Ministry of Higher Education and Scientific Research
Scientific Supervision and Scientific Evaluation
Quality Assurance and Performance Evaluation Division

Academic Programand Course Description Chemical Engineering Department

2024

Introduction:

The educational program is a well-planned set of courses that include procedures and experiences arranged in the form of an academic syllabus. Its main goal is to improve and build graduates' skills so they are ready for the job market. The program is reviewed and evaluated every year through internal or external audit procedures and programs like the External Examiner Program. The academic program description is a short summary of the main features of the program and its courses. It shows what skills students are working to develop based on the program's goals. This description is very important because it is the main part of getting the program accredited, and it is written by the teaching staff together under the supervision of scientific committees in the scientific departments. This guide, in its second version, includes a description of the academic program after updating the subjects and paragraphs of the previous guide in light of the updates and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (annual, quarterly), as well as the adoption of the academic program description circulated according to the letter of the Department of Studies T 3/2906 on 3/5/2023 regarding the programs that adopt the Bologna Process as the basis for their work. In this regard, we can only emphasize the importance of writing an academic programs and course description to ensure the proper functioning of the educational process.

Concepts and terminology:

Academic Program Description: The academic program description provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.

Course Description: Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the students to achieve, proving whether they have made the most of the available learning opportunities. It is derived from the program description.

Program Vision: An ambitious picture for the future of the academic program to be sophisticated, inspiring, stimulating, realistic and applicable.

Program Mission: Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions. **Program Objectives:** They are statements that describe what the academic program intends to achieve within a specific period of time and are measurable and observable.

Curriculum Structure: All courses / subjects included in the academic program according to the approved learning system (quarterly, annual, Bologna Process) whether it is a requirement (ministry, university, college and scientific department) with the number of credit hours. Learning Outcomes: A compatible set of knowledge, skills and values acquired by students after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.

Teaching and learning strategies: They are the strategies used by the faculty members to develop students' teaching and learning, and they are plans that are

followed to reach the learning goals. They describe all classroom and extracurricular activities to achieve the learning outcomes of the program.

Academic Program Description Form

University Name: University of Diyala

Faculty/Institute: College of Engineering

Scientific Department: Chemical Engineering Department

Academic or Professional Program Name: Bachelor

Final Certificate Name: Bachelor of Science in Chemical Engineering

Academic System: Course

Description Preparation: 2024

Completion Date: 20/7/2024

Signature:

Head of Department Name:

Lec. Dr. Muwafaq Mahdi Abd

Date: 24/7/2024

Signature:

Scientific Associate Name:

Jabar Qasim Jabar

Date:

The file is checked by: Assist Prof Salah N. Farhan

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Date: 2024

Signature:

Approval of the Dean

Prof. Dr. Anees Abdullah Khadom

1. Program Vision

The vision of the Chemical Engineering Department is to be recognized as one of the distinguished departments in its education, research and outreach programs.

• Hopping to be a world-renowned department, advancing the contributions of chemical engineering through innovation, research, education, and social responsibility.

• Making every effort to provide the student with the foundations of modern knowledge and scientific research methods in the fields of chemical engineering.

• Working to develop the students' personality to make them capable of innovation, leadership, self-learning, and teamwork.

• Developing curricula periodically and according to local and international standards.

• Opening horizons of cooperation between the Department of Chemical Engineering and the departments of faculties of the University of Diyala and the corresponding departments in Iraqi universities.

2. Program Mission

• Preparing engineers with competence and scientific knowledge in the of chemical engineering and its technological developments.

• Enabling the graduate student to possess the skills in designing production units, oil, petrochemical, food and pharmaceutical industries.

• Preparing engineers capable for operate and manage factories related to chemical engineering specializations by focusing on the theoretical aspects and linking them to the practical aspect.

• Preparing the graduates to continue postgraduate studies in various fields of chemical engineering.

• Study the market needs for new and necessary branches of chemical engineering and implement it.

•Make contact with the community's needs for chemical engineering specializations by preparing highly qualified graduates.

• Working to develop teaching and learning methods and adopting modern methods in addition to traditional one.

• Contributing to providing academic and scientific consultations and developing services in Diyala Governorate in particular and Iraq in general.

3. Program Objectives

- Graduating effective scientific cadres who are distinguished scientifically and practically and are characterized by sound professional ethics and honesty.
- Promoting scientific research and encouraging creativity and innovators in the fields and applications of chemical technology.
- Providing an environment for stimulating the scientific thoughts.
- acquiring the local and international academic accreditation.

4. Program Accreditation

The department submitted an application to obtain program accreditation from the Iraqi Council for Engineering Accreditation

5. Other external influences

All relevant ministries in dealing with this program, such as the Ministry of Oil, Industry, Environment, and others

6. Program Structure

Program Structure	Number of Courses	Credit Hours	Percentage	Reviews
Institution Requirements	**4**	**9**	**21%**	
College Requirements	**2**	**8**	**18.6%**	
Department Requirements	**7**	**26**	**60.4%**	
Summer Training	**1 month**	**Without credit**	**-**	**Compulsory training**
Others				

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

7. Program Description				
Year	Course code	Course Name	Credit Hours	
			Theoretical	**Practical**
First Year	E 101	Mathematics I	4	0
First Year	CHE 101	Organic Chemistry	2	2
First Year	CHE 102	Principles of Chemical Engineering	4	0
First Year	CHE 103	Engineering Mechanics	3	0
First Year	U 101	Democracy and Human Rights	2	0
First Year	U 103	Computer skills	1	2
First Year	E 102	Mathematics II	4	0
First Year	CHE 104	Analytical Chemistry	2	2
First Year	CHE 105	Material Balance	4	0
First Year	CHE 106	Engineering Drawing	1	3
First Year	U 104	English Language	2	0
First Year	CHE 107	Workshop Engineering	0	3
First Year	UD02	Arabic Language	2	0

