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

Academic Program and Course Description Guide

2026

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 extra-curricular activities to achieve the learning outcomes of the program.

Academic Program Description Form

University Name: Al-Muthanna University

Faculty/Institute: Engineering College

Scientific Department: Chemical Engineering Department

Academic or Professional Program Name: Chemical Engineering

Final Certificate Name: Bachelor's of Chemical Engineering

Academic System: Bologna + Courses

Description Preparation Date: 12-2-2026

File Completion Date: 16-2-2026

Signature:

Head of Department Name:

Ali A. Hassan

Date:

Signature:

Scientific Associate Name:

Asst. Prof. Dr. Forat Yasir AlJaboori

Date:

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Date: 15/9/2025

Signature:

Approval of the Dean

1. Program Vision

Graduating chemical engineers with competence and skills in chemical engineering and the petroleum industries, in alignment with national development requirements to serve the community. The department strives to achieve scientific distinction by enriching its students with the scientific and practical expertise aligned with the nature of Al-Muthanna University. The department is committed to adopting the principles of high performance and quality to achieve creativity and advancement in the fields of chemical engineering and the petroleum industries.

2. Program Mission

Preparing engineering professionals in the field of chemical engineering, specifically in petroleum refining, to serve the chemical and petroleum industries. This includes training them to operate, design, conduct applied research and studies, and solve industrial problems in the chemical and petroleum sectors, thereby contributing to the scientific and economic development of the country.

3. Program Objectives

1. Preparing chemical engineers who are well-versed in the fundamental scientific and engineering knowledge relevant to chemical engineering and the petroleum industries, as well as the latest technological advancements.
2. Equipping graduates with the ability to design laboratories and factories related to chemical, petroleum, and petrochemical industries.
3. Preparing graduates who are capable of operating and managing laboratories and factories in the fields of chemical engineering and oil refineries.
4. Encouraging faculty members and students to engage in scientific research.

Engaging with the community through the organization of courses and seminars that enhance awareness and understanding of this specialization.

4. Program Accreditation

No

5. Other external influences

No

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	9	19	8.48%	supportive
College Requirements	7	23	10.27%	Basic
Department Requirements	36	185	82.59%	Core
Summer Training	1 months	N.A.	N.A.	
Other				

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

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
			theoretical	practical
2025-2026 First Year 1nd Semester	UNI003	Arabic Language	2	--
	UNI004	Computer I	2	2
	ENG001	Mathematics I	4	--
	ENG003	Engineering drawing	1	2
	CHE112	Physics	3	--
	CHE113	Chemical Eng. Principle I	4	--

Year/Level	Course Code	Course Name	Credit Hours	
			theoretical	practical
2025-2026 First Year 2nd Semester	UNI001	English Language I	2	---
	UNI006	Human Rights and Democracy	2	---
	ENG002	Workshops	1	2
	ENG005	Mathematics II	4	---
	CHE122	Chemistry	5	3
	CHE123	Chemical Eng. Principle II	4	---

Year/Level	Course Code	Course Name	Credit Hours	
			theoretical	practical
2025-2026 Second Year 1nd Semester	UNI0010	The Crimes of the Baath regime	2	--
	ENG004	Engineering Statistics	2	---
	CHE211	Engineering Mathematics I	4	---
	CHE212	Fluid Flow I	3	2
	CHE213	Physical chemistry I	3	2
	CHE214	Chemical Eng. Principle IiI	4	---
	CHE216	Pollution	2	---

Year/Level	Course Code	Course Name	Credit Hours	
			theoretical	practical
2025-2026 Second Year 2nd Semester	UNI002	English Language II	2	---
	UNI005	Computer II	2	2
	CHE221	Engineering Mathematics II	4	---
	CHE222	Fluid Flow II	3	2
	CHE223	Physical chemistry II	3	2
	CHE225	Properties of materials	3	--
	UNI011	Arabic Language	2	--

Year/Level	Course Code	Course Name	Credit Hours	
			theoretical	practical
2025-2026 Third Year 1nd Semester	CHE311	Engineering analysis	3	---
	CHE312	Mass transfer I	4	---
	CHE313	Heat transfer I	3	2
	CHE314	Industrial management	2	---
	CHE315	Reactor design I	4	---
	CHE316	Thermodynamic I	4	---

Year/Level	Course Code	Course Name	Credit Hours	
			theoretical	practical
2025-2026 Third Year 2nd Semester	CHE321	Numerical methods	2	2
	CHE322	Mass transfer II	4	0
	CHE323	Heat transfer II	3	2
	CHE324	Reactor design II	4	0
	CHE325	Thermodynamic II	4	0
	CHE326	Equipment design I	4	0

Year/Level	Course Code	Course Name	Credit Hours	
			theoretical	practical
2025-2026 Fourth Year 1nd Semester	CHE 411	Unit operation I	3	---
	CHE 412	Process control I	4	---
	CHE 413	Petrochemical Industries I	2	---
	CHE 414	Equipment design I	3	---
	CHE 415	Petroleum refining I	4	---
	CHE 416	Computer application I	2	3
	U 411	English language IV	2	---
	CHE 417	Engineering Project I	5	---

Year/Level	Course Code	Course Name	Credit Hours	
			theoretical	practical
2025-2026 Fourth Year 2nd Semester	CHE421	Unit operation II	3	---
	CHE422	Process control II	4	---
	CHE423	Petrochemical Industries II	2	---
	CHE424	Equipment design II	3	---
	CHE425	Petroleum refining II	4	---
	CHE426	Computer application II	2	3
	CHE 428	Chemical Eng. Lab. II	3	---
	CHE 427	Engineering Project I	5	---

7. **Expected learning outcomes of the program**	
Knowledge	
Learning Outcomes 1	1- Develop the ability to use chemical engineering principles to solve problems of practical importance to society. 2- Able to formulate, analyze, and solve practical chemical engineering problems. - 3- Define the principles of chemical engineering, including chemical reaction equilibrium and thermodynamics. 4- Mass and energy balance, transportation processes, separation processes, mechanical unit operations, and process control. Possess the ability to design a chemical system, process, or component, taking into account realistic constraints, including practical, economic, environmental, safety, ethical, social, and political impacts.
Skills	
Learning Outcomes 2	1. Integrates processing steps into a sequence and applies analysis techniques such as energy and mass balance. Chemical engineering graduates possess self-learning skills to ensure lifelong learning.
Learning Outcomes 3	1. Chemical engineering graduates choose technical electives, concentrations, projects, and minors that satisfy their professional interests or career goals. Can work effectively alone and in a team environment, including multidisciplinary teams
Ethics	
Learning Outcomes 4	1. Providing a helping hand to the student and taking him to the place of excellence. 2. Analyzing students' treatments and treating them fairly 3. Providing attention to students with limited income. Good treatment and awareness are determined by demand and respect among students.
Learning Outcomes 5	1. Able to understand and apply developments in the work environment 2. It attracts individuals with experience, skill, and motivation 3. Organizational loyalty is increased and encouraged Developing employees' skills through workshops and courses

8. **Teaching and Learning Strategies**
Self-learning, cooperative learning, brainstorming, discussion, interactive presentations, lecture, project. Interrogation

9. **Evaluation methods**
1. Presentations 2. Written Exams 3. Quizzes 4. Final Exam 5. Weekly Reports 6. Attendance

Professional Development
Mentoring new faculty members
A short description to the process used to orienting New, Visiting, Full-Time, and Part-Time Faculty at the Institution and Department levels.
Professional development of faculty members
A short description to the Academic and Professional Development plan of Faculty Members, including Teaching & Learning Strategies, Assessment of Learning Outcomes, etc.

10. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Dr.Raed Tariq Hadi	Chemical Engineering	Fluid Flow			**Staff**	
Dr.Ahmed Hassan Ali	Chemical Engineering	Water Treatment			**Staff**	
Dr.Haider Tawfiq Naeem	Materials Engineering	Materials			**Staff**	
Dr.Anas Badiwi Salman	Chemical Engineering	Mass Transfer			**Staff**	
Dr.Ihsan Habib Dakhel	Chemical Engineering	Industrial Units			**Staff**	
Dr.Adel Hatem Rashid	Chemical Engineering	Biological Processes			**Staff**	
Dr.Furat Yasser Sharad	Chemical Engineering	Water Treatment			**Staff**	
Dr.Ali Abdul Hassan Kadhim	Chemical Engineering	Water Treatment			**Staff**	
Dr.Ghazi Faisal Nasser	Chemical Engineering	Water Treatment			**Staff**	
Dr.Rafe Dakhel Hussein	Mechanical Engineering	Applied Mechanics			**Staff**	
Dr.Ali Samir Aneid	Mechanical Engineering	Refractory			**Staff**	
Dr. Hassanein Majeed Hussein	Production and Metallurgical Engineering	Composite Materials			**Staff**	
Dr.Baligh Saud Abdul Razzaq	Materials Engineering	Metallurgical			**Staff**	

