	Ministry of Higher Education and Scientific Research - Iraq University of Warith Al_Anbiyaa.... College of Engineering Oil and Gas Department	

MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	Academic English Writing	**Module Delivery**	
Module Type	**Support or related learning activity**		☒ **Theory**
Module Code	UOW211		☒ **Lecture**
ECTS Credits	**4**		☐ **Lab**
SWL (hr/sem)	**100**		☐ **Tutorial** ☐ **Practical** ☐ **Seminar**

Module Level	UGII	**Semester of Delivery**	1
Administering Department	OGE	**College**	Engineering
Module Leader	Dr. Dheiaa Alfarge	**e-mail**	dheiaa.al@uowa.edu.iq
Module Leader's Acad. Title	lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor	NA	**e-mail**	dheiaa.al@uowa.edu.iq
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	ENLA111	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	Aims and objectives are: 1. to offer a structure approach to writing 2. to acquaint the students with the process of writing 3. to provide practice in basic sentence structure 4. to develop Grammar and Mechanics skills
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Be able to express themselves in correct English with correct grammar usage 2. Be able to construct coherent and logically constructed paragraphs 3. Write a sentence that expresses an idea in short (topic sentence) 4. Recognize the various types of supporting evidence to support their topic sentence 5. Limit ideas according to the context
Indicative Contents المحتويات الإرشادية	This course concentrates on the paragraph as the basic unit in extended writing. It begins with a review of sentence types, then it takes the students through the way of paragraph development including a topic sentence, supporting evidence and a concluding sentence. This course aims at developing students' writing and guiding students through the logical steps necessary for creating a paragraph.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The methods of instruction may include, but are not limited to: 1. Lectures 2. Individual assignments 3. Listening 4. Any active learning method such as: small group, presentations

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	37	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.4
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, 10	LO #1, 2
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 5
	Projects	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	All
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-3
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction
Week 2	Paragraph Structure

Week 3	Parts of a paragraph
Week 4	Topic Sentence
Week 5	Exercises on topic sentences
Week 6	Supporting sentences
Week 7	Concluding Sentence
Week 8	Midterm exam
Week 9	Achieving coherence by repetition of key nouns
Week 10	Achieving coherence by Using consistent Pronouns
Week 11	Achieving coherence by using Transition words
Week 12	Achieving coherence by arranging ideas in logical order
Week 13	Supporting Details
Week 14	Facts vs. Opinions
Week 15	Plagiarism
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	English for Oil and Gas #2 (Oxford English for Careers: Oil and Gas, Lewis Lansford, D'Arcy Vallance, Jon Naunton, and Alison Pohl. Oxford University Press.).	Yes
Recommended Texts	Academic Writing from paragraph to essay, Lisa A. Rumisek, Dorothy Zemach. Macmillan, Oxford, 2005	No
Websites	A Practical Guide to Academic Writing for International Students:	

	https://www.routledge.com/rsc/downloads/A_Practical_Guide_to_Academic_Writing_for_International_Students-A_Routledge_FreeBook-_FINAL_VERSION_.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 Information

معلومات المادة الدراسية

Module Title	**اللغة العربية**	**Module Delivery**	
Module Type	**Basic**	☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐**Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UOW204**		
ECTS Credits	**2**		
SWL (hr/sem)	**50**		
Module Level	UGII	**Semester of Delivery**	1
Administering Department	OGE	**College**	Engineering
Module Leader	Natik aziz	**e-mail**	Natik.a@uowa.edu.iq
Module Leader's Acad. Title		**Module Leader's Qualification**	MS.c.
Module Tutor	1	**e-mail**	Natik.a@uowa.edu.iq
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date		**Version Number**	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module		**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	**1- تمكين الطالب من الوقوف على حقيقة أحكام اللغة.** **2- صون اللسان عن الخطأ والنطق الصحيح بالحرف العربي** **3- أن يطبق القواعد النحوية والإملائية التي يدرها الطالب تطبيقا سليما.** **4- أن تتعزز فيه الميول الأدبية والمواهب .** **5- التذوق الجمالي والقدرات اللغوية المتميزة.**

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**1- المعرفة والفهم** **2-الوقوف على قواعد اللغة** **3- اعتزاز الطالب بالأمة العربية والإسلامية** **4-الحفاظ على الهوية الإسلامية** **5- الوقوف على حقيقة الإعجاز القرآني.** **6 – تمكين الطالب من معرفة قواعد اللغة** **7– ان يكتسب ثروة لغوية تمكنه من التعبير السليم في المواقف التي يمر بها في حياته**
Indicative Contents المحتويات الإرشادية	**1- أن يكتسب الطالب مهارة في إتقان قواعد اللغة.** **2- قادرا أن يعطي مثالا لكل باب من أبواب اللغة** **3-أن يتدرب على إخراج موضوعات اللغة من النصوص** **4- اعتزاز الطالب بهويته الوطنية والإسلامية ولغته .**

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	**1- الشرح والتوضيح واستخدام السبورة** **2- طريقة عرض المادة والمحاضرة** **3- الطريقة التقليدية ، الكتاب المنهجي إضافة إلى مصادر خارجية**

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 12	LO #1 and 4
	Seminar	2	10% (10)	2, 10	LO # 1, 3 and 4
	Online assignments	2	10% (10)	3, 7	LO # 2, 4 and 7
	Report	1	10% (10)	13	LO # 1 and 3
Summative assessment	Midterm Exam	2 hr	20% (20)	7	LO # 1,3 and 4
	Final Exam	3 hr	50% (50)	16	LO # 1,3 and 4
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	مهارات اللغة العربية ومميزاتها
Week 2	الادب والشعر في العصر الجاهلي (قصيدة للحفظ من العصر الجاهلي)
Week 3	اللغة العربية لغة القرآن الكريم (نص قرآني كريم للحفظ وقصيدة للحفظ من العصر الاسلامي)
Week 4	اللغة العربية لغة الضاد – الفروقات في اللغة العربية
Week 5	اسماء الاشارة وحروف الجر والعطف ومعانيها
Week 6	المبتدأ والخبر
Week 7	كان واخواتها
Week 8	ان واخواتها

Week 9	العدد والمعدود
Week 10	الاخطاء الشائعة باللغة العربية
Week 11	امتحان منتصف الفصل
Week 12	الاملاء في اللغة العربية
Week 13	علامات التنقيط في اللغة العربية
Week 14	كيفية كتابة الانشاء بلغة صحيحة
Week 15	**قصيدة من الشعر العربي الحديث**
Week 16	الامتحان النهائي

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	•	
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.