8. Extended learning outcomes of the program

A- Knowledge

1- Knowledge and understanding	➢ Knowing the facts, concepts, principles and theories of chemical engineering, and understanding the determinants and constraints facing the engineer's work for the purpose of making the right decision. ➢ Understanding basic mathematical derivations and linking various phenomena with equations and laws to determine the variables that govern the industrial unit. ➢ The ability to know the optimal conditions for industrial work and manage it correctly.
2- Awareness and understanding	➢ Awareness of industrial problems that may be specific to known or unknown circumstances. ➢ Analyze and discuss available data or conduct specific experiments to obtain more data.
3- Ability to apply	➢ Design units and processes and make the necessary improvements. ➢ The ability to apply new technologies within the general jurisdiction. ➢ Having a comprehensive view of industrial engineering problems, taking into account cost, safety and quality

Skills	
1- The ability to use a variety of sources of understanding 2- Conduct successful laboratory experiments or design a safe experiment and extract important data 3- Work ethically and have the ability to identify and identify risks	➢ Using multiple techniques and devices related to the specialty. ➢ Using laboratory equipment to find data. ➢ Develop and provide a safe work environment by selecting the most appropriate devices and equipment.
Ethics	
1- Professional work, taking into account costs and occupational safety 2- Working in the spirit of one team and ensuring human victory 3- Anticipating problems and finding appropriate solutions to them	➢ Ethics and professionalism of the profession. ➢ The impact of industrial activities on society, both negatively and positively. ➢ Compatibility with environmental issues and environmental preservation

9. Teaching and Learning Strategies

1. Theoretical lectures with the use of illustrations.
2. Practical laboratory application of concepts taught theoretically
3. Assigning students to perform seminars by assigning them a topic to be discussed with their colleagues
4. Solve problems, discuss them, and assign students some homework and reports through the e-learning platform.

10. Evaluation methods

- Sudden exams (5) marks
- Monthly exams (25) marks
- Reports assigned to them (5) degrees
- Homework assignments (5) marks
- A final examination of the curriculum (60 marks).

11. Facility

Facility Members

Academic Rank	Specialization		Special Requirements / Skills		Number of Teaching	
	General	Special			Staf	lecture
Prof. Dr. Anees A. Khadom	Chemical Engineering	Corrosion			staff	
Prof. Dr. Ahmed Daham Wiheeb	Chemical Engineering	Mass transfer			staff	
Ass. Prof. Dr. Salah N. Farhan	Chemical Engineering	Biochemical Engineering			staff	
Ass. Prof. Dr. Adiba Alnuaimi	Chemical Engineering	Electrochemistry			staff	
Lec. Dr. Ali Z. Alhassan	Chemical Engineering	Unit operation			staff	
Lec. Dr. Muwafaq Mahdi Abd	Chemical Engineering	Fluid Flow			staff	
Lec. Dr. Muhammed Faiq	Chemical Engineering	Mass transfer			staff	
Lec. Dr. Mohammed H. Msaed	Chemical Engineering	Reactor Design			staff	
Assistant Lecturer Nabaa B. Ali	Science of Chemistry	Physical Chemistry			staff	
Ass. Prof. Mohammad A. Hameed	college of Literature	Hebrew language			staff	
Lec. Dr. Ahmed Abbas	Chemical Engineering	Corrosion			staff	
Assistant Lecturer Ali I. Abdalla	Electrical Engineering	Power Converters			staff	
Ass. Prof. Sura Fahmy Yousif	Communication engineering	Image processing			staff	
Assistant Lecturer Whalaa A. Alkhaisi	Petroleum Engineering	Drilling wells			staff	
Ass. Prof. Yaser I. Jasem	Civil Engineering	Environmental Engineering			staff	
Ass. Prof. Mustafa S Mahdi	Mechanical Engineering	Thermal engineering			staff	
Lec. Khalid Al Dolaimy	Mechanical Engineering	Mechanical Design			staff	
Lec. Mohammed k. Mohammed	Nuclear engineering	Environmental Engineering			staff	
Lec. Mohanad A. Sultan	Science of Chemistry	Organic Chemistry			staff	
Ilaf W. Ibrahim	General Law	Human Rights			staff	
Lec. Mutaz H. Ismael	Chemical engineering	Oil Refinery				

Professional Development
Orienting new faculty members
New teaching staff are developed by putting them in central development courses organized by the university, as well as by interacting with senior staff during periodic meetings in the department for the purpose of introducing them to the work contexts and informing them of directives and instructions, along with giving advice, daily guidance and continuous follow-up.
Professional Development of faculty members
Professional development for faculty members takes place through the Divisions of Continuing Education and Academic Affairs in the Deanship of the College and its corresponding departments in the University, which constantly work to hold discussion circles and specialized scientific seminars, while reviewing what is published on the Internet sites of books and periodicals in various scientific specializations.

12- Acceptance criterion

Admission is centralized by the Ministry of Higher Education and Scientific Research according to the grade point average of the students obtained in the sixth scientific stage.

13- The most important sources of information about the program

- Diyala University website / College of Engineering / Department of Chemical Engineering

Website of the Ministry of Higher Education and Scientific Research

11- Program development plan

- Development is carried out by focusing on the advanced scientific staff in the department and through the committees formed annually, especially the Scientific Committee and the Quality Assurance and Academic Accreditation Committee.
- By preparing evaluation studies to prepare and develop senior leadership cadres in all aspects of the educational institution.
- Equipping scientific laboratories with modern equipment and qualifying their cadres in order to improve the most efficient performance.
- Develop future plans and work to implement them
- Creating a kind of competition among researchers, honoring the distinguished ones and motivating them to give more.
- Working to create a kind of financial income for the department to sustain and develop the work
- Supporting the department's first-in-class admission program annually and enrolling them in postgraduate studies.
- Conducting a twinning process with advanced universities and providing training opportunities for teaching staff in those universities

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	Ministry of Higher Education and Scientific Research - Iraq University of Diyala College of Engineering Department of Chemical Engineering	

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Computer Skills			**Module Delivery**	
Module Type	Basic			**Theory** **Lecture** **Lab**	
Module Code	U 103				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Chemical Engineering		**College**	College of Engineering	
Module Leader	Sura F. Yousif		**e-mail**	sura.fahmy@uodiyala.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	MSc	
Module Tutor	-		**e-mail**	-	
Peer Reviewer Name	-		**e-mail**	-	
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	
Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية			