Ali Saleh Jaafar	Materials Engineering	Environmental Safety			**Staff**	
Dawood Zahi Khattar	Computer Engineering	Computer			**Staff**	
Thabit Fadhil Hassouni	Chemical Engineering	Chemical Engineering Management			**Staff**	
Hanan Ahmed Ibrahim	Chemical Engineering	Chemical Engineering			**Staff**	
Abbas Nawar Zannad	Chemical Engineering	Chemical Engineering			**Staff**	
Mahmoud Abdul Ameer	Chemical Engineering	Process Control			**Staff**	
Ahmed Baqir Abdullah	Chemical Engineering	Chemical Engineering			**Staff**	
Mohammed Najm Abdullah	Chemical Engineering	Chemical Engineering			**Staff**	
Alaa Fares Obeid	Mechanical Engineering	Applied Mechanics			**Staff**	
Nour Amin Ahmed	Law	Special Law			**Staff**	
Haider Karim Sakran	Mechanical Engineering	Fluids			**Staff**	
Hatem Karim Ziad	Chemical Engineering	Chemical Engineering			**Staff**	
Faiz Latif Jawda	Management and Economics	Economics			**Staff**	
Ahmed Rageh Hassan	Civil Engineering	Green building				**Lecturer**
Safa Abdul Wahid	Electrical Engineering	Electrical Power				**Lecturer**
Ali Nasser Hussein	Mechanical Engineering	Applied Mechanics				**Lecturer**
Karim Fadhil Sagheer	Chemical Engineering	Chemical Engineering				**Lecturer**

Irfan Abdul Hussein Jaber	Mechanical Engineering	Energy Conversion				**Lecturer**
Bashair Makki Jir	Computer programing	Computer Programing				**Lecturer**
Abbas Fadel Ghayyad	Arabic language	Learning Methods				**Lecturer**

11. Acceptance Criterion

The Department admits graduates of High School and the scientific branch.

12. The most important sources of information about the program

Library, Internet, Electronic Websites, and Virtual Library

13. Program Development Plan

None

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
First Year 1st Semester	UNI003	Arabic Language	Basic		√	√				√				√	
	UNI004	Computer I	Basic	√				√	√	√		√			
	ENG001	Mathematics I	Basic		√				√				√	√	
	ENG003	Engineering drawing	Basic		√	√		√	√			√			
	CHE112	Physics	Basic	√					√				√		
	CHE113	Chemical Eng. Principle I	Basic	√	√	√		√	√	√		√	√	√	

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

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
First Year 2nd Semester	UNI001	English Language I	Basic		√				√			√		√	
	UNI006	Human Rights and Democracy	Basic			√				√		√	√		
	ENG002	Workshops	Basic		√			√	√	√		√	√	√	
	ENG005	Mathematics II	Basic		√	√		√	√			√			
	CHE122	Chemistry	Basic	√	√			√	√			√	√		
	CHE123	Chemical Eng. Principle II	Basic	√	√	√		√	√	√		√	√	√	

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
Second Year 1st Semester	UNI0010	The Crimes of the Baath regime	Basic		√				√	√		√	√		
	ENG004	Engineering Statistics	Basic		√	√			√			√	√		
	CHE211	Engineering Mathematics I	Basic		√	√		√	√	√			√	√	
	CHE212	Fluid Flow I	Basic	√	√	√		√	√	√		√	√		
	CHE213	Physical chemistry I	Basic	√	√			√	√	√		√	√	√	
	CHE214	Chemical Eng. Principle III	Basic	√	√	√		√	√	√		√		√	
	CHE216	Pollution	Basic	√	√			√	√			√	√	√	

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
Second Year 2nd Semester	UNI002	English Language II	Basic		√				√	√			√		
	UNI005	Computer II	Basic		√	√		√	√			√	√		
	CHE221	Engineering Mathematics II	Basic		√	√		√	√				√		
	CHE222	Fluid Flow II	Basic	√	√	√		√	√	√		√	√	√	
	CHE223	Physical chemistry II	Basic	√	√			√	√	√		√	√		
	CHE225	Properties of materials	Basic	√	√				√	√		√	√		
	UNI011	Arabic Language	Basic		√				√			√			

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
Third Year 1st Semester	CHE311	Engineering analysis	Basic		√			√	√			√	√		
	CHE312	Mass transfer I	Basic	√	√	√		√	√			√	√		
	CHE313	Heat transfer I	Basic	√	√	√		√	√			√	√		
	CHE314	Industrial management	Basic	√	√				√	√		√	√		
	CHE315	Reactor design I	Basic	√	√	√		√	√	√		√	√		
	CHE316	Thermodynamic I	Basic	√	√				√	√		√	√		

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
Third Year 2nd Semester	CHE321	Numerical methods	Basic		√			√	√			√	√		
	CHE322	Mass transfer II	Basic	√	√	√		√	√			√	√		
	CHE323	Heat transfer II	Basic	√	√	√		√	√			√	√		
	CHE324	Reactor design II	Basic	√	√	√		√	√	√		√	√		
	CHE325	Thermodynamic II	Basic	√	√	√		√	√			√	√		
	CHE326	Equipment design I	Basic		√	√		√	√			√	√		

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**
Fourth Year 1st Semester	CHE 411	Unit operation I	Basic	√	√	√		√	√	√		√	√	√	√
	CHE 412	Process control I	Basic	√	√	√		√	√			√	√		
	CHE 413	Petrochemical Industries I	Basic	√	√	√		√	√			√	√		
	CHE 414	Equipment design I	Basic	√	√	√		√	√	√		√	√		
	CHE 415	Petroleum refining I	Basic	√	√			√	√	√		√	√		
	CHE 416	Computer application I	Basic	√	√	√		√	√			√	√		
	U 411	English language IV	Basic	√	√	√			√				√		√
	CHE 417	Engineering Project I	Basic	√	√	√		√				√			√

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
Fourth Year 2nd Semester	CHE421	Unit operation II	Basic	√	√			√				√	√	√	
	CHE422	Process control II	Basic	√	√	√		√	√	√		√	√	√	
	CHE423	Petrochemical Industries II	Basic	√	√			√	√			√	√		
	CHE424	Equipment design II	Basic	√	√	√		√	√			√	√		
	CHE425	Petroleum refining II	Basic	√	√	√		√	√	√		√	√		
	CHE426	Computer application II	Basic	√	√	√		√	√			√	√		
	CHE 428	Chemical Eng. Lab. II	Basic	√	√			√	√			√	√	√	
	CHE 427	Engineering Project I	Basic	√	√	√		√	√	√		√		√	

First Year
First Semester

No	Subject Title	Weekly hours			Units/ ECTS
		Th.	Tut.	Lab./Pr.	
1	Arabic Language	2	--	--	2.00
2	Computer I	1	1	2	3.00
3	Mathematics I	3	1	--	6.00
4	Engineering drawing	1	---	2	5.00
5	Physics	2	1	--	6.00
6	Chemical Eng. Principle I	3	1	--	8.00
Total		12	4	4	30
		20			

Course description form Arabic Language

1. Course Name:	
Arabic Language and Literature	
2. Course code:	
UNI003	
3. Semester/Year	
2nd / 2025-2026	
4. Date this description was prepared:	
1٠/9/2025	
5. Available attendance forms:	
In-person	
6. Total study hours:	
30 hrs / Total units: 2	
7. Name of the course coordinator (if there is more than one, mention it)	
Name: Ahmed Qasim Mohammed e-mail :ahmed.kasim@mu.edu.iq	
8. Course Objectives	
Goals Study material	• To empower students with Arabic language skills and knowledge at all levels: phonological, morphological, syntactic, semantic, stylistic, and writing. • To enable them to interpret fundamental theories, concepts, and terminology in Arabic linguistics. • To develop students' listening, reading, and expression skills. • To deepen students' connection to Arab and Islamic heritage, allowing them to draw upon its ethical and social values in a way that resonates with contemporary Arab society. • To elevate Arabic linguistic and literary knowledge in an educational and cultural manner. • To cultivate creative and literary talents, and to develop linguistic appreciation and the ability to distinguish good texts from bad ones
9. Teaching and learning strategies	
Strategy	The educational strategy can be described as a roadmap for guiding students to optimal language use in their academic and professional lives, defining the boundaries of creativity, developing their language skills, and helping them avoid various types of linguistic errors: grammatical, morphological, spelling, and stylistic. The strategies we employ are diverse and vary depending on the curriculum, the learners' levels, and their individual differences. Among the most important of these strategies are:

