives, and key considerations in wellbore integrity and zonal isolation. [15 hrs]

	• Geological and Reservoir Analysis for Casing Design: Formation evaluation, pore pressure prediction, wellbore stability analysis, and casing seat selection. [15 hrs] • Casing Types, Sizes, and Materials: Casing specifications, selection criteria, and industry standards. [15 hrs] • Revision problem classes [6 hrs] **2. Part B- Cementing Techniques and Additives:** • Primary cementing techniques, cement additives, slurry design, and job execution considerations. [15 hrs]. • Cement Bond Evaluation. [15 hrs]. • Casing and Cementing Quality Control [15 hrs]. • Circulating systems and equipment. [15 hrs] • Revision problem classes [6 hrs] **3. Part C- Casing Design and Cementing Common Challenges:** • lost circulation, gas migration, re, • Sustained casing pressure. [15 hrs] • Mitigation strategies.. [15 hrs]. [15 hrs] • Revision problem classes [6 hrs]
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The primary approach employed to deliver this module involves fostering student engagement in exercises and enhancing their critical thinking abilities. This will be accomplished through a combination of classes, interactive tutorials, and the incorporation of captivating experiments and sampling activities that align with students' interests.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem)	139	**Structured SWL (h/w)**	9

الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	11	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	5% (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	20% (10)	Continuous	All
	Report	1	5% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	20% (20)	7	LO #1 - #7
	Final Exam	3hr	40% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to casing design and Formation pore pressures
Week 2	Casing design, purpose of casing, levels of casing design, types and functions of casing, string definition
Week 3	Preliminary casing design: Minimum casing diameter, minimum casing setting depths

Week 4	lithological casing seat selection, factors impact on casing selection depth,
Week 5	preliminary casing design process, casing scheme selection, wellhead selections, casing wear prediction, design software.
Week 6	calculation of performance properties under load conditions, calculation of collapse and burst loads
Week 7	Mid-term Exam
Week 8	calculation of tension based on suspended weight, shock load, bending force, compression and buckling load and analysis of biaxial and triaxle loads
Week 9	Pressure testing. Corrosion, wear and fatigue: Influence of corrosion on casing strength, influence of wear on casing strength, influence of fatigue on casing strength.
Week 10	Casing design and practice for high temperature, high pressure wells and directional and horizontal wells
Week 11	Understanding of cementing process , introduction Oil well cementing technologies and cementing and leakage prevention
Week 12	Methods of cementing and technologies , primary cementing
Week 13	Cementing calculations and evaluation
Week 14	Common equipment used and cementing additives
Week 15	Risk assessment of cementing
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: specific Gravity of cement slurry
Week 2	Lab2: Initial setting time and final setting
Week 3	Lab 3: Filtration of cement slurry
Week 4	Lab 4: Rheology of cement slurry

Week 5	Lab 5: cement Fineness
Week 6	Lab 6: Free Water - Stability
Week 7	Lab 7: Mechanical strength of cement Rock

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	RABIA H. 1985. Oilwell Drilling Engineering. Graham & Trotman	Yes
Recommended Texts	BOURGOYNE et al. 1984. Applied Drilling Engineering. SPE Publication	Yes
Websites		

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Petroleum and Gas Production Engineering**			**Module Delivery**	
Module Type	**Core**			☒ **Theory**	
Module Code	**PGE302**			☒ **Lecture**	
ECTS Credits	**6**			**Lab**	
SWL (hr/sem)	**150**			☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Level	3		**Semester of Delivery**	1	
Administering Department	Petroleum and Gas Engineering PGE		**College**	College of Engineering	
Module Leader	Abdullah K. Okab		**e-mail**	Abdullah.k.okab@utq.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D. Petroleum and Gas	
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	71. Aims to provide students with a comprehensive understanding of the principles and practices involved in the, drilling, production, and management of oil and gas resources. The program is designed to equip students with the knowledge and skills necessary to work in the petroleum and gas fields.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	125. Recognize how to Production oil and Gas. 126. List the various terms associated with Petroleum and Gas 127. Summarize what is meant by a basic Petroleum and gas Production. 128. Identify the basic of petroleum and gas production 129. Analyze and interpret data from well logs, seismic surveys, and other sources to identify and evaluate potential hydrocarbon reservoirs. 130. 3. Design and implement drilling programs to safely and efficiently extract oil and gas from reservoirs. 131. 4. Develop and implement production strategies to optimize the recovery of oil and gas from reservoirs.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 12. Geology and Geophysics of Petroleum 2. Reservoir Engineering 3. Drilling Engineering

	4. Production Engineering 5. Petroleum Economics and Management 6. Health, Safety, and Environment in Petroleum Production

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	138	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	10
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	**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	1	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	0		Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	20% (20)	10	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	Review of casing design concepts.
Week 2	Well completions: various completion designs,
Week 3	reservoir and mechanical considerations.
Week 4	Perforations,
Week 5	production packers, tubing strings, liners,
Week 6	subsurface completions,
Week 7	production control equipments and completion fluids.
Week 8	Wellhead and subsurface components installation.
Week 9	Surface production facilities.
Week 10	Piping systems,
Week 11	valves, chokes, fittings,
Week 12	separators
Week 13	stock tanks, gathering systems and individual well flow rate allocation.

