Ministry of Higher Education and Scientific Research
University of Misan
College of Engineering
Department of Chemical Engineering
Directorate of Quality Assurance and Academic Accreditation

Academic Program and Course Description Guide for the Bachelor's Program in Chemical Engineering According to the Bologna Process for the First and Second Stages

2024

Academic Program Description Form

University Name: University of Misan Faculty/Institute: Engineering

Scientific Department: Chemical

Academic or Professional Program Name: Bachelor of Science in Chemical Engineering

Final Certificate Name: Bachelor of Science in Chemical Engineering Academic System: Semester Based

Description Preparation Date: Feb ٢٠٢٥ File Completion Date: July ٢٠٢٥

Signature:

Head of Department Name: **Dr. Mudhaffar Hussein**

Date: July ١٥, ٢٠٢٥

Signature:

Scientific Associate Name: HASANAIN ABBAS HASAN

Date:

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department: Date:

Signature:

Approval of the Dean

Abbas O. Dawood
Prof. of Structural Engineering

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1. Program Vision

Our vision as academic staff in the Chemical Engineering academic staff at the University of Misan is to lead the way in advancing scientific knowledge, technological innovation, and sustainable solutions for a better future. We are committed to fostering a collaborative and inclusive environment that cultivates excellence in education, research, and service. In our pursuit of excellence, we aim to equip our students with a comprehensive understanding of the principles and practices of chemical engineering, preparing them to be innovative problem solvers and ethical leaders in the global community. We strive to provide them with hands-on experiences, cutting-edge research opportunities, and a strong foundation in core technical skills, enabling them to contribute effectively to the industry and society. As academic staff, we are dedicated to pushing the boundaries of knowledge through impactful research. We seek to address pressing challenges in areas such as sustainable energy, environmental protection, pharmaceuticals, advanced materials, and process optimization. By collaborating with industry partners, governmental agencies, and other academic institutions, we aim to translate our research findings into practical applications that positively impact society. Beyond the classroom and laboratory, our vision is comprehensive. We are dedicated to cooperating with the neighborhood and proactively advancing the wise and sustainable use of resources. We work to increase awareness of the contribution of chemical engineering to tackling global concerns and motivating future generations of engineers through outreach activities, public lectures, and partnerships with regional organizations.

2. Program Mission

The mission of the academic staff in Chemical Engineering is to provide great education, pursue cutting-edge research, encourage entrepreneurship, give back to the community, and support professional growth. We want to have a beneficial influence on the area of chemical engineering and society at large via our passion and dedication. As members of the academic faculty, we are dedicated to providing high-quality instruction that gives our students the ethical perspective, technical proficiency, and knowledge needed to succeed in the area of chemical engineering. We try to develop critical thinking, problem-solving skills, and a solid foundation in fundamental concepts via challenging coursework, realistic laboratory experiences, and practical training. We provide a welcoming learning atmosphere that values diversity, cooperation, and lifelong learning. Academic staff members are also devoted to the ongoing professional growth, to keep up with the most recent developments in the industry. As academic staff, we strongly advise membership in conferences, seminars, and professional groups. We promote a culture of excellence and lifelong learning by offering mentoring and assistance for professional advancement.

3. Program Objectives

1. To provide a solid theoretical and analytical foundation in the core principles of Chemical Engineering, including: advanced thermodynamics, transport phenomena, reaction engineering, process design, and unit operations. This ensures graduates are equipped to tackle complex and multidisciplinary problems.

2. To incorporate specialized curricular components in leadership and management, focusing on team leadership, resource optimization, and project management. This aims to develop the strategic and organizational competencies necessary for managing technical initiatives and cross-disciplinary functions.

3. To prepare graduates for diverse career paths in fields such as: the chemical industries, energy systems, pharmaceuticals, and environmental engineering. The program also provides a robust knowledge base for those wishing to pursue graduate studies in Chemical Engineering or related disciplines.

4. To instill a culture of lifelong learning and continuous professional development by encouraging students to follow the latest research literature, engage in continuing education programs, and participate in professional societies. This ensures the maintenance of intellectual agility and ethical responsibility throughout their careers.

5. To enhance communicative and collaborative competencies by engaging students in evidence-based written and oral assignments, as well as structured team projects addressing complex engineering problems. This ensures their ability to proficiently present technical results and work effectively in multidisciplinary environments.

4. Program Accreditation

Does the program have program accreditation? And from which agency?

No

5. Other external influences

Is there a sponsor for the program?
College of engineering /University of Misan

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	**6**	**14**	**11.66**	
College Requirements	**7**	**29**	**24.16**	
Department Requirements	**14**	**75**	**62.5**	
Summer Training	---	---	---	**3th stage**
Other	**1**	**2**	**1.66**	

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

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours			
			theoretical	practical	Lab	Tut.
1/1	CH-EN116	Analytical Chemistry	3	1	3	
1/1	ENG122	Mathematics I	2			2
1/1	ENG128	Engineering Drawing	1		1	1
1/1	ENG125	Physics	2			
1/1	UOM120	English Language I	1	1		
1/1	CH-EN111	Engineering Mechanics and Strength of Material	3		2	1

1/2	**CHEN126**	Organic Chemistry	**3**	**1**	**3**	
1/2	**CHEN127**	Principles of Chemical Engineering	**3**	**1**		**1**
1/2	**ENG124**	Mathematics II	**2**			**2**
1/2	**ENG123**	Workshop Technology			**2**	
1/2	**UOM122**	Computer I	**1**		**2**	
1/2	**UOM121**	Democracy and Human Rights	**2**			
1/2	**UOM123**	Arabic Language I	**2**			
2/1	**CHEN217**	Fluid Flow I	**2**			**1**
2/1	**CHEN216**	Physical Chemistry I	**2**			**1**
2/1	**CHEN215**	Material Balance	**3**			**1**
2/1	**CHEN214**	Materials Properties	**3**			**1**
2/1	**ENG201**	Mathematics III	**2**			
2/1	**CHEN212**	Engineering Management	**2**			
2/1	**MNS120**	Crimes of the baath regime in Iraq	**2**			
2/2	CHEN227	Fluid Flow II	**2**		**3**	**1**
2/2	CHEN226	Physical Chemistry II	**2**		**3**	**1**
2/2	CHEN225	Energy Balance	**3**			**1**
2/2	ENG202	Mathematics IV	**2**			**2**
2/2	CHEN222	Statistics and Engineering Economics	**2**	**1**		**1**
2/2	UOM202	English Language II	**1**	**1**		
2/2	UOM201	Computer II	**1**		**2**	

8. Expected learning outcomes of the program

Knowledge	
Learning Outcomes 1	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
Skills	
Learning Outcomes 2	**The ability to develop and implement innovative engineering designs that meet specified requirements, while considering**

	technical, economic, environmental, and social constraints, through the integration of comprehensive analysis methodologies and creative synthesis processes in the design cycle.
Learning Outcomes 3	**The ability to design and conduct appropriate measurements and experiments while ensuring quality standards, accurately analyze and interpret data, and use engineering judgment to draw conclusions and inferences.**
Ethics	
Learning Outcomes 4	**The ability to recognize ethical and professional responsibilities in engineering contexts and make informed judgments that carefully consider global economic, environmental, and societal consequences.**
Learning Outcomes 5	**The ability to recognize the ongoing need for professional knowledge development and how to properly locate, evaluate, integrate, and apply it.**

9. Teaching and Learning Strategies

The use of visual, laboratory, and electronic tools, along with any methods capable of effectively and accurately communicating concepts and content.

10. Evaluation methods

Daily assessments, seminars, reports, and homework assignments.

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Professor						
Assist Prof.		2			2	
Lecture	3				3	

Assist. Lec.	1	4			5	

Professional Development

Mentoring new faculty members

New faculty members undergo a comprehensive qualification program before commencing their teaching duties and being assigned courses, ensuring their full integration into the academic and administrative activities of the department.

This program introduces them to:

1. **The Central Importance of Their Role:**
   As essential mentors for chemical engineering students, guiding and influencing their professional and future paths.
2. **The Impact of Character and Knowledge:**
   The professor's academic standing and personal conduct have a direct and comprehensive impact on students, not only academically but also on personal and professional aspects.
3. **Attention to Detail:**
   The necessity of adhering to precision and caring for even the smallest matters, recognizing the importance of every detail in building a successful professor's image.
4. **Leveraging Experience:**
   Emphasizing the importance of benefiting from the wisdom and experience of senior professors, consulting them and seeking advice before making any critical or significant decisions.

Professional development of faculty members

This stage includes three main steps:

1. **Enrolling in a teaching methods course.**
2. **Training under professors with extensive academic and practical experience, including laboratory work.**
3. **Delivering a final seminar on a specific topic.**

12. Acceptance Criterion

"**Multiple admission channels (Central Admission, Special Government Education, Families of Martyrs, …)**"

13. The most important sources of information about the program
International, Arab, and Iraqi universities, along with their respective professors.

14. Program Development Plan
Continuous monitoring and periodic evaluation of the curriculum execution plan, coupled with an ongoing feedback system during the academic year, to ensure the fulfillment of the intended educational goals.

Program Skills Outline															
				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
	A competency framework has been created for each subject, detailed within its corresponding paragraph.														

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Analytical Chemistry**			**Module Delivery**	
Module Type	**Core learning activity**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	**CH-EN116**				
ECTS Credits	**8**				
SWL (hr/sem)	**200**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Type Dept. Code CHEN		**College**	Type College Code	
Module Leader	Mohammed Abdulraheem Saeed		**e-mail**	al-asadim@uomisan.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	05/06/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	

Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1- Those who will take this course will have extensive training in the subjects that deal with chemical analysis, like calculations based on the weight relations of chemical formulas and equations. 2- Our study of quantitative analysis with special emphasis on analytical applications (molarity , normality, pH of solution, Equilibrium constants). 3- Water treatment calculation like Total Hardness Determination Using EDTA. 4- This will give the students background and strong basic to higher level courses involving dealing with different solutions specifically during dealing with solutions in laboratory.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Introduce basic definitions and introductory concepts of analytical chemistry. 2- Show the different methods to prepare solutions with different concentrations and PH. 3- Explains the methods to control the precipitation process . 4- Show the methods for the quantitative calculations of oxidation reduction reactions. 5- Water treatment like Total Hardness Determination Using EDTA. 6- Provide a background to higher level courses involving dealing with different solutions. 7- Provide a strong quantitative and analytical understanding to the students in order to be able to deal with different solution concentrations and its preparation in chemical industry
Indicative Contents المحتويات الإرشادية	1. Introduction to Analytical Chemistry: • Overview of analytical chemistry • Importance and applications of analytical chemistry • Analytical methods and techniques 2. Measurement Fundamentals: • Units and measurements in analytical chemistry

- Precision, accuracy, and errors in measurements
- Calibration and standardization

3. Chemical Equilibrium and Analytical Chemistry:
    - Acid-base equilibria
    - Solubility equilibria
    - Redox reactions and equilibria
4. Classical Methods of Analysis:
    - Gravimetric analysis
    - Volumetric analysis (titrations)
    - Precipitation reactions
    - Acid-base titrations
    - Redox titrations
5. Instrumental Methods of Analysis:
    - Spectroscopic methods (UV-Vis, IR, NMR, Mass spectrometry)
    - Chromatographic methods (Gas Chromatography, Liquid Chromatography)
    - Electroanalytical methods (Potentiometry, Voltammetry)
6. Separation Techniques:
    - Distillation
    - Extraction techniques
    - Filtration and centrifugation
    - Chromatographic separations
7. Quality Assurance and Quality Control:
    - Statistical analysis in analytical chemistry
    - Validation of analytical methods
    - Quality control procedures
    - Calibration curves and validation parameters
8. Environmental Analysis:
    - Analysis of water, air, and soil samples
    - Monitoring of pollutants and contaminants
    - Environmental regulations and standards

	9. Pharmaceutical Analysis: • Drug discovery and development • Analysis of pharmaceuticals and drug formulations • Pharmacokinetics and bioavailability studies 10. Forensic Analysis: • Analysis of trace evidence • Drug analysis in forensic investigations • DNA analysis and fingerprinting 11. Industrial Analysis: • Analysis in the petroleum industry • Analysis of food and beverages • Analysis of metals and alloys 12. Data Analysis and Instrumentation: • Data handling and statistical analysis • Instrumentation techniques and maintenance • Laboratory safety and good laboratory practices

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Creating a Positive Learning Environment: Foster a supportive and encouraging classroom environment where students feel comfortable taking risks and making mistakes. Providing constructive feedback and praising their efforts to boost their confidence. 2. Using Authentic Materials: Incorporating real-life materials such as newspaper articles, advertisements, or videos into the lessons. Where the authentic materials will expose students to real language use and help them develop practical language skills. 3. Differentiate Instruction: Recognizing that students have different learning styles, needs, and proficiency levels, so its necessary to adapt teaching methods and materials to cater to diverse learners, and providing individualized support and additional challenges as necessary.

	4. Promote Active Learning: Encouraging students in hands-on activities, group discussions, role-plays, and projects that require them to actively use the language. Also, Encouraging participation and create opportunities for students to practice their English skills in meaningful ways. 5. Provide Regular Feedback: Regularly assess students' progress and provide timely feedback on their performance. Offering specific suggestions for improvement and guide them towards resources and strategies to enhance their learning.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	108	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	92	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6.13
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)	3, 10	LO #1, 2, 6 and 7
	Assignments	2	10% (10)	2, 12	LO # 3, 4
	Projects / Lab.	5	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 6
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-4
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Stoichiometric Calculations of Chemical Analyses
Week 2	Calculation Involving Concentrations of Solutions: Molarity
Week 3	Calculation Involving Concentrations of Solutions: Normality
Week 4	Computations Based on Molarities of Solutions
Week 5	Computations Based on Indirect Analysis
Week 6	Acid-Base Equilibrium and pH of Aqueous Solution: Strong Acid, Strong Base, Salt of Strong Acid and Strong Base
Week 7	pH of Aqueous Solution: Weak Acid, Weak Base, Weak Acid plus its Salt, Weak Base plus its Salt, Buffer solutions
Week 8	pH of Aqueous Solution: Salt of Weak Acid and Strong Base, Salt of Weak Base and Strong Acid
Week 9	Practical training
Week 10	Equilibrium in Precipitation Reaction: Solubility Product
Week 11	Equilibrium in Precipitation Reaction: Fractional Precipitation
Week 12	System With Competing Equilibrium : Dissolving Precipitates
Week 13	Oxidation – Reduction Analysis: Redox Titration
Week 14	Stoichiometry of Redox Reaction: Typical Problem Calculations
Week 15	Practical training

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

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to Laboratory Tools and Apparatus Used in Volumetric Analysis
Week 2	Preparation of Standard Acid and Base
Week 3	Neutralization Titration: (Acid – Base Titration)
Week 4	Titration of Strong Acid with Strong Base
Week 5	Titration of Weak Acid with Strong Base (HAC with NaOH)
Week 6	Titration Using Two Indicators: Determination of Concentration of NaOH & Na_2CO_3 in Solution Mixture
Week 7	Determine the Concentration of Pure Acetic Acid in Vinegar
Week 8	First Analytical Chemistry Lab. Exam
Week 9	Precipitation Reaction: More Method – Formation of Colored Precipitate
Week 10	Precipitation Reaction: Fajan Method – Adsorption Indicators
Week 11	Precipitation Reaction: Unknown Chloride Concentration Solution
Week 12	Oxidation – Reduction Analysis : Titration of $KMnO_4$ Solution With $H_2C_2O_4$ Solution
Week 13	Oxidation – Reduction Analysis: Determination of Normality of $FeSO_4$ by Titration with $KMnO_4$
Week 14	Total Hardness Determination Using EDTA
Week 15	Second Analytical Chemistry Lab. Exam

Learning and Teaching Resources

مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Quantitative analysis ", by Pierce Haeinsch , Sawyer 4th edition ,1958	No
Recommended Texts	Analytical chemistry by Gary D. Christian	No
Websites		

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Mathematics I**			**Module Delivery**	
Module Type	**Basic learning activity**			☒ **Theory**	
Module Code	**ENG122**			☐ **Lecture**	
ECTS Credits	5			☐ **Lab**	
SWL (hr/sem)	125			☒ **Tutorial** ☐ **Practical** ☐ **Project**	
Module Level	1		**Semester of Delivery**	1	
Administering Department	Type Dept. Code		**College**	Type College. Code ENG	
Module Leader	Huda Radhi Jabbar		**e-mail**	Huda198806@gmail.com	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	M.Sc.	
Module Tutor	Huda Radhi Jabbar)		**e-mail**	Huda198806@gmail.com	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	

Co-requisites module	ENG124	**Semester**	2

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Understanding Mathematical Concepts: The primary aim is to ensure that students develop a solid understanding of fundamental mathematical concepts and principles. This includes topics such as algebra, calculus, differential equations, linear algebra, statistics, and numerical methods. 2. Mathematical Modeling: Chemical engineering involves the use of mathematical models to describe and analyze chemical processes. The aim is to teach students how to formulate mathematical models that represent real-world chemical engineering systems. This includes understanding the principles of mass and energy balances, reaction kinetics, transport phenomena, and thermodynamics. 3. Problem-solving Skills: Mathematics is a key tool for problem-solving in chemical engineering. The aim is to develop students' problem-solving skills using mathematical techniques. This involves applying mathematical methods to solve engineering problems, analyzing data, interpreting results, and making informed decisions. 4. Computational Skills: Chemical engineering often requires the use of computational tools and software for simulations and analysis. The aim is to teach students how to use mathematical software packages and programming languages to solve mathematical and engineering problems. This includes learning how to implement numerical methods, write algorithms, and perform simulations. 5. Critical Thinking and Analytical Skills: Mathematics in chemical engineering helps develop critical thinking and analytical skills. Students learn to analyze complex problems, break them down into smaller manageable parts, and apply mathematical techniques to find solutions. This includes developing skills in logical reasoning, pattern recognition, and quantitative analysis. 6. Communication and Presentation: Mathematics plays a crucial role in communicating and presenting technical information in chemical engineering. The aim is to develop students' ability to communicate mathematical concepts and solutions effectively through technical reports, presentations, and visual aids.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the reason behind studying function and how to graph the function 2. Understand this function and their domain and range and graph the function 3. Understand the meaning of limits and help the student to evaluate the limit and continuity 4. Introduce basic definition of derivative function and their inverse 5. Learn the basic method to solve equation related to chemical engineering

Indicative Contents المحتويات الإرشادية	Algebra: • Expressions and equations (4 hrs.) • Polynomials (4 hrs.) • Exponents and logarithms (6 hrs.) • Matrices and determinants (6 hrs.) Geometry: • Trigonometry (4 hrs.) Calculus: • Limits and continuity (10 hrs.) • Differentiation (10 hrs.) • Applications of differentials (10 hrs.) • Differential equations (10 hrs.) •

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Creating a Positive Learning Environment: Foster a supportive and encouraging classroom environment where students feel comfortable taking risks and making mistakes. Providing constructive feedback and praising their efforts to boost their confidence. 2. Using Authentic Materials: Incorporating real-life materials such as newspaper articles, advertisements, or videos into the lessons. Where the authentic materials will expose students to real language use and help them develop practical language skills. 3. Differentiate Instruction: Recognizing that students have different learning styles, needs, and proficiency levels, so it's necessary to adapt teaching methods and materials to cater to diverse learners, and providing individualized support and additional challenges as necessary. 4. Promote Active Learning: Encouraging students in hands-on activities, group discussions, role-plays, and projects that require them to actively use the language. Also, encouraging participation and create opportunities for students to practice their English skills in meaningful ways. 5. Provide Regular Feedback: Regularly assess students' progress and provide timely feedback on their performance. Offering specific suggestions for improvement and guide them towards resources and strategies to enhance their learning

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.13
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)	3, 10	LO #1, 2, 3, 4
	Assignments	2	10% (10)	2, 11	All LO
	Project	1	10% (10)	12	All LO
	Report	1	10% (10)	9	All LO
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-4
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Understand the reason behind studying function and how to graph the function, part 1

Week 2	Understand the reason behind studying function and how to graph the function, part 2
Week 3	Understand this function and their domain and range and graph the function, part 1
Week 4	Understand this function and their domain and range and graph the function, part 2
Week 5	Understand this function and their domain and range and graph the function, part 3
Week 6	Understand this function and their domain and range and graph the function, part 4
Week 7	Understand this function and their domain and range and graph the function, part 5
Week 8	Understand this function and their domain and range and graph the function, part 6
Week 9	Understand the meaning of limits and help the student to evaluate the limit and continuity, part 1
Week 10	Understand the meaning of limits and help the student to evaluate the limit and continuity, part 2
Week 11	Understand the meaning of limits and help the student to evaluate the limit and continuity, part 3
Week 12	Understand the meaning of limits and help the student to evaluate the limit and continuity, part 4
Week 13	Understand the meaning of limits and help the student to evaluate the limit and continuity, part 5
Week 14	Introduce basic definition of derivative function and their inverse
Week 15	Learn the basic method to solve equation related to chemical engineering
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	1. George B. Thomas Jr.- Maurice D. Weir Joel R. HassThomas Calculus_ Early Transcendentals (13 Edition)- Pearson 2. Thomas Calculus Early Transcendentals Single Variable 13th c2014 Solutions ISM	Online
Recommended Texts	1. Thomas Calculus Multivariable 13th c2014 solutions ISM. 2. Advanced Engineering Mathematics 10th Edition. 3. Solution Manual of advanced engineering mathematics by Erwin kreyszig 9th edition 4. Thomas calculus 11th (textbook solutions)	Online
Websites		

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Engineering Drawing**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory**	
Module Code	**ENG128**			☐ **Lecture**	
ECTS Credits	**5**			☒ **Lab**	
SWL (hr/sem)	**125**			☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Level	1		**Semester of Delivery**	1	
Administering Department	Type Dept. Code		**College**	Type College. Code ENG	
Module Leader			**e-mail**		
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	M.Sc.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	05/06/2024		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1- Learning the basic principles of engineering drawing. 2- Develop the student's skills in using tools to draw the engineering shapes. 3- Knowing the types and uses of lines and the difference between them. 4- Understand how to measure, read and put appropriate dimensions and how to distribute dimensions on the shapes inside the sheet. 5- Learning and training students to read the engineering shapes and to dissociate and gather the parts by drawing the projections and sections and then isometric drawing. 6- The ability to grow and small the shapes in suitable scale. 7- Finally, the student being able to bring out an engineering sheet arranged by geometric art assets through implementation of several applications on engineering operations.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	At the end of the class, the student will be able to: 1-Know and understand the basic principles of engineering drawing. 2-Understand and apply the right use of the drawing tools. 3-Read and understand the drawing sheets. 4-Conclude of projections and sections that lead to extend the mind and imagination of students. 5-Gather the parts or projections and sections to reach and find the final design for the shape. 6-Draw perfect engineering drawing sheets. 7-Grow and minimize any part or shape.