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
first	2	Identify the course vocabulary	The origin of language, its theories, and its functions.	a lecture	Oral questions
second	2	Knowledge of Arab language sciences, their linguistic classifications and types, and the most prominent linguists	The characteristics of the Arabic language, its linguistic classifications and types, and the most prominent linguists.	Lecture and discussion	General and cultural oral questions

third	2	Forming grammatically and spell-wise correct sentences	Parts of speech: noun, verb, particle. And types of sentences: nominal, verbal, and phrase.	A lecture and analysis of poetic verses and Quranic verses	General and cultural oral questions
Fourth	2	Identifying diptote nouns and their inflectional markers	Diptotes (Nouns Prohibited from Declension)	Lecture and practical application on literary texts	Daily test
Fifth	2	Understanding the history of literature, literary knowledge, and identifying the (aesthetic features) creative texts.	Literary Eras and Major Poetic Purposes in the Pre-Islamic and Islamic Periods.	Critical readings, open discussion, expressing viewpoints, deep reflection and comprehensi on of texts.	Intellectual discussion through presenting a research paper.
Sixth	2	Identifying types of sentences in Arabic and forming sentenc according to their ru and structures	Grammatical Particles (Kana and its sisters; Inna and its sisters).	Lecture and grammatical applications on literary and Qur'anic texts.	Homework
Seventh	2	Measuring the academic level of previously studied material.	Midterm (Elongation) Test.	Written exam.	Written exam.
Eighth	2	Text analysis	The Umayyad Era and Its Most Important Characteristics and Poetic Purposes.	Critical reading and analysis of texts, followed by discussion of issues	Report.
Ninth	2	Knowing its rules a writing grammatica and morphologicall correct sentences.	Sound Masculine Plural and What Is Attached to It.	Lecture and grammatical applications on literary and Qur'anic texts.	Homework
Tenth	2	Knowing writing standards according the academic scient methodology.	Spelling and Punctuation Marks.	Lecture and practical applications.	In-class assignment
Eleventh	2	Understanding the aesthetic features of creative texts.	The Abbasid Era and its most important characteristics and poetic and prose purposes.	Analytical lecture	Report
Twelfth	2	Knowing the rules related to the subjec	The Six Nouns (al-asmā' al-sittah).	Lecture and linguistic applications.	In-class test.

		and producing spee free of linguistic err			
Thirteenth	2	Knowing the rules f writing numbers an counted nouns.	The grammatical inflection of numbers and counted nouns.	Lecture and grammatical applications.	Online test (via Google Form).
Fifteenth	2	Understanding the cultural, literary, an intellectual issues o the era.	The Modern Era and its most important characteristics and poetic purposes.	Discussion session.	Critic al paper .

١١. Course Evaluation

- Written examinations.
- Daily and surprise quizzes.
- Assessing students' level of comprehension of the prescribed material.
- Oral questions.
- Reports.
- Critical and research papers.

11. Learning and teaching resources

Required textbooks (methodology, if applicable)	Lectures prepared according to the curriculum set by the department
Main references (sources)	Sharh Ibn 'Aqil 'ala Alfiyyat Ibn Malik (Explanation of Ibn 'Aqil on Alfiyyat Ibn Malik). Qatr al-Nada wa Ball al-Sada by Ibn Hisham al-Ansari. Al-Balaghah wa al-Tatbiq by Ahmad Matlub. Jawahir al-Balaghah by Ahmad al-Hashimi
Recommended supporting books and references (scientific journals, reports, etc.)	The Iraqi Language Academy – Al-Manhal – Al-Nour Library The Egyptian Arabic Language Academy in Cairo
Electronic references, Websites	https://youtube.com/playlist?list=PLUbGxXvC8t7GC9xxO9JFfwR-Z_xPvMJv-&si=Q-AEnHbXfAyvBCt1

Course Description Form Computer I

1. Course Name:
Computer1
2. Course Code:
UNI004
3. Semester / Year:
1st2025-2026
4. Description Preparation Date:
10/09/2025
5. Available Attendance Forms:
Attendance is recorded and managed via the application
6. Number of Credit Hours (Total) / Number of Units (Total)
2hrs Practical – 2hrs Theoretical per week / 3 Units
7. Course administrator's name (mention all, if more than one name)
Name: Dawood Zahi Khutar Email: dawoodzahi@mu.edu.iq
8. Course Objectives
Course Objectives: The program aims to bring students to an advanced level of understandi computer fundamentals, components, and how to use them, including th different sections. It then covers Microsoft Word and Excel, teaching users h to work with them and troubleshoot common problems. Finally, the progr concludes with an introduction to the concept of artificial intelligence.
9. Teaching and Learning Strategies

Strategy	The applications are explained in the theoretical section and th continuously applied practically.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	**Computer Basics**		**Practical - Theoretica**	
2	4	**Operating o Systems**		**Practical - Theoretic**	
3	4	**Folder & window**		**Practical - Theoretic**	
4	4	**Control Panel**		**Practical - Theoretic**	
5	4	**First month exam**		**Practical - Theoretic**	
6	4	**introduction to Micro Word**		**Practical - Theoretic**	
7	4	**Insert formats**		**Practical - Theoretic**	
8	4	**Midterm exam**		**Practical - Theoretic**	
9	4	**Formatting mathemat equations and ta in Word**		**Practical - Theoretic**	
10	4	**Print settings**		**Practical - Theoretic**	
11	4	**Creating tables in Excel**		**Practical - Theoretic**	

12	4	**Solving simple and com equations**		**Practical - Theoretic**	
13	4	**Second month exam**		**Practical - Theoretic**	

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Computer Basics Teach yourself Microsoft Office Excel 2010 in a simplif way Word Processing - Microsoft Word 2010
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form for Mathematics-I

1. Course Name:
Mathematics-I
2. Course Code:
ENG005
3. Semester / Year:
1st Semester 2025-2026
4. Description Preparation Date:
01/09/2025
5. Available Attendance Forms:
Attendance is recorded and managed via the application
6. Number of Credit Hours (Total) / Number of Units (Total):
4 hours per week – 60 hrs/ 6 Units
7. Course administrator's name (mention all, if more than one name)
Name: Baleegh Saud Abdulrazzaq Alobaid **Email: Baleegh.saud@mu.eud.iq**

8. Course Objectives

Course Objectives	Functions and Graphs, Identifying Functions; Even & Odd Functions, Functions and Graphs, Combining Functions; Shifting and Scaling Graphs, Trigonometric Functions, limits and continuity, One-Sided Limits and Limits at Infinity. Differentiation Rules, Applications of Derivatives.

9. Teaching and Learning Strategies

Strategy	▪ Different forms of teaching will be used to cover the objectives of the course. PowerPoint presentations for the head titles, definitions, graphs, and many useful illustrations with a summary at the end of each chapter will be presented and discussed. ▪ The PowerPoint contains information about new topics and unsolved examples, and then the whiteboard will be used to solve them and to let students see the solutions.

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Algebraic Preliminaries	Numbers, Sets	Theory & tutorial	Classwork & Homework
2	4	Algebraic Preliminaries	Inequalities & Absolute Value	Theory & tutorial	Classwork & Homework
3	4	Functions	Domain and Range unctions and Graphs, Identifyi unctions; Even & Odd Functio	Theory & tutorial	Classwork & Homework

6	4	Limits	Theorems, Continuity	Theory & tutorial	Classwork & Homework
7	4	Limits	One-Sided Limits, Limits at Infinity, L Hopital′s rule.	Theory & tutorial	Classwork & Homework
8	4	Derivatives	Definition, Power, and Sum Rules	Theory & tutorial	Classwork & Homework
9	4	Derivatives	Product and Quotient Rules	Theory & tutorial	Classwork & Homework
10	4	Derivatives	Chain rule	Theory & tutorial	Classwork & Homework
11	4	Derivatives	High-Order derivatives	Theory & tutorial	Classwork & Homework
12	4	Derivatives	Implicit differentiation	Theory & tutorial	Classwork & Homework
13	4	Applications of Derivative	Maximum and minimum	Theory & tutorial	Classwork & Homework
14	4	Applications of Derivatives	mean value theorem, Increasing and Decreasing Functions	Theory & tutorial	Classwork & Homework
15	4	Applications of Derivative	Concavity and Points of Inflection, Secor Derivative Test.	Theory & tutorial	Classwork & Homework

11. Course Evaluation

Formative assessment: Quizzes 2; Online assignments 2; Onsite assignments 2; Report 1 **(40%)**
Midterm Exam 1: **10%**
Final Exam: **50%**
Total assessment: **100% (100 Marks)**

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Thomas' Calculus Early Transcendental, Thirteenth Edition.
Main references (sources)	Thomas' Calculus Early Transcendental, Thirteenth Edition.
Recommended books and references (scientific journals, reports...)	1. Calculus: Early Transcendental, Seventh Edition, by James Stewart. 2. University Calculus Early Transcendental, Third Edition, by Joel Hass. 3. Calculus Volume 1, by OpenStax. 4. Schaum's Outline of Beginning Calculus, 2nd Edition, by Elliott Mendelson
Electronic References, Websites	https://openstax.org/details/books/calculus-volume-1. https://engineering.mu.edu.iq/, https://classroom.google.com/u/0/c/NzI2MzMzMzc3MDQ1

Course Description Form: Engineering Drawing

1. Course Name:
Engineering Drawing
2. Course Code:
CHE311
3. Semester / Year:
1 st stage
4. Description Preparation Date:
01/09/2025
5. Available Attendance Forms:
In-person
6. Number of Credit Hours (Total) / Number of Units (Total)
3/ Numbers of Units 45
7. Course administrator's name (mention all, if more than one name)
Name: Lecturer Ali Salih Email: ali.salih@mu.edu.iq
8. Course Objectives

Course Objectives	**Development of Spatial Visualization:** Cultivating the cognitive ability to mentalize complex 3D geometries and accurately translate them into 2D projections, and vice versa. **Mastery of Technical Communication:** Enhancing the ability to communicate via technical drawings—the "universal language" that ensures seamless coordination between engineers and manufacturers globally. **Precision and Standardization:** Equipping the student with the proficiency to render lines, dimensions, symbols, and cross-sections with rigorous accuracy in compliance with international engineering standards (e.g., ISO, ANSI). **Principles of Orthographic Projection:** Providing systematic training in deriving multiview projections (Front, Side, and Top/Plan views) and constructing isometric perspectives. **Technical Documentation Proficiency:** Documenting the technical specifications of engineering products (mechanical, civil, or electrical) with absolute clarity to eliminate any potential ambiguity. **Foundations for Computer-Aided Design (CAD):** Establishing the conceptual and manual groundwork necessary for a seamless transition into computer-aided drafting and design software. **Analytical and Assembly Skills:** Enabling students to decompose and integrate complex engineering systems, fostering a deep understanding of component relationships through assembly drawings.