	Ministry of Higher Education and Scientific Research - Iraq University of Warith Al_Anbiyaa.... College of Engineering Oil and Gas Department	

MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	Computer Programming II	**Module Delivery**	
Module Type	**Support or related learning activity**		☒ **Theory**
Module Code	ENG214		☐ **Lecture**
ECTS Credits	**5**		☒ **Lab**
SWL (hr/sem)	**125**		☐ **Tutorial** ☐ **Practical** ☐ **Seminar**

Module Level	UGII	**Semester of Delivery**	1
Administering Department	OGE	**College**	Engineering
Module Leader	Dr.Salam Jabar Hussain	**e-mail**	
Module Leader's Acad. Title	Asst. Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor	NA	**e-mail**	
Peer Reviewer Name	Asst.Lect.Salam Khalid	**e-mail**	Salam.khalid@uowa.edu.iq
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	COPR115	**Semester**	1
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 main objective of this course is to provide a foundation in programming for engineering problem solving using the MATLAB software package. Students will develop the skills analyze and break down an engineering program and solve it algorithmically using MATLAB. After this course, students will have an understanding of various programming constructs and how they can be used to solve a computational problem.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• An ability to identify, formulate, and solve engineering problems by applying principles of engineering, science, and mathematics. • An ability to develop the confidence necessary to successfully solve Mathematical problems with a computer. • An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
Indicative Contents المحتويات الإرشادية	we will provide students with the skills to create & develop applications using MATLAB , where that allow Engineers to develop engineering applications that run in the Windows environment. MATLAB provides the engineer a programming tool to write simple programs quickly that meet their needs. Example programs written using MATLAB include gas and oil fluid correlations, interpolation software, gas well bottom hole pressure from surface conditions, volumetric reserve calculations, simple log analysis, water pattern analysis and bottom hole pressure analysis, also MATLAB can help you develop predictive maintenance algorithms customized to the specific operational and architectural profile of your equipment. Use Predictive Maintenance Toolbox to design condition indicators and estimate the remaining useful life of your critical equipment like pumps and compressors

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in delivering this module is to Encourage students to ask and answer questions, as well as training students to implement many practical exercises in the laboratory (which covers most of what is studied in theoretical lectures), which in turn gives students the ability to carry out the work required of them in the future in their practical life.

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	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 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	All
	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	Starting With Matlab: MATLAB windows , Menus and the toolbar , Working in the command window , Arithmetic operations with scalars , Display formats , Elementary math built-in functions, Useful commands for managing variables, Script files and the Editor Debugger, Matlab Help System
Week 2	Vector :Row Vectors, Extracting Bits of a vector, Column Vectors, Transposing, Matrices.vector addressing , Using a colon:in addressing vector , Adding elements to existing variables, Deleting elements, Built-in functions for handling vector , Mathematics With vector: Addition and subtraction , vector multiplication, vector division ,
Week 3	Creating Arrays: Creating a two-dimensional array (matrix) , The transpose operator , Array addressing , Using a colon: in addressing arrays, Adding elements to existing variables, Deleting elements, Built-in functions for handling arrays
Week 4	Mathematics With Array:Addition and subtraction , Array multiplication, Array division , Elementby-element operations , Using arrays in MATLAB built-in math functions,Built-in functions for analyzing arrays, Generation of random numbers
Week 5	Functions:Elementary Functions(log10, log, exp, sqrt), Max, min, mean, all, sort, unique, length, size, sum, abs functions, Polyarea, std (Standard Deviation), roots (Polynomial Roots), polyval, diff functions, Build functions
Week 6	Programming In Matlab: Relational and logical operators, Conditional statements, if constructs(if ... end, if ... else ... end, if ... elseif ... else ... end), Switch statements. The switch case statement,
Week 7	Loops:For Loops, while loop, Break & continue statement.

Week 8	Symbolic toolbox Factor, simplify and Expand the terms, Solving Equations, User-definedfunction (Inline, vectorize), Differentiation(The first derivative, The nth derivative), Integration (Definitive and in-definitive integrals, Multiple integral), Solutions of Differential Equations (First Order Differential Equations, Higher Order Differential Equations), Limits
Week 9	Graphic Plotting functions, Plotting a given data set, Adding (titles, axis labels, and annotations), Multiple data sets in one plot, Multiple Plots in One Figure, Three Dimensional Plot-Surface Generation
Week 10	Polynomials, Curve Fitting, And Interpolation : Polynomials, Curve fitting , Interpolation , Extrapolation
Week 11	Applications and Engineering Problems:Numerical analysis,The Root of The Equation Iteration method, Linear interpolation method, Bisection method, Tangent method (Newton-Raphson method).
Week 12	Solution of System of Equations: The Elimination method, Gauss-Jordan method, Gauss- Seidel Method, Newton-Raphson method.
Week 13	The solution of Ordinary Differential Equations: The Taylor Series method, The Euler method, The Runge-Kutta method, Method of Solving Higher Order Equations
Week 14	Petroleum Data Science and Machine Learning
Week 15	Apply the fundamental knowledge of mathematics, science & engineering, to solve the real engineering problems
Week 16	**Preparatory week before the final Exam**
Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered

Week 1	Starting With MATLAB: MATLAB windows , Menus and the toolbar , Working in the command window , Arithmetic operations (exercises using MATLAB as calculator).
Week 2	Vectors (practical exercises + homework): Row Vectors, Column Vectors, Transposing, Vector addressing , Adding elements to existing variables, Deleting elements, Built-in functions for handling vector , Mathematics With vector: Addition and subtraction , vector multiplication, vector division .
Week 3	Matrices (practical exercises + homework): Creating a two-dimensional array (matrix) , The transpose operator , addressing , Using a colon: in addressing arrays, Adding elements to existing variables, Deleting elements.
Week 4	Mathematics with Matrix (practical exercises + homework): Addition and subtraction, Array multiplication, Array division, element by-element operations.
Week 5	Built in functions (practical exercises + homework): log10, log, exp, sqrt, max, min, mean, all, sort, length, size, sum, abs, polyarea, std (Standard Deviation).
Week 6	Test.
Week 7	Programming In Matlab (practical exercises + homework): Relational and logical operators. Solving simple exercises using script files (Editor).
Week8	Conditional statements (practical exercises + homework): if constructs (if ... end, if ... else ... end, if ... elseif ... else ... end), Switch statement (The switch case statement).
Week9	Loop statements (practical exercises + homework): For Loops, while loop, Break & continue statement.
Week10	User defined functions (practical exercises + homework): Creating a function file, structure of a function file, saving a function file , and using a user-defined function
Week11	Graphic (practical exercises + homework): Plotting functions, Plotting a given data set, Adding (titles, axis labels, and annotations), and multiple data sets in one plot, Multiple Plots in One Figure, Three Dimensional Plot-Surface Generation
Week12	Symbolic toolbox (practical exercises + homework):

	Factor, simplify and Expand the terms, Solving Equations, User-defined function (Inline, vectorize), Differentiation, Integration, Solutions of Differential Equations (First Order Differential Equations, Higher Order Differential Equations), and Limits.
Week13	Solution of System of Equations (practical exercises + homework): The Elimination method, and Newton-Raphson method.
Week14	Solve some engineering problems using MATLAB
Week15	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1. RudraPratap: Getting started with MATLAB 7, Oxford Press (Indian edition),2006. 2. Desmond J. Higham and Nicolas J. Higham: Matlab Guide, SIAM, 2000.	yes
Recommended Texts	Introduction to MATLAB for Chemical & Petroleum Engineering 2nd Edition by Sam Toan , Hertanto Adidharma , Bahareh Nojabaei	No
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
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	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group **(0 – 49)**	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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	Ministry of Higher Education and Scientific Research - Iraq University of Warith Al_Anbiyaa.... College of Engineering Oil and Gas Department	

MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	Crimes of the Baath regime in Iraq	**Module Delivery**	
Module Type	Suport	☒ **Theory**	
Module Code	UOWA226	☒ **Lecture**	
ECTS Credits	2	☐ **Lab**	
SWL (hr/sem)	50	☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	

Module Level	UGII	**Semester of Delivery**	1
Administering Department	OGE	**College**	Engineering
Module Leader	Asst. Lect. Mosa Ali	**e-mail**	mousa.ali@uowa.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	
Module Tutor		**e-mail**	mousa.ali@uowa.edu.iq
Peer Reviewer Name	Asst. Lect. Mosa Ali	**e-mail**	mousa.ali@uowa.edu.iq
Scientific Committee Approval Date	01/09/2024	**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	1
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 curriculum aims to document the crimes of the Ba'athist regime to provide a clear and truthful account for current university students. It allows them to understand the reality of decades of Iraqi rule under a tyrant disguised as a human being. By studying its sections and contents, students will be guided to counteract any media distortion that attempts to mislead them, thus preventing any form of deception.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	After completing the academic semester, the student will learn: 1. The concept of crimes and their categories. 2. Types of international crimes. 3. Psychological crimes and their effects. 4. The Ba'athist regime's stance on religion. 5. Forms of human rights violations and abuses of power. 6. Environmental crimes committed by the Ba'ath regime in Iraq.