	8-Have communication skills with references and designers. 9-Implement the panel with all engineering requirements (as a designer) that accepted in the field of work, and that reflect the skills that trains them.
Indicative Contents المحتويات الإرشادية	This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Lectures. 2. Classwork in the atelier. 3. Homework and assignments. 4. Tests and exams. 5. In-Class questions and discussions. 6. Connection between theory and application.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4

Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 4, 5, 6, 8
	Assignments	2	10% (10)	13	LO # 2,6
	Projects / Lab.	10	10%(10)	3-12	LO # 1-7
	Report	1	10%(10)	9	All LO
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-5
	Final Exam	3hr	50% (50)	16	ALL
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction , references, tools, the sheet of drawing
Week 2	Border and title of the sheet, the kind of lines, symbols
Week 3	Scales of drawing, letters and numbers, free hand drawing
Week 4	Engineering process
Week 5	Engineering process
Week 6	Dimensions

Week 7	Projection, conclusion of third dimension
Week 8	Projection, conclusion of third dimension
Week 9	Projection, conclusion of third dimension
Week 10	Sections
Week 11	Practical training
Week 12	AutoCAD lab
Week 13	AutoCAD lab
Week 14	AutoCAD lab
Week 15	Practical training
Week 16	**Preparatory week before the final Exam.**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction , references, tools, the sheet of drawing
Week 2	Border and title of the sheet, the kind of lines, symbols
Week 3	Scales of drawing, letters and numbers, free hand drawing
Week 4	Engineering process
Week 5	Engineering process
Week 6	Dimensions
Week 7	Projection, conclusion of third dimension
Week 8	Projection, conclusion of third dimension
Week 9	Projection, conclusion of third dimension

Week 10	Sections
Week 11	Practical training
Week 12	AutoCAD lab
Week 13	AutoCAD lab
Week 14	AutoCAD lab
Week 15	Practical training
Week 16	**Preparatory week before the final Exam.**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	عبد الرسول الخفاف – الرسم الهندسي	Yes
Recommended Texts	M. B. Shah and B.C. Rana, Engineering Drawing, Sai Print-O-Pac Pvt. Ltd, India, 2009	No
Websites		

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية		
Module Title	**Physics**	**Module Delivery**
Module Type	**Support learning activity**	☒ **Theory**
Module Code	**ENG125**	☐ **Lecture**
ECTS Credits	**4**	☐ **Lab**
SWL (hr/sem)	**100**	☐ **Tutorial**

			☐ **Practical** ☐ **Seminar**		
Module Level	1		**Semester of Delivery**	1	
Administering Department	Type Dept. Code		**College**	Type College Code ENG	
Module Leader			**e-mail**		
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**		
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	05/06/2024		**Version Number**	1.0	

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	NONE	**Semester**	
Co-requisites module	NONE	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. Provide students with a solid understanding of the fundamental principles that govern the behavior of the physical world. This includes concepts such as motion, forces, energy, and the interactions between different forms of matter and energy. 2. Develop students' skills in scientific inquiry, critical thinking, and problem-solving. Students learn how to formulate hypotheses, design experiments, collect and analyze data, and draw conclusions based on evidence. 3. Develop students' mathematical skills, including algebra, calculus, and trigonometry, and their ability to apply these mathematical concepts to solve physics problems.

	4. Develop students' practical skills in handling scientific equipment, making accurate measurements, and conducting experiments to validate theoretical concepts. 5. Cultivate scientific literacy and an appreciation for the role of physics in understanding the natural world. It encourages students to develop a curiosity about the physical world, engage with scientific discoveries and developments, and understand the broader implications of physics in society and technology. 6. Provide a strong foundation by covering essential concepts and principles that form the basis for more advanced physics courses, as well as disciplines such as engineering, astronomy, and material science.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Knowledge and Understanding: ● Demonstrate a comprehensive understanding of the fundamental concepts and principles of physics, such as motion, forces, energy, waves, electricity, magnetism, and modern physics. ● Explain key theories, laws, and equations that govern various physical phenomena. ● Recall and describe the properties and behaviors of matter, energy, and their interactions. 2. Application and Problem-Solving Skills: ● Apply mathematical and scientific reasoning to solve physics problems and analyze real-world situations. ● Utilize appropriate formulas, equations, and models to calculate and predict physical quantities and outcomes. ● Design and conduct experiments, collect data, analyze results, and draw conclusions based on scientific principles. 3. Scientific Inquiry and Critical Thinking: ● Demonstrate the ability to formulate scientific questions, hypotheses, and predictions. ● Apply critical thinking skills to evaluate scientific information, analyze data, and make logical conclusions. ● Identify and understand the limitations and uncertainties associated with experimental measurements and scientific models. 4. Practical and Experimental Skills: ● Perform laboratory experiments using proper techniques, equipment, and safety protocols.

	● Make accurate observations, measurements, and data recordings. ● Analyze experimental data using appropriate statistical methods and graphical representations. 5. Communication and Scientific Literacy: ● Effectively communicate scientific ideas, principles, and results using appropriate terminology, symbols, and units. ● Present and interpret scientific information in written, graphical, and oral formats. ● Engage in scientific discussions and debates, demonstrating an understanding of the broader implications of physics in society, technology, and the environment. 6. Collaborative and Ethical Practices: ● Work collaboratively in groups to solve problems, conduct experiments, and discuss physics concepts. ● Demonstrate ethical practices in scientific inquiry, including proper citation of sources and responsible use of data.
Indicative Contents المحتويات الإرشادية	1. Mechanics: ● Motion: Displacement, velocity, acceleration, and kinematic equations. ● Forces: Newton's laws of motion, friction, centripetal force, and gravitational force. ● Energy and Work: Kinetic energy, potential energy, work-energy theorem, and conservation of energy. ● Momentum: Impulse, conservation of momentum, and collisions. 2. Thermodynamics: ● Temperature and Heat: Thermal equilibrium, temperature scales, heat transfer mechanisms. ● Laws of Thermodynamics: Zeroth law, first law, second law, and third law. ● Heat Engines and Efficiency: Carnot cycle, efficiency calculations, and thermal processes. ● Entropy: Entropy concept, entropy change in various processes, and entropy calculations. 3. Waves and Optics: ● Wave Characteristics: Amplitude, frequency, wavelength, period, and wave equation.

	• Optics: Reflection, refraction, lenses, mirrors, and image formation. • Interference and Diffraction: Young's double-slit experiment, interference patterns, and diffraction patterns. • Wave Optics: Polarization, Huygens 'Principle, and interference in thin films. 4. Electricity and Magnetism: • Electric Fields and Forces: Electric charge, Coulomb's law, electric fields, and electric potential. • Electric Circuits: Ohm's law, series and parallel circuits, resistors, capacitors, and Kirchhoff's laws. • Magnetic Fields and Forces: Magnetic fields, magnetic forces, and magnetic field lines. • Electromagnetic Induction: Faraday's law, Lenz's law, induced EMF, and transformers. 5. Modern Physics: • Quantum Mechanics: Wave-particle duality, Heisenberg's uncertainty principle, and the Schrödinger equation. • Atomic Physics: Bohr's model, energy levels, electron transitions, and atomic spectra. • Nuclear Physics: Radioactivity, nuclear decay, half-life, and nuclear reactions. • Particle Physics: Elementary particles, the standard model, and particle interactions.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Creating a Positive Learning Environment: Foster a supportive and encouraging classroom environment where students feel comfortable taking risks and making mistakes. Providing constructive feedback and praising their efforts to boost their confidence. 2. Using Authentic Materials: Incorporating real-life materials such as articles, advertisements, or videos into the lessons.

	3. Differentiate Instruction: Recognizing that students have different learning styles, needs, and proficiency levels, it's necessary to adapt teaching methods and materials to cater to diverse learners, and provide individualized support and additional challenges as necessary. 4. Promote Active Learning: Encouraging students in hands-on activities, group discussions, role-plays, and projects that require them to actively use the language. Also, Encouraging participation and creating opportunities for students to practice their English skills in meaningful ways. 5. Provide Regular Feedback: Regularly assess students' progress and provide timely feedback on their performance. Offering specific suggestions for improvement and guiding them towards resources and strategies to enhance their learning.

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	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	67	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.47
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 and 3
	Report	1	10% (10)	12	LO # 3, 4 and 5
	Assignment	2	10% (10)	2,4, 6, 9, 11	All LO
	Project	1	10% (10)	6, 13	All LO
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Atomic Theory: Atomic structure and Electron Orbits
Week 2	Energy Bands, and electrical properties of materials
Week 3	Vectors and Vector Addition, Components of Vectors, Unit Vectors, Products of Vectors
Week 4	Force and Interactions, Newton's Laws of Motion
Week 5	Work, Kinetic Energy, and the Work-Energy Theorem
Week 6	Momentum and Impulse, Elastic Collisions
Week 7	Angular Velocity, rotational motion, and Rigid-Body rotation
Week 8	Waves/Acoustics: Mechanical Waves types and C/Cs, Energy in Wave Motion, Wave Interference, Boundary Conditions, and Superposition,
Week 9	Waves/Acoustics: Sound Waves C/Cs, Speed of Sound Waves, Sound Intensity

Week 10	Resonance and Sound, Interference of Waves, and The Doppler Effect
Week 11	Electric Charge, Coulomb's Law, Electric Field and Electric Forces, Gauss's Law
Week 12	Electric Potential, Resistivity, Electromotive Force, Energy and Power in Electric Circuits
Week 13	Magnetic Field Sources and Lenz's Law
Week 14	Seminar.
Week 15	Seminar.
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	• "University physics with modern physics". By Hugh D. Young 14th edition	No (online)

Recommended Texts	• Douglas Giancoli, Physics: Principles with Applications, published by Pearson • Paul Hewitt, Conceptual Physics, published by Pearson. Available through UF Access • Fundamentals of Physics 10th Edition by David Halliday, Robert Resnick, Jearl Walker	No
Websites	https://www.physlink.com/, https://www.slac.stanford.edu/library/pdg/ https://scienceworld.wolfram.com/physics/topics/Electromagnetism.html	

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية		
Module Title	**English language I**	**Module Delivery**
Module Type	**Basic learning activity**	

Module Code	**UOM120**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**
ECTS Credits	2			
SWL (hr/sem)	**50**			
Module Level	1	**Semester of Delivery**	1	
Administering Department	Type Dept.	**College**	Type College Code UOM	
Module Leader	ALI ABDULZAHRA ALI	**e-mail**	Alihussin2294@uomisan.edu.iq	
Module Leader's Acad. Title	Assist. 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	5/06/2024	**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	UOM202	**Semester**	4

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To improve and develop the reading, writing, listening, and speaking skills and linguistic abilities of the students. 2. To identify the weaknesses and problems that hinder students' speaking and writing skills in English. 3. To categorize and classify the essential features of the English language's key elements. 4. To improve and develop students' skills in exploring and using English grammar correctly, both verbally and in writing. 5. To increase the analytical capabilities of the language's key elements and develop students abilities to construct suitable relationships between the linguistic components. 6. To expand students' understanding of comparing and clarifying linguistic components and distinguishing between them easily. 7. To develop students' knowledge and provide them with new distinctive knowledge, not only by learning a new language but also by getting to know the cultures that speak this language.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Gain proficiency in adhering to the conventions of oral and written academic presentations. 2. Acquire the skills necessary to utilize the Internet to locate academic resources in the library and elsewhere. 3. Establish fundamental logical communication skills that are important for academic communication and practical in the job. 4. Give students the chance to collaborate, peer instruct, get and give feedback, talk about their work by seminars, and engage with academic staff. 5. Increase student proficiency with online learning tools and information/communication technology, such as word processing, presentation, and note-taking software. 6. Work on your lifelong learning and self-directed learning skills, with a focus on mastering all language macro skills (reading, writing, speaking, and listening) in English. 7. Create a variety of English communication tools and abilities with a broad range of applications outside of the classroom. 8. Gain insight into diverse viewpoints through participating in discussions on a range of moral and social concerns.

Indicative Contents المحتويات الإرشادية	The following items are examples of indicative content: 1. Grammar: Parts of speech (nouns, verbs, adjectives, etc.), sentence structure, tenses, syntax, punctuation, and word order. [15 hr.] 2. Vocabulary: Word meanings, synonyms, antonyms, idioms, phrasal verbs, collocations, and word formation. 3. Reading Comprehension: Understanding and analyzing written texts, including fiction, non-fiction, articles, essays, poems, and literary works. [15 hr]. 4. Writing Skills: Composition, essay writing, creative writing, formal and informal writing styles, letter writing, grammar usage, and paragraph development. [15 hr]. 5. Speaking and Listening: Oral communication skills, conversation, pronunciation, intonation, listening comprehension, and public speaking. [10 hr]. 6. English for Specific Purposes: Specialized vocabulary and language use for various fields such as engineering, technology, business, medicine, law, and academia. [15 hr]. 7. Cultural Studies: Exploring English-speaking cultures, sports, traditions, history, literature, and societal aspects. [10 hrs.].

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Creating a Positive Learning Environment: Foster a supportive and encouraging classroom environment where students feel comfortable taking risks and making mistakes. Providing constructive feedback and praising their efforts to boost their confidence. 2. Using Authentic Materials: Incorporating real-life materials such as newspaper articles, advertisements, or videos into the lessons. Where the authentic materials will expose students to real language use and help them develop practical language skills. 3. Differentiate Instruction: Recognizing that students have different learning styles, needs, and proficiency levels, so its necessary to adapt teaching methods and materials to cater to diverse learners, and providing individualized support and additional challenges as necessary. 4. Promote Active Learning: Encouraging students in hands-on activities, group discussions, role-plays, and projects that require them to actively use the language. Also, Encouraging participation and create opportunities for students to practice their English skills in meaningful ways.

	5. Provide Regular Feedback: Regularly assess students' progress and provide timely feedback on their performance. Offering specific suggestions for improvement and guide them towards resources and strategies to enhance their learning.

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	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.13
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
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Seminar	1	10% (10)	13	LO # 5, 8
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	50% (50)	16	All

Total assessment	100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to the course and syllabus overview Reading Comprehension: Strategies for effective reading Structure Item: Present Simple (Formation and usage)
Week 2	Reading Comprehension: Main ideas and supporting details Structure Item: Present Continuous (Formation and usage)
Week 3	Reading Comprehension: Inference and critical thinking skills Structure Item: Past Simple (Formation and usage)
Week 4	Reading Comprehension: Vocabulary development and context clues Structure Item: Past Continuous (Formation and usage)
Week 5	Reading Comprehension: Summarizing and synthesizing information Structure Item: Present Perfect (Formation and usage) Quiz
Week 6	Reading Comprehension: Text organization and paragraph comprehension Structure Item: Future Simple (Formation and usage)
Week 7	Reading Comprehension: Practice with different text types (fiction, non-fiction, etc.) Structure Item: Conditional Statements (Types I, II, III)
Week 8	Reading Comprehension: Practice with longer passages and multiple-choice questions Structure Item: Indirect Questions
Week 9	Reading Comprehension: Analyzing author's tone and purpose Structure Item: Simple Statement and Definite/Indefinite Articles

Week 10	Reading Comprehension: Practice with comprehension questions and short answer responses Structure Item: Idioms (Introduction and common examples) Quiz
Week 11	Speaking and Listening Skills: Oral presentations and discussions Structure Item: Review of previously covered grammar structures
Week 12	Speaking and Listening Skills: Role-plays and debates Structure Item: Review and reinforcement of grammar structures
Week 13	Speaking and Listening Skills: Group discussions and problem-solving activities Vocabulary Development: Idioms and collocations (continued practice) Report due
Week 14	Vocabulary Development: Expanding vocabulary through reading and word exercises Speaking and Listening Skills: Listening comprehension activities and note-taking practice
Week 15	Final Project and Exam Preparation Completion of the project Exam preparation and review
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	Richard Harrison, Headway Academic Skills Level 1, OUP Oxford; Student edition, 2011. Headway Academic Skills Reading, Writing, and Study Skills INTRO DUCTO RY LEVEL Student's Book By Sarah Philpot and Lesley Curnic	Yes
Recommended Texts	Jean Yates, English Conversation, 3rd Edition, McGraw Hill, 2020.	No
Websites	https://dictionary.cambridge.org/ https://www.bbc.co.uk/learningenglish/english/features/6-minute-english https://ed.ted.com/?utm_term=ted%20ed&utm_campaign=&utm_source=adwords&utm_medium=ppc&hsa_acc=7777130675&hsa_cam=18739292599&hsa_grp=151439764548&hsa_ad=631444589734&hsa_src=g&hsa_tgt=kwd-296155107571&hsa_kw=ted%20ed&hsa_mt=b&hsa_net=adwords&hsa_ver=3&gad_source=1&gclid=EAIaIQobChMIj8337Le6gwMV-QQGAB1G1QWkEAAYASAAEgKIsfD_BwE	

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	**Engineering Mechanics and Strength of Material**		**Module Delivery**	
Module Type	**Support**		☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CH-EN111**			
ECTS Credits	**6**			
SWL (hr/sem)	**150**			
Module Level	1	**Semester of Delivery**		1

Administering Department	Type Dept. CHEN	**College**	Type College Code
Module Leader		**e-mail**	
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	M.Sc.
Module Tutor		**e-mail**	
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2024	**Version Number**	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	The aims of Engineering Mechanics are to provide a fundamental understanding of the principles and laws governing the behavior of physical systems, with a focus on mechanical systems. This discipline is essential for engineers as it lays the foundation for analyzing and solving problems related to the design, operation, and maintenance of structures and machines. The specific module aims of Engineering Mechanics may vary depending on the educational institution and the level of study. However, here are some common aims that are typically covered in Engineering Mechanics courses: Understanding the fundamental principles: The module aims to introduce students to the basic principles of mechanics, such as Newton's laws of motion, equilibrium conditions, and conservation of energy and momentum. These principles form the

	basis for analyzing the behavior of objects and systems under various forces and constraints. Developing problem-solving skills: Engineering Mechanics aims to enhance students' ability to apply the principles of mechanics to solve engineering problems. It focuses on developing analytical and mathematical skills to model and analyze the behavior of mechanical systems, including the calculation of forces, moments, and stresses. Analyzing static equilibrium: The module aims to teach students how to analyze the equilibrium of rigid bodies under the action of forces and moments. This includes understanding the concept of free-body diagrams, determining reactions at supports, and solving problems related to trusses, beams, and frames. Studying dynamics: Engineering Mechanics aims to provide an understanding of the motion of particles and rigid bodies under the influence of forces and moments. This involves studying concepts such as kinematics, kinetics, and the laws of motion to analyze the motion, acceleration, and energy relationships in mechanical systems. Introducing structural analysis: The module aims to introduce students to the analysis of structures, including determining internal forces and stresses in beams, columns, and other structural elements. It covers topics like axial loading, bending moments, and shear forces, and provides the basis for the design of safe and efficient structures. Enhancing engineering intuition: Engineering Mechanics aims to develop students' engineering intuition and problem-solving abilities by providing practical examples and real-world applications. It aims to bridge the gap between theory and practice, enabling students to apply their knowledge to practical engineering problems. Overall, the module aims to equip students with a solid foundation in mechanics, enabling them to analyze and design mechanical systems and structures, and providing a basis for further study in engineering disciplines such as civil, mechanical, and aerospace engineering.
Module Learning Outcomes	The specific learning outcomes of an Engineering Mechanics module may vary depending on the educational institution and the level of study. However, here are some common learning outcomes that are typically associated with Engineering

مخرجات التعلم للمادة الدراسية	Mechanics courses: Knowledge and understanding of fundamental principles: Students should demonstrate a solid understanding of the fundamental principles of mechanics, including Newton's laws of motion, equilibrium conditions, conservation of energy and momentum, and their application to mechanical systems. Problem-solving skills: Students should be able to apply the principles of mechanics to solve engineering problems. They should demonstrate the ability to analyze and model the behavior of mechanical systems, calculate forces, moments, and stresses, and apply appropriate equations and formulas to solve problems. Ability to analyze static equilibrium: Students should be able to analyze and determine the equilibrium of rigid bodies under the action of forces and moments. They should be able to draw and interpret free-body diagrams, calculate reactions at supports, and solve problems related to trusses, beams, and frames. Understanding of dynamics: Students should have a good understanding of the motion of particles and rigid bodies under the influence of forces and moments. They should be able to analyze the kinematics and kinetics of mechanical systems, calculate acceleration and velocity, and apply the laws of motion to solve dynamic problems. Competence in structural analysis: Students should be able to analyze and determine internal forces and stresses in structural elements such as beams, columns, and trusses. They should be able to calculate axial loading, bending moments, and shear forces, and understand the relationships between applied loads, reactions, and structural behavior. Application of engineering principles to real-world problems: Students should be able to apply their knowledge of Engineering Mechanics to practical engineering problems. They should demonstrate the ability to identify and define engineering problems, analyze and evaluate different solutions, and make informed decisions based on engineering principles and considerations. Effective communication and teamwork: Students should be able to communicate their ideas, analysis, and solutions effectively, both in written and verbal forms. They should also be able to work collaboratively in teams, demonstrating effective teamwork and the ability to contribute to group discussions and projects. These learning outcomes aim to provide students with a solid foundation in Engineering Mechanics, preparing them for further study or professional practice in engineering disciplines that require a strong understanding of mechanics, such as civil engineering,

	mechanical engineering, aerospace engineering, and more. .
Indicative Contents المحتويات الإرشادية	Introduction to Engineering Mechanics: Overview of mechanics and its importance in engineering Fundamental concepts and definitions Units and dimensions Scalars and Vectors: Differentiation between scalar and vector quantities Vector operations, such as addition, subtraction, and multiplication Components and coordinate systems Force Systems and Equilibrium: Types of forces (e.g., gravitational, applied, frictional) Resultant and equilibrium conditions Free-body diagrams and analysis of forces Newton's Laws of Motion: Newton's three laws of motion and their applications Force and acceleration Application of Newton's laws to solve problems Applications of Newton's Laws: Motion of particles in one and two dimensions Projectile motion Circular motion and centripetal force Work, Energy, and Power: Work done by forces