9. Teaching and Learning Strategies

Strategy	**Hands-on Application and Continuous Training:** Dedicating specific daily drafting hours to reinforce technical skills, with a rigorous focus on the precise handling of manual instruments (drawing boards, T-squares, and set squares). **Scaffolded Curriculum Progression:** Implementing a structured learning path that begins with drafting fundamentals and line-weight control, gradually advancing to orthographic projection and 3D geometric representation. **Integrated Technological Proficiency (CAD):** Bridging traditional techniques with modern software by incorporating AutoCAD and contemporary modeling tools alongside manual drafting. **Visual Learning and Simulation:** Utilizing physical models and instructional aids to clarify spatial perspectives and multiview projections (Front, Top, and Side views). **Iterative Problem-Solving and Assessment Readiness:** Engaging with diverse, graded exercises and past examination papers to ensure full mastery of the subject matter prior to evaluation. **Strict Adherence to Drafting Standards:** Emphasizing sheet cleanliness, line-type consistency, and the standardized application of centerlines for circles and arcs.

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	"Cultivating **manual dexterity** and **technical neatness** as core competencies in engineering graphics.	**Drafting Instruments**	Lectures: Delivering fundamental theoretical concepts through structured presentations, complemented by visual practical demonstrations to enhance conceptual clarity. Interactive Discussions: Engaging students through dynamic Q&A sessions, group discussions, and peer-to-peer learning to deepen their analytical understanding. Problem-Based Learning (PBL): Integrating hands-on problem-solving activities during class sessions that challenge students to apply theoretical principles to real-world engineering scenarios. Continuous Assessment & Feedback: Conducting regular quizzes, home assignments, and coursework with immediate constructive feedback to monitor academic progress and identify areas for improvement.	In-Class Assignments Home Assignments / Coursework Examinations:
2	3		**Types of Lines in Engineering Drawing**		
3	3		**Standard Scales and Sheet Sizes**		
4	3		**Centerlines and Circular Geometry**		
5	3		**Geometric Constructions**		
6	3		**Inscribed and Circumscribed Polygons**		
7	3		**Applications of T-Squares, Compas and Set Squares**		
8	3		**Arcs and Tangencies**		
9	3		**Construction of Ellipses and Ova Shapes**		
10	3		**Parabolic Construction**		
11	3		**Engineering Views and Projection**		
12	3		**First and Third Angle Projections**		
13	3		**Derivation of the Third View**		
14	3		**Sectional Views / Sectioning:**		
15	3		**Sectional Views / Sectioning:**		

11.Course Evaluation

40%+10%+50%

12.Learning and Teaching Resources

الرسم الهندسي	عبد الرسول الخفاف ١٩٩٠
الرسم الهندسي	عبد الرسول الخفاف ١٩٨٦

Course Description Form Physical

1. Course Name:	
Physics	
2. Course Code:	
CHE112	
3. Semester / Year:	
First\2026	
4. Description Preparation Date:	
10/09/2025	
5. Available Attendance Forms:	
Theoretical	
6. Number of Credit Hours (Total) / Number of Units (Total)	
3hrs per week - 45 hours \ 6 units	
7. Course administrator's name (mention all, if more than one name)	
Name Alaa fairs Obaid Email: alaafarisobaid@mu.edu.iq	
8. Course Objectives	
Course Objectives	**Introducing the student to the field of influence of static forces and moments, calculating the center of gravity of the body, and analyzing forces.**
9. Teaching and Learning Strategies	
Strategy	Traditional, modern and electronic teaching methods

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Introduction to physics	Introduction	lecture	ass participati
2	3	Learn the basics of physics	Scalar &vector, Force system	lecture	ass participati
3	3	Force analysis	Force analysis	lecture	Homework
4	3	Moments basics a methods of calculating them	Moment, principle of mome	lecture	Exam
5	3	Couple and its transmission method	couple, couple-force syste	lecture	Homework
6	3	Resultants	Resultants	lecture	Exam
7	3	Resultants in one point	Resultants in one point	lecture	ass participati
8	3	Resultants is parallel	Resultants is parallel	lecture	Exam
9	3	Resultants is perpendicular	Resultants is perpendicula	lecture	Homework
10	3	Free body diagram	Free body diagram	lecture	Report

11	3	Equilibrium	Equilibrium	lecture	ass participati
12	3	Centroids of lines and Areas	Centroids of lines and Areas	lecture	Exam
13	3	Centroids of Composite bodies and figures	Centroids of Composite bodies and figures	lecture	Report
14	3	Exercises	Exercises	lecture	Homework
15	3	Moment of inertia - composite area	Moment of inertia - compos area	lecture	Homework

11. Course Evaluation	
Daily tests Monthly exams Lab reports Class participation	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any	Engineering Mechanics by J.L. Meriam, Fifth Edition
Main references (sources)	.Engineering mechanics: Statics and Dynamics /by R.C.Hibbeler
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form Chemical Engineering Principles I

1. Course Name:	
Chemical Engineering Principles I	
2. Course Code:	
CHE113	
3. Semester / Year:	
1st Level \ 1st Course	
4. Description Preparation Date:	
01/09/2025	
5. Available Attendance Forms:	
Attendance	
6. Number of Credit Hours (Total) / Number of Units (Total)	
4 hours weekly/ ٦٠ hours / 8 Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Prof. Dr. Ahmed Hassan Ali Email: dr.ahmedha@mu.edu.iq	
8. Course Objectives	
Course Objectives	(1) Achieve the university's objectives within the field of chemical engineering; (2) Provide correct education in the fundamentals of chemical engineering; (3) Develop the skills and confidence necessary to solve problems in the biochemical, chemical, and other industries, based on engineering and scientific principles; (4) Continue to produce highly qualified graduates; (5) Provide education that is compatible with the needs of the labor market and linked to the Chemical Engineers Association.
9. Teaching and Learning Strategies	
Strategy	Essential facts, concepts, principles, and theories of chemical engineering, and an understanding of the constraints facing engineers in making sound decisions in various fields, including basic mathematics, science, and technology. A- Management ideas and concepts. 1- Awareness and understanding of: A- Ethics and professionalism of the profession. B- The impact of engineering activities on society and civilization.

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Explaining the basic concepts of engineering branches (general concepts).	General Engineering Principles	Lecture	Class work
2	4	Explaining the dimensions units used in mathematical and engineering calculations.	Units and dimensions	Lecture	Class work
3	4	Clarifying how to calculate pressure and its benefits in engineering processes, especially industrial	Pressure	Lecture	Home work

		processes and those related to chemical engineering.			
4	4	Explaining the methods and devices used to measure pressure and their working principles	Pressure instruments	Lecture	Class work
5	4	Teaching students how to calculate pressure in different cases.	Examples Pressure calculation	Visual aids	Quiz
6	4	Explaining how to calculate temperature and its benefits in engineering processes, especially industrial processes and those related to chemical engineering.	Temperature	Lecture	Monthly exan
7	4	Explaining the methods used to measure temperature and their working principles.	Temperature instruments	Visual aids	Class work
8	4	Teaching students through practical examples of calculating pressure.	Examples Temperature calculations	Visual aids	Class work
9	4	Explaining how the raw materials entering a reaction are transformed into products, calculating the remainder and conversion ratio, and how to determine productivity and selectivity.	Conversion , selectivity , Production	Lecture	Mid course examination
10	4	Practical examples of calculating the remainder and conversion ratio, and how to determine productivity and selectivity.	Examples Conversion , selectivity , Production	Visual aids	Quiz
11	4	Explaining the principle of operation of production processes and how to calculate the input and output materials according to the principle that matter cannot be created or destroyed without a chemical reaction.	Material balance with out chemical reaction	Lecture	Class work
12	4	Explaining the practical examples of calculations of production processes and how to calculate the input and output materials according to the principle that matter cannot be created or destroyed without a chemical reaction.	Examples Material balance without chemical reaction	Visual aids	Monthly examination
13	4	Explaining the principle of operation of production processes and how to calculate the input and output materials according to the principle that matter cannot be created or destroyed without a chemical reaction.	Material balance without chemical reaction	Visual aids	Report
14	4	Illustrative examples of production process calculations and how to calculate input and output materials, including a chemical reaction.	Material balance with chemical reaction	Visual aids	Monthly examination
15	4	Continued illustrative examples of production process calculations and how to calculate input and output materials, including a chemical reaction.	Examples Material balance with chemical reaction	Visual aids	Class work