Module Objectives أهداف المادة الدراسية	1. Training students on the basics of using the computer and providing them with the necessary skills to deal with the computer with high efficiency. 2. Assisting the student in distinguishing and developing his scientific and artistic abilities. 3. Enriching the student's skills to be able to deal with the computer with high efficiency. 4. Providing students with a way to use other modern technologies related to the educational process.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Enabling the student to know the concepts of information technology by learning the basics of the computer. 2. Enabling the student to know about the use of GUI operating systems. 3. Enabling the student to deal with the skills of using the operating system (Windows operating system) through exploring, customizing, and controlling its settings. 4. Enabling the student to work on the word processing program (Microsoft Word). 5. Enabling the student to work on the spreadsheet program (Microsoft Excel). 6. Enabling the student to work on the presentation program (Microsoft PowerPoint).
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following.** • Course introduction (4 hrs) • Working with GUI operating systems with a focus on Microsoft Windows OS (8 hrs) • Microsoft Office Word (MS Word) (16 hrs) • Microsoft Office Excel (MS Excel) (16 hrs) • Microsoft Office PowerPoint (MS PowerPoint) (16 hrs)
Description	Overview of computers: basic components, applications. GUI operating systems: Microsoft Windows operating system. Microsoft Office Word: getting started with Word, editing a document and formatting text and paragraphs, adding tables and inserting graphic objects, controlling page appearance and proofing a document. Microsoft Office Excel: getting started with Excel, sorting, selecting and subtotaling data, formulas and functions, worksheet formatting and presentation. Microsoft Office PowerPoint: getting started with PowerPoint, developing a PowerPoint presentation, adding graphical elements to your presentation and modifying objects in your presentation, adding graphical elements, tables and charts to your presentation and modifying objects in your presentation, prepare to deliver your presentation.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**In this course, students are guided by:** • Using different examples. • Using different styles of discussion that aim to connect the theoretical and practical sides. • Asking questions and giving exercises that require analysis and conclusions related to lectures. • Encourage students to participate in discussions and do the practical work. • Encourage students to work in groups.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل **In class lectures** 13 **In class tests** 4 **Lab** 43 **Final Exam** 4	**64**	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	**4**
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل **Library, dorm, home memorizing** 14 **Preparation for tests** 14 **Homework** 8	**36**	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	**2.4**
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	**2**	**10% (10)**	**6 and 12**	**LO #1 to #3 and #4 to #6**
	Assignments	**2**	**10% (10)**	**2 and 13**	**LO #3 to #6**

	Projects / Lab.	**1**	**10% (10)**	**Continuous**	**All**
	Report	**1**	**10% (10)**	**13**	**LO #3, #4 and #6**
Summative assessment	**Midterm Exam**	**2hr**	**10% (10)**	**9**	**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	Overview of computers and their basic components and applications
Week 2	Operating computer using GUI operating systems
Week 3	The basic use of Microsoft Windows operating system
Week 4	**Microsoft Office Word:** Getting Started with Word
Week 5	**Microsoft Office Word:** Editing a Document and Formatting Text and Paragraphs
Week 6	**Microsoft Office Word:** Adding Tables and Inserting Graphic Objects
Week 7	**Microsoft Office Word:** Controlling Page Appearance and Proofing a Document
Week 8	**Microsoft Office Excel:** Getting Started with Excel
Week 9	**Microsoft Office Excel:** Sorting, Selecting and Subtotaling data
Week 10	**Microsoft Office Excel:** Formulas and Functions
Week 11	**Microsoft Office Excel:** Worksheet Formatting and Presentation
Week 12	**Microsoft Office PowerPoint:** Getting Started with PowerPoint
Week 13	**Microsoft Office PowerPoint:** Developing a PowerPoint Presentation, Adding Graphical Elements to Your Presentation and Modifying Objects in Your Presentation
Week 14	**Microsoft Office PowerPoint:** Adding Graphical Elements, tables and charts to Your Presentation and Modifying Objects in Your Presentation
Week 15	**Microsoft Office PowerPoint:** Prepare to deliver your presentation
Week 16	**Final exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to the lab and get started with use of computer
Week 2	Basic use of Windows operating system
Week 3	General view of Windows OS tools with a focus on Microsoft Office tools
Week 4	**Microsoft Office Word:** Getting Started with Word
Week 5	**Microsoft Office Word:** Editing a Document and Formatting Text and Paragraphs
Week 6	**Microsoft Office Word:** Adding Tables and Inserting Graphic Objects
Week 7	**Microsoft Office Word:** Controlling Page Appearance and Proofing a Document
Week 8	**Microsoft Office Excel:** Getting Started with Excel
Week 9	**Microsoft Office Excel:** Sorting, Selecting and Subtotaling data
Week 10	**Microsoft Office Excel:** Formulas and Functions
Week 11	**Microsoft Office Excel:** Worksheet Formatting and Presentation
Week 12	**Microsoft Office PowerPoint:** Getting Started with PowerPoint
Week 13	**Microsoft Office PowerPoint:** Developing a PowerPoint Presentation, Adding Graphical Elements to Your Presentation and Modifying Objects in Your Presentation
Week 14	**Microsoft Office PowerPoint:** Adding Graphical Elements, tables and charts to Your Presentation and Modifying Objects in Your Presentation
Week 15	**Microsoft Office PowerPoint:** Prepare to deliver your presentation

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	• Joan Lambert and Steve Lambert, Windows 10 step by step, 1st Edition 2015. • Joan Lambert and Curtis Frye, Microsoft Office 2016 step by step, 1st Edition 2015.	Yes

	Ministry of Higher Education and Scientific Research - Iraq University of Diyala College of Engineering Department of Chemical Engineering	

Recommended Texts	• Michael Miller, ABSOLUTE BEGINNER'S GUIDE TO COMPUTER BASICS, 5th EDITION, QUE Indianapolis, Indiana 46240, 2010. • Paul McFedries, TEACH YOURSELF VISUALLY MICROSOFT WINDOWS 10, ANNIVERSARY	No
Websites	Microsoft Help, https://support.microsoft.com/en-us/products Learn Microsoft Office, https://www.goskills.com/Microsoft-Office	

Grading Scheme
مخطط الدرجات

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

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

	Ministry of Higher Education and Scientific Research - Iraq University of Diyala College of Engineering Department of Chemical Engineering	