Week 14	Fluid Separators: separator components, types and factors influencing separator capacity.
Week 15	Sand control procedures
Week 16	**Preparatory week before the final Exam**

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Petroleum Production System 2nd edition 2013	Yes
Recommended Texts	Petroleum Production Engineering 2007	No
Websites	Petroleum_Production_Engineering.pdf	

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.

Petroleum Economy

DESCRIPTION FORM

Module Information معلومات المادة الدراسية					
Module Title	**Petroleum Economy**			**Module Delivery**	
Module Type	**Core**			☒ **Theory**	
Module Code	**PGE306**			☒ **Lecture**	
ECTS Credits	**3**			☒ **Lab**	
SWL (hr/sem)	**75**			☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Level	1		**Semester of Delivery**	1	
Administering Department			**College**		
Module Leader	Iqbal Khalaf Erabea		**e-mail**	iqbal@utq.edu.iq	
Module Leader's Acad. Title	Assist. Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	14/06/2023		**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	72. To identify methods and tools which are used in the study of oil economy, and also study number of concepts, terminology and metrics that are used in the methods. 73. To identify the stages of the oil industry in order to find appropriate solutions facing each stage. 74. To understand the main characteristics of oil industry and its importance in different fields of life. 75. To recognize the factors that influence the supply, demand and pricing of oil in world markets. 76. To identify Prospects for the oil and gas sector in Iraq and some problems facing the industry of oil such as water problem. 77. To investigate obstacles of riffing industry and their solutions.
Module Learning Outcomes مخرجات التعلم للمادة الدراسي	132. Recognize the tools study of oil economy. 133. List the various stages of oil industry. 134. Summarize what is meant by supply, demand and types of oil reserves.. 135. Discuss the importance of oil industry and the factors that effect pricing of oil..

	136. Describe oil investment patterns. 137. Explain the method of estimation of cost of extracting a barrel of oil in Iraq. 138. Identify the basic circuit elements and their applications. 139. Discuss the calculation of Break-even point and cash flow diagram. 140. Discuss the prospects of oil and gas sector in Iraq and the main proven reserve fields. 141. Explain the sources of renewable energy types. .
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Importance of oil industry</u> Tools study of oil economy, energy map, map of a barrel of oil, advantages and disadvantages of using oil as major source of energy, oil industry stages, theories of oil formation, petroleum supply, petroleum demand. [15 hrs] <u>Part B – Estimation of oil reserves</u> Estimating of oil reserves, proven oil reserve, possible oil reserve, base oil reserve, oil investment pattern, estimation the cost of extracting a barrel of crude oil in Iraqi fields, features of Iraqi oil, a series of activities related to the oil industry. [15 hrs] <u>Part C – Prospects for oil and gas sector in Iraq</u> Oil fields in Iraq, water problem, refining, obstacles of riffing industry, solutions of obstacles of oil industry, export oil points, natural gas production, alternative energy sources. {15hrs}

Learning and Teaching Strategies استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by visiting to the nearby sites of oil fields and oil refineries.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	75	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	12
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل		**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل			

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	1	5% (5)	5 and 10	LO #1, #2 and #10, #11
	Assignments	1	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.				
	Report				
Summative assessment	**Midterm Exam**	2hr	25% (25)	7	LO #1 - #7
	Final Exam	3hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction – Tools study of oil economy
Week 2	The importance of oil, stages of oil industry
Week 3	Petroleum supply
Week 4	Oil reserve
Week 5	Demand for oil, oil investment patterns
Week 6	Estimation the cost of extracting of a barrel of oil in Iraqi fields
Week 7	Mid-term Exam
Week 8	Advantages of Iraqi crude oil
Week 9	Calculation the cost of production process, production rate
Week 10	Cash flow diagram
Week 11	Prospects for the oil and gas sector in Iraq
Week 12	Water problem
Week 13	Refining process and its problems and solutions
Week 14	Alternative energy sources
Week 15	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	

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

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Petroleum Economics and Engineering, Third Edition , Edited by Hussein K. Abdel-Aal and Mohammed A. Alsahlawi, International Standard Book Number-13: 978-1-4822-4169-3 (eBook - PDF)	No
Recommended Texts		
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	**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	**Well Testing**			**Module Delivery**	
Module Type	**Core**			☒ **Theory**	
Module Code	**PGE403**			☒ **Lecture**	
ECTS Credits	**6**			**Lab**	
SWL (hr/sem)	**150**			☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Level	4		**Semester of Delivery**	1	
Administering Department	Petroleum and Gas Engineering PGE		**College**	College of Engineering	
Module Leader	Abdullah K. Okab		**e-mail**	Abdullah.k.okab@utq.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D. Petroleum and Gas	

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	78. The study of well testing in Petroleum Engineering aims to provide students with a comprehensive understanding of the principles and practices of well testing, which is a critical aspect of petroleum and Gas Production and reservoir engineering.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	142. Understanding the fundamentals of well testing: This includes the basic concepts of well testing, types of well tests, and the importance of well testing in reservoir engineering. 143. Analyzing well test data: This includes the interpretation of well test data, analysis of pressure transient data, and the use of well test analysis software. 144. Designing well tests: This includes the design of well tests, selection of well test equipment, and the planning of well test operations. 145. Evaluating well performance: This includes the evaluation of well performance, identification of well problems, and the use of well performance data to optimize reservoir management. 146. Understanding well testing in unconventional reservoirs: This

	includes the application of well testing in unconventional reservoirs, such as shale gas and tight oil reservoirs. 147. Develop and implement well testing to optimize the Petrol and Gas production
Indicative Contents المحتويات الإرشادية	indicative contents of the course may include topics such as well test design and analysis, pressure transient analysis, well test interpretation, well test equipment and operations, well performance evaluation, and well testing in unconventional reservoirs. The course may also include case studies and practical exercises to help students apply the concepts learned in class to real-world scenarios.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	123	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	8
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	27	**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	1	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	1	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	0		Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	20% (20)	10	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	Diffusivity equation, derivation & solutions.
Week 2	Radius of investigation. Principle of superposition.
Week 3	Horner's approximation..
Week 4	Drill Stem Testing
Week 5	Pressure Transient Tests:
Week 6	Drawdown and build up-test analysis.
Week 7	Wellbore effects.
Week 8	Multilayer reservoirs.