	7. The effects of war and radioactive pollution, and the dangers of landmines. 8. The destruction of cities and villages. 9. The draining of marshlands and the devastation of palm groves, trees, and crops. 10. Crimes related to mass graves. 11. Locations of prisons and detention centers under the Ba'ath regime. 12. Social crimes. 13. Violations of Iraqi laws. 14. The militarization of society. 15. The events of mass extermination graves perpetrated by the Ba'athist regime in Iraq.
Indicative Contents المحتويات الإرشادية	The indicative contents cover various aspects of the Ba'ath regime's crimes in Iraq, including categories of crimes, international and psychological offenses, religious stances, human rights abuses, environmental destruction, war pollution, and mass graves, alongside violations of laws and societal impacts.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Learning and teaching strategies involve a mix of interactive lectures, detailed case studies, multimedia presentations, and survivor testimonies to explore the Ba'ath regime's crimes. Students critically analyze historical documents, engage in group discussions, and conduct research projects, enabling a comprehensive understanding of the regime's impact on Iraqi society.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	2	**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	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects	1	10% (10)	Continuous	All
	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	- The concept of crimes and their categories.
Week 2	- Types of international crimes.
Week 3	- Psychological crimes and their effects.
Week 4	- The Ba'athist regime's stance on religion.

Week 5	- Forms of human rights violations and abuses of power.
Week 6	- Environmental crimes committed by the Ba'ath regime in Iraq.
Week 7	- The effects of war and radioactive pollution, and the dangers of landmines.
Week 8	- The destruction of cities and villages.
Week 9	- The draining of marshlands and the devastation of palm groves, trees, and crops.
Week 10	- Crimes related to mass graves.
Week 11	- Locations of prisons and detention centers under the Ba'ath regime.
Week 12	- Social crimes.
Week 13	- Violations of Iraqi laws.
Week 14	- The militarization of society.
Week 15	- The events of mass extermination graves perpetrated by the Ba'athist regime in Iraq
Week 16	- **The preparatory week before the Final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Crimes of the Baath regime in Iraq book	
Recommended Texts	Crimes of the Baath regime in Iraq book	
Websites	https://euaa.europa.eu/country-guidance-iraq-2021/crimes-committed-during-regime-saddam-hussein#:~:text=Saddam%20Hussein%20and%20the%20Baath,Kurdish%20people%20were%20systematically%20persecuted.	

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 Warith Al_Anbiyaa.... College of Engineering Oil and Gas Department	

MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	Fluid Mechanic I	**Module Delivery**	
Module Type	**Basic**		☒ **Theory**
Module Code	**ENG213**		☐ **Lecture**
ECTS Credits	**5**		☐ **Lab**
SWL (hr/sem)	**125**		☒ **Tutorial** ☐ **Practical** ☐ **Seminar**

Module Level	UGII	**Semester of Delivery**	1
Administering Department	OGE	**College**	Engineering
Module Leader	Dr.Salam Jabar	**e-mail**	
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor		**e-mail**	
Peer Reviewer Name	Asst.Lect.Mujtaba Mahdi	**e-mail**	Mujtaba.mahdi@uowa.edu.iq
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	CALC123	**Semester**	2
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	This course provides students an information on the principal concepts and methods of fluid mechanics. Topics covered in the course include pressure, hydrostatics, control volume analysis; mass conservation, momentum conservation and energy conservation for moving fluids; viscous fluid flows, flow through pipes; dimensional analysis; boundary layers. Students will work to formulate the models necessary to study, analyze, and design fluid systems through the application of these concepts, and to develop the problem-solving skills essential to good engineering practice of fluid mechanics in practical applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- To give the student the knowledge in fluid types, physical properties and the consequence of such properties on fluid flow, and types of units and their conversion. 2- To make the students release the forces acting on static fluid. 3- To give knowledge on types of flow and the basic forces acting on simple profiles and shapes in an steady fluid flow. 4- To give knowledge on viscous flow ,friction factor and losses in pipes.
Indicative Contents المحتويات الإرشادية	Students will work to formulate the models necessary to study, analyze, and design fluid systems through the application of these concepts, and to develop the problem-solving skills essential to good engineering practice of fluid mechanics in practical applications.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Using the following: 1- Discussion.

	2- Brain storming by encouraging students to produce a large number of ideas about some issue or problem raised during the lecture. 3- Self-learning by teaching the student by his own according to his special abilities and mental and cognitive levels responding to his preferences and interests to achieve development and integration of his capabilities. 4- Cooperative learning by team working.

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	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 12	LO #1 and 4
	Assignments	2	10% (10)	2, 10	LO # 1, 3 and 4
	Projects /	-	-	-	-
	Report	1	10% (10)	13	LO # 1 and 3
Summative assessment	**Midterm Exam**	2 hr	20% (20)	7	LO # 1,3 and 4
	Final Exam	2hr	50% (50)	16	LO # 1,3 and 4

Total assessment	100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	**Introduction** Syllabus and References Definition, types of fluids, units and dimensions
Week 2	**Physical Properties** dynamic and kinematic viscosity, surface tension, vapor pressure and cavitation.
Week 3	**Static Fluid** static fluid and gage measurement.
Week 4	**Static Fluid** Application on pressure gage measurement.
Week 5	**Hydrostatic Forces on Submerged Surfaces** Hydrostatic Forces on Plane Surfaces, and curved Surfaces .
Week 6	**Hydrostatic Forces on Submerged Surfaces** Buoyancy
Week 7	**Dynamic Fluid** Definition, Reynolds no. ,types of flow and flow pattern . flow in noncircular duct, and the derivation.
Week 8	**Governing Equations** Continuity equation, momentum equation, and energy equation.
Week 9	**Governing Equations**

	Euler equation, Bernoulli equation and its modification
Week 10	EGL and HGL.
Week 11	**Velocity Distribution** Derivation of velocity distribution, maximum, average and mean velocity for laminar flow
Week 12	**Velocity Distribution** Velocity distribution, maximum, average and mean velocity for turbulent flow. Correction factor
Week 13	**Friction in Pipes** Types of friction, skin friction and derivation of Darcy equation, form friction and its application.
Week 14	**Losses in Pipes** Major and minor losses.
Week 15	**Preparatory week before the final Exam**
Week 16	**Final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	• Streeter, V. "Fluid Mechanic", 6th edition, Mc-Graw Hill, 1975 . • Frank M. White "Fluid Mechanics", 5th edition, McGraw Hill. 1997. • Coulson & Richardson's Chemical Engineering - Vol. 1, Fluid Flow, Heat Transfer and Mass Transfer - 6th edition, Butterworth-Heinemann, 1999. • R. C. Hibbeler "FLUID MECHANICS", 2nd edition in SI units, Pearson Education, 2021.	