MODULE DESCRIPTOR
وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	ENGINEERING MECHANICS		**Module Delivery**	
Module Type	BASIC		**Theory** **Lecture** **Tutorial**	
Module Code	CHE 103			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	1	**Semester (s) offered**	1	
Administering Department	Chemical Engineering	**College**	Engineering	
Module Leader		**e-mail**		
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.	
Module Tutor	None	**e-mail**		
Peer Reviewer Name	None	**e-mail**		
Review Committee Approval		**Version Number**	1.0	

Relation With Other Modules
العلاقة مع المواد الدراسية الأخرى

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

Module Aims, Learning Outcomes, Indicative Contents and Brief Description

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية مع وصف مختصر

Module Aims أهداف المادة الدراسية	
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On successful completion of this course students will be able to: 1 Define Newton's laws of motion. 2 Recall trigonometric laws and apply to the addition and decomposition of vectors quantities. 3 Identify the moment of a force and calculate its value about a specified axis. Define the moment of a couple. 4 Describe the concept of dry friction and analyse the equilibrium of rigid bodies subjected to this force. 5 Construct "Free Body Diagrams" of real world problems and apply Newton's Laws of motion and vector operations to evaluate equilibrium of particles and bodies. 6 Apply the principles of equilibrium of particles and bodies to analyse the forces in planar truss members. 7 Discuss the concepts of ``centre of gravity" and ``centroids" and compute their location for bodies of arbitrary shape. 8 Apply the concepts used for determining centre of gravity and centroids to find the resultant of a generally distributed loading. 9 Use methods learnt for equilibrium of bodies and the resultant of a generally distributed loading to compute the internal forces in beams. Generalise the procedure to construct bending moments and shear force diagrams (internal forces) and utilise this information in engineering design.
Indicative Contents المحتويات الإرشادية	**Attribute 1: Deep discipline knowledge and intellectual breadth** Graduates have comprehensive knowledge and understanding of their subject area, the ability to engage with different traditions of thought, and the ability to apply their knowledge in practice including in multi-disciplinary or multi-professional contexts. **Attribute 2: Creative and critical thinking, and problem solving** Graduates are effective problems-solvers, able to apply critical, creative and evidence-based thinking to conceive innovative responses to future challenges. **Attribute 4: Professionalism and leadership readiness** Graduates engage in professional behavior and have the potential to be entrepreneurial and take leadership roles in their chosen occupations or careers and communities.

Course Description	This course familiarizes students with the principles of static equilibrium by applying Newton's laws of motion to solve engineering problems. Emphasis is placed on drawing free body diagrams and self-checking strategies. Topics include introduction to forces; 2D equilibrium of particles and rigid bodies; center of gravity and centroids; friction; force vectors analysis, equilibrium of particles, force systems resultant, moments and couples, equilibrium of rigid bodies; friction, center of gravity and centroids, moment of inertia.
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل **In class lectures** **In class tests** **Final Exam**	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل **Library, dorm, home memorizing** **Preparation for tests** **Homework**	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 (hr)	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	3 and 10	LO #1, 2, 8, and 9
	Assignments	4	20% (20)	5 and 13	LO # 1, 2, 3, 4, 6,8,10, 11 and 12
	Home work	1	10% (10)	13	LO # 7-12
Summative assessment	**Midterm Exam**	2	10% (10)	7	LO # 1-6
	Final Exam	3	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	Midterm Exam
Week 8	
Week 9	
Week 10	
Week 11	
Week 12	
Week 13	
Week 14	
Week 15	
Week 16	Final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts		
Recommended Texts		
Websites	https://www.adelaide.edu.au/course-outlines/109875/1/sem-1/	

APPENDIX:

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

Note:

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	Ministry of Higher Education and Scientific Research - Iraq University of Diyala College of Engineering Department of Chemical Engineering	

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	حقوق الانسان والديمقراطية		**Module Delivery**		
Module Type	Suport		**Theory** **Lecture** **Seminar**		
Module Code	U 101				
ECTS Credits	2				
SWL (hr/sem)	30				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Chemical Engineering		**College**	Engineering	
Module Leader	Mohamed Ali Hameed		**e-mail**	amohamed_902@uodiyala.edu.iq	
Module Leader's Acad. Title	Assist. Proff.		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	1.0	

	Ministry of Higher Education and Scientific Research - Iraq University of Diyala College of Engineering Department of Chemical Engineering	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1- يتعلم الطالب خلال السنه الدراسية اساسيات حقوق الانسان والديمقراطية ما حقوقه كيف يدافع عنها بالطرق القانونية وما هي ضماناتها الداخلية والدولية. 2-استحصال المعرفة في مجال الديمقراطية وأنواع أنظمتها واثرها على حقوق الانسان . 3-تنمية شخصية الطالب وتعزيز وعيهم في الأنظمة السياسية الديمقراطية وتفاصيلها وكيفية تطبيقها على ارض الواقع واهمية ان يكون فعال في المجتمع من خلال احترامه لحقوق الاخرين ومعرفه ان الحقوق والحريات تنتهي عند بداية حقوقهم وحرياتهم ويؤدي واجباته بدلا من اكتساب الحقوق فقط. 4- تعزيز ثقافة السلام القائمة على العدل والمساواة.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1 -تمكين الطالب من معرفة اساسيات الدفاع عن حقوقه وحقوق الاخرين بعد معرفتها ومعرفة أهميتها له وللمجتمع بصورة عامة وأيضا معرفه كل شخص حدود حقوقه وحريته . ٢- تمكين الطالب في المشاركة السياسية وذلك من خلال معرفته بأهمية مشاركته في الانتخابات وتأثير هذه المشاركة على سير الانتخابات وتشكيل السلطة فيما بعد. ٣- معرفه الطالب ضمانات حقوقه وحرياته وما هي مصادرها. ٤ - معرفة الفرق بين الحقوق والحريات. ٥- تمكين الطالب من معرفة ما هي المفهوم العلمي للديمقراطية وما هي جذورها وانواعها واشكالها. ٦- يتعلم الطالب كيف يؤثر النظام الديمقراطي على حقوق الانسان وما هي العلاقة بينها. ٧ - ادراك الطالب ضرورة ان يكون مواطن فعال في المجتمع ايضا معرفه شروط الناخب وشروط المرشح للانتخابات. ٨- معرفه أنظمة الانتخابات وايهما افضل. ٩ - فهم الطالب للقانون الدولي لحقوق الانسان وايضا معرفة مختصرة عن المنظمات الدولية والية عملها كالأمم