Week 9	Injection well testing.
Week 10	M.T. Exam
Week 11	Multiple well testing.
Week 12	Interference testing,
Week 13	Pulse testing,
Week 14	well-test analysis by use of type curves.
Week 15	Gas well testing.
Week 16	**Preparatory week before the final Exam**

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Oil Well Testing Handbook 2017	Yes

Recommended Texts	Gas Well Testing Handbook	No
Websites	Oil Well Testing Handbook - Amanat Chaudhry - كتب Google	

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 Control and drilling optimization**			**Module Delivery**	
Module Type	**Core**			☒ **Theory**	
Module Code	**PGE405**			☒ **Lecture**	
ECTS Credits	**7**			☒ **Lab**	
SWL (hr/sem)	**175**			☒ **Tutorial**	
				☐**Practical**	
				☐**Seminar**	
Module Level	UGIV	**Semester of Delivery**	7		
Administering Department	Type Dept. Code	**College**	Type College Code		
Module Leader	Khalid Abdulhussain Mohammed	**e-mail**	Dr.khalid@utq.edu.iq		
Module Leader's Acad. Title	Assist. Professor	**Module Leader's Qualification**	Ph.D.		
Module Tutor		**e-mail**	E-mail		
Peer Reviewer 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	The aim of this module is to provide students with a comprehensive understanding of well control principles and drilling optimization techniques in the context of oil and gas exploration and production. Students will learn the importance of maintaining wellbore integrity, implementing effective well control measures, and optimizing drilling operations to ensure safe and efficient drilling processes.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of this module, students should be able to: 1. Understand the fundamental principles of well control and its significance in drilling operations. 2. Apply well control techniques and procedures to prevent and mitigate well control incidents. 3. Evaluate drilling parameters and implement optimization strategies to enhance drilling efficiency. 4. Analyze drilling data and make informed decisions to optimize drilling performance. 5. Demonstrate knowledge of industry best practices and regulations related to well control and drilling optimization
Indicative Contents المحتويات الإرشادية	**1. Part A:** Introduction to Well Control: • Overview of well control and its importance in drilling operations. [15 hrs] • Key components of well control equipment and systems. [15 hrs] • Well control barriers and primary well control methods. [15 hrs] • Revision problem classes [6 hrs] **2. Part B:** Well Control Techniques and Procedures: • Kick detection and well shut-in procedures. [15 hrs] • Well control calculations and pressure monitoring technique. [15 hrs] • Well control equipment testing and maintenance. [15 hrs] • Revision problem classes [6 hrs] 3. **Part C**: Drilling Optimization Strategies: • Analysis of drilling parameters and optimization opportunities. [15 hrs] • Use of software and technology for drilling optimization. [15 hrs]

	• Wellbore stability and hole cleaning considerations for optimization.[15 hrs] ▪ Revision problem classes [6 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The primary approach employed to deliver this module involves fostering student engagement in exercises and enhancing their critical thinking abilities. This will be accomplished through a combination of classes, interactive tutorials, and the incorporation of captivating experiments and sampling activities that align with students' interests.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	139	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	9
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	11	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	5% (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	20% (10)	Continuous	All
	Report	1	5% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	20% (20)	7	LO #1 - #7
	Final Exam	3hr	40% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Well Control
Week 2	Overview of well control and its importance in drilling operations
Week 3	Kick detection and well shut-in procedures
Week 4	Well control equipment testing and maintenance
Week 5	Methods of control, driller's method
Week 6	Engineer's method
Week 7	Mid-term Exam
Week 8	Data collection and interpretation for drilling optimization
Week 9	Real-time monitoring and decision-making during drilling operations
Week 10	Post-drilling analysis and lessons learned for continuous improvement
Week 11	Factors affecting drilling rate (effect of pressure, effect of physical properties of drilling mud, effect of weight on bit and rotary speed, economical effect)
Week 12	hole problems (pipe sticking
Week 13	Lost circulation
Week 14	Hole deviation
Week 15	Torque and drag calculations surge and swab pressure

Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Blowout and Well Control Handbook Robert D. Grace, 2003	Yes
Recommended Texts	Rabia, Hussain (1986). *Oil Well Drilling Engineering*. Springer. p. 174.	Yes
Websites	Journal articles, conference proceedings, and appropriate websites. Example OnePetro, Knovel, ASME	