11.Course Evaluation	
Home work , class work , quizzes , monthly examination , mid-course examples , reports	
12.Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Nill
Main references (sources)	David M. Himmelblue and James B. Riggs, Basic Principles and Calculations in Chemical Engineering.
Recommended books and references (scientific journals, reports...)	Coulson & Richardson's, Chemical Engineering, Volume 1.
Electronic References, Websites	Any websites including information about chemical reaction

First Year

Second Semester

No	Subject	Weekly hours			Units/ECTS
		Th.	Tut.	Lab./Pr.	
1	English Language I	2	--	---	2.00
2	Human Rights and Democracy	2	--	---	2.00
3	Workshops	1	---	2	4.00
4	Mathematics II	3	1	---	6.00
5	Chemistry	3	2	3	8.00
6	Chemical Eng. Principle II	3	1	---	8.00
	Total	14	4	5	30
		25			

Course Description Form English language

1. Course Name:	
English language	
2. Course Code	
UNI001	
3. Semester / Year:	
2nd / first year	
4. Description Preparation Date:	
20/2/2026	
5. Available Attendance Forms:	
in Presence	
6. Number of Credit Hours (Total) / Number of Units (Total)	
2 hours weekly, 28 hours for the semester 2 Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Thabit Fadhil Email: thabit.fadil@mu.edu.iq	
8. Course Objectives	
Course Objectives	1- That the student knows the sources of the language and how it was formed. 2- To be able to understand linguistic importance as well as search for literary sources. 3- To be able to know how to invest the competency and awareness of language skills. 4- To recognize the percentage of understanding of the material given to him and to identify the factors affecting him in pronunciation or spelling. 5-He should be familiar with the methods used to transfer ideas that he acquires from some professors, because practice has an important role in producing language skills .
9. Teaching and Learning Strategies	
Strategy	1.Balanced Skills Integration Headway systematically combines listening, speaking, reading, and writing activities in each unit, ensuring learners develop all four skills in a coherent, interconnected way. 2. Grammar-Vocabulary Focus Each lesson introduces key grammar points alongside high-frequency vocabulary, providing clear explanations, guided practice, and opportunities for controlled and free production. 3. Communicative Tasks Tasks such as role-plays, information-gap exercises, and discussions encourage real-world use of language, helping students to internalize structures through meaningful communication. 4. Authentic and Semi-Authentic Materials The course incorporates dialogues, articles, and audio recordings that reflect everyday English usage, exposing learners to both spoken and written language in context.

	5. Progressive Recycling and Review Vocabulary and grammar items recur throughout the course in varied contexts, supported by regular review sections and "Check Your Progress" tasks to consolidate learning.

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Introductions and Greetings	Talking about yourself, asking someone's name, where they are from,	Lecture	H.W.
2	2	Daily Routines	Describing a typical day, telling the time, and talking about habits.	Lecture	H.W.
3	2	Family and Relationships	escribing family members, talk about relationships and relative	Lecture	H.W.
4	2	Jobs and Occupations	Talking about what people do f ring, workplaces, and job routi	Lecture	H.W.
5	2	Free Time and Hobbies	Speaking about leisure activitie hobbies, and weekend plans	Lecture	Quiz
6	2	Food and Drink	Talking about meals, favorite foods, ordering in a restaurant.	Lecture	H.W.
7	2	Travel and Holidays	Describing past vacations, trav plans, and dream destinations.	Lecture	H.W.
8	2	Shopping and Money	Shopping conversations, price using money and credit cards.	Lecture	H.W.
9	2	Health and Fitness	lking about illnesses, going to doctor, healthy lifestyles.	Lecture	Exam
10	2	Home and House	Describing a house or apartmen furniture, and household chore	Lecture	H.W.
11	2	Education and School	alking about school life, subje teachers, and study habits.	Lecture	H.W.
12	2	Weather and Seasons	Describing the weather, seasons, and how it affects activities.	Lecture	Quiz
13	2	Technology and Gadgets	Talking about phones, computers, the internet, and social media.	Lecture	H.W.
14	2	Past Experiences and Memories	Using the past tense to talk about childhood, past events, and experiences.	Lecture	H.W.
15	2	Dreams and the Future	Talking about hopes, ambition future plans, and predictions.	Lecture	Exam

11.Course Evaluation	
12.Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Headway
Main references (sources)	Oxford Headway Books
Recommended books and references (scientific journals, reports...)	Headway Elementary Student Headway intermediate
Electronic References, Websites	Beginner Advance PDF-www-pdfdrive.com

Course Description Form: Human rights and democracy

1. Course Name:	
Human rights and democracy	
2. Course Code:	
UNI006	
3. Semester / Year:	
2026-2025 Second Semester	
4. Description Preparation Date:	
٢٠/02/2026	
5. Available Attendance Forms:	
Presence theoretical	
6. Number of Credit Hours (Total) / Number of Units (Total)	
2 hrs per week -30 hours total / 2 Units	
7. Course administrator's name (mention all, if more than one name)	
Name: noor ameain ahmed Email: noorameain@mu.edu.iq	
8. Course Objectives	
Course Objectives	1. Introduce students to human rights and their duties toward society. 2. Trace the historical roots of human rights and their development throughout the ages. 3. Consolidate the concepts of rights, freedom, and duties of the individual and society. 4. Explain the constitutional articles of the Iraqi Constitution related to human rights to students. 5. Highlight the importance of understanding individual rights in fulfilling their duties to the fullest extent. 6. Shed light on democracy and its various forms
9. Teaching and Learning Strategies	
Strategy	Relying on concrete evidence and examples of human rights and the concept of democracy, which reflects the nature of society and the environment that nurtures the individual. - Teaching students the mechanisms of scientific thinking, analysis, and deduction.

	- Motivating students to identify real-life problems and solve them scientifically. - Brainstorming, which gives students the opportunity to present and discuss their ideas. - Lectures. - Questions and intellectual discussions.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Review the curriculum	Present the course content a study plan to students for compliance	Lectures	no
2	2	Learn about the origins of the concept of human rights.	The most prominent civilizations that emerged in ancient times	Lectures	scussion
3	2	How did human rights appear in the various divine laws?	Iuman rights in the divine lav and religions.	Lectures	scussion
4	2	Learn how the conce of human rights has taken root in Arab countries.	The Universal Declaration o Human Rights	Lectures	Written Exam
5	2	Understanding the types of rights and their areas of application	ıe concept of human rights - Characteristics and types o human rights	Lectures	scussion
6	2	Learn about freedom and the most important meanings in which	public freedoms are used	Lectures	scussion
7	2	Discussing the stages of development of democratic thought in ancient and contemporary countries	historical look at the emerge of democratic thought	Lectures	scussion
8	2	Getting to know contemporary	democratic thought	Lectures	Popular Exam
9	2	Learn about democracy and the most important characteristics that distinguish	a democratic system	Lectures	scussion
10	2	Learn about the most important ways	. Ways in which democracy emerged.	Lectures	Popular Exam

		in which democracy spread.			
11	2	Distinguishing between the most important forms of democracy	Forms of democracy	Lectures	scussion
12	2	Political and Constitutional Foundations	Basic Foundations of Democracy	Lectures	Popular Exam
13	2	Understanding whether there is a conflict between Islam and democracy	Islam and Democracy	Lectures	scussion
14	2	Understanding the manifestations of dictatorial thought	The Dictatorship	Lectures	scussion
15	2	Monocracy	Understanding the meaning o honocracy and distinguishing from democracy	Lectures	Written Exam

11. Course Evaluation

_ Written exams.
- Daily and surprise exams.
- Assessing students' comprehension of the assigned material.
- Oral questions.
- Attempting to apply human rights and the concept of democracy to contemporary reality.