	المتحدة ومنظمة الصليب الأحمر وغيرها .
Indicative Contents المحتويات الإرشادية	1 الجزء الأول –تعريف حقوق الانسان وحقوق الانسان في الحضارات القديمة . (تعريف الحق وتعريف الانسان ومعرفة أهمية حقوق الانسان بالنسبة للإنسان والمجتمع أيضا دراسة حقوق الانسان في الحضارات كالحضارة المصرية والعراقية واليونانية والرومانية) (٤ساعات) الجزء الثاني معرف حقوق الانسان في الأديان السماوية واهمها الإسلام (٢ساعة) مصادر حقوق الانسان تتضمن (مصادر دولية كالإعلان العالمي لحقوق الانسان والعهدان الدوليان والمصادر الإقليمية التي تشمل الاتفاقيات الإقليمية كالاتفاقية الاوربية والأمريكية والدستور) (٢ساعة) ضمانات حقوق الانسان (كالضمانات الدستورية والقانونية) (٢ساعة) الاتفاقيات الدولية والإقليمية لحقوق الانسان (٢ساعة) الحريات العامة وانواعها والمقارنة فيما بينها (٢ساعة) مستقبل حقوق الانسان والعولمة وحقوق الانسان (٢ساعة) تعريف وتاريخ وأنواع الديمقراطية (دراسة تعريف ونشأة وتطور الديمقراطية مبادئها وانواعها كالديمقراطية المباشرة وغير المباشرة والنظام الرئاسي والبرلماني) (٦ساعات) تعريف الانتخاب وشروطه وأنواع النظم الانتخابية وتعريف المجلس النيابي (٦ساعات) العلاقة بين الديمقراطية وحقوق الانسان (٢ساعة)
Course description وصف المادة	إن حقوق الإنسان والديمقراطية توصف بأنها موضوع مهم وحيوي اذ تسهم في تمكين الطالب من معرفة حقوقه وحرياته وأهمية التمسك بها والدفاع عنها . حيث يهدف إلى تعريف الطالب ما هي حقوق الإنسان ، وما تأثيرها وأهميتها على الإنسان والمجتمع بشكل عام ، وما هي العلاقة بينها وبين الديمقراطية . و دراسة الديمقراطية كدراسة علمية .
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1-زيادة وعي الطالب بأهمية معرفه حقوقه وواجباته اتجاه المجتمع وعلاقة حقوق الانسان بالنظام الديمقراطي 2-ثقافة عامة في مجموعة من المجالات ومنها المجال القانوني و السياسي والاجتماعي ورفع ثقة الطالب بنفسه من خلال ربط المادة النظرية بالواقع العملي

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	30	**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	1.1
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	15% (15)	5 and 10	LO #1, #2 #,3,and #6 #7#8
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.				
	Report	1	15% (15)	13	LO #5, #8 and #9
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	محاضرة تعريفية عن المادة واهميتها ..
Week 2	تعريف الحق والانسان وحقوق الانسان واهمية حقوق الانسان ,حقوق الانسان في الدين الإسلامي والحضارات القديمة .
Week 3	مصادر حقوق الانسان الدولية والإقليمية والمحلية .
Week 4	ضمانات حقوق الانسان الدستورية والقانونية وضمانات حقوق الانسان على الصعيد الدولي.
Week5	ضمانات حقوق الانسان في الإسلام
Week 6	دور المنضمات الإقليمية في حماية حقوق الانسان.
Week 7	خصائص حقوق الانسان وتعريف الحريات العامة وانواعه والمقارنة بينها وبين الحقوق القانون الدولي لحقوق الانسان والقانون الدولي الإنساني ومنظمة الصليب الأحمر.
Week 8	مستقبل حقوق الانسان وسبل تطويرها .
Week 9	العولمة وحقوق الانسان .
Week 10	تعريف الديمقراطية وتطورها التاريخي ومبادئها . الديمقراطية بين العالمية والخصوصية . اشكال الديمقراطية / الديمقراطية المباشرة.
Week 11	الديمقراطية شبه المباشرة والديمقراطية التمثيلية / اركان النظام التمثيلي / اشكال النظام التمثيلي.
Week 12	المجلس النيابي وانواعه / الانتخاب وشروطه / هيئة الناخبين.
Week 13	تنظيم عملية الانتخاب / تحديد الدوائر الانتخابية / القوائم الانتخابية / المرشحون/ الحملة الانتخابية / التصويت .
Week 14	نظم الانتخابات.
Week 15	علاقة الديمقراطية بحقوق الانسان وكيفية التأثير والتأثر فيما بينها .
Week 16	الامتحان النهائي

Learning and Teaching Resources

مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	حقوق الانسان و الطفل و الديمقراطية /تأليف ماهر صالح علاوي وريا ض عزيز هادي و علي عبد الرزاق محمد و اخرون / العاتك / بيروت / ٢٠٠٩	نعم
Recommended Texts	عباس الدليمي / حقوق الانسان الفكر و الممارسة فخري رشيد ،صلاح ياسين /المنظمات الدولية / العاتك لصناعة الكتاب / بغداد عصام العطية / القانون الدولي العام / المكتبة القانونية /بغداد /2012	لا
Websites		

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

(0 – 49)	**F –** Fail	راسب	(0-44)	Considerable amount of work required

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

	Ministry of Higher Education and Scientific Research - Iraq University of Diyala College of Engineering Department of Chemical Engineering	

MODULE DESCRIPTOR
وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	MATHEMATICS I			**Module Delivery**	
Module Type	BASIC			**Theory** **Lecture** **Tutorial**	
Module Code	E 101				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	1		**Semester (s) offered**	1	
Administering Department	Chemical Engineering		**College**	Engineering	
Module Leader	Ali I. Abdalla		**e-mail**	alialnuaimmy@uodiyala.edu.iq	
Module Leader's Acad. Title	Assistant lecturer		**Module Leader's Qualification**	MSc	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Review Committee Approval			**Version Number**	1.0	