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	**Natural Gas Engineering**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**PGE406**				
ECTS Credits	**3**				
SWL (hr/sem)	**75**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	PEG		**College**	ER	
Module Leader	Khalid Farhod Chasib		**e-mail**	khalid_farhod@utq.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	None		**e-mail**		
Peer Reviewer Name			**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	In the context of Natural Gas Engineering, the module objectives may vary depending on the educational institution or program. However, some common objectives for a Natural Gas Engineering module might include: 79. Understanding the properties and composition of natural gas. 80. Gaining knowledge of the exploration and production techniques used in the natural gas industry. 81. Learning about the processing, transportation, and storage of natural gas. 82. Familiarizing with the various technologies and equipment involved in natural gas production and processing. 83. Developing an understanding of the environmental, safety, and regulatory considerations in natural gas engineering. 84. Acquiring knowledge of the economic aspects and market dynamics related to natural gas. 85. Learning how to analyze and optimize natural gas production and processing operations. 86. Gaining practical skills through laboratory work or case studies related to natural gas engineering. These objectives serve as a guide for instructors and students, helping to structure the module's content and ensure that the desired learning outcomes are met.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	In the context of Natural Gas Engineering, some examples of module learning outcomes could be: 1. Understand the fundamental principles and concepts related to natural gas exploration, production, and processing. 2. Analyze the properties and behavior of natural gas, including its composition, phase behavior, and thermodynamic properties. 3. Demonstrate knowledge of the technologies and equipment used in natural gas production, processing, transportation, and storage. 4. Apply engineering principles to design and optimize natural gas production and processing systems.

	5. Evaluate the environmental, safety, and regulatory considerations associated with natural gas engineering projects. 6. Assess the economic aspects and market dynamics affecting the natural gas industry. 7. Conduct laboratory experiments or simulations to investigate and analyze natural gas engineering problems. 8. Communicate effectively, both orally and in writing, about natural gas engineering concepts and projects. These learning outcomes provide a clear indication of the skills and knowledge that students are expected to develop during the module. They guide the instructional process and serve as a basis for assessing students' achievements and mastery of the subject matter.
Indicative Contents المحتويات الإرشادية	The indicative contents for a Natural Gas Engineering module may vary depending on the specific educational institution or program. However, some common topics that are often included in such a module could be: 1. Introduction to Natural Gas Engineering: • Overview of the natural gas industry • Properties and composition of natural gas • Reservoir characterization and estimation of reserves 2. Exploration and Production: • Geological and geophysical methods for natural gas exploration • Drilling and well completions • Reservoir engineering and production techniques 3. Natural Gas Processing: • Gas gathering and transportation systems • Separation and treatment of natural gas from impurities • Gas compression and dehydration 4. Natural Gas Transmission and Storage: • Pipeline systems and network design

	• Compressor stations and metering facilities • Underground storage of natural gas 5. Safety, Environment, and Regulatory Considerations: • Health, safety, and environmental regulations in natural gas operations • Risk assessment and management • Environmental impact assessment and mitigation measures 6. Natural Gas Economics and Markets: • Economic analysis of natural gas projects • Pricing mechanisms and market dynamics • Contracts and trading in the natural gas industry 7. Optimization and Simulation in Natural Gas Engineering: • Optimization techniques for production and processing operations • Simulation modeling and reservoir simulation software • Case studies and practical applications 8. Emerging Technologies and Future Trends: • Shale gas and unconventional natural gas resources • LNG (liquefied natural gas) technology and export/import facilities • Renewable natural gas and sustainability in the industry These indicative contents provide a broad overview of the main subject areas typically covered in a Natural Gas Engineering module. The specific topics and depth of coverage may vary depending on the duration and level of the course.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	In the context of Natural Gas Engineering, some effective learning and teaching strategies that can be employed include: 1. Lectures: Instructors deliver presentations to introduce and explain key concepts, theories, and principles related to natural gas engineering. Lectures provide a foundation of knowledge and allow for the dissemination of information to a large group of students. 2. Practical Sessions: Hands-on activities, such as laboratory experiments, field visits, or computer simulations, allow students to apply theoretical knowledge to real-world scenarios. These practical sessions help develop technical skills and reinforce understanding of natural gas engineering principles. 3. Case Studies: Instructors present real or hypothetical case studies that involve practical problems or challenges in natural gas engineering. Students analyze the cases, identify relevant factors, propose solutions, and discuss the implications. This approach encourages critical thinking, problem-solving, and decision-making skills. 4. Group Projects: Assigning group projects or assignments related to natural gas engineering promotes collaboration and teamwork among students. Working in groups, students can tackle complex problems, conduct research, and present their findings, fostering communication and interpersonal skills. 5. Guest Speakers: Inviting industry professionals or experts to give guest lectures or share their experiences can provide students with valuable insights into the practical aspects of natural gas engineering. Guest speakers can share industry trends, challenges, and advancements, connecting theoretical concepts to real-world applications. 6. Field Trips: Organizing visits to natural gas facilities, such as production sites, processing plants, or distribution centers, allows students to observe and interact with industry operations firsthand. Field trips provide a practical context for learning and help students understand the complexities and challenges of the field. 7. Online Resources and Tools: Utilizing online platforms, educational videos, interactive simulations, and other digital resources can supplement traditional teaching methods. These resources can enhance students'

	understanding, engagement, and self-directed learning in natural gas engineering. 8. Assessments and Feedback: Providing regular assessments, such as quizzes, exams, or project evaluations, allows instructors to measure students' progress and understanding of the subject matter. Constructive feedback on students' performance helps guide their learning process and highlights areas for improvement. It is important for instructors to employ a combination of these strategies to cater to different learning styles and promote active student engagement. By incorporating various teaching approaches, Natural Gas Engineering modules can offer a well-rounded and effective learning experience for students.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
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
	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11