	Kinetic and potential energy Conservation of mechanical energy Power and efficiency Impulse and Momentum: Linear momentum and its conservation Impulse-momentum theorem Collisions and impact Statics of Rigid Bodies: Equilibrium conditions for rigid bodies Analysis of trusses, frames, and machines Distributed forces and centroids Friction and its effects Kinematics of Rigid Bodies: Translation, rotation, and general plane motion Angular velocity and acceleration Relative motion analysis Dynamics of Rigid Bodies: Moment of inertia and its properties Equations of motion for rotating bodies Torque and angular momentum Structural Analysis: Analysis of simple structures (e.g., beams, columns) Axial loading, bending moments, and shear forces Stress and strain analysis Applications to Engineering Problems:

	Application of Engineering Mechanics principles to real-world engineering problems Case studies and examples from various engineering disciplines Design considerations and optimization These topics provide a comprehensive overview of Engineering Mechanics, covering the fundamental principles and their applications to various mechanical systems and structures. The actual contents and depth of coverage may vary, and additional topics may be included based on the specific requirements of the curriculum and the level of study.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Lectures: Lectures are a common teaching method used to deliver key concepts and theoretical foundations of Engineering Mechanics. In lectures, instructors present the material using visual aids, demonstrations, and examples. This allows students to gain a theoretical understanding of the subject matter. Tutorials and Problem-solving Sessions: Tutorials and problem-solving sessions provide students with opportunities to apply the principles and concepts learned in lectures to solve engineering problems. In these sessions, students work through practice problems individually or in groups, guided by the instructor. This helps reinforce understanding, develop problem-solving skills, and clarify any misconceptions. Laboratory Sessions: Laboratory sessions provide hands-on experience with physical experiments or computer simulations related to Engineering Mechanics. These sessions allow students to observe and measure physical phenomena, validate theoretical concepts, and develop practical skills in data collection and analysis. Lab sessions may also involve the use of software tools for modeling and simulation. Interactive Discussions: Interactive discussions, such as seminars or group discussions, encourage active participation and critical thinking among students. Instructors may present case studies, real-world examples, or challenging problems to stimulate discussion and promote

	deeper understanding of Engineering Mechanics principles. This strategy also allows students to share their perspectives, ask questions, and engage in collaborative learning. Computer-Aided Learning: Computer-aided learning tools, such as online tutorials, interactive simulations, or virtual laboratories, can enhance understanding and provide additional resources for students. These tools enable students to explore concepts, visualize complex phenomena, and engage in self-paced learning. Design and Project Work: Design projects or assignments related to Engineering Mechanics provide opportunities for students to apply their knowledge and skills to practical engineering problems. Students may be tasked with analyzing and designing structures, evaluating mechanical systems, or optimizing designs based on given constraints. These projects enhance critical thinking, problem-solving abilities, and teamwork. Formative Assessments: Formative assessments, such as quizzes, in-class exercises, or online assessments, are used to provide feedback and monitor students' progress throughout the module. These assessments help identify areas where students may need additional support or clarification, allowing instructors to adjust their teaching methods accordingly. Summative Assessments: Summative assessments, such as examinations or coursework, evaluate students' understanding of Engineering Mechanics concepts and their ability to apply them to solve engineering problems. These assessments may include theoretical questions, problem-solving exercises, or design projects. They assess students' overall achievement and determine their level of mastery in the subject. Self-directed Learning: Encouraging self-directed learning empowers students to take responsibility for their own learning. Instructors may provide additional resources, recommended readings, or online materials for students to explore beyond the scope of lectures. This promotes independent research, critical thinking, and a deeper understanding of Engineering Mechanics principles. These strategies aim to create an engaging and interactive learning environment, combining theoretical knowledge with practical applications and promoting active participation and problem-solving skills among students. The specific mix of strategies used may vary depending on the course objectives, available resources, and the teaching style of the instructor.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6.2
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
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)	10-13	All
	Seminar	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered	
Week 1	Force system: (force, moment, couple, resultant of forces)	Statics
Week 2	Equilibrium: (Conditions of Equilibrium, Free Body Diagram, Two and Three Force Member)	

Week 3	Friction: (Characteristics of Friction, Types of Friction and Application of Friction).	
Week 4	Center of Gravity and Centroid: (Center of Mass and Body, Centroids of Lines, Area and Volume, Composite Bodies and Figures).	
Week 5	Moments of Inertia: (Definition of Moments of Inertia for Area, Moments of Inertia for Composite Areas and Moments of Inertia for an Area about Inclined Axes).	
Week 6	(Newton's Laws: (First, Second and third Law)	Dynamics
Week 7	Mid-term Exam	
Week 8	Kinematic of Particle: (Rectilinear Motion, Curvilinear Motion)	
Week 9	Kinetic of Particle: (Force, Mass and acceleration).	
Week 10	Kinetic of Particle: (Work and Energy and Rotation).	
Week 11	Simple stress and strain	Strength of materials
Week 12	Shear force diagram and bending moment diagram	
Week 13	Bending stress	
Week 14	Shear stress	
Week 15	Compound stresses and Moher circle	
Week 16		

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Meriam, J.L. and Kraige, L.G. 2002., Engineering Mechanics Statics, Fifth Edition, John Willey & Sons Inc.**	yes
Recommended Texts		No
Websites		

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Organic Chemistry**			**Module Delivery**	
Module Type	**Core learning activity**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	CHEN126				
ECTS Credits	**8**				
SWL (hr/sem)	**200**				
Module Level		1	**Semester of Delivery**		2
Administering Department		Type Dept. Code CHEN	**College**	Type College Code	
Module Leader	Hanan hashim abed		**e-mail**	hananalmaula@uonisan.edu	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		M.Sc.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		05/06/2024	**Version Number**		1.0

Relation with other Modules

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1-The aim of this module is to provide an understanding of the fundamental principles of organic chemistry and their applications in solving problems relevant to chemical engineering. 2. Students will be introduced to key organic chemistry concepts and reactions that they will encounter in their future chemical engineering studies and professional practice.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the principles of organic chemistry, including nomenclature, structure, and functional groups 2. Understand the basic reactions of organic compounds, including substitution, addition, and elimination reactions 3. Understand the stereochemistry of organic compounds 4. Apply organic chemistry principles to solve problems related to chemical engineering 5. Have an understanding of the production of organic chemicals on an industrial scale
Indicative Contents المحتويات الإرشادية	Indicative contents: The following are indicative contents that may be covered in this module. 1. Introduction to organic chemistry • Brief history of organic chemistry • Atomic structure and bonding of carbon • Functional Groups and Isomerism

	2. Structure and bonding in organic compounds • Molecular shape and electronic configuration • Hybridization and Resonance • Acidity and Basicity 3. Stereochemistry in organic compounds • Stereoisomers and chirality • Stereochemical notation and nomenclature • Geometric isomerism: cis-trans and E-Z isomerism 4. Properties and reactions of organic compounds • Alkanes and Cycloalkanes • Alkenes and Alkynes • Aromatic compounds • Halides and Alcohols • Aldehydes and Ketones • Carboxylic acids • Amines and Amides 5. Organic reaction mechanisms • Nucleophilic substitution reactions • Elimination reactions • Addition reactions • Radical reactions

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Lecture-based learning: Organic chemistry is taught through lectures to explains the fundamental concepts, principles, and reactions related to organic compounds.

	Students are expected to take notes, ask questions, and actively engage in the learning process. 2. Problem-solving: Organic chemistry heavily relies on problem-solving skills. Where problems will be provided to encourage students to practice and and apply the learned concepts to solve them. This helps students develop critical thinking and analytical skills required for understanding and applying organic chemistry principles. 3. Laboratory experiments: Hands-on laboratory experiments are an essential part of learning organic chemistry. These experiments give students practical experience in synthesizing, analysing, and characterizing organic compounds. The lab work also helps reinforce the concepts learned in lectures and develop essential laboratory skills. 4. Group work and discussions: Collaborative learning is often encouraged in organic chemistry courses. Group discussions, in-class activities, and problem-solving sessions allow students to discuss, apply, and reinforce their understanding of organic chemistry concepts. Working in groups also promotes effective communication and teamwork skills. 5. Visual aids and technology: Instructors often use visual aids like molecular models, diagrams, and animations to enhance students' understanding of complex concepts. Digital platforms and software applications may also be utilized to simulate and visualize organic reactions, mechanisms, and structures. 6. Real-world applications: Chemical engineering students are often interested in the practical applications of organic chemistry in their field. There will be emphasizing on the industrial relevance of organic reactions and processes to motivate and engage students. Connecting organic chemistry concepts to real-world examples and cases helps students see the relevance and importance of the subject. 7. Continuous assessment: Regular quizzes, tests, and assignments are administered to assess students' understanding and progress in organic chemistry. Frequent feedback enables students to track their learning and address any conceptual gaps or misconceptions.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	108	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7,2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	92	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6.1
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)	2, 12	LO #1, 2, and 3
	Assignments	2	10% (10)	2, 4, 6, 8, 10	LO # 3, 4, and 5
	Seminar	1	10% (10)	Continuous	All
	Report	1	10% (10)	8	LO # 4, and 5
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-3
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to organic chemistry And Electronic Structure and orbitals representation of Organic molecules
Week 2	Stereochemistry in organic compounds
Week 3	General Classification, Identification, Structure and Characterization of Organic compounds
Week 4	Properties and reactions of organic compounds
Week 5	Alkanes and Cycloalkanes
Week 6	Alkenes and Alkynes
Week 7	Aromatic compounds
Week 8	Halides and Alcohols
Week 9	Aldehydes and Ketones
Week 10	Carboxylic acids
Week 11	Amines and Amides
Week 12	Organic reaction mechanisms
Week 13	Organometallic compounds of crude oil fractions
Week 14	Seminar.
Week 15	Seminar.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Melting point
Week 2	Boiling point

Week 3	Fractional Distillation and vacuum Rotary evaporator
Week 4	Crystallization
Week 5	Sodium Fusion
Week 6	Esterification
Week 7	Aspirin preparation

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Modern Organic Chemistry by Rodger w. Griffin JR ISBN-13. 978-0070247796 ; Publisher. McGraw-Hill Inc.,US ; Publication date. June 1, 1969	No (online)
Recommended Texts	Organic Chemistry [by Hornback, Joseph M. [Cengage Learning,2005] [Hardcover] 2ND EDITION Hardcover – January 11, 2005	No
Websites	1 . https://www.acs.org/careers/chemical-sciences/areas/organic-chemistry.html 2. https://www.sciencedirect.com/book/9780128128381/organic-chemistry 3. https://www.youtube.com/@ranaalrubaye5990	

Grading Scheme

مخطط الدرجات

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

(50 - 100)	**B -** Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
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Fail Group	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	**Principles of Chemical Engineering**	**Module Delivery**	
Module Type	**Core learning activity**		☒ **Theory**
Module Code	**CHEN127**		☐ **Lecture**
ECTS Credits	**8**		☐ **Lab**
SWL (hr/sem)	**200**		☒ **Tutorial**
			☒ **Practical**
			☐ **Seminar**

Module Level	**1**	**Semester of Delivery**	2
Administering Department	Type Dept. Code CHEN	**College**	Type College Code
Module Leader		**e-mail**	
Module Leader's Acad. Title	Assist Prof.	**Module Leader's Qualification**	Ph.D.
Module Tutor		**e-mail**	
Peer Reviewer Name	Lecture	**e-mail**	-
Scientific Committee Approval Date	05/06/2024	**Version Number**	1.0

Relation with other Modules
العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	**Semester**	
Co-requisites module	CHENG 214	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. Studying the basics of chemical engineering 2. Studying the basics of solving problems of chemical engineering 3. Studying the basics of solving problems of temperature and pressure, ideal gas. 4. Studying real gas relationships and gas mixture 5. Studying the introduction of material balance for different systems and chemical engineering and stoichiometry.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Ability to identify and describe various unit operations in chemical industry. 2. Ability to change and derive units from one unit to others. 3. Ability to calculate moles, density, concentrations, temperatures, and pressure. 4. Ability to calculate the density and specific gravity for gases. 5. Ability to calculate the real gas relationships and gas mixture. 6. Ability to understand the material balance for different systems and chemical engineering and stoichiometry. 7. Solve problems for unit operations in chemical industry. 8. Ability to demonstrate effective teamwork and problem-solving skills. 9. Solving problems for real gas and their mixture. 10. Solving problems for material balance for different systems and chemical engineering and stoichiometry. 11. Developing critical and creative thinking skills related to material balance on chemical engineering processes. 12. Using different methods solution. 13. Analysis assumptions. 14. Community effectively. 15. Work individually and team members in international and multidisciplinary teams. 16. Understanding impact of engineering solutions in an environmental and social context.

Indicative Contents المحتويات الإرشادية	1. Dimensions and Units 2. Conversion 3. Moles and Density 4. Concentration 5. Choosing a basis 6. Temperature 7. Pressure 8. Differential pressure measurement 9. Ideal gases and the ideal gas law 10. Ideal gas mixtures and partial pressure 11. Real gas relationships and gas mixture 12. Introduction to material balances 13. Multiple component system 14. Accounting for chemical reactions 15. The chemical equation and stoichiometry 16. The chemical equation and stoichiometry

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Lectures 2. Class work 3. Homework 4. Daily and monthly exams 5. Problem answers 6. Meeting

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	122	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	8.1
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 # 1-9
	Assignments	2	10% (10)	2, 12	LO # 10-13
	Seminar	1	10% (10)	Continuous	All LO
	Report	1	10% (10)	9	LO # 1, 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 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	Dimensions and Units
Week 2	Conversion
Week 3	Moles and Density
Week 4	Concentration
Week 5	Choosing a basis

Week 6	Temperature
Week 7	Pressure
Week 8	Differential pressure measurement
Week 9	Ideal gases and The ideal gas law
Week 10	Ideal gas mixtures and partial pressure.
Week 11	Carboxylic acids.
Week 12	Organic reaction mechanisms.
Week 13	Accounting for chemical reactions
Week 14	The chemical equation and stoichiometry
Week 15	The chemical equation and stoichiometry
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	Basic principles and calculations in chemical engineering 7th edition, by David M.Himmeblau the University of Texas.	Yes
Recommended Texts	Elementary principles of chemical processes 3rd edition (2005) Richard M.Felder ,Ronald W.Rousseau.	Yes
Websites	https://www.engineeringbookspdf.com/principles-chemical-engineering-processes-material-energy-balances-second-edition-nayef-ghasem-redhouane-henda	

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Mathematics II**			**Module Delivery**	
Module Type	**Basic learning activity**			☒ **Theory**	
Module Code	**ENG124**			☐ **Lecture**	
ECTS Credits	5			☐ **Lab**	
SWL (hr/sem)	125			☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Level	1		**Semester of Delivery**	2	
Administering Department	Type Dept. Code		**College**	Type College Code ENG	
Module Leader	Huda Radhi Jabbar		**e-mail**	Huda198806@gmail.com	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	M.Sc.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	ENG122	**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	1. Understanding Mathematical Concepts: The primary aim is to ensure that students develop a solid understanding of fundamental mathematical concepts and principles. This includes topics such as algebra, calculus, differential equations, linear algebra, statistics, and numerical methods. 2. Mathematical Modeling: Chemical engineering involves the use of mathematical models to describe and analyze chemical processes. The aim is to teach students how to formulate mathematical models that represent real-world chemical engineering systems. This includes understanding the principles of mass and energy balances, reaction kinetics, transport phenomena, and thermodynamics. 3. Problem-solving Skills: Mathematics is a key tool for problem-solving in chemical engineering. The aim is to develop students' problem-solving skills using mathematical techniques. This involves applying mathematical methods to solve engineering problems, analyzing data, interpreting results, and making informed decisions. 4. Computational Skills: Chemical engineering often requires the use of computational tools and software for simulations and analysis. The aim is to teach students how to use mathematical software packages and programming languages to solve mathematical and engineering problems. This includes learning how to implement numerical methods, write algorithms, and perform simulations. 5. Critical Thinking and Analytical Skills: Mathematics in chemical engineering helps develop critical thinking and analytical skills. Students learn to analyze complex problems, break them down into smaller manageable parts, and

	apply mathematical techniques to find solutions. This includes developing skills in logical reasoning, pattern recognition, and quantitative analysis. 6. Communication and Presentation: Mathematics plays a crucial role in communicating and presenting technical information in chemical engineering. The aim is to develop students' ability to communicate mathematical concepts and solutions effectively through technical reports, presentations, and visual aids.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Learn the integration of trigonometric and their inverses and the integration of logarithmic and exponential function and the integration of hyperbolic function and their inverses 2. Learn the substitution by part, power trigonometric function, trigonometric substitution, by part function, improper integral) 3. Learn how to evaluate area, length ,surface area, volume 4. Understand the matrix and how to find determinate 5. Learn how to solve first order differential equation
Indicative Contents المحتويات الإرشادية	- Introductory concepts to integration (4 hrs) - The Fundamental Theorems of Integral Calculus (4hrs) - Introductory Concepts to Indefinite Integrals (4hrs) - Introductory Concepts to Numerical Integration (8hrs) - Rules for Approximating Integrals (2) - Methods of Integration Part 1 (6hrs) - Methods of Integration Part 2 (6hrs) - Methods of Integration Part 3 (6hrs) - Trigonometric Integral's (5hrs) - Using Integral Table (2hrs) - Introductory Concepts to Matrices and Introductory Concepts to Determinants (4hrs) - Applications of Integration (10hrs)

	- Solve differential equation (4hrs)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Creating a Positive Learning Environment: Foster a supportive and encouraging classroom environment where students feel comfortable taking risks and making mistakes. Providing constructive feedback and praising their efforts to boost their confidence. 2. Using Authentic Materials: Incorporating real-life materials such as newspaper articles, advertisements, or videos into the lessons. Where the authentic materials will expose students to real language use and help them develop practical language skills. 3. Differentiate Instruction: Recognizing that students have different learning styles, needs, and proficiency levels, so its necessary to adapt teaching methods and materials to cater to diverse learners, and providing individualized support and additional challenges as necessary. 4. Promote Active Learning: Encouraging students in hands-on activities, group discussions, role-plays, and projects that require them to actively use the language. Also, encouraging participation and create opportunities for students to practice their English skills in meaningful ways. 5. Provide Regular Feedback: Regularly assess students' progress and provide timely feedback on their performance. Offering specific suggestions for improvement and guide them towards resources and strategies to enhance their learning.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem)	63	**Structured SWL (h/w)**	4.2

الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	87	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.8
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
Formative assessment	**Quizzes**	2	10% (10)	4, 14	LO 1-3
	Assignments	2	10% (10)	2, 12	All LO
	Seminar	1	10% (10)	10	All LO
	Report	1	10% (10)	13	All LO
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO 1-4
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introductory Concepts to Integration
Week 2	The Fundamental Theorems of Integral Calculus
Week 3	Introductory Concepts to Indefinite Integrals
Week 4	Introductory Concepts to Numerical Integration

Week 5	Rules for Approximating Integrals
Week 6	Methods of Integration Part 1
Week 7	Methods of Integration Part 2
Week 8	Methods of Integration Part 3
Week 9	Trigonometric Integral's
Week 10	Using Integral Table
Week 11	Introductory Concepts to Matrices and Introductory Concepts to Determinants
Week 12	Applications of Integration, part 1
Week 13	Applications of Integration, part 2
Week 14	Applications of Integration, part 3
Week 15	Solve differential equation
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	• George B. Thomas Jr.- Maurice D. Weir_Joel R. Hass Thomas Calculus_ Early Transcendentals (13 Edition)-Pearson • Thomas Calculus Early TRansendentals Single Variable 13th c2014 Solutions ISM.	Online
Recommended Texts	• Thomas Calculus Multivariable 13th c2014 solutions ISM. • Advanced Engineering Mathematics 10th Edition. • Solution Manual of advanced engineering mathematics by Erwin kreyszig 9th edition Thomas calculus 11th (textbook solutions)	Online
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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condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية		
Module Title	**Workshop Technology**	**Module Delivery**
Module Type	**Support related learning activity**	☐ **Theory**
Module Code	**ENG 123**	

ECTS Credits	2			☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
SWL (hr/sem)	50				
Module Level	1		**Semester of Delivery**	2	
Administering Department	Type Dept. Code		**College**	Type College Code ENG	
Module Leader			**e-mail**		
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	M.Sc.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	05/06/2024		**Version Number**	1.0	