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Human Rights Booklet
Main references (sources)	- Human Rights in Islam by Dr. Ali Abdul Wahid Wafi 2- Human Rights and Democracy by Professor Ali Abboudi Nehme
Recommended books and references (scientific journals, reports...)	Human Rights Book by Dr. Hamid Hanoun, taught to first-year law students
Electronic References, Websites	Sayyid Baqir Sharif al-Qurashi Professor Ali Muhammad Dakhil

Course Description Form Workshops

1. Course Name:	
Workshops	
2. Course Code:	
ENG002	
3. Semester / Year:	
Second semester \2025-2026 / 1st stage	
4. Description Preparation Date:	
20\02\2026	
5. Available Attendance Forms:	
In person	
6. Number of Credit Hours (Total) / Number of Units (Total)	
3 hrs per week - 45 hours total \ 4 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Alaa faris obaid Email: alaafairsobaid@mu.edu.iq	
8. Course Objectives	
Course Objectives	1-Practical training in workshops is fundamental to real-world industrial environments, contributing to the development and enhancement of the technical and manual skills necessary for technicians working in various engineering industries and workshops. 2. A workshop can introduce participants to a new concept, motivating them to explore it independently, or demonstrate practical methods and encourage their application. It is an excellent way to teach practical skills, as it allows participants to experiment with new techniques and learn from mistakes in a safe environment.
9. Teaching and Learning Strategies	
Strategy	1- In the carpentry workshop, students learn about the importance of wood in everyday life – types of wood, their advantages and disadvantages, and applications – in addition to practical carpentry exercises. 2- In the metalworking workshop, students learn about the importance of metalworking, types of metalworking tools, and metalworking techniques, along with practical application. 3- The lathe workshop is one of the workshops where students gain new information about cutting operations. 4- In the plumbing workshop, one of the learning outcomes is learning about the types of plastic pipes used in plumbing installations, their advantages and disadvantages, methods of connecting them, and their classification, whether for sewage, gas pipes, or gutters. 5- In the welding workshop, students learn about the importance of welding technology, which involves joining two inseparable pieces, and gain additional information about the classification of welding types, welding gases, and welding machines.

10.Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1	3	Theoretical explanation of the Metalworking unit, filing tools, and types, and a practical lesson on filing	The metalworking unit includes theoretical and practical lessons.	Theoretical and practical	Class participation
2	3	Explanation of types of saws, drilling machines, and cutting tools + a practical lesson on filing; theoretical explanation	Carpentry includes theoretical and practical lessons	Theoretical and practical	Class participation
3	3	Introduction to the welding workshop + practical application Welding workshop	Carpentry includes theoretical and practic lessons	Theoretical and practical	Class participatio
4	3	Introduction to the welding workshop + practical application Welding workshop	Carpentry includes theoretical and practic lessons	Theoretical and practical	Class participation
5	3	Explanation of the plumbing workshop - Types of plastic pipes, advantages and disadvantages of plastic pipes, practical application of the plumbing workshop	Health includes theoretical and practica lessons	Theoretical and practical	Class participatio
6	3	Plastic pipe welding, pipe classification, and practical application in a sanitary workshop	Health includes theoretical and practical lessons	Theoretical and practical	Class participation
7	3	Galvanized iron pipes and their components: Gas pipelines Practical application in a sanitary workshop	Health includes theoretical and practica lessons	Theoretical and practical	Class participation
8	3	Explanation of the turning workshop, the main parts of lathe machines, and a practical lesson on lathe operation.	The turning operation includes theoretical and practical lessons.	Theoretical and practical	Class participation
9	3	Types of metal cutting tools and the materials used to make them; a practical lesson on turning.	The turning operation includes theoretical and practical lessons	Theoretical and practical	Class participation
10	3	Explanation of a carpentry workshop: Tools used in a carpentry workshop Carpentry - Wood defects: A practical application for carpentry	Carpentry includes theoretical and practical lessons	Theoretical and practical	Class participation
11	3	Types of wood, wood drying, wood defects Practical application of carpentry	Carpentry includes theoretical and practical lessons	Theoretical and practical	ass participati
12	3	Explanation of the bodywork workshop;	Plumbing includes theoretical and practical lessons.	Theoretical and practical	Class participation

		practical application of the plumbing workshop.			
13	3	Plumbing tools + practical application of a plumbing workshop	Plumbing tools + practical application of a plumbing workshop	Theoretical and practical	Class participation
14	3	Comprehensive review of the theoretical curriculum	Comprehensive review of the theoretical curriculum	Theoretical and practical	Class Disscussion
15	3	Comprehensive review of the practical curriculum	Comprehensive review of the practical curriculum	Theoretical and practical	Class Disscussion

11.Course Evaluation

Formative assessment (40%) includes reports, seminars, homework, and surprise quizzes, plus a midterm exam (10%) and a final exam (50%).

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	اساسيات تكنولوجيا الورش – المؤلف احمد زكي حلمي- اللغة العربية اصدار ٢٠٠٧
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form Mathematics-II

1. Course Name:

Mathematics-II

2. Course Code:

ENG005

3. Semester / Year:

2nd Semester 2024-2025

4. Description Preparation Date:

23/2/2026

5. Available Attendance Forms:

Attendance is recorded and managed via the application

6. Number of Credit Hours (Total) / Number of Units (Total):

4 hours per week – 60 hrs total/ 6 Units

7. Course administrator's name (mention all, if more than one name)

Name: Baleegh saud Abdulrazzaq Alobaid
Email: Baleegh.saud@mu.eud.iq

8. Course Objectives

Course Objectives	integration, and applications of integrals, matrices, Solving Systems with Cramer's Rule

9. Teaching and Learning Strategies

Strategy	▪ Different forms of teaching will be used to cover with objectives of the course. PowerPoint presentations for the head titles, definitions, graphs, and many useful illustrations with a summary at the end of each chapter will be presented and discussed. ▪ The PowerPoint contains information about new topics and unsolved examples, and then the whiteboard will be used to solve them and to let students see the solutions.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Definite Integration	Definition, Integral Theorems	Theory & tutorial	Classwork & Homework
2	4	Definite Integration	INTEGRATION-Indefinite Integrals	Theory & tutorial	Classwork & Homework
3	4	Definite Integration	INTEGRATION-Indefinite Integrals	Theory & tutorial	Classwork & Homework
4	4	Definite Integration	INTEGRATION-definite	Theory & tutorial	Classwork & Homework
5	4	Definite Integration	INTEGRATION-definite	Theory & tutorial	Classwork & Homework
6	4	Methods of Integration	Integration by substitution, Trigonometric Integrals & Quadratic Functions	Theory & tutorial	Classwork & Homework
7	4	Methods of Integration	Integration by Parts, Integration by partial fractions.	Theory & tutorial	Classwork & Homework
8	4	Methods of Integration	Integration of Rational Functions, improp integrals.	Theory & tutorial	Classwork & Homework

9	4	applications of integrals	Area between curves	Theory & tutorial	Classwork & Homework
10	4	applications of integrals	Area between curves	Theory & tutorial	Classwork & Homework
11	4	applications of integrals	Volume of Solids: Disk Method	Theory & tutorial	Classwork & Homework
12	4	applications of integrals	Volume of Solids: Washer Method	Theory & tutorial	Classwork & Homework
13	4	Matrices and Determinants	Definition, Properties of Matrices	Theory & tutorial	Classwork & Homework
14	4	Matrices and Determinants	Operations on Matrices, Determinants, and Matrix Inverse	Theory & tutorial	Classwork & Homework
15	4	Matrices and Determinates	Solution of Linear Simultaneous Equation (Gramer's Rule).	Theory & tutorial	Classwork & Homework

11. Course Evaluation

Formative assessment: Quizzes 2; Online assignments 2; Onsite assignments 2; Report 1 **(40%)**
Midterm Exam 1: **10%**
Final Exam: **50%**
Total assessment: **100% (100 Marks)**

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Thomas' Calculus Early Transcendental, Thirteenth Edition.
Main references (sources)	Thomas' Calculus Early Transcendental, Thirteenth Edition.
Recommended books and references (scientific journals, reports...)	5. Calculus: Early Transcendental, Seventh Edition, by James Stewart. 6. University Calculus Early Transcendental, Third Edition, by Joel Hass. 7. Calculus Volume 1, by OpenStax. 8. Schaum's Outline of Beginning Calculus, 2nd Edition, by Elliott Mendelson
Electronic References, Websites	https://openstax.org/details/books/calculus-volume-1. https://engineering.mu.edu.iq/, https://classroom.google.com/u/0/c/NzI2MzMzMzc3MDQ1

Course Description Form Chemistry

1. Course Name:
Chemistry
2. Course Code:
CHE122
3. Semester / Year:
Second \2026
4. Description Preparation Date:
٢٠\2\2026
5. Available Attendance Forms:
Theoretical + practical
6. Number of Credit Hours (Total) / Number of Units (Total)
120 hours in total 5 hrs Theoretical + 3hrs practical \8 units
7. Course administrator's name (mention all, if more than one name)
Name: Ali Salih Email: ali.salih@mu.edu.iq
8. Course Objectives

Course Objectives	Preparing students to use glassware and laboratory equipment and to understand the methods used to calculate the weight and volume of liquid and solid materials. - Knowledge of quantitative and qualitative analysis, weight, volume, molarity, normal distribution and the relationship between them, in addition to the function of acids and volumetric and gravimetric analysis in chemical engineering... in addition to knowledge of organic materials, their properties, production methods and chemical reactions.
9. Teaching and Learning Strategies	
Strategy	Traditional, modern and electronic teaching methods