Formative assessment	**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	Properties of natural gases
Week 2	hydrate formation
Week 3	Estimation of gas reserves
Week 4	Gas well testing
Week 5	Estimation of gas deliverability
Week 6	Gas flow measurement
Week 7	Natural gas deliverability
Week 8	Natural gas transmission
Week 9	design of gathering systems
Week 10	Field treating of natural gas
Week 11	Field processing of natural gas
Week 12	Compressor horsepower requirement
Week 13	Acid Gas Treating
Week 14	Gas Dehydration

Week 15	Recovery, Separation, and Fractionation of Natural Gas Liquids
Week 16	**Preparatory week**

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Arthur J. Kidnay and William Parrish, Fundamentals of natural gas processing , (2006)	Yes
Recommended Texts	Campbell, J.M., Gas Conditioning and Processing, 3rd Ed. Campbell, (1992)	No
Websites	https://www.taylorfrancis.com/books/mono/10.1201/9781420014044/fundamentals-natural-gas-processing-arthur-kidnay-arthur-kidnay-william-parrish	

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 and Gas Field Processing**	**Module Delivery**
Module Type	**Core**	☒ **Theory** ☒ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**
Module Code	**PGE414**	
ECTS Credits	**7**	
SWL (hr/sem)	**175**	

Module Level		1	**Semester of Delivery**		1
Administering Department		PEG	**College**	ER	
Module Leader	Khalid Farhod Chasib		**e-mail**	khalid_farhod@utq.edu.iq	
Module Leader's Acad. Title		Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor	None		**e-mail**		
Peer Reviewer Name			**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	In the context of Petroleum and Gas Field Processing, the module objectives may vary depending on the educational institution or program. However, some common objectives for a module on this topic could include: 87. Understanding the principles and processes involved in the production and processing of petroleum and natural gas. 88. Gaining knowledge of the various components and properties of crude oil and natural gas. 89. Learning about the equipment and technologies used in the extraction, separation, and treatment of petroleum and natural gas.

	90. Familiarizing with the techniques for measuring and analyzing the composition and quality of petroleum and natural gas. 91. Developing an understanding of the refining and fractionation processes used in petroleum processing. 92. Acquiring knowledge of the various gas processing techniques, including compression, dehydration, sweetening, and fractionation. 93. Understanding the principles and practices of gas sweetening and sulfur recovery. 94. Learning about the environmental and safety considerations in petroleum and gas field processing operations. 95. Gaining knowledge of the economic aspects and market dynamics related to petroleum and natural gas processing. 96. Understanding the role of technology and innovation in improving efficiency and sustainability in petroleum and gas field processing. These objectives serve as a guide for instructors and students, helping to structure the module's content and ensure that the desired learning outcomes are met. They provide a clear indication of the knowledge and skills that students are expected to develop during the module on Petroleum and Gas Field Processing.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	In the context of Petroleum and Gas Field Processing, some examples of module learning outcomes could be: 9. Understand the principles and processes involved in the production and processing of petroleum and natural gas. 10. Demonstrate knowledge of the properties, composition, and behavior of crude oil and natural gas. 11. Identify and describe the equipment and technologies used in the extraction, separation, and treatment of petroleum and natural gas. 12. Apply analytical techniques to measure and analyze the composition and quality of petroleum and natural gas. 13. Explain the refining and fractionation processes used in petroleum processing and their impact on product quality. 14. Describe the different techniques for gas processing, including compression, dehydration, sweetening, and fractionation.

	15. Understand the principles and practices of gas sweetening and sulfur recovery. 16. Evaluate and apply environmental and safety considerations in petroleum and gas field processing operations. 17. Analyze the economic aspects and market dynamics related to petroleum and natural gas processing. 18. Discuss the role of technology and innovation in improving efficiency and sustainability in petroleum and gas field processing. These learning outcomes provide a clear indication of the skills and knowledge that students are expected to develop during the module on Petroleum and Gas Field Processing. They serve as a basis for assessing students' achievements and mastery of the subject matter and help ensure that the module's objectives are met.
Indicative Contents المحتويات الإرشادية	In the context of Petroleum and Gas Field Processing, some indicative contents that are often covered in a module could include: 1. Introduction to Petroleum and Gas Field Processing: • Overview of the petroleum and natural gas industry • Introduction to upstream, midstream, and downstream operations • Introduction to oil and gas reservoirs and their characteristics 2. Petroleum Processing: • Crude oil properties and characterization • Oil separation techniques, such as gravity separation and distillation • Refining processes, including distillation, cracking, and hydrotreating • Product quality control and analysis in petroleum refining 3. Natural Gas Processing: • Natural gas properties and composition • Gas separation techniques, such as absorption and cryogenic distillation • Gas sweetening and sulfur recovery processes

	• Natural gas dehydration, compression, and fractionation 4. Oil and Gas Separation Facilities: • Oil and gas separation processes and equipment • Separation of oil, gas, and water in production facilities • Design and operation of separation units 5. Transportation and Storage of Petroleum and Natural Gas: • Pipeline transportation of oil and gas • Storage facilities for crude oil and natural gas • Terminal operations and logistics in the oil and gas industry 6. Environmental and Safety Considerations: • Environmental regulations and sustainability in petroleum and gas field processing • Safety measures and hazards in processing facilities • Waste management and pollution control in the industry 7. Economic and Market Aspects: • Economic analysis of petroleum and gas field processing projects • Pricing mechanisms and market dynamics in the oil and gas industry • Economic optimization and decision-making in processing operations 8. Technology and Innovation: • Advanced technologies in petroleum and gas field processing • Digitalization and automation in processing operations • Emerging trends and innovations in the industry