Recommended Texts	Frank M. White "Fluid Mechanics", 5th edition, McGraw Hill. 1997.	
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.

	Ministry of Higher Education and Scientific Research - Iraq University of Warith Al_Anbiyaa.... College of Engineering Oil and Gas Department	

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Fluid Mechanic II			**Module Delivery**	
Module Type	**Basic**			☒ **Theory**	
Module Code	ENG223			☐ **Lecture**	
ECTS Credits	**6**			☒ **Lab**	
SWL (hr/sem)	**150**			☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Level	UGII		**Semester of Delivery**	4	
Administering Department	OGE		**College**	ENG	
Module Leader	Dr.Salam Jabar		**e-mail**	salam.jabar@uowa.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	PH.D.	
Module Tutor	Asst.Lect Mujtaba Mahdi		**e-mail**	Mujtaba.mahdi@uowa.edu.iq	
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	ENG213	**Semester**	3
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	This course provides students an information on the principal concepts and methods of fluid mechanics. Topics covered in the course include pipe systems and pipes network, fluid measurements(types and their importance), Non Newtonian liquids, dimensional analysis, pumps, flow of compressible fluid, and flow in porous media. Students will work to formulate the models necessary to study, analyze, and design fluid systems through the application of these concepts, and to develop the problem-solving skills essential to good engineering practice of fluid mechanics in practical applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- To give the student the knowledge in types of fluid measurements; their importance, principles and applications. 2- To give the students an idea on Non-Newtonian fluids; their types and models, their physical principles of flow, and friction. 3- To give the students an idea on dimensional analysis grouping. 4- To give knowledge on types of pumps and their principles. 5- To make the students release the compressible fluid; their difference from incompressible fluid and how to write their basic equations
Indicative Contents المحتويات الإرشادية	Students will work to formulate the models necessary to study, analyze, and design fluid systems through the application of these concepts, and to develop the problem-solving skills essential to good engineering practice of fluid mechanics in practical applications.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Using the following: 1- Discussion. 2- Brain storming by encouraging students to produce a large number of ideas about some issue or problem raised during the lecture. 3- Self-learning by teaching the student by his own according to his special abilities and mental and cognitive levels responding to his preferences and interests to achieve development and integration of his capabilities. 4- Cooperative learning by team working.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	90	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.8
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**
	Quizzes	2	10% (10)	5, 13	LO #1

Formative assessment	**Assignments**	2	10% (10)	3, 11	LO # 1 and 4
	Projects / lab	1	10% (10)	15	LO # 1 and 3
	Report	7	10% (10)	2,4,6,8,10,12,14	LO # 1,3 and 4
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1 and 3
	Final Exam	2hr	50% (50)	16	LO # 1 and 3
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	**Multiple-pipe system** Parallel connection, series connection.
Week 2	**Multiple-pipe system** Reservoir pipe junction, and piping network.
Week 3	**Flow measurement** Why it is important? Custody Transfer Measuring System Obstructive devices, and Non-obstructive devices. Pitot tube
Week 4	**Flow measurement of close channel** Venture meter, Orifice meter.
Week 5	**Flow measurement of close channel** Nozzle meter, Rotameter.

Week 6	**Flow measurement of open channel** Weir and Notch.
Week 7	**Mid Exam**
Week 8	**Non- Newtonian liquids** Introduction, types of Non-Newtonian liquids, apparent viscosity.
Week 9	**Non- Newtonian liquids** Velocity distribution.
Week 10	**Non- Newtonian liquids** friction factor, and the pressure losses.
Week 11	**Dimensional Analysis** The Principle of Dimensional Homogeneity, Why do we need to do dimensional analysis? Dimensionless group using Rayleigh Method.
Week 12	**Dimensional Analysis** Dimensionless group using Buckingham Pi Theorem.
Week 13	**Pumps** Types, application, similarity rules, starting point for one and two pumps connected in parallel or sequence.
Week 14	**Compressible fluid** Introduction, applications, energy losses of its flow, derivation of sonic equation, supersonic and subsonic flow and the types of measurement.
Week 15	**Preparatory week before the final Exam**

Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	**Hydraulic bench, Volumetric flow rate measurement.**
Week 2	**Osborne-Reynolds and laminar flow Demonstration.**
Week 3	**flow through a Venture meter.**
Week 4	**Head losses in bends.**
Week 5	**Energy losses in piping system.**
Week 6	**Fluid friction in a smooth & roughened pipe/flow measuring and valves.**
Week 7	**Bourdon manometer calibration (dead weight).**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	• Streeter, V. "Fluid Mechanic", 6th edition, Mc-Graw Hill, 1975 . • Frank M. White "Fluid Mechanics", 5th edition, McGraw Hill. 1997.	

	• Coulson & Richardson's Chemical Engineering - Vol. 1, Fluid Flow, Heat Transfer and Mass Transfer - 6th edition, Butterworth-Heinemann, 1999. • R. C. Hibbeler "FLUID MECHANICS", 2nd edition in SI units, Pearson Education, 2021.	
Recommended Texts	Frank M. White "Fluid Mechanics", 5th edition, McGraw Hill. 1997.	
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

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	Ministry of Higher Education and Scientific Research - Iraq University of Warith Al_Anbiyaa.... College of Engineering Oil and Gas Department	

MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	Ordinary and partial differential equations		**Module Delivery**
Module Type	**Basic**		☒ **Theory**
Module Code	ENG212		☐ **Lecture**
ECTS Credits	**5**		☐ **Lab**
SWL (hr/sem)	**125**		☒ **Tutorial** ☐ **Practical** ☐ **Seminar**
Module Level	UGII	**Semester of Delivery**	1
Administering Department	OGE	**College**	Engineering
Module Leader	Dr.dheiaa hamadi	**e-mail**	Dheiaa.ha@uowa.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor	2	**e-mail**	E-mail
Peer Reviewer Name	Asst.Lect.Hawraa Majed	**e-mail**	hawraa.majeed@uowa.edu.iq
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CALC123	**Semester**	2
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	Important objectives of the calculus sequence are to develop and strengthen students' problem-solving skills and to teach them to read, write, speak, and think in the language of mathematics. In particular, students learn how to apply calculus tools to a variety of problem situations.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Find limits of functions (graphically, numerically, and algebraically) 2. Analyze and apply the notions of continuity and differentiability to algebraic and transcendental functions. 3. Determine derivatives by a variety of techniques including explicit differentiation, implicit differentiation, and logarithmic differentiation. Use these derivatives to study the characteristics of curves. Determine derivatives using implicit differentiation and use them to study the characteristics of a curve. 4. Students will use a variety of methods to solve the Laplace and Poisson equations.