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. Practical Skill Development: The primary aim of Workshop Technology is to develop practical skills among students. This includes acquiring hands-on experience in various workshop processes, such as machining, fitting, welding, carpentry, sheet metal work, and electrical work. 2. Understanding Workshop Tools and Equipment: Workshop Technology aims to familiarize students with different types of tools, machines, and equipment commonly

	used in workshops. Students learn about their purpose, operation, and maintenance, enabling them to work efficiently and safely. 3. Workshop Safety: Safety is a crucial aspect of workshop operations. The subject aims to educate students about workshop safety practices, including the proper use of personal protective equipment (PPE), handling hazardous materials, and following safety protocols to prevent accidents and injuries. 4. Material Selection and Handling: Workshop Technology focuses on the selection and handling of various materials used in workshops, such as metals, wood, plastics, and composites. Students learn about their properties, characteristics, and appropriate techniques for working with different materials. 5. Workshop Processes: The subject aims to introduce students to different workshop processes and techniques, such as machining, casting, forging, welding, soldering, brazing, and fabrication. Students learn the fundamentals of these processes, enabling them to carry out basic operations and understand their applications. 6. Measurement and Quality Control: Workshop Technology emphasizes the importance of accurate measurement and quality control in workshop operations. Students learn about different measuring tools and techniques, dimensional accuracy, tolerance, and inspection methods to ensure the quality of their work. 7. Project Work: Workshop Technology often includes project work or practical assignments, allowing students to apply their theoretical knowledge and skills to complete hands-on projects. This promotes problem-solving abilities, teamwork, and creativity. 8. Industry Relevance: The subject aims to bridge the gap between theoretical knowledge and industry practices. It strives to provide students with practical knowledge and skills that are relevant and applicable in real-world workshop environments, preparing them for careers in manufacturing, engineering, or related fields.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Students should be able to develop practical skills related to workshop processes, such as machining, fitting, welding, carpentry, sheet metal work, and electrical work. They should be proficient in using various tools, machines, and equipment commonly found in workshops. 2. Students should have a solid understanding of different workshop processes and techniques, including machining, casting, forging, welding, soldering, brazing, and fabrication. They should be familiar with the principles, applications, and limitations of these processes. 3. Students should be aware of workshop safety practices and demonstrate the ability to work safely in a workshop environment. They should understand the importance of personal protective equipment (PPE), handling hazardous materials, and following safety protocols to prevent accidents and injuries. 4. Students should be knowledgeable about various materials used in workshops, such as metals, wood, plastics, and composites. They should understand their properties, characteristics, and appropriate techniques for working with different materials. 5. Students should be proficient in accurate measurement using different tools

	and techniques. They should understand dimensional accuracy, tolerance, and inspection methods to ensure the quality of their work. 6. Students should be able to analyze workshop-related problems and apply appropriate problem-solving techniques. They should demonstrate the ability to make informed decisions regarding workshop processes, tool selection, and material usage. 7. Students should be capable of planning and executing workshop projects. They should be able to apply their theoretical knowledge and practical skills to complete hands-on projects, meeting specified requirements and timelines. 8. Students should possess effective teamwork and communication skills, allowing them to collaborate with peers and effectively communicate ideas, instructions, and project progress in a workshop setting. 9. Students should understand the relevance of workshop technology in various industries and be able to relate theoretical concepts to real-world applications. They should be prepared for careers in manufacturing, engineering, or related fields. 10. Students should demonstrate ethical behavior, professionalism, and respect for intellectual property rights while working in a workshop environment. They should adhere to professional standards and regulations governing workshop practices.
Indicative Contents المحتويات الإرشادية	1. Introduction to Workshop Technology: • Overview of workshop practices and their significance in various industries. • Workshop safety measures, including safety equipment and precautions. • Introduction to common workshop tools, machines, and equipment. 2. Hand Tools and their Uses: • Identification, selection, and proper use of hand tools used in workshop operations. • Techniques for handling, maintaining, and storing hand tools. • Hands-on practice with hand tools, such as hammers, chisels, screwdrivers, wrenches, etc. 3. Measuring and Marking Tools: • Introduction to various measuring and marking tools, such as rulers, calipers, micrometers, gauges, and levels. • Principles of accurate measurement and marking techniques. • Practical exercises on measuring and marking tasks. 4. Workshop Processes:

	• Machining processes, including lathe work, drilling, milling, grinding, and shaping. • Casting processes, such as sand casting and die casting. • Welding and joining techniques, like arc welding, gas welding, and soldering. • Sheet metal work, including cutting, bending, and forming operations. • Carpentry techniques, such as sawing, planing, and jointing. • Introduction to electrical work, including wiring, soldering electrical connections, and basic circuitry. 6. Workshop Safety and Environmental Considerations: • Importance of workshop safety and adherence to safety guidelines. • Handling and disposal of hazardous materials and waste. • Fire safety measures and emergency protocols. • Environmental sustainability practices in workshop operations. 7. Quality Control and Inspection: • Principles of quality control and assurance in workshop processes. • Inspection techniques, including visual inspection, measurements, and non-destructive testing methods. • Understanding tolerance, surface finish, and dimensional accuracy requirements. 8. Workshop Projects and Exercises: • Practical projects and exercises to apply theoretical knowledge and develop practical skills. • Project planning, execution, and documentation. • Collaborative work and teamwork exercises. 9. Industry Practices and Career Orientation: • Introduction to various industries and career opportunities related to workshop technology. • Understanding industry standards, codes, and regulations. • Work ethics, professionalism, and entrepreneurship in the workshop context.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	

	1. Practical Demonstrations: Workshop Technology emphasizes practical demonstrations of workshop processes and techniques. Teachers or instructors demonstrate various operations using tools, machines, and equipment, allowing students to observe and understand the correct procedures. 2. Hands-on Workshops: Students actively participate in hands-on workshops where they perform various workshop tasks and operations themselves. This includes using tools, machines, and equipment to carry out machining, fitting, welding, carpentry, and other relevant activities. Students gain practical experience and develop their skills through direct engagement. 3. Project-based Learning: Project-based learning is often incorporated into Workshop Technology. Students are assigned projects that require them to apply their theoretical knowledge and practical skills to complete specific tasks or create tangible outcomes. This approach promotes problem-solving, critical thinking, and teamwork. 4. Collaborative Learning: Workshop Technology encourages collaborative learning where students work together in teams or groups. They collaborate on projects, share knowledge and expertise, and learn from each other's experiences. This fosters communication skills, teamwork, and the ability to collaborate effectively in a workshop environment. 5. Simulations and Virtual Labs: In some cases, virtual simulations or online virtual labs are used to supplement practical workshops. These interactive tools allow students to practice and experiment with workshop processes in a virtual environment, enhancing their understanding and skills before engaging in actual hands-on activities. 6. Multimedia Resources: The use of multimedia resources, such as videos, animations, and interactive presentations, can enhance learning in Workshop Technology. These resources provide visual demonstrations, explanations, and step-by-step instructions, helping students grasp complex concepts and procedures. 7. Field Visits and Industry Exposure: Organizing field visits to workshops, factories, or industrial sites can provide students with real-world exposure and a deeper understanding of workshop technology in practice. They can observe industry professionals in action, learn about advanced technologies, and gain insights into the application of workshop processes. 8. Assessment through Practical Tasks: Assessments in Workshop Technology often involve practical tasks and projects. Students are evaluated based on their ability to perform specific workshop operations, apply correct techniques, and produce quality work. This allows for a comprehensive assessment of their practical skills and knowledge. 9. Reflective Practices and Feedback: Students are encouraged to reflect on their own work, evaluate their strengths and areas for improvement, and seek feedback from instructors and peers. This reflective practice helps students identify their learning gaps and refine their skills for continuous improvement. 10. Safety Training and Demonstrations: Safety is a critical aspect of Workshop Technology. Students receive comprehensive safety training, including demonstrations and practice of safety procedures and the proper use of personal protective equipment. Regular safety reminders and discussions are integrated into the teaching process to ensure a safe workshop environment

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	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.1
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, and 10
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Seminar	1	10% (10)	Continuous	All LO
	Report	1	10% (10)	13	LO # 5, and 8
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-5
	Final Exam	3 hr	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	

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to Workshop Technology and Safety
Week 2	Workshop practices, tools, machines, and equipment
Week 3	Safety guidelines and procedures in the workshop environment
Week 4	Demonstration and practice of proper use of personal protective equipment
Week 5	Fire safety measures and emergency protocols

Week 6	Hand Tools and Measurement: Identification, selection, and use of hand tools
Week 7	Measurement techniques using measuring tools like rulers, calipers, and micrometers
Week 8	Hands-on practice with hand tools and measurement tasks
Week 9	Principles of accurate measurement and marking techniques
Week 10	Practical exercises on measuring and marking tasks
Week 11	Project Work and Review
Week 12	Collaborative project work integrating various workshop techniques and skills
Week 13	Collaborative project work integrating workshop techniques with chemical engineering concepts
Week 14	Review of learned concepts, techniques, and safety protocols
Week 15	Finalization and presentation of workshop projects
Week 16	Preparatory week before the final Exam.

Learning and Teaching Resources

مصادر التعلم والتدريس

		Available in the Library?
Required Texts	Textbook of Engineering Drawing by K. Venkata Reddy	Online
Recommended Texts	French,"Engineering Drawing"	Online
Websites	http://www.jaist.ac.jp/nmcenter/mshop/mshp/pdf/MDWfull_E.pdf https://doc.lagout.org/science/0_Computer%20Science/9_Others/Textbook%20of%20Engineering%20Drawing.pdf https://bharatskills.gov.in/pdf/E_books/Engineering_Drawing_1st_Sem_Final.pdf	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information

معلومات المادة الدراسية

Module Title	**Arabic Language I**	**Module Delivery**	
Module Type	**Basic**		☒ **Theory**
Module Code	**UOM123**		☐ **Lecture**
ECTS Credits	**2**		☐ **Lab**
SWL (hr/sem)	**50**		☐ **Tutorial**
			☐ **Practical**
			☐ **Seminar**

Module Level	1	**Semester of Delivery**	1
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader		**e-mail**	
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date	05/06/2023	**Version Number**	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	**Semester**	
Co-requisites module	UOM 203	**Semester**	5

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. يهدف المقرر إلى تعليم الطلاب اللغة العربية وفهمها، بما في ذلك القراءة والكتابة والمحادثة والاستماع. يتم تدريس قواعد اللغة والصرف والنحو، وتوظيفها في التعبير الصحيح والفعال. 2. يسعى المقرر إلى تنمية مهارات الطلاب في استخدام اللغة العربية بشكل صحيح وفعال في مختلف الأوضاع الاتصالية. يتم تدريب الطلاب على التعبير بوضوح ودقة، وتحسين قدرتهم على فهم المقروء والمسموع، والتواصل بطلاقة. 3. يهدف المقرر إلى تعزيز الثقافة العربية وترسيخ الهوية اللغوية والثقافية للطلاب. يتم تقديم مواضيع متنوعة تتناول الأدب والشعر والتراث العربي، وتاريخ اللغة العربية وتطورها، والعادات والتقاليد العربية. 4. يساعد المقرر الطلاب على تطوير مهارات التفكير النقدي من خلال قراءة وتحليل النصوص الأدبية والتعبير عن آراءهم واستنباط المعاني والرسائل المخفية. يتم تشجيع الطلاب على التفكير الإبداعي والتحليلي والانتقادي. 5. يهدف المقرر إلى تعزيز التواصل الثقافي بين الطلاب من خلال تعريفهم بثقافات ومجتمعات مختلفة داخل العالم العربي. يتم تناول مواضيع مثل اللهجات المحلية، والاختلافات الثقافية، والتعايش والتفاعل
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. يتوقع من الطلاب أن يكتسبوا مهارات القراءة والكتابة والإستماع والمحادثة في اللغة العربية. يجب عليهم أن يتمكنوا من قراءة وفهم النصوص المختلفة، وكتابة نصوص بنية واضحة ومنظمة، وفهم وإستيعاب المحادثات والنقاشات. 2. ينبغي للطلاب أن يكونوا قادرين على فهم وتطبيق قواعد اللغة العربية، بما في ذلك قواعد الصرف والنحو. يتعلم الطلاب كيفية تحليل الجمل وتشكيلها بشكل صحيح ومناسب للتعبير عن المعاني المرادة. 3. يتوقع من الطلاب أن يكونوا قادرين على التعبير بوضوح ودقة باستخدام اللغة العربية. يجب أن يتمكنوا من التعبير عن أفكارهم وآرائهم بطريقة منطقية ومقنعة، واستخدام المفردات والتراكيب اللغوية الملائمة. 4. يشمل المقرر تعزيز فهم الطلاب للثقافة العربية، بما في ذلك الأدب والشعر والتراث العربي. يجب على الطلاب أن يتعرفوا على القيم والتقاليد والمعتقدات العربية، وفهم تأثيرها على اللغة والثقافة العربية. 5. يتوقع من الطلاب أن يطوروا مهارات التفكير النقدي والتحليلي من خلال قراءة ودراسة النصوص الأدبية العربية. يجب أن يكونوا قادرين على استنباط المعاني العميقة والرسائل المخفية في النصوص، وتقييمها والتعبير عن آرائهم بشأنها. 6. يتضمن المقرر تعزيز التواصل الثقافي بين الطلاب من خلال دراسة ثقافات ومجتمعات مختلفة داخل العالم العربي. يتعلم الطلاب كيفية التفاعل مع الثقافات المختلفة والتعايش معها بفهم واحترام.
Indicative Contents المحتويات الإرشادية	1. يتم تنظيم المقرر إلى وحدات دراسية تغطي مواضيع مختلفة في اللغة العربية. يتم تحديد أهداف ومحتويات كل وحدة وفقًا لمستوى الطلاب والمرحلة التعليمية. قد تتضمن الوحدات دراسة القواعد اللغوية، والمفردات، والتعبير الكتابي والشفهي، والأدب والثقافة العربية.[12 hr]

	2. تشمل المحتويات الإرشادية الموارد التعليمية المستخدمة في المقرر، مثل الكتب الدراسية والمراجع الإضافية. يتم توفير مصادر متنوعة ومناسبة لتعلم اللغة العربية، مثل النصوص الأدبية، والمواد المرئية والمسموعة، والأنشطة التفاعلية. [12 hr] 3. يجب أن تتضمن المحتويات الإرشادية وصف الأنشطة التعليمية المقترحة لتحقيق أهداف المقرر. يمكن أن تشمل الأنشطة التعليمية قراءة ومناقشة النصوص، وكتابة تعبيرات ومقالات، وممارسة التحدث والاستماع، وحل التمارين والتدريبات. [12 hr] 4. يجب أن توفر المحتويات الإرشادية معايير التقييم والتقويم لقياس تحقيق الطلاب للأهداف المقررة. يمكن أن تشمل طرق التقييم اختبارات الفهم والتطبيق، وتقييم الأداء الشفهي والكتابي، ومشاركة الطلاب في الأنشطة الجماعية. [12 hr]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. إستخدام الأنشطة التفاعلية والمشروعات الجماعية لتشجيع التواصل والمشاركة النشطة للطلاب في تعلم اللغة العربية. يمكن تنظيم مناقشات جماعية، وألعاب الأدوار، وممارسة الحوارات والمناقشات لتعزيز مهارات الاستماع والتحدث وتطوير الثقة بالنفس في استخدام اللغة. 2. تنظيم الأنشطة التعاونية مثل العروض التقديمية المشتركة، وإعداد المشاريع الجماعية، وممارسة الأدوار، وتبادل الملاحظات والمساعدة المتبادلة. يعزز هذا النهج التواصل اللغوي ويساعد الطلاب على تطوير المهارات الاجتماعية واللغوية. 3. إشراك الطلاب في أنشطة عملية وتطبيقية لتعلم اللغة العربية. يمكن تنظيم أنشطة مثل الألعاب اللغوية، والمحاكاة، والتمثيل، والكتابة الإبداعية. يتم تشجيع الطلاب على الاستخدام الفعال للغة العربية في سياقات حقيقية وتطبيقها على الواقع. 4. تشجيع الطلاب على تولي المسؤولية الشخصية في تعلم اللغة العربية. يمكن تشجيع الطلاب على قراءة النصوص والكتب، ومشاهدة الأفلام والبرامج التلفزيونية باللغة العربية، واستخدام الموارد عبر الإنترنت لتعزيز مهاراتهم اللغوية وزيادة ثقافتهم اللغوية. 5. إستخدام التكنولوجيا في تعزيز تعلم اللغة العربية، مثل إستخدام البرامج والتطبيقات التعليمية، والموارد التعليمية عبر الإنترنت، ومنصات التعلم الإلكتروني. يمكن إستخدام التكنولوجيا لتنويع الأنشطة وجعلها أكثر تفاعلية وشيقة للطلاب.

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**		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	تدريبات على قواعد اللغة العربية والنحو
Week 2	دراسة هيكل الجملة العربية وتحليلها
Week 3	دراسة العلاقة بين اللغة والثقافة العربية
Week 4	التعرف على الثقافة والأدب العربي ذات الصلة بالمجالات العلمية والثقافية
Week 5	دراسة وتحليل النصوص الأدبية والغير الأدبية
Week 6	فنون البلاغة والأساليب اللغوية في الكتابة والخطاب
Week 7	مهارات الكتابة الصحيحة والتعبير الفعال في اللغة العربية
Week 8	تعزيز مهارات الإستماع والتحدث في المواضيع الهندسية
Week 9	تعلم المفردات والمصطلحات الخاصة بمجال الهندسة الكيمياوية
Week 10	توسيع المفردات وتطبيقها في سياقات هندسية
Week 11	قراءة وفهم النصوص التقنية والمقالات العلمية باللغة العربية
Week 12	تحليل النصوص الهندسية وفهم المعلومات الفنية والتقنية المتعلقة بالموضوعات الهندسية المختلفة
Week 13	كتابة التقارير الفنية والوثائق الهندسية باللغة العربية

Week 14	تدريب على كتابة المقالات العلمية باللغة العربية
Week 15	تدريب على كتابة المقالات الأدبية باللغة العربية
Week 16	إمتحان

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, 4
	Assignments	2	10% (10)	2, 12	LO # 3, and 5
	Projects / Lab.	-	-	-	-
	Report	2	20% (20)	6, 13	LO # 1, and 6
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-4
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	محمود فهمى حجازي، علم اللغة العربية، دار غريب للطباعة والنشر والتوزيع، مصر	No

Recommended Texts	جرجي زيدان، اللغة العربية كائن حي، مؤسسة هنداوي، مصر، 2010.	No (Online-pdf)
Websites	https://www.diwanalarab.com/%D8%A7%D9%84%D8%A3%D9%84%D9%81%D8%A7%D8%B8-%D8%A7%D9%84%D8%B9%D9%84%D9%85%D9%8A%D8%A9-%D9%81%D9%8A	

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 I**			**Module Delivery**	
Module Type	**Basic related learning activity**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UOM122**				
ECTS Credits	**3**				
SWL (hr/sem)	**75**				
Module Level	1		**Semester of Delivery**	2	
Administering Department	Type Dept. Code		**College**	Type College Code UOM	

Module Leader	Nsaif Jasim Hadi	**e-mail**	
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	05/06/2024	**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
Prerequisite module		**Semester**	
Co-requisites module	UOM201	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الارشادية	
Module Aims اهداف المادة الدراسية	1. To provide students a thorough grasp of computers, how they work, and what applications they may be used for. 2. To identify the computer components such as hardware, software, and input/output devices. 3. To identify and classify the essential features of the Operating Systems, which is a set of software that controls and addresses the physical components of the computer. 4. To improve and develop students' skills in exploring and using operating systems windows 7. 5. To improve and develop students' skills in writing, editing, formatting, and printing texts by using Microsoft word 2010 program, because of their large applications in the field of education and preparing research reports. 6. To expand students' skills of creating presentations by using Microsoft Power Point 2010 program. 7. To improve and develop students' skills in computing and executing the mathematical and statistical operations and creating charts of different types, as well as managing and analyzing data by using Microsoft Excel 2010 program. 8. To help students adapt to the quickly changing technology world, computer courses also attempt to promote computational thinking and digital literacy.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Gain knowledge in computer fundamentals and components. 2. Knowing the operating system and its function, and also knowing the essential features of Windows 7 and explore it. 3. Increase student proficiency with writing, editing formatting the research reports by using Microsoft word 2010 program. 4. Increase student skill in creating presentations by inserting images, video , table, and texts … etc. on slides by using Microsoft Power point 2010 program. 5. Learn how to compute and execute the mathematical and statistical operations and creating charts by using Microsoft Excel 2010 program.

Indicative Contents المحتويات الارشادية	The following items are examples of indicative content: 1. Computer Fundamentals: the phases of the computer life cycle, the evolution of computer, data and information, computer features, areas of computer use, computer components, and types of computers. 2. Computer Components: components of a computer, the hard parts of a computer, input devices, output devices, software entities, computer number system, computer platform, factors to consider when buying a computer, and the main features of a personal computer. 3. Operating systems: define the operating system, OS functions, OS goals

	, classification of operating systems, Windows 7 operating system, windows 7 installation requirements, desktop components, folders and files, and control panel. 4. Microsoft word 2010: operating Microsoft word 2010, MS word 2010 interface, file tab, home tab, page layout tab, view tab, help, and inserttab. 5. Microsoft power point 2010: operating Microsoft power point 2010, power point 2010 interface, file tab, home tab, design tab, slides show tab, viewtab, help, insert tab, transitions tab, and animations tab. 6. Microsoft excel 2010: operating Microsoft Excel 2010, Microsoft Excel 2010 interface, file tab, home tab, page layout tab, help, insert tab, formulas tab , and view tab.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Creating a Positive Learning Environment: Foster a supportive and encouraging classroom environment where students feel comfortable taking risks and making mistakes. Providing constructive feedback and praising their efforts to boost their confidence. 2. Using Authentic Materials: Incorporating real-life materials such as newspaper articles, advertisements, or videos into the lessons. Where the authentic materials will expose students to real language use and help them develop practical language skills. 3. Differentiate Instruction: Recognizing that students have different learning styles, needs, and proficiency levels, so it's necessary to adapt teaching methods and materials to cater to diverse learners, and providing individualized support and additional challenges as necessary. 4. Promote Active Learning: Encouraging students in hands-on activities, group discussions, role-plays, and projects that require them to actively use the language. Also, encouraging participation and create opportunities for students to practice their English skills in meaningful ways. 5. Provide Regular Feedback: Regularly assess students' progress and provide timely feedback on their performance. Offering specific suggestions for improvement and guide them towards resources and strategies to enhance their learning.