	These indicative contents provide a broad overview of the main subject areas typically covered in a Petroleum and Gas Field Processing module. The specific topics and depth of coverage may vary depending on the duration and level of the course.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	In the context of Petroleum and Gas Field Processing, some effective learning and teaching strategies that can be employed include: 1. Lectures: Instructors deliver lectures to present and explain key concepts, theories, and principles related to petroleum and gas field processing. Lectures provide a foundation of knowledge and allow for the dissemination of information to a large group of students. 2. Practical Sessions: Hands-on activities, such as laboratory experiments, computer simulations, or field visits, allow students to apply theoretical knowledge to real-world scenarios. Practical sessions help develop technical skills and reinforce understanding of petroleum and gas field processing principles. 3. Case Studies: Instructors present real or hypothetical case studies that involve practical problems or challenges in petroleum and gas field processing. Students analyze the cases, identify relevant factors, propose solutions, and discuss the implications. This approach encourages critical thinking, problem-solving, and decision-making skills. 4. Group Projects: Assigning group projects or assignments related to petroleum and gas field processing promotes collaboration and teamwork among students. Working in groups, students can tackle complex problems, conduct research, and present their findings, fostering communication and interpersonal skills. 5. Guest Speakers: Inviting industry professionals or experts to give guest lectures or share their experiences can provide students with valuable insights into the practical aspects of petroleum and gas field processing. Guest speakers can

	share industry trends, challenges, and advancements, connecting theoretical concepts to real-world applications. 6. Field Trips: Organizing visits to petroleum and gas processing facilities, such as refineries, gas plants, or storage terminals, allows students to observe and interact with industry operations firsthand. Field trips provide a practical context for learning and help students understand the complexities and challenges of the field. 7. Online Resources and Tools: Utilizing online platforms, educational videos, interactive simulations, and other digital resources can supplement traditional teaching methods. These resources can enhance students' understanding, engagement, and self-directed learning in petroleum and gas field processing. 8. Assessments and Feedback: Providing regular assessments, such as quizzes, exams, or project evaluations, allows instructors to measure students' progress and understanding of the subject matter. Constructive feedback on students' performance helps guide their learning process and highlights areas for improvement. It is important for instructors to employ a combination of these strategies to cater to different learning styles and promote active student engagement. By incorporating various teaching approaches, Petroleum and Gas Field Processing modules can offer a well-rounded and effective learning experience for students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	169	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	6	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
Total SWL (h/sem)	**175**		

الحمل الدراسي الكلي للطالب خلال الفصل	

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #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	Formation and Accumulation of Oil and Gas, Types Of Petroleum Reservoir,
Week 2	Introduction, The Separation Problem, Theory of Gas-Oil Separation
Week 3	Methods of Separation, Gas-Oil Separation Equipments, Introduction, Separation Theory, Equation and Rules
Week 4	Emulsion Treatment and Dehydration of Crude Oil, Desalting of Crude Oil, Crude Oil Stabilization and Sweetening
Week 5	Overview of Gas Field Processing, Sour Gas Treating
Week 6	Gas Dehydration, Recovery, Separation and Fractionation of Natural Gas Liquids

Week 7	Properties of Petroleum Products :Introduction, Bitumen composition {Asphaltine, resine aromatic oil, saturated oil}
Week 8	Bitumen for pavement, Bitumen evaluation for pavement
Week 9	Bitumen for pavement, Bitumen evaluation for pavement
Week 10	storage and handling of bitumen, Introduction, manufacturing process
Week 11	petroleum coke type, properties of calcined coke, uses of petroleum coke
Week 12	Introduction, manufacturing processes
Week 13	channel blacl process, carbon black process
Week 14	carbon black properties, secondary properties
Week 15	Introduction conventional process, catalytic dewaxing.
Week 16	**Preparatory week**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Softening Point of Asphalt (Bitumen) and Tar (Ring -and- Ball) AASHTO: T 53 and (ASTM: D 36-12)
Week 2	Lab 2: Ductility Test of Bituminous Materials AASHTO: T 51- 08) and (ASTM: D 113- 07)
Week 3	Lab 3: Specific Gravity Test of Semi-Solid Bituminous Materials (Pycnometer Method) AASHTO: T 228-06 and (ASTM: D 70-09)
Week 4	Lab 4: Solubility Test of Asphalt Materials in Trichloroethylene (ASTM: D2042- 09)
Week 5	Lab 5: Absolute and Solubility Test of Asphalt Materials in Trichloroethylene (ASTM: D2042- 09)
Week 6	Lab 6: Kinematic Viscosity Test of Bituminous Materials (ASTM: D 2170 - 92)
Week 7	Lab 7: Effect of Heat and Air on Asphaltic Materials (Thin-Film Oven Test) (ASTM D 1754-87)

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Hussein K. Abdel-Aal, Mohamed A. Aggour, and Mohamed A. Fahim, Petroleum and Gas Field Processing, Second Edition, (2016)	Yes
Recommended Texts	Abdel-Aal, H. K. Surface Petroleum Operations. Jeddah, Saudi Arabia: Saudi Publishing House, (1998)	No
Websites	https://www.taylorfrancis.com/books/mono/10.1201/9780429021350/petroleum-gas-field-processing-hussein-abdel-aal-mohamed-fahim-mohamed-aggour	

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.