	5. Harmonic function characteristics will be examined by the students. 6. The heat and wave equations will be solved, and students will examine their characteristics. 7. The characteristic approach will be used by students to resolve first order partial differential equations. 8. Students will evaluate conservation laws' characteristics. 9. Students will examine some other nonlinear PDEs' properties if time allows.
Indicative Contents المحتويات الإرشادية	1. To model and comprehend scenarios involving exponential growth or decay and second order physical systems, use established DE types. 2. Use a variety of input functions, such as zero, constants, exponentials, sinusoids, step functions, impulses, and superpositions of these functions, to solve the major equations. 3. Use the characteristic equation, exponential response formula, Laplace transform, convolution integrals, Fourier series, complex arithmetic, parameter variation, elimination, and anti-elimination methods to solve the differential equations mentioned above. 4. Be able to solve linear DEs using the fundamental ideas of linearity, superposition, and the existence and uniqueness of DE solutions.
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	• Highlight conceptual comprehension. • Assign homework that is difficult and builds on the lessons you gained in class. • Cooperative learning strategies ought to be applied.

	• Submit intelligent queries. • Put your focus on logical reasoning and practical problem-solving. • Use a range of assessment techniques.

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	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 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	All
	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	- Exponential and logarithm functions, Application of Exponential and logarithm functions
Week 2	- The relationship between the Exponential function and the logarithm function, Trigonometric functions
Week 3	- The inverse of Trigonometric functions, Hyperbolic functions
Week 4	- The inverse of Hyperbolic functions, Limits
Week 5	- Derivative, Implicit differentiation, Exponential functions derivative
Week 6	- The logarithm functions derivative, Derivative of hyperbolic functions
Week 7	- Mid-Term Exam
Week 8	- Applications of differentiation, Increasing and decreasing functions, Maximum and Minimum using Derivatives
Week 9	- Introduction to PDE and classification, Special functions: (Gamma function, Bessel function, Exponential integral function, Error function)
Week 10	- Fourier series and analysis (Definition, General Formula, Euler-Fourier Coefficient, Periodic Functions, Odd and Even Functions).
Week 11	- Fourier Transform (General Formula, Fourier Transform Theorems, Fourier Transform Pairs, Inverse of Fourier Transform, Inverse of Fourier Transform Theorems)
Week 12	- Methods of Solving PDE: (Direct integration method, Variables separable, Fourier Transform, Laplace Transform, ODE methods)
Week 13	- One Dimension Heat Equation, Two Dimension Heat Equation (Laplace equation)
Week 14	- One Dimension Wave Equation, Wave Equation: D. Alembert's formula
Week 15	- Single Phase Fluid Flow Equation Solution
Week 16	- **The preparatory week before the Final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1- George B. Thomas, "THOMAS' CALCULUS ", Eleventh Edition 2011, Dorling Kindersley (India). 2- Spiegel, M. R. Schaums outline series, theory and problems of Lablace transform, copy write 1965 by Mc Graw-Hill Inc. 3- Spiegel, M. R. Schaums outline series, theory and problems of Fourier analysis with application to boundary value problem, copy write 1974 by Mc Graw-Hill Inc.	
Recommended Texts	1- Ford , S.R. and Ford , J.R. " Calculus " , (1963) McGraw-Hill. 2- K.Back house and S.P.T. Houldsworth " Pure Mathematics a First Course " (1979) , S1 Edition , Longman Group . 3- Erwin Kreyszig, "Advanced Engineering Mathematics", John Wiley & Sons. Inc., 9th ed., 2006.	
Websites	1- https://en.wikipedia.org/wiki/Differential_equation 2- https://byjus.com/maths/differential-equation/	

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.

	Ministry of Higher Education and Scientific Research - Iraq University of Warith Al_Anbiyaa.... College of Engineering Oil and Gas Department	

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Partial Differential Equations	**Module Delivery**	
Module Type	**Basic**		☒ **Theory**
Module Code	ENG226		☐ **Lecture**
ECTS Credits	**5**		☐ **Lab**
SWL (hr/sem)	**125**		☒ **Tutorial** ☐ **Practical** ☐ **Seminar**
Module Level	UGII	**Semester of Delivery**	4
Administering Department	OGE	**College**	ENG
Module Leader	Dr.dheiaa hamadi	**e-mail**	E-mail: Dheiaa.ha@uowa.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D
Module Tutor		**e-mail**	E-mail
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	ENG212	**Semester**	3
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	Important objectives of the calculus sequence are to develop and strengthen students' problem-solving skills and to teach them to read, write, speak, and think in the language of mathematics. In particular, students learn how to apply calculus tools to a variety of problem situations.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Find limits of functions (graphically, numerically, and algebraically) 2. Analyze and apply the notions of continuity and differentiability to algebraic and transcendental functions. 3. Determine derivatives by a variety of techniques including explicit differentiation, implicit differentiation, and logarithmic differentiation. Use these derivatives to study the characteristics of curves. Determine derivatives using implicit differentiation and use them to study the characteristics of a curve. 4. Students will use a variety of methods to solve the Laplace and Poisson equations.

	5. Harmonic function characteristics will be examined by the students. 6. The heat and wave equations will be solved, and students will examine their characteristics. 7. The characteristic approach will be used by students to resolve first order partial differential equations. 8. Students will evaluate conservation laws' characteristics. 9. Students will examine some other nonlinear PDEs' properties if time allows.
Indicative Contents المحتويات الإرشادية	1. To model and comprehend scenarios involving exponential growth or decay and second order physical systems, use established DE types. 2. Use a variety of input functions, such as zero, constants, exponentials, sinusoids, step functions, impulses, and superpositions of these functions, to solve the major equations. 3. Use the characteristic equation, exponential response formula, Laplace transform, convolution integrals, Fourier series, complex arithmetic, parameter variation, elimination, and anti-elimination methods to solve the differential equations mentioned above. 4. Be able to solve linear DEs using the fundamental ideas of linearity, superposition, and the existence and uniqueness of DE solutions.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	• Highlight conceptual comprehension. • Assign homework that is difficult and builds on the lessons you gained in class. • Cooperative learning strategies ought to be applied.

	• Submit intelligent queries. • Put your focus on logical reasoning and practical problem-solving. • Use a range of assessment techniques.

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	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #3 and 10
	Assignments in collage	10	10% (10)	Continuous	All
	Assignments in home	10	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5
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	- General Review
Week 2	- Special Functions I
Week 3	- Special Functions I
Week 4	- Fourier Analysis and Series
Week 5	- Fourier Transform I
Week 6	- Inverse of Fourier Transform
Week 7	- Laplace Transform
Week 8	- Inverse of Laplace Transform
Week 9	- Methods of Solving PDE: (Direct integration method, Variables separable, Fourier Transform, Laplace Transform, ODE methods)
Week 10	- One Dimension Heat Equation, Two Dimension Heat Equation (Laplace equation) by Variable separable
Week 11	- One Dimension Heat Equation, Two Dimension Heat Equation (Laplace equation) by Transforms
Week 12	- One Dimension Wave Equation by Variable separable, Wave Equation: D. Alembert's formula
Week 13	- One Dimension Wave Equation by transforms
Week 14	- Single Phase Fluid Flow Equation Solution
Week 15	- Final Exam
Week 16	- **The preparatory week before the Final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1- George B. Thomas, "THOMAS' CALCULUS ", Eleventh Edition 2011, Dorling Kindersley (India). 2- Spiegel, M. R. Schaums outline series, theory and problems of Lablace transform, copy write 1965 by Mc Graw-Hill Inc. 3- Spiegel, M. R. Schaums outline series, theory and problems of Fourier analysis with application to boundary value problem, copy write 1974 by Mc Graw-Hill Inc.	
Recommended Texts	1- Ford , S.R. and Ford , J.R. " Calculus " , (1963) McGraw-Hill. 2- K.Back house and S.P.T. Houldsworth " Pure Mathematics a First Course " (1979) , S1 Edition , Longman Group . 3- Erwin Kreyszig, "Advanced Engineering Mathematics", John Wiley & Sons. Inc., 9th ed., 2006.	
Websites	1- https://en.wikipedia.org/wiki/Differential_equation 2- https://byjus.com/maths/differential-equation/	