Student Workload (SWL) المنهاج الاسبوعي النظري			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خالل الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خالل الفصل	52	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خالل 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, 3 and 4
	Assignments	2	10% (10)	2, 12	LO # 3, 4, and 5
	Seminar	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 3, and 5
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-3
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	Computer Fundamentals: the phases of the computer life cycle, the evolution of computer, data and information, computer features, areas of computer use, computer components, and types of computers.
Week 2	Computer Components: components of a computer, the hard parts of a computer, input devices, output devices, software entities, computer number system, computer platform, factors to consider when buying a computer, and the main features of a personal computer.
Week 3	Operating systems: define the operating system, OS functions, OS goals, classification of operating systems, Windows 7 operating system.
Week 4	Operating systems: windows 7 installation requirements, desktop components, start menu, task bar, folders and files, Icons, desk top back ground and control panel.
Week 5	Microsoft word 2010: operating MS word 2010, MS word interface, file tab, home tab, clipboard group, font group, paragraph group, styles group, editing group, page layout

	tab, themes group, page setup group, arrange group, view tab, document views group, zoom group.
Week 6	Microsoft word 2010: insert tab, pages group, tables group, tables tools tab, tables design tab, tables layout tab.
Week 7	Microsoft word 2010: illustrations group, image tools tab, head and footer group, text group, symbols group.
Week 8	Microsoft Power Point 2010: operating MS power point 2010, MS power point 2010 interface, file tab, open new presentation, save new presentation, open saving presentation, close presentation, home tab, font group, paragraph group, editing group, design tab, page setup group, themes group, background group, view tab.
Week 9	Microsoft Power Point 2010: insert tab, insert objects, drawing group, editing group, tables group, images group, illustrations group, text group, symbol group, media group
Week 10	Microsoft Power Point 2010: transitions tab, preview group, transition to this slide group, timing group, animation tab, preview group, advanced animations group, timing group.
Week 11	Microsoft Excel 2010: operating MS Excel 2010, MS Excel 2010 interface, file tab, home tab, clipboard group, font group, alignment group, number group, styles group, cells group, editing group, page layout tab, themes group, page setup group.
Week 12	Microsoft Excel 2010: insert tab, tables group, pivot table group, illustrations group, charts group, design tab, layout tab, format tab, text group, symbols group.
Week 13	Microsoft Excel 2010: formulas tab, function library group, writing roles of calculation formula, defined names group, formula audition group, calculation group, sort and filter group.
Week 14	Seminar.
Week 15	Seminar.
Week 16	**Preparatory week before the final Exam.**

Delivery Plan (Weekly Lab. Syllabus) **المنهاج الاسبوعي للمختبر**	
	Material Covered
Week 1	Learn about computer parts
Week 2	Exploration window 7 operating system interface

Week 3	Identify the desktop components, start menu, and task bar.
Week 4	Identify and create folders and files, Icons, applying new desk top back ground and explore control panel icon.
Week 5	Identify MS word 2010 interface and applying some tasks.
Week 6	Using insert tab in MS word 2010 to create table and learn how to add, d e l e t e rows and columns and changing table style
Week 7	Using insert tab in MS word 2010 to add illustrations, image, head and footer, text, and symbols to the document.
Week 8	Identify MS Power point 2010 interface and learning how to open and save new presentation and using home tab to change font type and size, and using the paragraph group to adjustment the paragraph alignment, editing the text, a n d add a new slide and design it, and add background to the slides.
Week 9	Using insert tab in MS power point 2010 to insert objects, drawing group, tables, images, illustrations group, text, symbol group, and media like sound and video to the slides.
Week 10	Appling a transition to the slides, and preview it, and add timing, and add animation to objects, and use advanced animations group, timing group.
Week 11	Identify MS Execl 2010 interface and applying some tasks.
Week12	Using insert tab in MS Excel 2010 to create chart and learning how to design it and format it
Week 13	Solving problems

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Curriculum book (computer fundamentals and its office application / first part) Curriculum book (computer fundamentals and its office application / second part) Curriculum book (computer fundamentals and its office application / third part)	yes
Recommended Texts		
Websites		

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

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Democracy and human rights			**Module Delivery**	
Module Type	Support			☒ **Theory**	
Module Code	UOM121			☐ **Lecture**	
ECTS Credits	**2**			☐ **Lab**	
SWL (hr/sem)	**50**			☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Level	1		**Semester of Delivery**	**2**	
Administering Department	Type Dept. Code		**College**	Type College Code UOM	
Module Leader			**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	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 gain an understanding of the philosophic and political backgrounds that underlie the concept of human rights, enabling students to grasp the multifaceted nature of this complex field. 2-To learn about the significant historical documents that have contributed to the development and formation of human rights theories, enriching their knowledge of the history and evolution of human rights. 3-To engage in critical examination and discussion of current political and ethical debates surrounding human rights, fostering critical thinking and encouraging students to form their own perspectives on these issues. 4-To study key legal documents and understand the work of crucial governmental and non-governmental institutions currently involved in the protection and promotion of human rights. This objective aims to make students aware of the global landscape of human rights protection and how it operates. 5-To undertake a detailed examination of at least one current problem area in human rights protection, providing a practical application of knowledge and giving students a deeper understanding of the complexities and challenges faced in human rights protection. 6-To promote an understanding and appreciation of the importance of human rights in all areas of life, including engineering, highlighting the significance of ethical considerations in technical professions. 7-To encourage students to consider how their future work as engineers could potentially impact human rights, fostering a sense of social responsibility and ethical awareness in their professional practice. 8-To cultivate skills in research, analysis, and argumentation related to human rights, thereby enhancing students' overall academic and intellectual skills.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Understand the historical, philosophical, and political context of human rights, appreciating the complexities and dimensions of the concept. 2- Be familiar with significant historical documents and milestones that have contributed to the evolution of human rights theories and their role in shaping the current understanding of human rights.

	3- Analyze and articulate positions on contemporary political and ethical debates about human rights, demonstrating critical thinking skills and a broad understanding of the issues. 4- Identify and understand the roles of major governmental and nongovernmental institutions in the promotion and protection of human rights, demonstrating an awareness of the broader global landscape of human rights advocacy. 5- Analyze a specific, current problem area in human rights protection, applying theoretical knowledge to real-world situations and demonstrating problem- solving skills. 6- Appreciate the relevance and importance of human rights considerations within their field of study, electrical engineering, and the broader engineering context. 7- Exhibit an understanding of the ethical responsibilities and potential impacts of engineering projects on human rights, preparing them to consider these factors in their future professional practice. 8- Show competence in researching, analyzing, and articulating arguments related to human rights, demonstrating development in academic skills applicable beyond this specific module. By achieving these learning outcomes, students will have not only a strong foundational understanding of human rights and its relevance to their discipline but also enhanced critical thinking and problem-solving skills.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Introduces students to the philosophic and political background of the concept of human rights. 2. Discusses important documents as part of the history of the development of human rights theories. 3. Examines important issues in current political and ethical debates about human rights. 4. Reviews core legal documents and the work of the most important governmental and nongovernmental institutions currently involved in human rights protection and promotion. 5. Examines at least one current problem area in human rights protection

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	1. Lectures: Traditional lectures will be used to introduce fundamental concepts, providing students with a strong theoretical foundation in the philosophic and political backgrounds of human rights, the history of human rights theories, and the role of various institutions in human rights protection and promotion. 2. Interactive Discussions: To facilitate critical thinking and engagement, class sessions will often involve interactive discussions. These might revolve around the analysis of important historical documents, current debates on human rights issues, or case studies of specific problem areas in human rights protection. 3. Group Projects: Students will work in groups to analyze a specific problem in human rights protection, encouraging teamwork, fostering a deeper understanding of the issue, and enabling students to apply theoretical knowledge to practical scenarios. 4. Guest Lectures: Inviting practitioners from the field, such as human rights activists, legal professionals, or engineers working on ethical issues, can provide students with real-world insights and inspire them to consider the impact of their work on human rights. 5. Research Assignments: Individual or group assignments might require students to conduct research on a specific topic related to human rights. This encourages independent learning, develops research skills, and deepens their understanding of the subject. 6. Case Studies: By analyzing and discussing real-world cases in class, students can understand the practical application of human rights theories, grasp the challenges faced in human rights protection, and consider the relevance of these issues in their own field of study. 7. Online Resources: Making use of online resources, such as academic articles, video lectures, podcasts, or documentaries, can supplement the course material and offer different perspectives on the subject matter. 8. Reflection Papers: Students could write reflection papers on how they see human rights intersecting with their engineering studies and future careers, promoting introspection and ethical awareness. These strategies aim to promote an active learning environment where students can deeply engage with the subject matter, enhancing their understanding and fostering important skills such as critical thinking, teamwork, research, and communication.

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	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.1
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
	Seminar	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	1 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to the course: Overview of the module, its objectives, and learning outcomes. Introduction to the concept of human rights.
Week 2	Philosophical Background: An exploration of the philosophical principles that underpin the concept of human rights.

Week 3	Political Background: Discussion on the political history and influences on the development of human rights.
Week 4	Key Documents in Human Rights - Part I: Overview and analysis of significant historical documents related to human rights.
Week 5	Key Documents in Human Rights - Part II: Continued analysis of crucial historical documents, including their role in shaping current human rights theories. + Quiz
Week 6	Institutions and Human Rights: Examination of the roles of major governmental and nongovernmental institutions in human rights protection.
Week 7	Mid-Term Exam
Week 8	In-depth study of current political and ethical debates in human rights - Part II: Continued discussion and analysis of contemporary debates, encouraging students to articulate positions.
Week 9	Guest Lecture: Inviting a practitioner in the field to provide real-world insights.
Week 10	Begin Group Project: Introduction of a specific current problem area in human rights protection for group projects. + Quiz
Week 11	Group Project Work: Class time allocated for group work on the project, with the instructor available for consultation and guidance.
Week 12	Group Project Presentations: Each group presents their analysis and proposed solutions to the class.
Week 13	Human Rights and Engineering - Part I: Introduction to the intersection of human rights and engineering.
Week 14	Human Rights and Engineering - Part II: Detailed exploration of case studies showcasing the impact of engineering projects on human rights.
Week 15	Course Review and Reflection: Review of the main themes covered in the course, discussion of the relevance of human rights to future careers in engineering, and submission of reflection papers.
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	حقوق الانسان والطفل والديمقراطية /تأليف ماهر صالح علاوي ورياض عزيز هادي وعلي عبد الرزاق محمد واخرون / العاتك / بيروت / ٢٠٠٩	
Recommended Texts	عباس الدليمي / حقوق الانسان الفكر والممارسة فخري رشيد ،صلاح ياسين /المنظمات الدولية / العاتك لصناعة الكتاب / بغداد عصام العطية / القانون الدولي العام / المكتبة القانونية /بغداد/2012	
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.

Second stage

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Fluid Flow I**			**Module Delivery**	
Module Type	**Core**			☒ **Theory**	
Module Code	**CHEN217**			☐ **Lecture**	
ECTS Credits	**5**			☐ **Lab**	
SWL (hr/sem)	**125**			☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Level	2		**Semester of Delivery**	3	
Administering Department	Type Dept. CHEN		**College**	Type College Code	
Module Leader	Abouther Thalib Halboose		**e-mail**	abouther@uomisan.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	01/06/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		**Semester**	
Co-requisites module	CHEN227	**Semester**	4

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Introduce basic definitions and introductory concepts of fluid mechanics. 2. Introduce the description of pressure distribution in a static fluid 3. Introduce the description of phenomena associated with measuring static pressure in oil well and fluid mechanics applications in Petroleum Engineering. 4. Introduce Explain and derive the conservation laws that govern fluid motion (continuity, energy, and momentum equations). 5. Drive Bernoulli's Equation and its applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Define Fluids and Fluid Mechanics and distinguish between incompressible and compressible fluids, and understand and define the basic fluid properties; especially density and viscosity, and apply Newton's law of viscosity. 2. Calculate; the pressure in static fluid and understand how can calculate the static pressure in oil and gas well. 3. Understand the types of fluid and what are the Newtonian and non-Newtonian fluid 4. Be familiar with continuity, energy, and momentum equations, and their application to fluid mechanics problems. 5. Be able to apply modern knowledge and to apply mathematics, science, engineering and technology to fluid mechanics problems and applications.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Definition of fluid, Units and dimensions (Systems of units) the centimetre-gram-second (cgs) system, the metre-kilogram-second (mks system and the Systeme International d'Unites (SI), British engineering system, Properties of fluid (Viscosity, Newtonian, non-Newtonian, density, surface tension, capillary, Measurement of Pressure (Absolute pressure, Gauge pressure, Vacuum pressure), Manometer (mercury barometer, piezometer tube, the U-tube manometer, and the inclined-tube manometer), General Conservation Laws, Steady-state mass balance for fluid flow, Energy Balances, Bernoulli's Equation, The Energy Line and the Hydraulic Grade Line, Application of use Bernoulli equation Free jet, Spraying Water into the Air, Siphoning Out Gasoline from a Fuel Tank, Measurement (Velocity Measurement by a Pitot Tube, the orifice meter, the nozzle meter, and the Venturi meter)

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Fluid flow is an important area of study in physics and engineering. There are several learning and teaching strategies that instructors can use to help facilitate student understanding of this complex topic. Here are a few: Hands-on experience: One of the best ways to learn about fluid mechanics is through hands-on experiences. Students can conduct experiments, work on projects, and participate in simulations that allow them to directly see the principles of fluid mechanics in action. Visual aids: Another effective teaching strategy is the use of visual aids such as animations, diagrams, and videos. These can help to illustrate complex concepts in a more easily understandable way. Active learning: Active learning strategies, such as group work and problem-based learning, can help students to better understand fluid mechanics by encouraging them to interact with the material and each other. Real-world examples: Using real-world examples can be a very effective teaching strategy in fluid mechanics. Students can better understand how these principles are applied in real life and this can help to increase their engagement and understanding. Concept mapping: Concept mapping is a teaching strategy where students create visual representations of their understanding of a particular topic. This can be particularly effective in fluid mechanics as it can help students to better understand the relationships between different concepts

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	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	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introductory concepts to fluid flow
Week 2	Units and dimensions

Week 3	Properties of fluids
Week 4	Types of fluid (Newtonian and non-Newtonian fluids) 1
Week 5	Types of fluid (Newtonian and non-Newtonian fluids) 2
Week 6	Pressure measurements
Week 7	Mid-term Exam
Week 8	Applications of Fluid flow in Chemical Engineering
Week 9	Steady-state mass balance for fluid flow
Week 10	Overall Energy Balances
Week 11	Bernoulli's Equation
Week 12	The Energy Line and the Hydraulic Grade Line
Week 13	Application of use Bernoulli equation
Week 14	Continued Flow Measurements in Pipes
Week 15	Momentum balance
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	**1. F.A. Holland and R. Bragg , Fluid Flow for chemical** **2. J.M. Coulson and J.F. Richardson, Fluid flow, heat transfer and mass transfer, sixth edition, vol.1, 1991.**	online
Recommended Texts		No
Websites		

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية		
Module Title	**Physical Chemistry I**	**Module Delivery**
Module Type	**Core learning activity**	☒ **Theory**
Module Code	**CHEN216**	

ECTS Credits	**5**			☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**
SWL (hr/sem)	**125**			
Module Level	2	**Semester of Delivery**	3	
Administering Department	Type Dept. CHEN	**College**	Type College Code	
Module Leader		**e-mail**		
Module Leader's Acad. Title	Assist. Professor	**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)	**e-mail**	E-mail	
Peer Reviewer Name	Name	**e-mail**	E-mail	
Scientific Committee Approval Date		**Version Number**	1.0	

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module		**Semester**	
Co-requisites module	CHEN226	**Semester**	4

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	8- Physical chemists are focused on understanding the physical properties of atoms and molecules, the way chemical reactions work, and what these properties reveal. Their discoveries are based on understanding chemical properties and describing their behavior using theories of physics and mathematical computations.

	9- The study of physical chemistry is important because it is one of the most fundamental sciences that helps us understand how nature works. It also enables chemists to develop new types of materials for use in products. 10- Describing and Predicting Chemical Reactions: One of the primary aims of Physical Chemistry is to understand and predict chemical reactions. This involves studying reaction rates, mechanisms, and equilibrium to determine the factors that influence the direction and extent of chemical transformations. Physical Chemistry provides a theoretical framework for analyzing and interpreting experimental data. 11- Applying Thermodynamics and Kinetics to Chemical Systems: Physical Chemistry utilizes thermodynamics to understand the energy changes in chemical reactions and processes. It aims to quantify and predict energy transfers, enthalpy, entropy, and free energy changes. Kinetics is employed to study the rates of chemical reactions and the factors that affect reaction rates, providing insights into reaction mechanisms and pathways.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1-Give an introduction to the uses of physical chemistry in chemical engineering. 2-It provide many opportunities for the intermediate applications of ideas and equations in solving problems. 3-Studying thermodynamics laws zero,first , second and third law. 4-Learning about Thermo chemistry. 5-Show how rates of chemical reactions can be understood 6-Learn about different energy like entropy ,Gibbs and Helmoltz energies 7-Drive Maxwell relation used in thermodynamics relations. 8-Understnnd phase equilibrium and chemical equilibrium
Indicative Contents المحتويات الإرشادية	13. Zeroth Law of Thermodynamics and Equations of State • State of a System • The Zeroth Law of Thermodynamics • The Ideal Gas Temperature Scale • Ideal Gas Mixtures and Dalton's Law • Real Gases and the Virial Equation • Critical Phenomena • The van derWaals Equation • Description of the State of a System without Chemical Reactions • Special Topic: Barometric Formula 14. First Law of Thermodynamics • Work and Heat • First Law of Thermodynamics and Internal Energy • Work of Compression and Expansion of a Gas at Constant Temperature. • Various Kinds of Work • Change in State at Constant Volume • Enthalpy and Change of State at Constant Pressure

	• Heat Capacities • Joule Thomson Expansion • Adiabatic Processes with Gases • Thermochemistry Enthalpy of Formation 15. Second and Third Laws of Thermodynamics • Entropy as a State Function • The Second Law of Thermodynamics • Entropy Changes in Reversible Processes • Entropy Changes in Irreversible Processes • Entropy of Mixing Ideal Gases • The Third Law of Thermodynamics • Special Topic: Heat Engines

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	6. Creating a Positive Learning Environment: Foster a supportive and encouraging classroom environment where students feel comfortable taking risks and making mistakes. Providing constructive feedback and praising their efforts to boost their confidence. 7. Using Authentic Materials: Incorporating real-life materials such as newspaper articles, advertisements, or videos into the lessons. Where the authentic materials will expose students to real language use and help them develop practical language skills. 8. Differentiate Instruction: Recognizing that students have different learning styles, needs, and proficiency levels, so it's necessary to adapt teaching methods and materials to cater to diverse learners, and providing individualized support and additional challenges as necessary. 9. Promote Active Learning: Encouraging students in hands-on activities, group discussions, role-plays, and projects that require them to actively use the language. Also, Encouraging participation and create opportunities for students to practice their English skills in meaningful ways. 10. Provide Regular Feedback: Regularly assess students' progress and provide timely feedback on their performance. Offering specific suggestions for improvement and guide them towards resources and strategies to enhance their learning.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Zeroth Law of Thermodynamics and Equations of State
Week 2	Real Gases and the Virial Equation

Week 3	• Work and Heat • First Law of Thermodynamics and Internal Energy • Work of Compression and Expansion of a Gas at Constant Temperature.
Week 4	• Various Kinds of Work • Change in State at Constant Volume • Enthalpy and Change of State at Constant Pressure
Week 5	• Heat Capacities • Joule Thomson Expansion • Adiabatic Processes with Gases • Thermochemistry Enthalpy of Formation
Week 6	• Entropy as a State Function
Week 7	• The Second Law of Thermodynamics
Week 8	• Entropy Changes in Reversible Processes
Week 9	• Entropy Changes in Irreversible Processes
Week 10	• Entropy of Mixing Ideal Gases
Week 11	• The Third Law of Thermodynamics
Week 12	• Special Topic: Heat Engines
Week 13	• Fundamental Equation for the Internal Energy
Week 14	• Definitions of Additional Thermodynamic Potentials
Week 15	• Effect of Temperature on the Gibbs Energy
Week 16	**Preparatory week before the final Exam.**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Robert J. Silbey , *Physical Chemistry, Fourth Edition,*** 2004	No

Recommended Texts	Arun Bahl et al , Essential of Physical Chemistry, 2000	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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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	**Material Balance**	**Module Delivery**	
Module Type	**Core learning activity**		☒ **Theory**
Module Code	**CHEN215**		☐ **Lecture**
ECTS Credits	**6**		☐ **Lab**
SWL (hr/sem)	**150**		☒ **Tutorial** ☐ **Practical** ☐ **Seminar**

Module Level	*UGx11 2*	**Semester of Delivery**	**3**
Administering Department	Type Dept. CHEN	**College**	Type College Code
Module Leader		**e-mail**	
Module Leader's Acad. Title	Assist Prof.	**Module Leader's Qualification**	Ph.D.
Module Tutor		**e-mail**	-
Peer Reviewer Name	-	**e-mail**	-
Scientific Committee Approval Date	05/06/2024	**Version Number**	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	CHEN127	**Semester**	2
Co-requisites module	CHEN225	**Semester**	4

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims	

أهداف المادة الدراسية	1. Students can examine and select pertinent data, and solve material balance problems (application, analysis, synthesis). 2. Students can select and/or evaluate problem solution methods, for example, between analytic and numerical solution techniques. 3. Students can give examples of important applications of material balances in chemical engineering processes. 4. Students can evaluate their own solutions and those of others to find and correct errors.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**1- Knowledge and Understanding** i. Ability to follow the strategy for solving problems. ii. Ability to perform mass balance with or without chemical reactions. iii. Ability to perform mass balance problems involving simple or multiple-unit processes, recycle, bypass and purge. **2. Subject-specific skills** i. Solve problems for unit operations in chemical industry. ii. Ability to demonstrate effective teamwork and problem-solving skills. iii. Solving problems for material balance for different systems and chemical engineering and stoichiometry. **3. Thinking Skills** i. Developing critical and creative thinking skills related to material balance on chemical engineering processes. ii. Using different methods solution. iii. Analysis assumptions. **4. General and Transferable Skills (other skills relevant to employability and personal development)** i. Community effectively. ii. Work individually and as team members in international and multidisciplinary teams. iii. Understanding the impact of engineering solutions in an environmental and social context.