Relation With Other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	-
Co-requisites module	None	**Semester**	-
Module Aims, Learning Outcomes, Indicative Contents and Brief Description أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية مع وصف مختصر			
Module Aims أهداف المادة الدراسية	This module aims to provide students with an understanding of, and competence in the use of, mathematical techniques that are relevant to the solution of engineering problems. It will also give students a firm foundation from which to develop solutions to a wider and deeper range of engineering problems that they will encounter throughout their undergraduate engineering program of study.		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Preliminaries : Explain mathematical coordinate systems, representing line, slope of line, shifting of lines 2. Vectors: Demonstrate an understanding of vectors in plane and space. 3. Function: Demonstrate an understanding of function and related variables, range and domain of function, types of functions and their graphs. 4. Limits and Continuity: Demonstrate an understanding of the fundamental concepts of calculus including limits, continuity, and differentiability. 5. Derivatives: Apply the techniques of differentiation at different types of functions including transcendental functions 6. Applications of derivatives: Apply the techniques of differentiation to solve problems involving rates of change, linearization, curve sketching, mean value theorem and Initial value problem. 7. Complex numbers: Demonstrate an understanding of complex numbers with basic operations and their mathematical and graphical representations including Euler's Formula		
Indicative Contents المحتويات الإرشادية	The topics listed under the indicative content below are the underpinning areas of knowledge and understanding that will be obtained from successful completion of the module. The mathematical topics are illustrated in the context of relevant engineering scenarios. • **Preliminaries** Cartesian coordinates, polar coordinates, slope of lines, angle of inclination. • **Functions**, types of functions, graph of the functions, domain and range of function • **Review of trigonometric function:** graph of trigonometric function, range and domain of trigonometric functions, identities. • **Limits and Continuity:** Properties, limits involving infinity,		

	continuity. • **Transcendental functions**: Inverse function, graph of inverse function, Logarithmic and exponential functions, inverse trigonometric functions, hyperbolic functions, inverse hyperbolic functions. • **Derivatives:** Definition, rules of derivative, Implicit differentiation, L hospital's rule, derivative of inverse functions • **Applications of derivatives:** rate of change problems, Relative maximum and relative minimum, Curve sketching with 1^{st} and 2^{nd} derivative, Linearization, Mean value theorem, Initial value problem,. • **Complex numbers:** Basic definitions. The geometric representations of the complex numbers**,** argand diagram, Basic operations with complex numbers, Euler's Formula • **Vectors**: Introduction to vectors
Course Description	This course lays the foundation for a robust understanding of mathematical concepts that underpin the various disciplines within engineering. It covers a breadth of topics ranging from coordinate systems, slopes of lines, and angles of inclination to the introduction of two- and three-dimensional coordinate systems. A focus is also given to the understanding and manipulation of functions, including domain and range determination and function composition. The course incorporates a substantial overview of trigonometry, limits, continuity, derivatives, including their applications in real-world engineering contexts in addition to complex numbers and their mathematical representation. By the end of the course, students will have a sound understanding of these principles, preparing them for more advanced engineering courses in their respective fields.
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Begin In Mathematics I, then employ a range of teaching strategies to ensure first-year engineering students fully grasp the various mathematical concepts. Instructional methods include interactive lectures, where core mathematical principles are explained in detail, and practical problem-solving sessions to provide hands-on learning experiences. Collaborative group work encourages peer-to-peer learning and reinforces understanding through shared insights. Regular formative assessments will be conducted to monitor students' understanding of the material, and feedback will be promptly given to guide their learning process. Instructors will maintain office hours for personalized support, and online resources will be available to supplement classroom instruction. Emphasis will be placed on relating mathematical concepts to real-world engineering applications to make the learning experience more relevant and engaging. These strategies aim to develop students' critical thinking skills, enhance their problem-solving abilities, and prepare them for advanced engineering studies.

Student Workload (SWL) الحمل الدراسي للطالب				
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل **In class lectures** 55 **In class tests** 5 **Tutorial** **15** **Final Exam** **3**		78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل **Assignment** **20** **Preparation for tests** **20** **Homework** **32**		72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل		150		

Module Evaluation تقييم المادة الدراسية					
		Time(hr)/ Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	3	20% (20)	3,5, 10, 12, 14	LO #1, 2, 3, 4 ,5 and 7
	Assignments	6	10% (10)	4, 8, 12	LO # 1, 2, 3, 4, 5 and 6
	Home Work	6	10% (10)	2,5,7,9,11,13	LO # 1, 2, 3, 4, 5,6 and 7
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	Cartesian coordinates, slope of lines, angle of inclination, functions, types of functions, graph of the functions, domain and range ,identifying functions, Circles and parabolas
Week 2	Introduction to vectors
Week 3	•Preliminaries Sum, differences, products and quotients of Composite functions, shifting a graph of a function, scaling and reflecting a graph of a function, Absolute value

Week 4	•Review of trigonometric function graph of trigonometric function, range and domain, identities
Week 5	•Limits and Continuity Properties, limits involving infinity, continuity
Week 6	•Transcendental functions Inverse function, graph of inverse function, Logarithmic and exponential functions, trigonometric functions , inverse trigonometric functions, hyperbolic functions, inverse hyperbolic functions
Week 7	•Derivatives Definition, rules of derivative, slopes , tangent lines, chain rule, derivative of trigonometric functions, Implicit differentiation, L hospital's rule
Week 8	derivative of inverse trigonometric functions, derivative of exponential and logarithmic functions
Week 9	•Applications of derivatives Speed and acceleration, Relative maximum and relative minimum
Week 10	Curve sketching with 1st and 2nd derivative
Week 11	Linearization
Week 12	rate of change problems
Week 13	Mean value theorem -Initial value problem
Week 14	Complex numbers**:** Basic definitions. The geometric representations of the complex numbers**,** argand diagram
Week 15	Basic operations with complex numbers, Euler's Formula
Week 16	**Final Exam**

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	George B. Thomas and Ross L. Finney, "Calculus and Analytic Geometry, Addison- Wesley	Yes
Recommended Texts	Thomas Calculus, by George B.Thomas,Jr,Elevnth Edition Media Upgrade 2008 Calculus Early Transcendental (Sixth Edition) James Stewart	Yes
Websites		

APPENDIX:

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

Note:

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

	Ministry of Higher Education and Scientific Research - Iraq University of Diyala College of Engineering Department of Chemical Engineering	