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	8	Introduction to Chemistry	Introduction to Chemistry	lecture	lass participati
2	8	Equivalent weight,Mole ,Atomic weight ,Molecular weight	Equivalent weight,Mole ,Atomic weight ,Molecular weight	lecture	lass participati
3	8	Molarity and Normality and relation between them	Molarity and Normality and relatior between them	lecture	Homework
4	8	Chemical Stoichiometr	Chemical Stoichiometry	lecture	Exam
5	8	Density and specific gravity ,Weight Percentagee	Density and specific gravity ,Weigh Percentagee	lecture	Homework
6	8	Acid – base equilibria and pH of solutions	Acid – base equilibria and pH of solutions	lecture	Exam
7	8	Calculation of pH of aqueous solution & salt of weak acid and strong base	alculation of pH of aqueous solution salt of weak acid and strong base	lecture	lass participati
8	8	Calculation of the pH of buffer solution	Calculation of the pH of buffer soluti	lecture	Exam

9	8	Analysis of samples by titration with standard solution	Analysis of samples by titration with standard solution	lecture	Homework
10	8	Direct titration and back titration	Direct titration and back titration	lecture	Report
11	8	Organic chemistry	Organic chemistry	lecture	lass participati
12	8	Learn about alkanes, a type of organic compound, their properties, production methods, and reactions.	Alkanes	lecture	Exam
13	8	Learn about Alkenes, a type of organic compound, their properties, production methods, and reactions.	Alkenes	lecture	Report
14	8	Learn about Alkynes, a type of organic compound, their properties, production methods, and reactions.	Alkynes	lecture	Homework
15	8	Learn about Aromatic, a type of organic compound, their properties, production methods, and reactions.	Aromatic	lecture	Homework

11. Course Evaluation
Daily tests Monthly exams Lab reports Class participation

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Chemistry by (Melvin Winokur(
Main references (sources)	1-Skoog A. Douglas ,"Fundamental of Analytical Chemistry ",8 th edition ,Canada (2004) 2-Daniel C .Harris ,"Quantitative chemical Analysis", 6 th edition , U.S. (2003). 3- Raymond chang ,"Essential chemistry ", 2nd edition, Mc Graw –Hill (2000). 4-Organic Chemistry 2010 by Saibal Kanti Bhattacharjee Robert Thornton Morrison , Robert Neilson Boyd
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form Chemical Engineering Principles II

1. Course Name:	
Chemical Engineering Principles II	
2. Course Code:	
CHE123	
3. Semester / Year:	
1st Level \ 2nd Course	
4. Description Preparation Date:	
15\2\2026	
5. Available Attendance Forms:	
Theoretical – In person	
6. Number of Credit Hours (Total) / Number of Units (Total)	
4 hrs per week - 60 hrs total / 8 Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Prof. Dr. Ahmed Hassan Ali Email: dr.ahmedha@mu.edu.iq	
8. Course Objectives	
Course Objectives	1. Understand the properties of gases*: Describe the physical and thermodynamic properties of gases, including ideal gas behavior, real gas behavior, and gas mixtures. 2. Apply gas laws and equations of state*: Apply gas laws, such as the ideal gas law, and equations of state, such as the van der Waals equation, to solve problems involving gases. 3. Analyze gas processes and cycles*: Analyze and evaluate gas processes, such as compression, expansion, and heat transfer, and gas cycles, such as the Otto cycle and the Diesel cycle. 4. Understand combustion fundamentals*: Describe the principles of combustion, including combustion reactions, stoichiometry, and thermodynamics. 5. Apply combustion principles to systems*: Apply combustion principles to analyze and design combustion systems, such as internal combustion engines, gas turbines, and furnaces. 6. Evaluate combustion performance*: Evaluate the performance of combustion systems, including efficiency, emissions, and safety. 7. Understand gas kinetics and chemical equilibrium*: Describe the principles of gas kinetics and chemical equilibrium, and apply them to combustion reactions. 8. Analyze gas mixtures and combustion products*: Analyze and evaluate the properties and behavior of gas mixtures and combustion products. 9. Apply gas and combustion principles to real-world problems*: Apply gas and combustion principles to solve real-world problems, such as energy production, environmental control, and safety. 10. Communicate gas and combustion concepts and results*: Effectively communicate gas and combustion concepts, results, and recommendations to technical and non-technical audiences.

9. Teaching and Learning Strategies

Strategy	1. Lecture-discussion*: Use lectures to introduce key concepts and principles, followed by discussions to encourage critical thinking and problem-solving. 2. Problem-solving sessions*: Provide students with practice problems and have them work in groups to solve them, encouraging collaboration and peer-to-peer learning. 3. Case studies*: Use real-world examples to illustrate gas and combustion concepts and have students analyze and solve problems related to the case study. 4. Group projects*: Assign group projects that require students to apply gas and combustion principles to a real-world problem or scenario. 5. Flipped classroom*: Assign video lectures or readings for students to complete outside of class, and use class time for problem-solving, discussions, and group work. 6. Active learning*: Encourage students to participate in class discussions, ask questions, and engage in problem-solving activities. 7. Collaborative learning*: Encourage students to work in groups to solve problems and complete projects. 8. Problem-based learning*: Use real-world problems to teach gas and combustion concepts and principles. 9. Inquiry-based learning*: Encourage students to explore and investigate gas and combustion concepts through hands-on activities and experiments. 10. Reflective learning*: Encourage students to reflect on their learning and identify areas where they need more practice or review.

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Explaining the combustion (general concepts).	Combustion	Lecture	Class work
2	4	Explaining the combustion by different example used in mathematical and engineering calculations.	Combustion	Lecture	Class work
3	4	Explaining the ideal gas (general concepts).	Ideal gas	Lecture	Class work
4	4	Explaining the ideal gas law by different example used in mathematical and engineering calculations.	Ideal gas	Lecture	Class work
5	4	Evaluations monthly examination	Combustion and ideal gas	Examination	Monthly examination
6	4	Explaining the ideal gas mixture (general concepts).	Ideal gas mixture	Lecture	Class work
7	4	Explaining the ideal gas mixture by different example used in mathematical and engineering calculations.	Ideal gas mixture	Lecture	Class work
8	4	Evaluations midyear xamination	Combustion , ideal gas , ideal gas mixture	Examination	examination

9	4	Explaining the real gas (general concepts).	Real gas	Lecture	Class work
10	4	Explaining the real gas by different example used in mathematical and engineering calculations.	Real gas	Lecture	Class work
11	4	Explaining the real gas mixture (general concepts).	Real Gas Mixture	Lecture	Mid course examination
12	4	Explaining the real gas mixture by different example used in mathematical and engineering calculations.	Real Gas Mixture	Lecture	Quiz
13	4	Explaining the real gas mixture (general concepts).	Vander Waals equation	Lecture	Class work
14	4	Practical examples of calculating parameters of Vander Waals equations	Vander Waals equation	Lecture	Monthly examination
15	4	Explaining the real gas mixture (general concepts).	Compressibility factor	Lecture	Class work

11.Course Evaluation

Home work , class work , quizzes , monthly examination , mid-course examples , reports

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Nill
Main references (sources)	David M. Himmelblue and James B. Riggs, Basic Principles and Calculations in Chemical Engineering.
Recommended books and references (scientific journals, reports...)	Coulson & Richardson's, Chemical Engineering, Volume 1.
Electronic References, Websites	Any websites including information about chemical reaction

Second Year
First Semester

No.	Subject	Weekly hours			Units/ECTS
		Th.	Tut.	Lab./Pr.	
1	The Crimes of the Baath regime	2	--	--	2.00
2	Engineering Statistics	1	1	---	2.00
3	Engineering Mathematics I	3	1	---	4.00
4	Fluid Flow I	2	1	2	6.00
5	Physical chemistry I	2	1	2	6.00
6	Chemical Eng. Principle III	3	1	---	6.00
7	Pollution	2	---	---	4.00
	Total	15	5	4	30
		24			

Course Description Form: Crimes of the Ba'ath Party regime

1. Course Name:
crimes of the Ba'ath Party regime
2. Course Code:
UNI0010
3. Semester / Year:
Second Semester - Academic Year 2025-2026
4. Description Preparation Date:
1/02/2026
5. Available Attendance Forms:
Theoretical
6. Number of Credit Hours (Total) / Number of Units (Total)
2 hours per week - 30 hours per semester - 2 units
7. Course administrator's name (mention all, if more than one name)
Name: Assist. Lecturer Noor Ameen Ahmed Email: noorameain@mu.edu.iq
8. Course Objectives

Course Objectives	Enabling students to learn about the numerous crimes committed by the dissolved Ba'ath regime against various components and segments of the Iraqi population, to build awareness among students to reject all forms of injustice and oppression perpetrated by these dictatorial regimes and to demand all civil and political rights guaranteed by the constitution. • Familiarizing students with the content of local and international laws that guarantee human rights and freedom of expression, as well as raising their level of legal literacy to reject any form of violations within and outside their home country. • Familiarizing students with the laws of the International Criminal Court and the laws of the Iraqi High Criminal Court of 2005, which document the violations of humanity committed by the defunct Ba'ath regime during its rule.