Indicative Contents المحتويات الإرشادية	• General strategy for solving material balance problems. • Solving material balance problems for single units without reaction. • Solving material balance problems for single units without reaction. • Solving material balance problems for single units without reaction. • Material balances for processes involving reaction. • Material balances for processes involving reaction. • Material balances for processes involving reaction. • Material balance problems involving multiple units. • Material balance problems involving multiple units. • Material balance problems involving multiple units. • Recycle (without reaction). • Recycle (involving reaction). • Bypass and Purge. • Industrial application of material balances. • Industrial application of material balances.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Lectures 2. Class work 3. Homework 4. Daily and monthly exams 5. Problem answers 6. Meeting

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem)	87	**Unstructured SWL (h/w)**	6

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

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	General strategy for solving material balance problems
Week 2	Solving material balance problems for single units without reaction
Week 3	Solving material balance problems for single units without reaction
Week 4	Solving material balance problems for single units without reaction
Week 5	Material balances for processes involving reaction
Week 6	Material balances for processes involving reaction
Week 7	Material balances for processes involving reaction

Week 8	Material balance problems involving multiple units
Week 9	Material balance problems involving multiple units
Week 10	Material balance problems involving multiple units
Week 11	Recycle (without reaction)
Week 12	Recycle (involving reaction)
Week 13	Bypass and Purge
Week 14	Industrial application of material balances
Week 15	Industrial application of material balances
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	Basic principles and calculations in chemical engineering 7th edition, by David M.Himmeblau the University of Texas.	Yes
Recommended Texts	Elementary principles of chemical processes 3rd edition (2005) Richard M.Felder ,Ronald W.Rousseau.	Yes
Websites	https://www.engineeringbookspdf.com/principles-chemical-engineering-processes material-energy-balances-second-edition-nayef-ghasem-redhouane-henda	

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	**Materials Properties**			**Module Delivery**	
Module Type	**Core learning activity**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CHEN214**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	2		**Semester of Delivery**	3	
Administering Department	Type Dept. Code CHEN		**College**	Type College Code	
Module Leader			**e-mail**		
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**	E-mail	
Scientific Committee Approval Date	05/06/2024		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. One of the primary aims of a Materials Properties course is to develop a solid understanding of the atomic and molecular structure of materials. This includes learning about crystal structures, defects, grain boundaries, and other microstructural features that influence material properties. 2. The course aims to establish the relationship between the structure of materials and their properties. This involves learning how different structural characteristics affect mechanical, thermal, electrical, magnetic, and optical properties of materials. 3. Students in a Materials Properties course are introduced to various techniques used for characterizing materials. This includes microscopy (e.g., optical, electron, and scanning probe microscopy), spectroscopy (e.g., X-ray, infrared, and Raman spectroscopy), and other analytical techniques. The aim is to familiarize students with the tools and methods used to analyze and understand material properties. 4. Understanding the mechanical properties of materials is another key aim of the course. Students learn about concepts such as stress, strain, elasticity, plasticity, and fracture mechanics. They also explore different mechanical testing methods and their applications. 5. The course aims to provide an understanding of how materials respond to temperature changes. Students learn about concepts like thermal expansion, heat capacity, thermal conductivity, and phase transformations. The aim is to understand how materials behave under different thermal conditions. 6. Another aim of the course is to cover the electrical, magnetic, and optical properties of materials. Students learn about concepts such as conductivity, resistivity, permittivity, permeability, magnetism, and optical absorption and transmission. This knowledge is essential for understanding and manipulating the behavior of materials in electronic, magnetic, and optical devices. 7. The course aims to develop students' ability to select materials for specific applications based on their properties. Students learn about material selection criteria, including considerations for strength, durability, cost, environmental impact, and other relevant factors. Additionally, they gain insight into materials design principles to tailor properties for specific requirements.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Students should acquire a comprehensive understanding of the atomic and molecular structure of materials, including crystal structures, defects, and microstructural features. 2. Students should be able to describe and explain the mechanical, thermal, electrical, magnetic, and optical properties of materials. They should understand the relationship between the structure of materials and their properties. 3. Students should gain exposure to various techniques used for characterizing materials, such as microscopy, spectroscopy, and other analytical methods. They should understand the principles behind these techniques and their applications in materials analysis. 4. Students should develop skills in analyzing and interpreting data obtained from material characterization experiments. They should be able to extract meaningful information about material properties from experimental results. 5. Students should be able to apply concepts of stress, strain, elasticity, plasticity, and fracture mechanics to understand the mechanical behavior of materials. They should understand different mechanical testing methods and be able to interpret mechanical testing data. 6. Students should be able to analyze how materials respond to temperature changes, including thermal expansion, heat transfer, and phase transformations. They should be able to predict and explain the thermal behavior of materials under different conditions. 7. Students should gain knowledge of the electrical conductivity, resistivity, dielectric properties, magnetic properties, and optical properties of materials. They should understand the underlying principles and applications of these properties. 8. Students should develop the ability to select materials based on specific requirements and constraints. They should consider factors such as strength, durability, cost, environmental impact, and functionality when selecting materials for specific applications. They should also understand how to tailor material properties through design and processing techniques. 9. Students should enhance their critical thinking skills by applying their knowledge of materials properties to solve problems and make informed decisions. They should be able to analyze complex material behavior and propose appropriate solutions. 10. Students should be able to effectively communicate their understanding of materials properties through oral and written means. They should also develop teamwork skills by collaborating with others in laboratory experiments and group projects.

Indicative Contents المحتويات الإرشادية	The following items are examples of indicative content: 1. Introduction to Materials Science and Engineering: [6 hrs] • Overview of materials science and engineering • Classification of materials (metals, ceramics, polymers, composites • Historical perspective and advancements in materials science 2. Atomic and Molecular Structure of Materials: [6 hrs] • Atomic structure and bonding • Crystal structures and unit cells • Defects in crystals (point defects, line defects, planar defects) • Amorphous materials 3. Mechanical Properties of Materials: [6 hrs] • Stress and strain • Elastic deformation and Hooke's law • Plastic deformation and yield criteria • Strengthening mechanisms (dislocation theory, solid solution strengthening, grain size effects) • Fracture mechanics and failure analysis • Fatigue and creep behavior 4. Thermal Properties of Materials: [6 hrs] • Thermal expansion • Heat capacity and thermal conductivity • Phase diagrams and phase transformations • Heat treatment and thermal processing of materials 5. Electrical Properties of Materials: [6 hrs] • Electrical conductivity and resistivity • Ohm's law and electronic conduction • Dielectric properties and polarization • Semiconductor materials and devices 6. Magnetic Properties of Materials: [6 hrs]

- Magnetic fields and magnetic moments
- Paramagnetism, diamagnetism, and ferromagnetism
- Magnetic materials and applications

7. Optical Properties of Materials: [6 hrs]
    - Interaction of light with matter
    - Reflection, refraction, and absorption of light
    - Optical transparency and opacity
    - Optical materials and applications
8. Characterization Techniques: [6 hrs]
    - Microscopy techniques (optical microscopy, electron microscopy)
    - Spectroscopic techniques (X-ray, infrared, Raman spectroscopy)
    - Mechanical testing methods (tensile testing, hardness testing)
    - Thermal analysis techniques (differential scanning calorimetry, thermal gravimetric analysis)
    - Electrical and magnetic characterization techniques
9. Material Selection and Design: [6 hrs]
    - Material selection criteria (strength, durability, cost, environmental impact)
    - Materials selection charts and databases
    - Materials design and processing techniques
    - Case studies of materials selection and design in specific applications
10. Emerging Materials and Advanced Topics: [6 hrs]
    - Nanomaterials and nanotechnology
    - Biomaterials and their properties
    - Smart materials and their applications
    - Materials for energy storage and conversion
    - Environmental considerations in materials selection and design

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم	
Strategies	1. Creating a Positive Learning Environment: Foster a supportive and encouraging classroom environment where students feel comfortable taking risks and making mistakes. Providing constructive feedback and praising their efforts to boost their confidence. 2. Using Authentic Materials: Incorporating real-life materials such as newspaper articles, advertisements, or videos into the lessons. Where the authentic materials will expose students to real language use and help them develop practical language skills. 3. Differentiate Instruction: Recognizing that students have different learning styles, needs, and proficiency levels, so its necessary to adapt teaching methods and materials to cater to diverse learners, and providing individualized support and additional challenges as necessary. 4. Promote Active Learning: Encouraging students in hands-on activities, group discussions, role-plays, and projects that require them to actively use the language. Also, Encouraging participation and create opportunities for students to practice their English skills in meaningful ways. 5. Provide Regular Feedback: Regularly assess students' progress and provide timely feedback on their performance. Offering specific suggestions for improvement and guide them towards resources and strategies to enhance their learning.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.2

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.2
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)	3, 5, 7, 9, 13	LO #1, 2, 4, 6, and 9
	Assignments	2	10% (10)	4, 14	LO # 3, 5, 7, 8, and 1(
	Projects / Lab.	1	10% (10)	14	LO # 3, 5, 7, 8, and 1(
	Report	1	10% (10)	13	LO # 3, 5, 7, 8, and 1(
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Materials Science and Engineering, Classification of Materials, Atomic Structure and Bonding

Week 2	Crystal Structures and Unit Cells, Defects in Crystals
Week 3	Stress and Strain, Elastic Deformation and Hooke's Law
Week 4	Plastic Deformation and Yield Criteria, Strengthening Mechanisms: Dislocation Theory
Week 5	Strengthening Mechanisms: Solid Solution Strengthening and Grain Size Effects, Fracture Mechanics and Failure Analysis
Week 6	Fatigue and Creep Behavior, Thermal Expansion
Week 7	Heat Capacity and Thermal Conductivity, Phase Diagrams and Phase Transformations
Week 8	Heat Treatment and Thermal Processing of Materials, Electrical Conductivity and Resistivity, Dielectric Properties and Polarization
Week 9	Semiconductor Materials and Devices, Magnetic Fields and Magnetic Moments
Week 10	Interaction of Light with Matter, Reflection, Refraction, and Absorption of Light, Optical Transparency and Opacity
Week 11	Microscopy Techniques: Electron Microscopy, Spectroscopic Techniques: X-ray, Infrared, Raman Spectroscopy
Week 12	Mechanical Testing Methods: Tensile Testing, Hardness Testing, Thermal Analysis Techniques: Differential Scanning Calorimetry, Thermal Gravimetric Analysis
Week 13	Electrical and Magnetic Characterization Techniques, Material Selection Criteria
Week 14	Materials Selection Charts and Databases, Materials Design and Processing Techniques
Week 15	Case Studies of Materials Selection and Design, Emerging Materials and Advanced Topics
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	Lawrence E. Murr, Handbook of Materials Structures, Properties, Processing and Performance, Springer Cham, 2014. https://doi.org/10.1007/978-3-319-01815-7	No (online)
Recommended Texts	Myer Kutz, Handbook of Materials Selection, John Wiley & Sons, Inc., 2002. DOI:10.1002/9780470172551	No
Websites	Materials Data Book - University of Cambridge: http://www-mdp.eng.cam.ac.uk/web/library/enginfo/cueddatabooks/materials.pd	

Grading Scheme

مخطط الدرجات

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

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	**Mathematics III**	**Module Delivery**	
Module Type	**Basic learning activity**	☒ **Theory**	
Module Code	**ENG201**	☐ **Lecture**	
ECTS Credits	**4**	☐ **Lab**	
SWL (hr/sem)	**150**	☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Level	2	**Semester of Delivery**	3
Administering Department	Type Dept. Code	**College**	Type College Code ENG

Module Leader		**e-mail**	
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor		**e-mail**	
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	05/06/2024	**Version Number**	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module		**Semester**	
Co-requisites module	ENG202	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	The students will get more knowledge in mathematical routes and treatments which help them in their future lied problems in chemical engineering and solving app
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Knowledge and Understanding: By the end of the course the student should be able to 1- Work in groups and solving different problems. 2- Understand professional social and ethical responsibilities 3- Communicate effectively. 4.Know the importance of mathematics in most of the chemical engineering problems. 5.Understand the partial differentiation concepts 6.Select appropriate technique for intended problem

	7. Identify formulate and solve chemical engineering problems
Indicative Contents المحتويات الإرشادية	The following items are examples of indicative content: 8. Polar Coordinates. [10 hr.] 9. Vectors [10 hr]. 10. Equation of Plane and Line in 3-space. [15 hr]. 11. Partial Derivatives. [15 hr]. 12. Multiple Integrals. [15 hr]. 13. First Order Differential. [15 hr].

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1- lectures 2- Tutorials 3- Homework 4- Tests and exams 5- In class questions and discussions

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	87	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5

Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 6 and 7
	Assignments	2	10% (10)	2, 12	LO # 3, 4
	Projects / Lab.	1	10% (10)	14	LO #1, 2, 6 and 7
	Report	1	10% (10)	6, 13	LO # 5, 6 and 7
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-4
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Polar Coordinates.
Week 2	Polar Equation and Graphs.
Week 3	Graphing Polar Coordinate Equation.
Week 4	Areas Bounded by Polar Curves.
Week 5	Vectors in plane Vectors in Space, .
Week 6	Properties of Dot product, Orthogonal vectors.
Week 7	The vector or cross product, Properties of cross product .

Week 8	Determinant Formula for UXV, Triple scaler or box Product
Week 9	Lines and Planes in Space.
Week 10	Double Integrals as Volumes
Week 11	Area by Double Integration
Week 12	Triple Integrals in Rectangular Coordinates
Week 13	Matrices, properties of matrices, matrices types
Week 14	Operations on matrices
Week 15	Determinants
Week 16	Matrix inverse, Solution of linear simultaneous equations

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	Calculus, Thomas', Thirteenth Edition; Joel Hass, University of California, Davis, 2014.	YES (online)
Recommended Texts	Mathematical Modeling of Engineering Problems, Jaroslav Vlˇcek Dept. of Mathematics and Descriptive Geometry VSB-TU Ostrava,2020	YES (online)
Websites	1. Mathematical Modelling https://www.scijournal.org/impact-factor-of-math-modelling-of-engineering-problems.shtml 2. polar-coordinates: https://byjus.com/maths/polar-coordinates3. Learn English - British Council:	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
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	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Engineering Management**			**Module Delivery**	
Module Type	**Support learning activity**			☒ **Theory**	
Module Code	**CHEN212**			☐ **Lecture**	
ECTS Credits	**3**			☐ **Lab**	
SWL (hr/sem)	**75**			☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Level	2		**Semester of Delivery**	3	
Administering Department	CHEN		**College**	Type College Code	
Module Leader			**e-mail**		
Module Leader's Acad. Title	Asst. Prof.		**Module Leader's Qualification**	MSc	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	05/06/2024		**Version Number**	1.0	

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	NONE	**Semester**	
Co-requisites module	NONE	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. The student will have the skills as a project manager. 2. The ability to transform industrial problems to linear programming models and find the optimal solution. 3. To deal with unexpected events during the production process. 4. To make the right decision of industrial problems to find the maximum profi or minimum cost; such as; assignment, transportation, gasoline blending an petroleum refinery problems; such as crude oil distillation. 5. Calculate the project time. 6. Study how to prevent any delay in project accomplishes time. 7. Study process control. 8. Iso-9001 9. Planning
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1-The student will have the skills as a project manager: Convert practical industrial problems to linear programming models. & studying linear programming methods. 2-Find the optimal solution of the models. 3-Understand the duality theory models to the dual form. 4-The student will be able to deal with unexpected events during the production processes by post –optimally analysis. 4-Calculating the minimum cost of the transportation problems. 5-To make the right decision of assignment problems. 6-Calculate the project time by studying the net- work models. Finding the critical path to prevent any delay in the project accomplishes time.

	7-Study and modeling of important industrial applications, such as, blending of gasoline and petroleum refinery problems. 8-Study quality control & planning.
Indicative Contents المحتويات الإرشادية	- Introduction to Eng. Management (1 hr.) - Linear Programing modeling (1 hr.) - Simplex method (2hrs) - Graphical method (2 hrs.) - Big M –Technique (2hrs) - Dual model (2hrs) - Post Optimally analysis (2hrs) - Transportation Problems (2 hrs) - Assignment Problems(2hrs) - Net –works (2hrs) - Quality control & iso-9001 (2hrs) - Planning (2hrs) - Gasoline blending modeling (2hrs) - Petroleum refinery modeling (4hrs)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1- Creating a Positive Learning Environment: Foster a supportive and encouraging classroom environment where students feel comfortable taking risks and making mistakes. Providing constructive feedback and praising their efforts to boost their confidence. 2- Using Authentic Materials: Incorporating real-life materials such as newspaper articles, advertisements, or videos into the lessons. Where the authentic materials will expose students to real language use and help them develop practical language skills. 3- Differentiate Instruction: Recognizing that students have different learning styles, needs, and proficiency levels, so its necessary to adapt teaching methods and materials to cater to diverse learners, and providing individualized support and additional challenges as necessary.

	4- Promote Active Learning: Encouraging students in hands-on activities, group discussions, role-plays, and projects that require them to actively use the language. Also, Encouraging participation and create opportunities for students to practice their English skills in meaningful ways. 5- Provide Regular Feedback: Regularly assess students' progress and provide timely feedback on their performance. Offering specific suggestions for improvement and guide them towards resources and strategies to enhance their learning.

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	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.13
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)	2,4,6,8,10,12	LO1-1,2,3,4,5,6,7,8
	Assignments	2	10% (10)	4,12	All LO
	Projects / Lab.	1	10% (10)	15	All LO
	Report	1	10% (10)	13	All LO
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO 1-4
	Final Exam	3hr	50% (50)	16	All

Total assessment	100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Eng. Management and Linear Programming models.
Week 2	Simplex Method
Week 3	Graphical method
Week 4	Big M Technique
Week 5	Dual Model
Week 6	Post –Optimally Analysis
Week 7	Transportation Problems
Week 8	Assignment Problems
Week 9	Net- Works
Week 10	Quality Control
Week 11	Iso- 9001
Week 12	Planning
Week 13	Gasoline blending models
Week 14	Petroleum Refinery Model 1
Week 15	Petroleum Refinery Model 1
Week 16	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	1- Mokhta S. B.,"Linear Programming and Network Flows" 3rd Edition, 2005. 2- Ann J. H.," Linear Programming :An Emphasis on Decision Making", Wesley, •	Yes
Recommended Texts	**1.** Hadley," Linear Programming" ,Wesley **الثانية و1986** **النعيمي,"بحوث العمليات", الطبعة الأولى,1999**	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	**جرائم نظام البعث في العراق**			**Module Delivery**	
Module Type	**Support learning activity**			☒ **Theory**	
Module Code	MLS 120			☐ **Lecture**	
ECTS Credits	**2**			☐ **Lab**	
SWL (hr/sem)	**50**			☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Level	2		**Semester of Delivery**	3	
Administering Department	CHEN		**College**	Type College Code	
Module Leader			**e-mail**		
Module Leader's Acad. Title	Asst. Prof.		**Module Leader's Qualification**	MSc	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	05/06/2024		**Version Number**	1.0	

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	NONE	**Semester**	
Co-requisites module	NONE	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	**لتعرف والاطلاع على مجموعة من الجرائم التي ارتكبها حزب البعث البائد والمنحل بحق أبناء الشعب العراقي ومن مختلف المكونات لأطيافه ولتأسيس وعي للطلبة لرفض جميع اشكال الظلم والتسلط لهذه الأنظمة والمطالبة بجميع الحقوق المدنية والسياسية**
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	
Indicative Contents المحتويات الإرشادية	-

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	6- Provide Regular Feedback: Regularly assess students' progress and provide timely feedback on their performance. Offering specific suggestions for improvement and guide them towards resources and strategies to enhance their learning.