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Organic Chemistry**			**Module Delivery**	
Module Type	**Core**			**Theory** **Lecture** **Lab** **Tutorial** **Seminar**	
Module Code	**CHE 101**				
ECTS Credits	**6**				
SWL (hr/sem)	**79**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Chemical engineering		**College**	College of Engineering	
Module Leader	Mohanad Ali Sultan		**e-mail**	maalazzawi@uodiyala.edu.iq	
Module Leader's Acad. Title	Lecture		**Module Leader's Qualification**	MSc	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To develop problem solving skills and understanding of basic principles of organic chemistry. 2. To understand sstructure, properties and synthesis , apply fundamental reactions of organic compounds. 3. This course deals with the basic concept of organic chemistry. 4. Recognize Structure Relationships Between Chemicals. 5. To understand Stability-Reactivity Principles. 6. Recognize and Apply Functional Groups.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Discuss polarization of a bond with electronegativity. understand nuclephile and electrophile groups and their properties. 2. Describe different bond types of carbon and its hybriorbitals .Express the differences between valence bond and molecular orbital approaches 3. Evaluate effects of atomic properties on acidity and basicity. enlighten relationship between acidity constant pKa and an acid-base reaction. Relate structure of molecule with strength of acidity and basicity write side chain reactions of aromatic compounds. 4. Explain the reactions and properties of halogen compounds. 5. Identify alkane, alkene and alkyn. 6. prepare alkane, alkene and alkynes using different methods. 7. Interpret the reactions and properties of alchols and phenols. Recognize the main differences between the acidities of alcohols and phenols. Explain the reactions and properties of ethers and epoxides. 8. Recognize the main differences between open chain ethers and epoxides. 9. Recognize the concept of aromaticity and the main properties of aromatic compounds. Explain aromaticity concept.

	10. Explain reactions of ketones. Explain preparation methods of aldehydes Describe preparation methods of ketones 11. Evaluates the importance of carbonyl function in organic chemistry. 12. Explain Carboxylic Acid Nomenclature. Describe Structure and Bonding Physical Properties . Identify Acidity of Carboxylic Acids
Indicative Contents المحتويات الإرشادية	• Introduction (3 hrs) • Alkanes and Cycloalkanes (3 hrs) • Alkyl halides (3 hrs) • Alkenes and Cycloalkenes (3 hrs) • Addition Reactions of Alkenes (3 hrs) • Alkynes (5 hrs) • Arenes and Aromaticity (5 hrs) • Alcohols (5 hrs) • Aldehydes and Ketones (5 hrs) • Carboxylic Acids (5 hrs) • Carboxylic Acid Derivatives (2 hrs) • Amine (3 hrs)
Course Description وصف المادة الدراسية	Hydrocarbons, aliphatic, ring, olefins, acytelines, aromatics, Orbitals, Thermal cracking process, hydrogenation, reduction, Special reactions: oxidation and combustion, addition, substitution, nitration, Sulphonation, halogenation, polymerization, Halides, Alcohols and phenols, Ethers, Aldehydes and ketones, Carboxylic acids, esters, amino-acids, amides, Amines and some.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Begin to establish a strong conceptual understanding of the principles of organic chemistry. Use real-life examples and measurements to help students relate abstract concepts to everyday experiences. Encourage discussions and questions to clear up any misconceptions. In addition, provide students with real-world problem scenarios that require the application of organic chemistry principles. Encourage active participation and group discussions to enhance critical thinking and problem-solving skills. Guide students through the problem-solving process and provide constructive feedback.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل **In class lectures 28** **In class tests 2** **Tutorial 15** **Lab 30** **Final Exam 4**	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل **Libraray, dorm, home, memorize 49** **Preparation for tests 10** **Homework 12**	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.7
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)	2 , 4 , 8 , 12	LO #1, #4 and #5, #10
	Assignments	4	10% (10)	5, 10, 12, 14	LO #5, #9 , #10, #11
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #7, #9 , #11
Summative assessment	**Midterm Exam**	2hr	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 - Atoms, molecules, bonding, polar and nonpolar molecules, intermolecular forces, solubilities, Lewis structures, acids and bases. Writing Organic Structures, Bond strength , Intro. to electrophiles & nucleophiles
Week 2	Alkanes and Cycloalkanes: Introduction to Hydrocarbons Molecular Formulas, nomenclature, alkyl group, Rings (cycloalkanes, polycyclic compounds)
Week 3	Alkyl halides IUPAC Nomenclature of Alkyl Halides substitution reactions of alkyl halides.Elimination reactions Physical Properties of Alcohols and Alkyl Halides: Intermolecular Forces
Week 4	Alkenes and Cycloalkenes structure and bonding, nomenclature, Physical Properties of Alkenes, Preparation of Alkenes:
Week 5	Addition Reactions of Alkenes Addition of Sulfuric Acid to Alkenes Acid-Catalyzed Hydration of Alkenes Hydroboration–Oxidation of Alkenes Addition of Halogens to Alkenes Epoxidation of Alkenes Ozonolysis of Alkenes Reactions of Alkenes with Alkenes
Week 6	Alkynes Sources of Alkynes Nomenclature Physical Properties of Alkynes Structure and Bonding in Alkynes: sp Hybridization Acidity of Acetylene and Terminal Alkynes Preparation of Alkynes by Alkylation of Acetylene
Week 7	Mid-term Exam
Week 8	Alkynes Reactions of Alkynes Hydrogenation , Hydration of Alkynes Metal–Ammonia Reduction of Alkynes Addition of Hydrogen Halides to Alkynes
Week 9	Arenes and Aromaticity Benzene The Structure of Benzene, The Stability of Benzene