	Ministry of Higher Education and Scientific Research - Iraq University of Thi-Qar College of Engineering Department of Petroleum and Gas Engineering	

MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Reservoir Simulation**			**Module Delivery**	
Module Type	**Core**			**Theory** **Lecture** **Lab**	
Module Code	**PGE415**				
ECTS Credits	**8**				
SWL (hr/sem)					
Module Level	1		**Semester of Delivery**	1	
Administering Department			**College**		
Module Leader	Najlaa ALswafi		**e-mail**	Najlaa.alswafi@utq.edu.iq	

Module Leader's Acad. Title	Assistant Lecturer	**Module Leader's Qualification**	Master
Module Tutor	None	**e-mail**	None
Peer Reviewer Name		**e-mail**	
Review Committee Approval		**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 Aims أهداف المادة الدراسية	The aim of a reservoir simulation module is to provide students with the knowledge and skills necessary to simulate the behavior of oil and gas reservoirs. This includes understanding the basic principles of reservoir engineering, such as fluid flow, rock properties, and numerical methods. Students will also learn how to use commercial reservoir simulation software to model the performance of reservoirs. Bellow some of the specific aims of a reservoir simulation module: • To provide students with a deep understanding of the behavior and characteristics of hydrocarbon reservoirs. This includes studying the rock and fluid properties, reservoir geometry, fluid flow mechanisms, and the interactions between different components of the reservoir system. To teach students how to use numerical methods to solve reservoir engineering problems • To train students in the use of commercial reservoir simulation software such as Eclipse, CMG, or Petrel RE, and taught how to use these tools to build and simulate reservoir models. The aim is to provide hands-on experience in using software to solve real-world reservoir engineering problems. • To enable students to predict and evaluate the performance of hydrocarbon reservoirs under different production scenarios. give students experience in modeling the performance of reservoirs • To prepare students for careers in the oil and gas industry
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	All outcomes are Aligned with ABET's Engineering Criteria 2020 (EC2020) outcomes for Engineering Knowledge and Problem Solving and Design. 1. Understanding the principles of reservoir simulation: • Explain the basic concepts and principles of reservoir simulation.

	• Understand the purpose and importance of reservoir simulation in reservoir engineering. 2. Familiarity with reservoir simulation software: • Gain proficiency in using industry-standard reservoir simulation software. • Navigate through the software interface and understand its functionalities. 3. Building and characterizing reservoir models: • Develop skills in building numerical reservoir models based on geological and petrophysical data. • Understand the process of data preparation, gridding, and assigning reservoir properties. 4. Selection and application of numerical methods: • Evaluate and select appropriate numerical methods for solving the reservoir simulation equations. • Apply numerical methods for fluid flow simulation in porous media. 5. Performing reservoir simulation simulations: • Run and execute reservoir simulation models with various simulation scenarios. • Analyze and interpret simulation results to understand reservoir behavior and performance. 6. Sensitivity analysis and uncertainty assessment: • Conduct sensitivity analysis to investigate the impact of reservoir parameters and uncertainties on simulation results. • Evaluate uncertainty and quantify its impact on reservoir performance predictions. 7. Prediction of reservoir performance: • Predict reservoir performance and behavior under different production scenarios. • Analyze and interpret simulation results to optimize reservoir management strategies. 8. Assessing reservoir performance indicators: • Calculate and analyze key performance indicators (e.g., recovery factor, production rates, pressure profiles) based on simulation results.

	• Evaluate the effectiveness of reservoir management strategies. 9. Integration with other reservoir engineering workflows: • Understand the integration of reservoir simulation with other reservoir engineering disciplines, such as well testing, production forecasting, and optimization. • Collaborate with multidisciplinary teams to incorporate reservoir simulation results into broader reservoir management workflows.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. • Introduction to Reservoir Engineering: This lecture will introduce students to the basic concepts of reservoir engineering. Students will learn about the history of reservoir engineering, the different types of reservoir simulation models, the applications , benefits and limitations of reservoir simulation . • Revision of basic reservoir engineering concepts: This lecture will focus on the properties of rocks that are important for reservoir simulation. Students will learn about the porosity, permeability, and compressibility of rocks.This lecture also will focus on the fundamental principles of fluid flow in porous media. Students will learn about the Darcy equation, the Buckley-Leverett equation, and the governing equations for multiphase flow. • Grid Generation: The lecture provides tools to create a numerical grid that discretizes the reservoir into a series of cells or elements. This includes options for structured or unstructured grids, grid refinement, and grid editing capabilities. • Initial Conditions: This lecture will focus on the definition of initial distribution of fluids (oil, gas, and water) and pressures within the reservoir. This information can be based on historical data, well tests, or geological models. • Well Specification: In this lecture wells will define within the reservoir, including their locations, types (e.g., production or injection), and operational characteristics (flow rates, pressures, etc.). • Boundary Conditions: Boundary conditions are set to represent the interactions between the reservoir and its surroundings. This includes constraints on pressure, fluid flow rates, and the presence of external water or gas sources • Numerical Methods for Reservoir Simulation: This lecture will focus on the numerical methods that are used to solve the governing equations for reservoir simulation. Students will learn about finite difference methods, finite element methods, and other numerical methods. • Time Steps and Simulation Periods: The simulation time is divided into discrete time steps, and the simulation period is defined. The length of the time steps depends on the dynamics of the reservoir and the desired accuracy of the simulation • Commercial Reservoir Simulation Software: This lecture will focus on the commercial reservoir simulation software that is available to engineers. Students will learn about the capabilities of different software packages and how to use them to solve reservoir engineering problems. • Case Studies: This lecture will focus on case studies that illustrate the use of