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	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.13
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)	2,4,6,8,10,12	LO1-1,2,3,4,5,6,7,8
	Assignments	2	10% (10)	4,12	All LO
	Projects / Lab.	1	10% (10)	15	All LO
	Report	1	10% (10)	13	All LO
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO 1-4
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered

Week 1	مفهوم وتعريف الجرائم وأقسامها تعريف الجريمة لغة واصطلاحا
Week 2	موقف قانون المحكمة الجنائية العليا لسنة 2005 من انتهاكات نظام البعث وأهم القرارات الصادرة عنها
Week 3	انواع الجرائم الدولية
Week 4	دور نظام البعث في الانتهاكات النفسية وأثارها المترتبة عليها
Week 5	دور نظام البعث في الانتهاكات الاجتماعية وأثارها المترتبة عليها
Week 6	موقف نظام البعث من الدين والمؤسسات الدينية
Week 7	دور نظام البعث بأنتهاك القوانين الخاصة بحقوق الانسان
Week 8	امتحان نصف الفصل
Week 9	انتهاكات نظام البعث السياسية والعسكرية
Week 10	انتهاكات نظام البعث للبيئة في العراق / التلوث الحربي
Week 11	انتهاكات نظام البعث للبيئة في العراق/ تدمير المدن والقرى
Week 12	انتهاكات نظام البعث للبيئة في العراق/تجفيف الاهوار والبساتين
Week 13	التكييف القانوني والشرعي لجريمة المقابر الجماعية
Week 14	دور نظام البعث في احداث المقابر الجماعية في العراق
Week 15	التكييف القانوني لجرائم المقابر الجماعية خلال حكم نظام البعث
Week 16	

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	**جرائم نظام البعث في العراق**	Yes
Recommended Texts	**أرشيف مؤسسة السجناء السياسيين**	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	**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	**Fluid Flow II**	**Module Delivery**	
Module Type	**Core**		☒ **Theory**
Module Code	CHEN227		☐ **Lecture**
ECTS Credits	5		☒ **Lab**
SWL (hr/sem)	125		☒ **Tutorial** ☐ **Practical** ☐ **Seminar**

Module Level	2	**Semester of Delivery**	4
Administering Department	Type Dept. Code CHEN	**College**	Type College Code
Module Leader	Abouther Thalib Halboose	**e-mail**	abouther@uomisan.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	01/06/2024	**Version Number**	1.0

Relation with other Modules
العلاقة مع المواد الدراسية الأخرى

Prerequisite module	CHEN217	**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	1- Introduce the principles of viscous flow in pipes. 2-Define the Reynold's number to introduce the laminar flow and turbulent flow 3-Introduce Moody chart 4-Introduce pumps and pumps connection. 5-Dimensional Analysis 6. Multiphase flow
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1-Be able to know the type of flow 2-Be able to derive the velocity profile and shear stress distribution in pipes 3-Calculate frictional losses in pipe problems for both laminar and turbulent flows, by using Moody Diagram. 4-Calculate secondary (minor) losses for various pipes fittings and connections. 5-Be able to analyze and design pumping stations and connection 6. Be able to use of The Rayleigh Method in dimensional analysis 7. Apply the Buckingham pi theorem and develop a set of dimensionless variables for a given flow situation. 8. Discuss the use of dimensionless variables in data analysis. 9. Be able to apply modern knowledge and to apply mathematics, science, engineering and technology to fluid mechanics problems and applications. 10. Be able to understand the fundamental two-phase flow.
Indicative Contents المحتويات الإرشادية	Laminar and Turbulent Flows Reynolds Number, The Entrance Region, Entry Lengths Laminar Flow in Pipes, Pressure Drop and Head Loss, Effect of Gravity on Velocity and Flow Rate in Laminar Flow, Laminar Flow in Noncircular Pipes, Turbulent Flow, The Moody Chart, Major Losses, Minor Losses Dimensional Analysis, The Rayleigh Method, Buckingham Pi Theorem, Determination of Pi Terms, Some Additional Comments About Dimensional Analysis, Pumping of liquids, Pumps and pumping, System heads, Centrifugal pumps, Centrifugal pump relations, Centrifugal pumps in series and in parallel, Gas-liquid two-phase flow Momentum equation for two-phase flow, Principles of Flow in Packed bed, Sphericity and voidage calculations

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	

	Fluid mechanics is an important area of study in physics and engineering. There are several learning and teaching strategies that instructors can use to help facilitate student understanding of this complex topic. Here are a few: Hands-on experience: One of the best ways to learn about fluid mechanics is through hands-on experiences. Students can conduct experiments, work on projects, and participate in simulations that allow them to directly see the principles of fluid mechanics in action. Visual aids: Another effective teaching strategy is the use of visual aids such as animations, diagrams, and videos. These can help to illustrate complex concepts in a more easily understandable way. Active learning: Active learning strategies, such as group work and problem-based learning, can help students to better understand fluid mechanics by encouraging them to interact with the material and each other. Real-world examples: Using real-world examples can be a very effective teaching strategy in fluid mechanics. Students can better understand how these principles are applied in real life and this can help to increase their engagement and understanding. Concept mapping: Concept mapping is a teaching strategy where students create visual representations of their understanding of a particular topic. This can be particularly effective in fluid mechanics as it can help students to better understand the relationships between different concepts

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	94	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	31	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
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.	5	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	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduce the principles of viscous flow in pipes.
Week 2	Define Reynolds Number to know the laminar and turbulent flow
Week 3	The Entrance Region, Entry Lengths Laminar Flow in Pipes,
Week 4	Pressure Drop and Head Loss, Effect of Gravity on Velocity and Flow Rate in Laminar Flow
Week 5	Laminar Flow in Noncircular Pipes, Turbulent Flow, The Moody Chart,
Week 6	Major Losses, Minor Losses
Week 7	Mid-term Exam
Week 8	Dimensional Analysis
Week 9	The Rayleigh Method, Buckingham Pi Theorem
Week 10	Pumping of liquids, Pumps and pumping, System heads

Week 11	Centrifugal pumps, Centrifugal pump relations, Centrifugal pumps in series and in parallel
Week 12	Gas-liquid two-phase flow
Week 13	Momentum equation for two-phase flow
Week 14	Principles of Flow in Packed bed
Week 15	Sphericity and voidage calculations
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Fluid properties
Week 2	Lab 2: Dead weight calibrated
Week 3	Lab 3: Manometers
Week 4	Lab 4: Visualization of the flow in the channels
Week 5	Lab 5: Pitot static tube
Week 6	Lab 6: Bernoulli´s Theorem Demonstration
Week 7	Lab 7: Reynolds number

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	1. F.A. Holland and R. Bragg , Fluid Flow for chemical	Online

Recommended Texts	2. J.M. Coulson and J.F. Richardson, Fluid flow, heat transfer and mass transfer, sixth edition, vol.1, 1991.	Online
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	**Physical Chemistry II**			**Module Delivery**	
Module Type	**Core learning activity**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CHEN226**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	2		**Semester of Delivery**	4	
Administering Department	Type Dept. Code CHEN		**College**	Type College Code	
Module Leader			**e-mail**		
Module Leader's Acad. Title	Assist. Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	05/06/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CHEN227	**Semester**	3
Co-requisites module	CHENG316	**Semester**	5

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1- Physical chemists are focused on understanding the physical properties of atoms and molecules, the way chemical reactions work, and what these properties reveal. Their discoveries are based on understanding chemical properties and describing their behavior using theories of physics and mathematical computations. 2-The study of physical chemistry is important because it is one of the most fundamental sciences that helps us understand how nature works. It also enables chemists to develop new types of materials for use in products. 3-Describing and Predicting Chemical Reactions: One of the primary aims of Physical Chemistry is to understand and predict chemical reactions. This involves studying reaction rates, mechanisms, and equilibrium to determine the factors that influence the direction and extent of chemical transformations. Physical Chemistry provides a theoretical framework for analyzing and interpreting experimental data. 4-Applying Thermodynamics and Kinetics to Chemical Systems: Physical Chemistry utilizes thermodynamics to understand the energy changes in chemical reactions and processes. It aims to quantify and predict energy transfers, enthalpy, entropy, and free energy changes. Kinetics is employed to study the rates of chemical reactions and the factors that affect reaction rates, providing insights into reaction mechanisms and pathways.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1-Give an introduction to the uses of physical chemistry in chemical engineering. 2-It provide many opportunities for the intermediate applications of ideas and equations in solving problems. 3-Studying thermodynamics laws zero,first , second and third law. 4-Learning about Thermo chemistry. 5-Show how rates of chemical reactions can be understood 6-Learn about different energy like entropy ,Gibbs and Helmoltz energies 7-Drive Maxwell relation used in thermodynamics relations. 8-Understnnd phase equilibrium and chemical equilibrium
Indicative Contents المحتويات الإرشادية	1-Fundamental Equations of Thermodynamics • Fundamental Equation for the Internal Energy • Definitions of Additional Thermodynamic Potentials • Effect of Temperature on the Gibbs Energy • Effect of Pressure on the Gibbs Energy • Fugacity and Activity • Gibbs–Duhem Equation 2- Chemical Equilibrium

	• Derivation of the General Equilibrium Expression • Equilibrium Constant Expressions for Gas Reactions • Determination of Equilibrium Constants • Use of Standard Gibbs Energies of Formation to Calculate Equilibrium Constants • Effect of Temperature on the Equilibrium Constant • Effect of Pressure, Initial Composition, and Inert Gases on the Equilibrium Composition • Equilibrium Constants for Gas Reactions Written in Terms of Concentrations • Heterogeneous Reaction • Degrees of Freedom and the Phase Rule 3- Phase Equilibrium • Phase Diagrams of One-Component Systems • The Clapeyron Equation • The Clausius–Clapeyron Equation • Vapor–Liquid Equilibrium of Binary Liquid Mixtures • Vapor Pressure of Nonideal Mixtures and Henry's Law • Activity Coefficients

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1 -Creating a Positive Learning Environment: Foster a supportive and encouraging classroom environment where students feel comfortable taking risks and making mistakes. Providing constructive feedback and praising their efforts to boost their confidence. 2 -Using Authentic Materials: Incorporating real-life materials such as newspaper articles, advertisements, or videos into the lessons. Where the authentic materials will expose students to real language use and help them develop practical language skills. 3-Differentiate Instruction: Recognizing that students have different learning styles, needs, and proficiency levels, so it's necessary to adapt teaching methods and materials to cater to diverse learners, and providing individualized support and additional challenges as necessary. 4-Promote Active Learning: Encouraging students in hands-on activities, group discussions, role-plays, and projects that require them to actively use the language. Also, Encouraging participation and create opportunities for students to practice their English skills in meaningful ways. 5-Provide Regular Feedback: Regularly assess students' progress and provide timely feedback on their performance. Offering specific suggestions for improvement and guide them towards resources and strategies to enhance their learning.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	94	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	31	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
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
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 5, 6, 7
	Projects / Lab.	5	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 3 and 4
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-4
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	• Fundamental Equations of Thermodynamics • Fundamental Equation for the Internal Energy
Week 2	• Definitions of Additional Thermodynamic Potentials • Effect of Temperature on the Gibbs Energy
Week 3	• Effect of Pressure on the Gibbs Energy • Fugacity and Activity
Week 4	• Gibbs–Duhem Equation
Week 5	• Chemical Equilibrium • Derivation of the General Equilibrium Expression
Week 6	• Equilibrium Constant Expressions for Gas Reactions
Week 7	• Determination of Equilibrium Constants • Use of Standard Gibbs Energies of Formation to Calculate Equilibrium Constants
Week 8	• Effect of Temperature on the Equilibrium Constant • Effect of Pressure, Initial Composition, and Inert Gases on the Equilibrium Composition
Week 9	• Equilibrium Constants for Gas Reactions Written in Terms of Concentrations • Heterogeneous Reaction • Degrees of Freedom and the Phase Rule
Week 10	• Phase Equilibrium • Phase Diagrams of One-Component Systems
Week 11	• The Clapeyron Equation
Week 12	• The Clausius–Clapeyron Equation
Week 13	• Vapor–Liquid Equilibrium of Binary Liquid Mixtures
Week 14	• Vapor Pressure of Nonideal Mixtures and Henry's Law
Week 15	• Activity Coefficients
Week 16	**Preparatory week before the final Exam.**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered

Week 1	Introduction to Laboratory Tools and Apparatus Used in Lab
Week 2	Calculation of molecular weight by Victor Meyer method
Week 3	Calculation of molecular weight by Domas method
Week 4	Calculation of molecular weight using the boiling point elevation method
Week 5	Density calculation using Pycnometer and Hydrometer
Week 6	Adsorption of acetic acid with activated carbon particles
Week 7	Surface Tension/ part 1
Week 8	Surface Tension/ part 2
Week 9	Measuring the concentrations of substances using UV device
Week 10	Heat of neutralization
Week 11	Steam distillation
Week 12	Three Component experiment / part 1
Week 13	Three Component experiment / part 2
Week 14	Refractive index / part 1
Week 15	Refractive index / part 2
Week 16	**Preparatory week before the final Exam.**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Robert J. Silbey , *Physical Chemistry, Fourth Edition,*** 2004	No
Recommended Texts	Arun Bahl et al , Essential of Physical Chemistry, 2000	No

Websites	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Computer II**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UOM201**				
ECTS Credits	**3**				
SWL (hr/sem)	**75**				
Module Level	2	**Semester of Delivery**	4		
Administering Department	Type Dept. Code	**College**	Type College Code UOM		
Module Leader		**e-mail**			
Module Leader's Acad. Title	Assist. Professor	**Module Leader's Qualification**	Ph.D.		
Module Tutor	Name (if available)	**e-mail**	E-mail		
Peer Reviewer Name	Name	**e-mail**	E-mail		
Scientific Committee Approval Date	05/06/2024	**Version Number**	1.0		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	UOM122	**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	The main objective of this course is to introduce the fundamentals of computer software (Matlab). It focuses on preparing chemical engineering students for lifelong learning of computer concepts and skills. Students discover why programming and software are essential components in education, business, and society in this course.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	After successfully completing this course, a student will be able to: 1. Possess knowledge of general basic programming and software 2. Know and use different number systems and the basics of programming 3. Solve basic computational problems with modern software 4. Apply the basic concepts to solving broader problems
Indicative Contents المحتويات الإرشادية	**Understanding the MATLAB Environment** Students will learn the main working window in MATLAB and some main panels (Current Folder, Current Folder, Workspace...etc). **Matlab function references** Students will learn the main functions references (such as Clear Command Window (clc), Clear function, Delete function, Change directory function, Directory, ..etc). **Plotting using Matlab** Students will learn the fundamental steps of plotting using Matlab. **Matlab Operators** Students will learn the main operators that can be used in chemical engineering problems.

	Main Matlab Function • Interpolation • Integration • Finding the zero of a function of one unknown • Finding solution for a system of nonlinear equations • Looping statements and descision statements **MATLAB ODE solvers for initial value problems** Students will learn to use standard built-in solvers with MATLAB, particularly ode45 and ode23s. We will apply these solvers to initial value problems.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1-Creating a Positive Learning Environment: Foster a supportive and encouraging classroom environment where students feel comfortable taking risks and making mistakes. Providing constructive feedback and praising their efforts to boost their confidence. 2-Using Authentic Materials: Incorporating real-life materials such as newspaper articles, advertisements, or videos into the lessons. Where the authentic materials will expose students to real language use and help them develop practical language skills. 3-Differentiate Instruction: Recognizing that students have different learning styles, needs, and proficiency levels, so it's necessary to adapt teaching methods and materials to cater to diverse learners, and providing individualized support and additional challenges as necessary. 4-Promote Active Learning: Encouraging students in hands-on activities, group discussions, role-plays, and projects that require them to actively use the language. Also, Encouraging participation and create opportunities for students to practice their English skills in meaningful ways. 5-Provide Regular Feedback: Regularly assess students' progress and provide timely feedback on their performance. Offering specific suggestions for improvement and guide them towards resources and strategies to enhance their learning.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	42	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.8
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, 10	LO #1, 2, 3 and 4
	Assignments	2	10% (10)	2, 12	LO # 1, 2, 3 and 4
	Projects / Lab.	10	10% (10)	Continuous	All
	Report	1	10% (10)	13	All
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-2
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Principles of MATLAB
Week 2	Matlab function references I
Week 3	Matlab function references II
Week 4	Plotting using Matlab_I
Week 5	Plotting using Matlab_II
Week 6	Matlab OPERATORS
Week 7	Matrix operations
Week 8	Interpolation
Week 9	Integration
Week 10	Finding the zero of a function of one unknown
Week 11	Finding solution for a system of nonlinear equations
Week 12	Looping statements and descision statements_I
Week 13	Looping statements and descision statements_II
Week 14	ODE function
Week 15	Applications_I
Week 16	**Preparatory week before the final Exam.**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Principles of MATLAB
Week 2	Matlab function references I
Week 3	Matlab function references II
Week 4	Plotting using Matlab_I
Week 5	Plotting using Matlab_II
Week 6	Matlab OPERATORS
Week 7	Matrix operations
Week 8	Interpolation
Week 9	Integration
Week 10	Finding the zero of a function of one unknown
Week 11	Finding solution for a system of nonlinear equations
Week 12	Looping statements and descision statements_I
Week 13	Looping statements and descision statements_II
Week 14	ODE function
Week 15	Applications_I
Week 16	**Preparatory week before the final Exam.**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1. Matlab, programming fundamentals, the mathworks, inc, 2015. 2. Introduction to matlab, the school of mathematics and statistics,2015	No

Recommended Texts	1. Introduction to matlab for Engineering students, northwestern university, 2005.	
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	**Energy Balance**			**Module Delivery**	
Module Type	**Core learning activity**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CHEN225**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	2		**Semester of Delivery**	4	
Administering Department	Type Dept. Code CHEN		**College**	Type College Code	
Module Leader			**e-mail**		
Module Leader's Acad. Title	Assist Prof.		**Module Leader's Qualification**	Ph.D.	
Module Tutor	-		**e-mail**	-	
Peer Reviewer Name	-		**e-mail**	-	
Scientific Committee Approval Date	05/06/2024		**Version Number**	1.0	

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CHEN216	**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	1-Reviewing material balances main topics. 2-Studying Forms of energy and Latent heat of vaporization 3-Define Standard heat of reaction, Types of systems, Heat capacity. 4-Studying Energy balance without and with chemical reaction 5-Studying Humidity charts and their uses 6-Studying Heat of solution, Enthalpy-concentration charts and their uses 7-Applying Material and energy balance for complete projects. 8-Studying Unsteady state material balance, 9-Studying Unsteady State energy balance.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Define Forms of energy and the First law of thermodynamic 2. Using Energy balance without and with chemical reaction 3. Solving problems for energy balance with and without chemical reactions 4. Heat of mixing and solutions 5. Enthalpy-concentration charts and their uses 6. Using Humidity charts 7. Using unsteady state balances for solving systems

Indicative Contents المحتويات الإرشادية	1. Review of material balance 2. Forms of energy 3. Standard heat of reaction 4. Types of systems 5. Energy balance without chemical reaction 6. Energy balance with chemical reaction 7. Material and energy balances problems 8. Heat of solution 9. Enthalpy-concentration charts and their uses 10. Humidity charts and their uses 11. Material and energy balance for complete projects. 12. Unsteady state material and energy balance

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1-Lectures 2-Class work 3-Homework 4-Daily and monthly exams 5-Problem answers 6-Meeting

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.1
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
	Assignments	2	10% (10)	2, 12	LO # 2,3,4
	Projects / Lab.	1	10% (10)	14	All
	Report	1	10% (10)	13	All
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-4
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Review of material balance
Week 2	Review of material balance
Week 3	Forms of energy
Week 4	First law of thermodynamic
Week 5	Standard heat of reaction
Week 6	Energy balance without chemical reaction
Week 7	Energy balance with chemical reaction
Week 8	Solving problems for energy balance with chemical reactions
Week 9	Solving problems for energy balance without chemical reactions

Week 10	Heat of solution
Week 11	Enthalpy-concentration charts and their uses
Week 12	Humidity charts and their uses.
Week 13	Solving problems for humidity.
Week 14	Material and energy balance for complete projects.
Week 15	Unsteady state material and energy balance
Week 16	Preparatory week before the final Exam.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Basic principles and calculations in chemical engineering 7th edition,by David M.Himmeblau the University of Texas.	yes
Recommended Texts	Elementary principles of chemical processes 3rd edition(2005) Richard M.Felder ,Ronald W.Rousseau.	yes
Websites	https://www.engineeringbookspdf.com/principles-chemical-engineering-processes-material-energy-balances-second-edition-nayef-ghasem-redhouane-henda	

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 error
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية		
Module Title	**Mathematics IIII**	**Module Delivery**
Module Type	**Basic learning activity**	☒ **Theory** ☐ **Lecture**
Module Code	**ENG 202**	
ECTS Credits	**4**	

SWL (hr/sem)	**150**	☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**

Module Level	2	**Semester of Delivery**	3
Administering Department	Chem. Department	**College**	Engineering College
Module Leader		**e-mail**	
Module Leader's Acad. Title	Assist.lecture	**Module Leader's Qualification**	Master
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date		**Version Number**	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	ENG 201	**Semester**	3
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	The students will get more knowledge in mathematical routes and treatments which help them in their future lied problems in chemical engineering and solving app
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Knowledge and Understanding: By the end of the course the student should be able to 1. Work in groups and solving different problems. 2. Understand professional social and ethical responsibilities 3. Communicate effectively. 4. Know the importance of mathematics in most of the chemical engineering problems. 5. Select appropriate technique for intended problem 6. Identify formulate and solve chemical engineering problems
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1- lectures 2- Tutorials 3- Homework 4- Tests and exams 5- In class questions and discussions

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

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	87	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	20% (20)	5, 10	LO #1, 2,6,7
	Assignments	2	10% (10)	2,12	LO #3,4
	Projects / Lab.	-	-	-	-
	Report	1	10% (10)	14	All
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1-4
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Hyperbolic function
Week 2	Inverse Hyperbolic function
Week 3	Partial derivatives Functions of Several Variables Graphing a Function of Two Variables Partial Derivatives
Week 4	Partial derivatives • Second Order Partial Derivatives • The Chain Rule
Week 5	Partial derivatives • Directional Derivatives and Gradient Vectors • Homework
Week 6	Partial derivatives • Gradients and Tangents to Level Curves • Functions of Three Variables
Week 7	Partial derivatives • Extreme Values and Saddle Points • Quiz.
Week 8	Partial derivatives • Lagrange Multipliers • Assignment
Week 9	Differential equations • Fundamental Definitions • Solutions of First Order: variable separable

	• Solutions of First Order: exact
Week 10	Differential equations • Solutions of First Order: linear • Solutions of First Order: Bernoulli • Homework
Week 11	Differential equations • Introduction to Solutions of second Order: Linear equation with constant coefficients, linear homogeneous equations with constant coefficients • Quiz.
Week 12	Differential equations • Introduction to Solutions of second Order: nonhomogeneous equations, solving of non-homogenous equations, variation of parameters
Week 13	Sequences, Infinite Sequences, Limits of Infinite Sequences
Week 14	Arithmetic and Geometric Sequences, Sequences and Graphing Calculators
Week 15	Series, Summation Notation, Sums of Arithmetic and Geometric Sequences