	Substituted Derivatives of Benzene and Their Nomenclature Physical Properties of Arenes
Week 10	Reactions of Arenes: Oxidation of Alkylbenzenes , Reactions of Benzylic Halides Reactions of Benzylic Halides Addition Reactions of Alkenylbenzenes Hückel's Rule
Week 11	Alcohols Sources of Alcohols Preparation of Alcohols by Reduction of Aldehydes and Ketones Preparation of Alcohols by Reduction of Carboxylic Acids Preparation of Alcohols from Epoxides Preparation of Diols Reactions of Alcohols: Esterification , Oxidation of Alcohols
Week 12	Aldehydes and Ketones Nomenclature Structure and Bonding: The Carbonyl Group Physical Properties Sources of Aldehydes and Ketones Reactions of Aldehydes and Ketones Acetal Formation
Week 13	Carboxylic Acids Carboxylic Acid Nomenclature Structure and Bonding Physical Properties Acidity of Carboxylic Acids
Week 14	Substituents and Acid Strength Salts of Carboxylic Acids Sources of Carboxylic Acids Synthesis of Carboxylic Acids Reactions of Carboxylic Acids
Week 15	Amine Amine Nomenclature Structure and Bonding Physical Properties Basicity of Amines mines as Natural Products Preparation of Amines by Alkylation of Ammonia Reactions of Amines:
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Melting point determination
Week 2	Lab 2: Boiling point determination
Week 3	Lab 3: Simple Distillation
Week 4	Lab 4: saturation and combustion tests for organic test
Week 5	Lab5: Distinguish between aliphatic and aromatic hydrocarbons
Week 6	Lab 6: Preparation of aspirin
Week 7	Lab 7: Identification of functional groups
Week 8	Lab8: Saponfication reaction
Week 9	Lab 9: Preparation of ester
Week 10	Lab 10: Identification of carboxylic acid and phenols

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Any textbooks for organic chemistry	Yes
Recommended Texts	Organic Chemistry 8th edition by Francis A. Carey University of Virginia and Robert M. Giuliano Villanova University Organic Chemistry (fifth edition)by Francis A. Carey Tata Mc Graw Hill publishing company Limited, New Delhi.	No
Websites		

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

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

	Ministry of Higher Education and Scientific Research - Iraq University of Diyala College of Engineering Department of Chemical Engineering	

MODULE DESCRIPTOR
وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Principles of Chemical Engineering**			**Module Delivery**	
Module Type	CORE			**Theory** **Lecture** **Tutorial**	
Module Code	CHE 102				
ECTS Credits	7				
SWL (hr/sem)	78				
Module Level	1		**Semester (s) offered**	1	
Administering Department	Chemical Engineering		**College**	Engineering	
Module Leader	Dr. Mohammed H. Msaed		**e-mail**	Mhmmsaed1@uodiyala.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	None		**e-mail**		
Peer Reviewer Name	None		**e-mail**		
Review Committee Approval			**Version Number**		

Relation With Other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	
Module Aims, Learning Outcomes, Indicative Contents and Brief Description أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية مع وصف مختصر			
Module Aims أهداف المادة الدراسية	Fundamentally, chemical engineering is the discipline that transforms scientific breakthroughs into large scale industrial processes. This course serves as an introduction to the principles and calculation techniques used in chemical engineering by developing knowledge and expertise in the basic principles of chemical engineering. It also comprehensively introduces problem-solving methods for material balances without chemical reactions.		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**Knowledge and Understanding** Having successfully completed this module, the student will be able to demonstrate knowledge and understanding of: 1. Definition of the dimensions, units and their conversions. 2. Describing the Dimensional Consistency (Homogeneity). 3. Explanation the concentrations, mole and density. 4. Discussion the Temperature and pressure. 5. Showing the General strategy for solving material balance problems. 6. Solving the Material Balances for Batch and Semi-Batch Processes. 7. Solving material balance problems for single units without reaction.		
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. • Understanding Review (4 hrs). • Understanding Definition the dimensions, units and their conversions(6 hrs). • Understanding Dimensional Consistency (6 hrs). • Express of concentrations, mole and density (8 hrs). • Temperature and pressure (16 hrs). • General strategy for solving material balance problems (6 hrs). • Material Balances for Batch and Semi-Batch Processes (16 hrs). • Solving material balance problems for single units without reaction (16 hrs).		
Course Description	This module is designed to provide first-year Chemical Engineering students with the foundational concepts of principles of chemical engineering, including the dimensions, units, and their conversion, dimensional consistency (homogeneity), moles, density, concentration, choosing a basis, temperature, pressure, introduction to material balance, material balances for batch and semi-batch processes, general strategy for solving material balance problems, solving material balance problems for single units without reaction.		

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Beginning to establish a strong understanding of the principles of chemical engineering, in particular, material balance. Using real industrial examples to help students relate the basic concepts of material balance to real industrial processes. Encouraging the discussions and questions to clear up any misconceptions. In addition, encouraging active participation and group discussions to enhance critical thinking and problem-solving skills. Guiding the students through the problem-solving process and providing constructive feedback.

Student Workload (SWL) الحمل الدراسي للطالب				
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل **In class lectures** **57** **In class tests** **3** **Tutorial** **15** **Final exam** **3**		78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل **Library, dorm, home memorizing** **40** **Preparation for tests** **40** **Homework** **17**		97	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل		175		

Module Evaluation
تقييم المادة الدراسية

		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	6	20% (20)	2,4,6,9,11 and 13	LO #1, 2, 6, and 7
	Assignments	4	10% (10)	3,5,7,9,11 and 14	LO # 1,2,3,5 and 6
	Home work	1	10% (10)	14	LO # 4-7
Summative assessment	**Midterm Exam**	1	10 % (10)	7	LO # 1-4
	Final Exam	1	50% (50)	16	All
Total assessment			100% (100Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Definition of dimensions and units
Week 2	Conversion of units and conversion factors
Week 3	Dimensional Consistency (Homogeneity)
Week 4	Express of concentrations, mole and density
Week 5	Express of concentrations and choosing a basis
Week 6	Temperature
Week 7	Pressure
Week 8	Introduction to Material Balances and Open, Closed, Steady-State Unsteady-State Systems
Week 9	The material balance for a single component process
Week 10	Multiple Component Systems
Week 11	Accounting for Chemical Reactions in Material Balances
Week 12	Material Balances for Batch and Semi-Batch Processes
Week 13	General Strategy for Solving Material Balance Problems
Week 14	Solving material balance problems for single units without reaction
Week 15	Solving material balance problems for single units without reaction
Week 16	**Final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	David M Himmelblau, Basic principles and calculations in chemical engineering, Prentice Hall.	Yes
Recommended Texts	Richard M Felder & Ronald W. Rousseau Elementary Principles of Chemical Processes, Wiley India.	No
Websites	Nil	

APPENDIX:

GRADING SCHEME مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors

	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

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