	reservoir simulation. Students will learn how reservoir simulation has been used to solve real-world problems. The module may also include additional topics, such as: • Enhanced oil recovery: This is a technique for increasing the recovery of oil from a reservoir. • Unconventional reservoirs: These are reservoirs that are difficult to produce from, such as shale oil and gas reservoirs. • Challenges and opportunities in reservoir simulation: This is a discussion of the challenges and opportunities facing the field of reservoir simulation. The module will be assessed through a combination of coursework and a final exam. The coursework will consist of homework assignments, quizzes, and a final project. The final exam will cover the material that was covered throughout the module
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	• Lectures: Lectures can be used to introduce students to the basic concepts of Reservoir Simulation. Lectures can also be used to present the latest research in Reservoir Simulation. • Laboratories: Laboratories provide students with the opportunity to learn by doing. Students can practice using different Reservoir Simulation software , working with different case studies and scenarios • Group work: Group work can be used to encourage students to collaborate and share ideas. Group work can also be used to help students learn from each other. • Presentations: Presentations can be used to give students the opportunity to share their knowledge and skills with others. Presentations can also be used to assess students' learning. • Research projects: Research projects can be used to give students the opportunity to explore a topic in more depth. Research projects can also be used to help students develop their critical thinking skills

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	102	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem)	98	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6.5

الحمل الدراسي غير المنتظم للطالب خلال الفصل			
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	**Introduction to Reservoir Simulation** (Overview of reservoir simulation, Importance and applications of reservoir simulation, Basic concepts and terminology)
Week 2	**Overview of reservoir modeling and discretization**
Week 3	**Numerical Methods for Reservoir Simulation** (Review of numerical methods for solving partial differential equations, Discretization methods: finite difference, finite element, and finite volume)
Week 4	**Implicit and explicit time-stepping schemes, Stability and convergence analysis**

Week 5	**Reservoir Grid Construction and Data Preparation** (Reservoir grid types and construction techniques, Grid refinement and coarsening, Treatment of faults and fractures, Handling of geological and reservoir data for simulation0
Week 6	**Fluid Flow Equations and Well Modeling** (Single-phase and multiphase flow equations, Saturation functions and relative permeability, Well modeling: well types, wellbore storage, and skin effect, Well placement and control strategies
Week 7	**Mid-term Exam**
Week 8	**Reservoir Simulation Input and Output Analysis** (Selection of simulation models and parameters, Initialization and boundary conditions,
Week 9	**Understanding and interpreting simulation output**
Week 10	**Case Studies**
Week 11	**Solution of linear difference equations applicable to the reservoir using direct and iterative methods.**
Week 12	**Compositional and thermal reservoir simulation**
Week 13	Hands-on training with a simulation software package
Week 14	Reservoir Simulation Project
Week 15	**Preparatory Week: Challenges Opportunities and Future of Reservoir Simulation**
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to Reservoir Simulation • Lab: Introduction to reservoir simulation software • Hands-on exercise: Navigating the software interface, creating a new project, and importing data
Week 2	Reservoir Model Building and Grid Construction • Lab: Building reservoir models using structured grids • Hands-on exercise: Creating a structured grid, assigning properties, and visualizing the grid

Week 3	Reservoir Rock and Fluid Properties • Lab: Assigning rock and fluid properties to the reservoir model • Hands-on exercise: Defining porosity, permeability, fluid viscosity, and density in the simulation software
Week 4	Reservoir Fluid Flow Equations and Discretization • Lab: Implementing the reservoir flow equations in the simulation software • Hands-on exercise: Discretizing the reservoir model using finite difference or finite volume methods
Week 5	Numerical Solution Techniques for Reservoir Simulation • Lab: Configuring numerical solvers and time-stepping schemes • Hands-on exercise: Running simulations with different solver options and time steps
Week 6	Reservoir Simulation Input Data and Initialization • Lab: Importing and preparing input data for reservoir simulation • Hands-on exercise: Initializing the reservoir model with pressure and saturation values
Week 7	Well Modeling and Simulation • Lab: Modeling wells and well control options • Hands-on exercise: Defining well locations, productivity indices, and well controls in the simulation software
	Reservoir Simulation Output Analysis • Lab: Analyzing simulation results and interpreting output data • Hands-on exercise: Analyzing pressure profiles, saturation distributions, and production rates from simulation results
	Sensitivity Analysis and Uncertainty Assessment • Lab: Performing sensitivity analysis and uncertainty assessment • Hands-on exercise: Varying input parameters and evaluating their impact on simulation results

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Reservoir Simulation: Problems and Solutions By Turgay Ertekin Qian Sun Jian Zhang	Yes
Recommended Texts	Principles of applied reservoir simulation	yes
Websites	https://www.scribd.com/doc/74468323/Heriot-Watt-University-Reservoir-Simulation	

APPENDIX:

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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB 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.