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 Warith Al_Anbiyaa.... College of Engineering Oil and Gas Department	

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Petroleum Geology			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	OGE221				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	UGII		**Semester of Delivery**	4	
Administering Department	OGE		**College**	ENG	
Module Leader	Hawraa Majeed Obaid		**e-mail**	Hawraa.majeed@uowa.edu.iq	
Module Leader's Acad. Title	Assist. Lect.		**Module Leader's Qualification**	MSc	
Module Tutor	NA		**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	OGE215	**Semester**	3
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	Understanding the nature of the organic-rich source rock, the paleoaquifers in which the petroleum flowed, and the trapping mechanism are important parts of Petroleum Geology. A petroleum engineers needs to have a broad knowledge of sedimentary geology (sedimentology and petrography), stratigraphy, structural geology, and hydrogeology.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	* An ability to identify, formulate, and solve engineering problems by applying principles of engineering, science, and mathematics. * An ability to develop the confidence necessary to successfully solve Mathematical problems with a computer. * An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
Indicative Contents المحتويات الإرشادية	The outcomes of this course are used to construct the evolutionary histories of sedimentary basins. Thus, a successful petroleum engineers needs a broad background, and a willingness to learn and apply a wide range of information and techniques to the problems of finding, developing, and exploiting a petroleum reservoir.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Have a basic understanding of the petroleum system, petroleum as a resource, and the value chain. 2. Have a basic understanding of petroleum formation and origin. 3. Understand how geologists conduct the search for petroleum resources through the value chain or the life cycle of a petroleum resource. This will include the processes involved and actual examples. 4. Learn details on how to begin evaluating a hydrocarbon play and developing a prospect. 5. Learn the concepts of migration and accumulation of hydrocarbon 6. Learn the principles of mapping a subsurface reservoir.

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	37	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.5
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, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects /	1	10% (10)	Continuous	All
	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 What is petroleum geology?, Principal of petroleum geology, Why is Carbon so Important in the Life Cycle, Oil and Gas.
Week 2	ORIGIN OF PETROLEUM FORMS Characteristics of petroleum reservoirs, Exploration activities in a sedimentary basin.
Week 3	PETROLEUM TRAP 1 General Considerations, Structural Traps, Types of Structural traps, Stratigraphic Traps,
Week 4	PETROLEUM TRAP 2 Types of stratigraphic traps, Combination Traps, Hydrodynamic Traps
Week 5	ORIGIN, MIGRATION, AND ACCUMULATION 1 Origin of petroleum, Total Organic Carbon (TOC), Source Rocks, TOC Types,

Week 6	ORIGIN, MIGRATION, AND ACCUMULATION 2 Conversion of OM to HC, Dehydrogenization and Carbonization, Deoxygenization and Carbonization.
Week 7	SOURCE ROCK QUALITY Maturation, Purposes of maturation indicators, Lopatin's TTI Index, Other Maturation Indicators, Oil Source Rock Criteria.
Week 8	MIGRATION OF HYDROCARBON 1 General considerations, Formation water, Formation water composition, Pressure and temperature during burial,
Week 9	MIGRATION OF HYDROCARBON 2 Evidence for Migration, Primary Migration, Primary Migration Controversy, Primary Migration Mechanisms ,Secondary Migration, Migration Pathways
Week 10	PETROLEUM RESERVOIR CHARACTERISTIC
Week 11	EXPLORATION TECHNIQUES FOR HYDROCARBON Surface geology, Subsurface geology, Drilling operations
Week 12	MAPS AND CROSS SECTIONS Contour maps, Geologic maps, Cross sections
Week 13	PETROLEUM GEOLOGY OF IRAQ AND SURROUNDING REGIONS 1
Week 14	PETROLEUM GEOLOGY OF IRAQ AND SURROUNDING REGIONS 2
Week 15	**Preparatory week before the final Exam**
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Basic Petroleum Geology, Peter K. Link	Yes
Recommended Texts	Elements of Petroleum Geology (2nd edition): Academic Press, Toronto,	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.

	Ministry of Higher Education and Scientific Research - Iraq University of Warith Al_Anbiyaa.... College of Engineering Oil and Gas Department	

MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	Physics and Thermodynamics	**Module Delivery**	
Module Type	**Basic**		☒ **Theory**
Module Code	ENG225		☐ **Lecture**
ECTS Credits	**5**		☐ **Lab**
SWL (hr/sem)	**125**		☒ **Tutorial** ☐ **Practical** ☐ **Seminar**

Module Level	UGII	**Semester of Delivery**	4
Administering Department	OGE	**College**	
Module Leader	Asst.lect Yahya hadi	**e-mail**	Yahya.hadi@uowa.edu.iq
Module Leader's Acad. Title	Prof.	**Module Leader's Qualification**	PhD
Module Tutor	2	**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	ENG212	**Semester**	3
Co-requisites module	1- It provides abroad foundation in the basic of science and engineering.	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. The program has a strong emphasis on modern physics and its application to 21st century technology. 2. Our program builds on the existing research and teaching strengths of the Physics and Materials Science Division in cross-cutting areas such as novel 21st century materials, materials for energy, macromolecules, quantum mechanics to devices, surfaces, interfaces, and nanostructures, and computation, and is flexible enough to grow together with the research base of our division.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Graduates will have substantial experience with laboratory methods, data analysis, and computation.
Indicative Contents المحتويات الإرشادية	Engineering physics students will be well equipped to pursue research and development careers in new and emerging technologies such as properties of new materials, quantum electronics, nanofabrication and devices, quantum signal processing and quantum computing, related to emerging advances in electrical, mechanical and petroleum engineering.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Active learning techniques methods

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	90	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	130		