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	• George B. Thomas Jr.- Maurice D. Weir_Joel R. Hass.Thomas Calculus_ Early Transcendentals (13 Edition)- Pearson • Thomas Calculus Early TRansendentals Single Variable 13th c2014 Solutions ISM.	NO(on line)
Recommended Texts	• THOMAS' CALCULUS ,G, B.Thomas, R.L.Finney, M.D.Weir, Addison-Wesley; 12th Edition, 2010	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
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	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	**Statistics and Engineering Economics**	**Module Delivery**	
Module Type	**Support learning activities**	☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	**CHEN222**		
ECTS Credits	**4**		
SWL (hr/sem)	**100**		
Module Level	2	**Semester of Delivery**	4

Administering Department	Type Dept. Code CHEN	**College**	Type College Code
Module Leader		**e-mail**	
Module Leader's Acad. Title	Assist Prof.	**Module Leader's Qualification**	Ph.D.
Module Tutor	-	**e-mail**	-
Peer Reviewer Name	-	**e-mail**	-
Scientific Committee Approval Date	05/06/2024	**Version Number**	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module		**Semester**	
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. Statistical course concerns with the organization of date collected from any research and tabulate them in tables and drawings and then analyze them, to give recommendation. 2. studying binomial distribution, normal distribution, chi-square distribution, F-distribution and types of tests like T- test, chi- square test, normal test and F- test. 3. The formation of regression that relate the studied variables with the outcomes of the experiments. 4. the economics of engineering will deal with economics calculation of the price of equipment using different ways, also calculation for the optimum points depending on one variable, two variable, depreciation cost.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Be able of solving statistics problem 2. Collect and organizing data 3. Be able to understand the numerical descriptive measurements for grouped and un grouped data 4. Be able to understand of which type of distributions the data belonged to, that will help to calculate the probability more accurately. 5. Solving problems concerning normal distribution, Poisson and binomial 6. Be able to form a regression that relates the affecting factor on the outcomes and understand the regression coefficient, like the sum of squares and the p-value 7. Be able of solving economics calculation problem 8. Able to estimate the cost of equipment's 9. Finding the optimum cost for any process 10. Be able to calculate the deprecation of equipment's cost. 11. Understanding the meaning of the feasibility study and its basic of formation and what it must be include. 12. Solving problems for data collecting and organizing 13. Solving problems for graphical presentation of the organized data. 14. Solving probability problems for different type of data. 15. Forming regression from collected data that relate the dependent and independent variables. 16. Understanding the use cost index. 17. Understanding the method for finding the optimum point for the cost 18. Use statistical programing for engineers and scientists to solve problems. 19. Using statistical program to form the representations graphs. 20. Communication effectively. 21. work in group and function on multi _disciplinary teams
Indicative Contents المحتويات الإرشادية	1. organization of date collected from any research and tabulate them in table and drawings and then analyze them 2. binomial distribution 3. normal distribution 4. chi-square distribution, and T- test, chi- square test, 5. regression formulation 6. economics calculation of the price of equipment using different ways for that like cost indexes 7. calculation for the optimum cost depending on one variable, two variable 8. Depreciation cost. 9. Feasibility study

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم	
Strategies	1-Lectures 2-Tutorials 3- Homework and assignments 4-Tests and Exams 5-In-Class questions and discussions 6-Connection between theory and application 7-Seminars 8-In- and Out-Class oral conservations

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
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 # 1-11
	Assignments	2	10% (10)	2,4,6,8,10,12, 14	LO # 1-11
	Seminar	1	10% (10)	13	All

	Report	1	10% (10)	8	LO # 1-6
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-10
	Final Exam	3hr	50% (70)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Collecting data and organizing them in frequency tables and curves
Week 2	The standard deviation and other measures of dispersion
Week 3	Normal distribution Bi-onomial distribution and Poisson distribution
Week 4	Normal distribution
Week 5	Curve fitting using Least – square method
Week 6	chi-square distribution
Week 7	Confidence intervals
Week 8	Seminar
Week 9	Cost Estimation
Week 10	Factors affecting the production cost and investment , Capital investment
Week 11	Optimum design
Week 12	Cost index
Week 13	Interest and investment cost
Week 14	depreciation calculation methods
Week 15	Interest and investment cost, Feasibility study

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	plant design and economics for chemical engineers	yes
Recommended Texts	probability and statistics for engineers , Richard johnson John freund Irwin miller statistics for engineers and scientists , William navidi	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	**English Language II**	**Module Delivery**
Module Type	**Basic**	☒ **Theory**
Module Code	UOM202	

ECTS Credits	**2**	☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐**Seminar**
SWL (hr/sem)	**50**	

Module Level	2	**Semester of Delivery**	4
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader		**e-mail**	
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Asst.lect
Module Tutor		**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	UOM120	**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 primary aims of this course are to: Enhance Language Proficiency:

	Develop students' English language skills, focusing on reading, writing, speaking, and listening, specifically tailored to the needs of chemical engineering contexts. Foster Technical Communication Skills: Equip students with the ability to communicate effectively in both written and oral forms, using appropriate technical vocabulary and academic conventions pertinent to the field of chemical engineering. Promote Critical Thinking and Analytical Skills: Encourage students to engage critically with academic texts, case studies, and data, promoting analytical thinking in problem-solving and decision-making processes related to engineering challenges. Cultivate Research Competence: Enable students to conduct effective research, synthesize information from various sources, and apply academic writing standards to produce coheren and well-structured documents. Encourage Collaborative Learning: Foster teamwork and collaboration among students through group project and discussions, enhancing their interpersonal communication skills and capacity to work in diverse teams typical in engineering environments. Integrate Ethical Considerations: Instill an understanding of the ethical dimensions of engineering communication and practice, guiding students to recognize and navigate ethical issues relevant to their field. Prepare for Professional Practice: Prepare students for the professional demands of the chemical engineering industry by developing their ability to draft professional documentation, including resumes and cover letters, and to participate in job interviews an networking opportunities. Support Reflective Learning: Encourage reflective practices that enable students to assess their own learning journey, identify areas for improvement, and set future learning goals in both language proficiency and technical communication. Build Confidence and Engagement: Create a supportive and interactive learning environment that builds stude t confidence in using English for academic and professional purposes, while fostering engagement with peers and instructors.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Upon successful completion of this course, students will be able to: 1. Technical Vocabulary Proficiency 2. Demonstrate a strong understanding and application of key technical vocabulary related to chemical engineering in both written and spoken contexts. 3. Academic Reading Comprehension 4. Analyze and interpret complex academic texts, including research articles and textbooks, to extract relevant information and concepts pertinent to chemical engineering. 5. Effective Technical Writing 6. Compose clear, coherent, and well-structured technical documents, including lab reports, research papers, and professional correspondence, adhering to appropriate academic standards and citation styles. 7. Oral Communication Skills 8. Deliver effective presentations on chemical engineering topics, utilizing appropriate visual aids and engaging techniques while demonstrating confident public speaking skills. 9. Case Study Analysis and Problem Solving 10. Critically evaluate case studies within the realm of chemical engineering, proposing informed solutions based on thorough analysis and research. 11. Professional Communication 12. Draft professional emails, cover letters, and resumes, exhibiting proper language use and etiquette suitable for the chemical engineering field. 13. Research Skills Development 14. Conduct thorough research using credible academic sources, synthesizing findings into literature reviews and group projects that reflect critical engagement with existing scholarship. 15. Data Interpretation and Presentation 16. Interpret technical diagrams, graphs, and data findings accurately, presenting these analyses in a manner that is understandable and meaningful to diverse audiences. 17. Collaborative Skills 18. Work effectively in teams, demonstrating leadership, accountability, and

	communication skills while completing project-based assignments. 19. Ethical Awareness in Engineering Communication 20. Identify and discuss ethical considerations in chemical engineering practices and communications, applying ethical principles to real-world scenarios. 21. Reflective Practice 22. Engage in reflective practice by assessing personal learning progress and setting goals for further development in language proficiency and communication skills.
Indicative Contents المحتويات الإرشادية	**Week 1: Introduction to Technical Vocabulary** • Overview of chemical engineering terminology • Glossary creation activity • Reading: "Basics of Chemical Engineering" **Week 2: Understanding Chemical Processes** • Vocabulary related to chemical reactions and processes • Reading selection: Chapters from relevant chemical engineering textbooks • Discussion on key concepts **Week 3: Academic Reading Strategies** • Techniques for analyzing academic articles • Reading assignment: Scientific journal articles • Summarization and discussion of readings **Week 4: Lab Reports and Technical Writing Basics** • Structure of lab reports (Introduction, Methods, Results, Discussion) • Writing exercise: Drafting a simple lab report based on provided data • Peer feedback on drafts **Week 5: Advanced Technical Writing** • Research paper structure (Abstract, Introduction, Methodology, Results, Conclusion) • Focus on writing clarity, coherence, and citation styles (APA/MLA) • Exercise: Writing an abstract for a research project **Week 6: Oral Communication Skills**

- Principles of effective presentations (body language, tone, engagement)
- Preparation for a short individual presentation on a chosen topic
- Conduct mock presentations with peer evaluations

Week 7: Case Study Analysis

- Identifying and analyzing key components of case studies in chemical engineering
- Group work: Prepare and present findings from a selected case study
- Discussion on problem-solving methodologies

Week 8: Professional Correspondence

- Writing professional emails and networking strategies
- Role-playing exercises for interviews and professional scenarios
- Activity: Crafting a cover letter and resume tailored to a job posting

Week 9: Research Skills and Literature Review

- How to search for credible academic sources (databases, journals)
- Writing a literature review: synthesis of research findings
- Group project: Present findings on a specific topic or research question

Week 10: Technical Diagrams and Data Interpretation

- Understanding and interpreting graphs, charts, and technical diagrams
- Activity: Analyze and present data from a provided technical report
- Discussion on the importance of visual aids in communication

Week 11: Collaborative Projects and Teamwork

- Best practices for effective group collaboration and project management
- Group project work: Identify a chemical engineering issue to address
- Planning phases and roles within the group

Week 12: Advanced Presentation Techniques

- Using visual aids (PowerPoint, posters) effectively during presentations
- Rehearsal of group project presentations
- Feedback session focused on presentation skills

Week 13: Ethics in Engineering Communication

- Exploring ethical considerations in scientific research and communication

	• Debate on current ethical issues faced in chemical engineering • Case study discussions relating to ethics **Week 14: Final Project Preparation** • Completing group projects and preparing for final presentations • Individual consultations with the instructor for guidance and feedback • Review sessions covering key concepts and skills learned throughout the course **Week 15: Final Presentations and Course Wrap-up** • Group project presentations showcasing research and solutions • Reflective discussions on learning outcomes and personal growth • Course evaluation and feedback collection

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Creating a Positive Learning Environment: Foster a supportive and encouraging classroom environment where students feel comfortable taking risks and making mistakes. Providing constructive feedback and praising their efforts to boost their confidence. 2. Using Authentic Materials: Incorporating real-life materials such as newspaper articles, advertisements, or videos into the lessons. Where the authentic materials will expose students to real language use and help them develop practical language skills. 3. Differentiate Instruction: Recognizing that students have different learning styles, needs, and proficiency levels, so its necessary to adapt teaching methods and materials to cater to diverse learners, and providing individualized support and additional challenges as necessary. 4. Promote Active Learning: Encouraging students in hands-on activities, group discussions, role-plays, and projects that require them to actively use the language. Also, Encouraging participation and create opportunities for students to practice their English skills in meaningful ways. 5. Provide Regular Feedback: Regularly assess students' progress and provide timely feedback on their performance. Offering specific suggestions for improvement and guide them towards resources and strategies to enhance their learning.

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	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.5
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, 6 and 7
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 5 and 6
	Seminar	1	-10% (10)	4,11	All
	Report	1	10% (10))	6, 13	LO # 5, and 8
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-4
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	**Introduction to Technical Vocabulary**

Week 2	**Understanding Chemical Processes**
Week 3	**Academic Reading Strategies**
Week 4	**Lab Reports and Technical Writing Basics**
Week 5	**Advanced Technical Writing**
Week 6	**Oral Communication Skills**
Week 7	**Case Study Analysis**
Week 8	**Professional Correspondence**
Week 9	**Research Skills and Literature Review**
Week 10	**Technical Diagram and Data Interpretation**
Week 11	**Collaborative Projects and Teamwork**
Week 12	**Advanced Presentation Techniques**
Week 13	**Ethics in Engineering Communication**
Week 14	**Final Project Preparation**
Week 15	**Final Presentations and Course Wrap-up**
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	Introduction to Chemical Engineering" by Mark M. Mansour Technical Writing for Dummies" by Sheryl Lindsell-Roberts	No (online)
Recommended Texts		No
Websites	**Websites & Online Resources** 1. **Purdue Online Writing Lab (OWL)** • Purdue OWL • An excellent resource for general writing tips, citation styles (APA, MLA), and technical writing guidelines. 2. **MIT OpenCourseWare: Writing and Communication Center** • MIT Writing and Communication • Offers resources and materials that can aid in developing writing skills applicable to engineering students. 3. **Engineering Communication Program at Stanford University** • Stanford Engineering Communication • Provides resources and guidance on effective communication practices in engineering. 4. **American Society for Engineering Education (ASEE)** • ASEE	

	• Offers various resources related to engineering education, including conferences and publications focusing on teaching methodologies.

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
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	F – Fail	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information

معلومات المادة الدراسية

Module Title	**Arabic Language I**	**Module Delivery**	
Module Type	**Basic**	☒ **Theory**	
Module Code	**UOM123**	☐ **Lecture**	
ECTS Credits	**2**	☐ **Lab**	
SWL (hr/sem)	**50**	☐ **Tutorial**	
		☐ **Practical**	
		☐ **Seminar**	

Module Level	1	**Semester of Delivery**	1
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader		**e-mail**	
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date	05/06/2023	**Version Number**	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	**Semester**	
Co-requisites module	UOM 203	**Semester**	5

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	6. يهدف المقرر إلى تعليم الطلاب اللغة العربية وفهمها، بما في ذلك القراءة والكتابة والمحادثة والاستماع. يتم تدريس قواعد اللغة والصرف والنحو، وتوظيفها في التعبير الصحيح والفعال. 7. يسعى المقرر إلى تنمية مهارات الطلاب في استخدام اللغة العربية بشكل صحيح وفعال في مختلف الأوضاع الاتصالية. يتم تدريب الطلاب على التعبير بوضوح ودقة، وتحسين قدرتهم على فهم المقروء والمسموع، والتواصل بطلاقة. 8. يهدف المقرر إلى تعزيز الثقافة العربية وترسيخ الهوية اللغوية والثقافية للطلاب. يتم تقديم مواضيع متنوعة تتناول الأدب والشعر والتراث العربي، وتاريخ اللغة العربية وتطورها، والعادات والتقاليد العربية. 9. يساعد المقرر الطلاب على تطوير مهارات التفكير النقدي من خلال قراءة وتحليل النصوص الأدبية والتعبير عن آراءهم واستنباط المعاني والرسائل المخفية. يتم تشجيع الطلاب على التفكير الإبداعي والتحليلي والانتقادي. 10. يهدف المقرر إلى تعزيز التواصل الثقافي بين الطلاب من خلال تعريفهم بثقافات ومجتمعات مختلفة داخل العالم العربي. يتم تناول مواضيع مثل اللهجات المحلية، والاختلافات الثقافية، والتعايش والتفاعل
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	8. يتوقع من الطلاب أن يكتسبوا مهارات القراءة والكتابة والإستماع والمحادثة في اللغة العربية. يجب عليهم أن يتمكنوا من قراءة وفهم النصوص المختلفة، وكتابة نصوص بنية واضحة ومنظمة، وفهم واستيعاب المحادثات والنقاشات. 9. ينبغي للطلاب أن يكونوا قادرين على فهم وتطبيق قواعد اللغة العربية، بما في ذلك قواعد الصرف والنحو. يتعلم الطلاب كيفية تحليل الجمل وتشكيلها بشكل صحيح ومناسب للتعبير عن المعاني المرادة. 10. يتوقع من الطلاب أن يكونوا قادرين على التعبير بوضوح ودقة باستخدام اللغة العربية. يجب أن يتمكنوا من التعبير عن أفكارهم وآرائهم بطريقة منطقية ومقنعة، واستخدام المفردات والتراكيب اللغوية الملائمة. 11. يشمل المقرر تعزيز فهم الطلاب للثقافة العربية، بما في ذلك الأدب والشعر والتراث العربي. يجب على الطلاب أن يتعرفوا على القيم والتقاليد والمعتقدات العربية، وفهم تأثيرها على اللغة والثقافة العربية. 12. يتوقع من الطلاب أن يطوروا مهارات التفكير النقدي والتحليلي من خلال قراءة ودراسة النصوص الأدبية العربية. يجب أن يكونوا قادرين على استنباط المعاني العميقة والرسائل المخفية في النصوص، وتقييمها والتعبير عن آرائهم بشأنها. 13. يتضمن المقرر تعزيز التواصل الثقافي بين الطلاب من خلال دراسة ثقافات ومجتمعات مختلفة داخل العالم العربي. يتعلم الطلاب كيفية التفاعل مع الثقافات المختلفة والتعايش معها بفهم واحترام.
Indicative Contents المحتويات الإرشادية	5. يتم تنظيم المقرر إلى وحدات دراسية تغطي مواضيع مختلفة في اللغة العربية. يتم تحديد أهداف ومحتويات كل وحدة وفقًا لمستوى الطلاب والمرحلة التعليمية. قد تتضمن الوحدات دراسة القواعد اللغوية، والمفردات، والتعبير الكتابي والشفهي، والأدب والثقافة العربية.[12 hr]

	6. تشمل المحتويات الإرشادية الموارد التعليمية المستخدمة في المقرر، مثل الكتب الدراسية والمراجع الإضافية. يتم توفير مصادر متنوعة ومناسبة لتعلم اللغة العربية، مثل النصوص الأدبية، والمواد المرئية والمسموعة، والأنشطة التفاعلية. [12 hr] 7. يجب أن تتضمن المحتويات الإرشادية وصف الأنشطة التعليمية المقترحة لتحقيق أهداف المقرر. يمكن أن تشمل الأنشطة التعليمية قراءة ومناقشة النصوص، وكتابة تعبيرات ومقالات، وممارسة التحدث والاستماع، وحل التمارين والتدريبات. [12 hr] 8. يجب أن توفر المحتويات الإرشادية معايير التقييم والتقويم لقياس تحقيق الطلاب للأهداف المقررة. يمكن أن تشمل طرق التقييم اختبارات الفهم والتطبيق، وتقييم الأداء الشفهي والكتابي، ومشاركة الطلاب في الأنشطة الجماعية. [12 hr]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	6. إستخدام الأنشطة التفاعلية والمشروعات الجماعية لتشجيع التواصل والمشاركة النشطة للطلاب في تعلم اللغة العربية. يمكن تنظيم مناقشات جماعية، وألعاب الأدوار، وممارسة الحوارات والمناقشات لتعزيز مهارات الاستماع والتحدث وتطوير الثقة بالنفس في استخدام اللغة. 7. تنظيم الأنشطة التعاونية مثل العروض التقديمية المشتركة، وإعداد المشاريع الجماعية، وممارسة الأدوار، وتبادل الملاحظات والمساعدة المتبادلة. يعزز هذا النهج التواصل اللغوي ويساعد الطلاب على تطوير المهارات الاجتماعية واللغوية. 8. إشراك الطلاب في أنشطة عملية وتطبيقية لتعلم اللغة العربية. يمكن تنظيم أنشطة مثل الألعاب اللغوية، والمحاكاة، والتمثيل، والكتابة الإبداعية. يتم تشجيع الطلاب على الاستخدام الفعال للغة العربية في سياقات حقيقية وتطبيقها على الواقع. 9. تشجيع الطلاب على تولي المسؤولية الشخصية في تعلم اللغة العربية. يمكن تشجيع الطلاب على قراءة النصوص والكتب، ومشاهدة الأفلام والبرامج التلفزيونية باللغة العربية، واستخدام الموارد عبر الإنترنت لتعزيز مهاراتهم اللغوية وزيادة ثقافتهم اللغوية. 10. إستخدام التكنولوجيا في تعزيز تعلم اللغة العربية، مثل إستخدام البرامج والتطبيقات التعليمية، والموارد التعليمية عبر الإنترنت، ومنصات التعلم الإلكتروني. يمكن إستخدام التكنولوجيا لتنويع الأنشطة وجعلها أكثر تفاعلية وشيقة للطلاب.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem)	33	**Structured SWL (h/w)**	2

الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعيا	
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**		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	الكلام العربي وأقسامه
Week 2	الفعل اقسام الكلام العربي
Week 3	الاسم الحرف أقسام الكلام العربي
Week 4	علامات الترقيم
Week 5	علامة الاستفهام النقطتان الراسيتان, النقطة الفاصلة المنقوطة الفاصلة أهم علامات الترقيم
Week 6	، حذف علامة ال القوسان علامة التنصيص المزدوجة، ب التعجة علام(أهم علامات الترقيمة الشرط علامة
Week 7	الكتاب الرسمي
Week 8	أهمية الكتاب الرسمي
Week 9	طريقة كتابة كتاب الرسمي
Week 10	علامات الاعراب
Week 11	علامات الاعراب
Week 12	علامات الاعراب
Week 13	كتابة التاء في العربية

Week 14	التاء المربوطة كتابة التاء في العربية
Week 15	التاء المفتوحة كتابة التاء في العربية
Week 16	

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcom
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 4
	Assignments	2	10% (10)	2, 12	LO # 3, and 5
	Projects / Lab.	-	-	-	-
	Report	2	20% (20)	6, 13	LO # 1, and 6
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-4
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	محمود فهمى حجازي، علم اللغة العربية، دار غريب للطباعة والنشر والتوزيع، مصر	No

Recommended Texts	جرجي زيدان، اللغة العربية كائن حي، مؤسسة هنداوي، مصر، 2010.	No (Online-pdf)
Websites	https://www.diwanalarab.com/%D8%A7%D9%84%D8%A3%D9%84%D9%81%D8%A7%D8%B8-%D8%A7%D9%84%D8%B9%D9%84%D9%85%D9%8A%D8%A9-%D9%81%D9%8A	

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.