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 /	1	10% (10)	Continuous	All
	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	History of nature science, electrical, charge, current.
Week 2	Resistance, resistivity, galvanometer, ammeter, voltmeter.
Week 3	Simple harmonic motion.
Week 4	Kinetic and potential energy
Week 5	Electric and magnetic properties of matter
Week 6	Insulators, semiconductor, conductor, superconductor.
Week 7	Diamagnetic, paramagnetic, ferromagnetic
Week 8	Nanotechnology
Week 9	Introduction: Zeroth law of thermodynamics: Definition of temperature, Zeroth law concept, Type of thermometers, Type of temperature scales, Kelvin experiment: gas thermometer
Week 10	Ideal gas Equation: Properties of matter, Temperature effect on matter, Thermal expansion laws Macroscopic description of ideal gas, Derivation of Ideal gas equation
Week 11	Heat: Heat and internal energy, Units of heat, Mechanical equivalent of heat, Specific heat capacity, Calorimetry, Latent heat Work: State variables, Transfer variables, Work in thermodynamics, PV diagrams, Energy transfer .
Week 12	The 1st law of thermodynamics: Isolated and open systems, Adiabatic processes, Adiabatic free expansion process Isobaric processes, Isochoric processes, Isothermal processes, Thermal expansion
Week 13	Engines and refrigerators: Work to heat, Heat engine, Thermal efficiency of heat engine, Heat pump (refrigerators), Refrigerator cycle (Sterling), Coefficient of performance
Week 14	2nd law of thermodynamics: Entropy Kelvin-Planck & Clausius forms, Reversible and irreversible processes Carnot engine and theorem, Carnot efficiency
Week 15	**Preparatory week before the final Exam**
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Electric Charge and Field, Guide to Semiconductor Engineering, Magnetic and Electric book. Publish Papers	Yes
Recommended Texts	Physics text book, Series of nanotechnology	
Websites	Elsevier, Springer, Physics library online, https://openlibrary.org/subjects/physics ,	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
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	Ministry of Higher Education and Scientific Research - Iraq University of Warith Al_Anbiyaa.... College of Engineering Oil and Gas Department	

MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	Properties and transportation of crude oil and gas	**Module Delivery**	
Module Type	**Core**		☒ **Theory**
Module Code	OGE222		☐ **Lecture**
ECTS Credits	**5**		☒ **Lab**
SWL (hr/sem)	**125**		☐ **Tutorial** ☐ **Practical** ☐ **Seminar**

Module Level	UGII	**Semester of Delivery**	4
Administering Department	OGE	**College**	ENG
Module Leader	Dr.Salam Jabar	**e-mail**	salam.jabar@uowa.edu.iq
Module Leader's Acad. Title	Ass. Prof. Dr	**Module Leader's Qualification**	PhD
Module Tutor	Asst.lect yahya hadi	**e-mail**	E-mail:Yahya.hadi@uowa.edu.iq
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	ENG213	**Semester**	3
Prerequisite module	UOW121	**Semester**	2
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	**Providing students with science and knowledge in oil and gas different types of transportation as single-phase flow and two-phase flow, Stresses types, study the types of pumps, compressors, legislation and laws relating to the transfer and storage of oil and gas, methods of storage and calculations of economic diameter. Also study the characteristics of crude oil and its products in terms of classification and use Products and methods of obtaining them as well as disposal methods of unwanted compounds in crude oil or its various products (light, medium and heavy).**
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**1- To give the student the knowledge in pipeline, horizontal and non-horizontal flow calculation as single and two-phase flow.** **2- To give student the knowledge of sizing and specifying pipe, selection of route, protection against corrosion pipe lying. Types of oil and gas transportations.** **3- To give student the idea about tanks, pressure vessels, design and selection of storage tanks.** **4- To give the student the knowledge and experiments of Petroleum assay (carbon residue, asphaltene content) Density, distillation, Light hydrocarbon, salt content, Sulfur content, Viscosity and pour point.** **5- To give student the knowledge of Crude oil properties, Industrial process of distillation towers and fraction processes.** **6- To give student the idea liquid petroleum gases (LPG), gasoline blending components, and naphtha, jet fuel, kerosene, and distillates, and Lubricated oil, Residue Fuel Oil, Wax, Asphlitane.**

Indicative Contents المحتويات الإرشادية	**This course focus to crude oil and gas properties first part then in the second part study oil and gas transportation which make the students through the application of module learning outcomes concepts to develop the problem-solving skills essential to good engineering practice of practical applications of Properties and transportation of crude oil and gas.**

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**1. Lectures.** **2- Discussion.** **3- Presentations and Listening.** **4- Encourage students to team working.** **5- Encouraging students to submit reports on problem and solutions related to the curriculum.**

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	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects /	1	10% (10)	Continuous	All
	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	**Source of Oil and classifications, Petroleum assay (carbon residue , asphaltene content) Density, Viscosity, Distillation process, Light hydrocarbon, salt content.**
Week 2	**Sulfur content, pour point, Properties of Oil Stock, fractional Industries, Industrial process of distillation towers and fraction processes, Basic operation in petroleum processing.**
Week 3	**Light products and Their properties (Gasoline blending components, and naphtha, Liquid petroleum gases (LPG))**
Week 4	**Mid-range Oil Products (Jet fuel, kerosene)**
Week 5	**Heavy Oil products and Their Properties (Residue Fuel Oil, Wax (classification, types) , Lubricants)**

Week 6	Methods of Oil and Gas Transportation (single flow calculations) and Pipeline Transportation of single and Multi-phase Flow
Week 7	Efficiency of Pipeline Transportation with other types
Week 8	Multi-phase Flow
Week 9	Horizontal and Non-Horizontal Flow Calculation multi-phase flow
Week 10	Gas Flow in Series, Parallel and Network Pipelines, Gathering pipelines. The SCADA System for pipelines.
Week 11	Pipelines Economics, Pipelines Design, Pipeline networks, Sampling and Testing of Oil and Gas.
Week 12	Pumps and Compressors, Instrumentation and Control, Safety and Supervision.
Week 13	Rules and Regulation in Transportation and Storage of Oil and Gas, Economic pipe diameter.
Week 14	Types of Storage, Underground Storage of Natural Gas
Week 15	Preparatory week before the final Exam
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	**density and specific gravity**
Week 2	**Astm distillation**
Week 3	**flash and fire point**
Week 4	**carbon residue and Ash content**
Week 5	**sulfur content**
Week 6	**smoke point**
Week 7	**octane and cetane number**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**1- Emir Ceriþc, "Crude Oil , Processes and Products", ISBN (9958917343, 9789958917349). 2012.** **2- Vasily .S and Raphael. I, Marcel Dekker, "Crude Oil Chemistry", Inc, New York Basel 2005.** **3- James. G. Speight "Petroleum Chemistry and Refining", Applied Energy Technology Series, Taylor and Francis USA, 1998.** **4- "Oil and Gas Production Handbook", Havard Devold., Wikipedia (The Free Encyclopedia), 2013.** **5- "Gas Conditioning and Processing: The Basic Principles", John. M. C., Robert. A. H., Robert. N. M., Copyright Campbell Petroleum Series USA. 1992.**	

	6- "Production and Transportation of Oil and Gas B: Gathering and Transportation (Development in Petroleum Science)", A. P. Szilas, Elsevier Science Publishing Company 1986.	
Recommended Texts	1- Emir Ceriþc, "Crude Oil , Processes and Products", ISBN (9958917343, 9789958917349). 2012. 2- "Oil and Gas Production Handbook", Havard Devold., Wikipedia (The Free Encyclopedia), 2013.	
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.

	Ministry of Higher Education and Scientific Research - Iraq University of Warith Al_Anbiyaa.... College of Engineering Oil and Gas Department	

MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Statistical and Optimization	**Module Delivery**	
Module Type	**Basic**	☒ **Theory**	
Module Code	ENG216	☐ **Lecture**	
ECTS Credits	**5**	☐ **Lab**	
SWL (hr/sem)	**125**	☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	

Module Level	UGII	**Semester of Delivery**	1
Administering Department	OGE	**College**	Engineering
Module Leader	Dr.ali khayoon	**e-mail**	ali.kh@uowa.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor	1	**e-mail**	ali.kh@uowa.edu.iq
Peer Reviewer Name	Asst. Lect..Yahya hadi	**e-mail**	yahya.hadi@uowa.edu.iq
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CALC123	**Semester**	2
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	Foundation material in probability and statistical inference. Topics include sample spaces, conditional probability, random variables, discrete and continuous probability distributions, expectation, estimation, and hypothesis testing as well as Simple linear regression, model and equation.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Learn the language and core concepts of probability theory. 2- Use software and simulation to do statistics. 3- Become an informed consumer of statistical information.
Indicative Contents المحتويات الإرشادية	1- Dealing with numbers and variables and identifying the methods of dealing with them. Studying Central tendency measures as important tools in dealing with many variables Define the Probability theories and determine how to deal with all variables according to the correct method of probability, and using suitable methods to deal with methods of continuous and discrete variables. 2- Using suitable software to deal with the large number of variables of all kinds. Recognition through exercise to determine the quality of variables and calculate central tendency measures and measures of variation. 3- Finding the relationship between dependent and independent variables and construct the correlation coefficient and degree of correlation as well as the studying the regression models and determining the equation. learning how to draw the relationship of the different variables.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	As a basic strategy .. students try through this course to identify the correct statistical methods in dealing with the numbers and the multi variables that they might deal with regarding of oil and gas engineering applications, in addition to studying the systems, concepts and theories of probability through which it can infer accurate facts and information which will be highly beneficial in their field and its practical applications through the use of a set of specialized software.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	75	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	1	10% (10)	1-4	1
	Assignments	1	10% (10)	5-8	1,2
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	1,2,3
Summative assessment	**Midterm Exam**	2 hr	10% (10)	8	1,2,3
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction and Fundamental elements of statistics.
Week 2	Types of data, Methods of describing data.
Week 3	Measures of central tendency.
Week 4	Measures of variation.
Week 5	Probability and Discreet of random variable.
Week 6	Probability and Continuous random distribution.
Week 7	Normal Distribution.
Week 8	Applications .
Week 9	Testing of Hypothesis.
Week 10	Traditional Methods.
Week 11	z Test for a Mean and Chi-square
Week 12	Simple linear regression.
Week 13	The coefficient of correlation.
Week 14	Regression model.
Week 15	Regression equation.
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Allan G. Bluman, 2007. Elementary Statistics: step by step approaches , Mc. Graw Hill, 7th edition.	Not sure
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 (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 Warith Al_Anbiyaa.... College of Engineering Oil and Gas Department	

MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Structure geology			**Module Delivery**	
Module Type	**Basic**			☒ **Theory**	
Module Code	OGE215			☐ **Lecture**	
ECTS Credits	**4**			☒ **Lab**	
SWL (hr/sem)	**100**			☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Level	UGII		**Semester of Delivery**	1	
Administering Department	OGE		**College**	Engineering	
Module Leader	Farah Taha Abdallah Hawraa Majeed Obaid		**e-mail**	Farrah.ta@uowa.edu.iq Hawraa.majeed@uowa.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	M.SC	
Module Tutor	NA		**e-mail**	Farrah.ta@uowa.edu.iq Hawraa.majeed@uowa.edu.iq	
Peer Reviewer Name			**e-mail**		

Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	GEGE122	**Semester**	2
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	Explain basic concepts related to structural geology Study the relationship between structure geology and petroleum engineering
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	* An ability to identify, formulate, and solve engineering problems by applying principles of engineering, science, and mathematics. * An ability to develop the confidence necessary to successfully solve Mathematical problems. * An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
Indicative Contents المحتويات الإرشادية	The outcomes of this course are used to study the stress and ductile deformation, thus understand rock mechanic and relation with petroleum engineering. Also, study the concepts of folds and fractures, thus understand hydrocarbon migration and traps. A successful petroleum engineers needs a broad background, and a willingness to learn and apply a wide range of information and techniques to the problems of finding, developing, and exploiting a petroleum reservoir.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	

	1- Explain fundamental concepts relevant to structure geology 2- Explain the concepts of stress and brittle deformation 3- Explain the concepts of stress and ductile deformation 4- Explain the fault connectivity during hydrocarbon migration 5- Explain naturally fractured Reservoirs 6- Explain the concepts of folds and hydrocarbon traps

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	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 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	All
	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	Stress in rocks: Introduction, Traction, Stress components.
Week 2	Stress in two dimensions, Biaxial stress, Uniaxial stress, Pure shear stress, Stress in three dimensions
Week 3	Deformation and strain, homogeneous strain and the strain ellipsoid, strain path, Coaxial and non-coaxial strain accumulation, superimposed strain,
Week 4	Strain quantities: Longitudinal Strain, Volumetric Strain, Angular Strain, Other Strain Quantities
Week 5	Faults: introduction, Fault components/Terminologies, the attitude of fault, classification of fault, Dip Slip Faults, Listric Normal Fault, Strike slip fault, Transfer fault, Tear Fault, Transform fault, Scissors fault
Week 6	Principal stress orientation for three main fault types: Normal Fault systems (Horst and graben and Half-Graben Blocks), Geometric classification of fault, Classification based on rake of net slip, Classification Based on attitude of fault relative to altitude of adjacent beds, Classification Based on fault pattern, Classification Based on angle at which fault dips, Fault activity
Week 7	Geological factors in characterizing fault connectivity during hydrocarbon migration, Parameters characterizing fault connectivity, Parameterization of geological factors controlling fault connectivity, case study (Effectiveness of selected parameters in assessing fault connectivity), Fault traps
Week 8	Joints: introduction, Joint patterns, Master joints, Plumose Structure, Twist hackle, Systematic and Non-systematic Joints, Joint Sets and Joint Systems, Cross-Cutting Relations between Joints, Joint Spacing in Sedimentary Rocks,
Week 9	Origin and interpretation of joints (Joints Related to Uplift and Unroofing, Formation of Sheeting Joints, Natural Hydraulic Fracturing, Stylolite joints), Mechanics of jointing
Week 10	The Nature of Naturally Fractured Reservoirs, Open and healed fractures, naturally fractured reservoirs classification, Fractured Rocks Properties (porosity, permeability, Compressibility)
Week 11	Fold: introduction, Folding processes, Mechanical role of layers: Active / passive folding, Folding mechanisms (Bending, Lithospheric-scale flexures, Buckling (Single layer buckling, Multilayer

	buckling, Influence of spacing) Flexural Folding. Flowage Folding, Shear Folding, Folding Due to intrusions, Folding Due to Differential Compression,
Week 12	Fold types, Geometric of folded surface, classification of fold based on Shape and orientation, Classification of folds relative to hinge curvature is referred to as bluntness, Classification based on the orientation of the hinge line and the axial plane, Fold axis orientation, Classification based on Interlimb angles, Fold Symmetry
Week 13	Fold dimensions (draw and calculations), Orientation of a plane (dip and strike), Draw and calculations thickness and depth of beds
Week 14	Dom, hydrocarbon traps
Week 15	Structural basin geology
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Structural maps
Week 2	Calculation the thickness of layers from maps
Week 3	Calculation the thickness of layers (case one)
Week 4	Calculation the thickness of layers (case two)
Week 5	Calculation the thickness of layers (case three)
Week 6	Calculation the depth of layers (case one , two)
Week 7	Calculation the depth of layers (case three)

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Natural Fractured Reservoir Engineering The Nature of Naturally Fractured Reservoirs	No
Recommended Texts	Structure geology	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
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