9. Teaching and Learning Strategies	
Strategy	Giving lectures, using discussion and dialogue methods, brainstorming, quick tests

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2hour	Introducing students to the crimes of the Baath regime	Crimes of the Ba'ath regime according to the Iraqi Supreme Criminal Court Law	giving a lecture	Questions and Answers
2	2hour	Distinguishing between the concept and types of crimes	Distinguishing between the concept and types of crimes	giving a lecture	uestions and Answ
3	2hour	Clarifying the term and language	arifying the term and language	giving a lecture	uestions and Answ
4	2hour	Understanding the types of crim	Understanding the types of crime	giving a lecture	uestions and Answ
5	2hour	Understanding the types of international crimes	derstanding the types of internati crimes	giving a lecture	uestions and Answ
6	2hour	Understanding the decisions issued by the International Criminal Court	Understanding the decisions issued by the International Criminal Court	giving a lecture	uestions and Answ

7	2hour	Understanding the decisions issued by the International Criminal Court	nderstanding psychological and so crimes and the most	giving a lecture	uestions and Answ
8	2hour	prominent violations of the Ba'ath Party	ominent violations of the Ba'ath P	giving a lecture	uestions and Answ
9	2hour	Identifying psychological crimes	Identifying psychological crimes	giving a lecture	uestions and Answ
10	2hour	Identifying the mechanisms of psychological crimes	Identifying the mechanisms of psychological crimes	giving a lecture	uestions and Answ
11	2hour	Identifying the effects of psychological crimes	entifying the effects of psycholog crimes	giving a lecture	Questions and Answers
12	2hour	Identifying social crimes	Identifying social crimes	giving a lecture	Questions and Answers
13	2hour	Clarifying the concept of militarization of society	Clarifying the concept of militarization of society	giving a lecture	Questions and Answers
14	2hour	Clarifying the concept of militarization of society	Clarifying the concept of militarization of society	giving a lecture	Questions and Answers
15	2hour	dentifying forms of human rights violations	dentifying forms of human rights violations	giving a lecture	Questions and Answers

11.Course Evaluation

The grade is distributed according to the Bologna Track system. The final grade is out of 100, but (50) grades are for the tasks assigned to the student, such as daily attendance, daily, oral and monthly exams, and the final exam out of 50, so the final grade is out of 100.

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	**Baath regime crimes in Iraq**
Main references (sources)	**Archives of the Political Prisoners Foundation.**
Recommended books and references (scientific journals, reports...)	**The cognitive foundation for studying the crimes of the Baath Party.**
Electronic References, Websites	**Magazines publishing Baath Party crimes - Crime Archi Baath and Saddam's Qadisiya.**

Course Description Form Engineering Statistics

1. Course Name:	
Engineering Statistics	
2. Course Code:	
ENG00٤	
3. Semester / Year:	
٢nd Semester/2nd year	
4. Description Preparation Date:	
01/09/2025	
5. Available Attendance Forms:	
Students' attendance is recorded in the classroom and on Excel sheet lists based on the number of lectures and according to the dates in the schedule, and is sent weekly to the Absences Committee.	
6. Number of Credit Hours (Total) / Number of Units (Total)	
2 hours weekly / 30 hours for the semester / 2 Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Prof. Dr. Haider Tawfiq Naeem Email: haidertn@mu.edu.iq	
8. Course Objectives	
Course Objectives	1. Definition of the basic concepts in statistics. 2. Knowledge of the tools and methods used in the descriptive statistics represented in the collecting data methods, the questionnaire, tabular and graphical presentation of data. 3. The ability to make the necessary calculations to arrive at the various metrics that highlight the basic characteristics of the phenomenon, such as measures of central tendency, as well as measures of dispersion. 4. Understand the ideas of probability and the basic probability distributions including discrete and continuous, simple regression and coloration – time series (general trend equation) – index number. 5. Using appropriate statistical package (such as SPSS, Excel) to fit mathematical models.
9. Teaching and Learning Strategies	
Strategy	▪ Teaching through the pattern, whether it is the visual (verbal) pattern or the sensory (kinetic) pattern. ▪ Education using mini-lessons, where the scientific curriculum is divided into main ideas and then taught to the student in the form of successive lectures, and each lecture deals with only one idea. ▪ Cooperative learning where the students are divided into small groups and a specific issue is presented to them and students are given the opportunity to solve this issue in cooperation with each other. ▪ Adopting the method of delivering lectures and linking each topic with examples from the reality of the statistician's work Practical exercises that are discussed by the students and solved during the lecture and with the participation of all students in the division with the professor to give the subject a kind of interaction.

10.Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1	2	Introduction-Description and Classification of Data	Description and Classificatior Data	Lecture	H.W.
2	2	Explain Frequency Distribution	Frequency Distribution	Lecture	H.W.
3	2	Explain Cumulative Frequency Distribution	umulative Frequency Distributi	Lecture	C.W.
4	2	Finding Frequency Histogram, Frequency Polygon & Frequency Curve and Relative Frequency	requency Histogram, Frequenc Polygon	Lecture	Quiz
5	2	Finding Mathematical Mean, Mode, Geometri Mean and Harmonic Me	Measurements of Central Tendency	Lecture	H.W.
6	2			Lecture	H.W.
7	2	inding Standard Deviatic Variance, efficient of Variance, Ra d Mean Absolute Deviat	Measures of Dispersion	Lecture	C.W.
8	2			Lecture	Quiz
9	2	Explain Theory of Probability	Theory of Probability	Lecture	H.W.
10	2			Lecture	H.W.
11	2	Explain Permutation and Combination	Permutation and Combination	Lecture	C.W.
12	2	Finding Statistical Probability Distributions	tatistical Probability Distributic	Lecture	Quiz
13	2	Finding (Poisson Distribution, Binomial and Normal Distribution)	oisson Distribution, Binomial a Normal Distribution)	Lecture	H.W.
14	2	Explain Sampling and Testing of Significant	mpling and Testing of Signific	Lecture	H.W.
15	2	Introduce Chi-Square Distribution and Linear Correlation and regression.	hi-Square Distribution and Lin Correlation and regression.	Lecture	C.W
11.Course Evaluation					
Homework, Classwork, Quizzes, Oral questions, Repots, Mid Exam, Final Exam Course Evaluation: ٥0%					

Final Exam: 50%	
12.Learning and Teaching Resources	
Required textbooks (curricular books, any)	• مبادئ الاحصاء ٢٠٠٨ , الدكتور احمد سمعة طيبة • الاحتماليات والاحصاء مترجم د.موري شيلر ٢٠٠٣
Main references (sources)	• Allan G. Bluman - Elementary Statistics_ A Step-By-Step Approach. 9th ed.-McGraw-Hill Ed (1) • Douglas C. Montgomery, George C. Runger - Applied Statistics and Probability for Engineers-Wiley (2018)
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form: Engineering Mathematics I

1. Course Name:	
Engineering Mathematics I	
2. Course Code:	
CHE211	
3. Semester / Year:	
1st Semester / 2nd year	
4. Description Preparation Date:	
1/02/2026	
5. Available Attendance Forms:	
Students' attendance is recorded in the classroom and on Excel sheet lists based on the number of lectures and according to the dates in the schedule, and is sent weekly to the Absences Committee.	
6. Number of Credit Hours (Total) / Number of Units (Total)	
4 hours weekly/ 60 hours for the semester / 4 Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Asst. Prof. Dr. Rafea Dakhil Hussein Email: rafea.dakhil@mu.edu.iq	
8. Course Objectives	
Course Objectives	The mathematics course promotes mathematical skills and knowledge, effectiveness in developing proficiency in analytical reasoning, and utility in modeling and solving real-world problems. To responsibly live within and participate in the transformation of a rapidly changing, complex, and interdependent society, students must develop and unceasingly exercise their analytical abilities.
9. Teaching and Learning Strategies	
Strategy	Department's program assessment outcomes, by the end of this course you should demonstrate the following relevant to the mathematics course: • Students will recognize problem-solving techniques • appropriate to a given situation, including the development of mathematical models the identification of assumptions, the understanding of the limitations of models, and the use of both graphical and numerical methods. • describe mathematical ideas from multiple perspectives • explain fundamental mathematical concepts or analyses of real-world problems to non-mathematicians. Group assignments in the classroom, the students will practice solving some questions; Homework, the students will practice solving questions on his/her own. Pop quizzes will cover the material previously discussed in class. The monthly arranged exam will cover specific topics from the lectures. The final exam will cover all materials which were discussed in class.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Explain Polar coordinates	Polar coordinates	Lecture	H.W.
2	4	Determine the area in polar coordinates	Areas and lengths in Polar coordinates	Lecture	H.W.
3	4	Finding area between polar curves	Area between polar curves	Lecture	C.W.
4	4	Estimating the length of a polar cu	Length of a polar curve	Lecture	Quiz
5	4	Learning Vectors	Vectors	Lecture	H.W.
6	4	Finding the dot product of vectors	The Dot product of vectors	Lecture	H.W.
7	4	Finding the cross product of vectors	The cross product of vectors	Lecture	C.W.
8	4	Understanding partial derivatives	Partial Derivatives	Lecture	Quiz
9	4	Determine the first and second order partial derivatives	First and second – order Partial Derivatives	Lecture	H.W.
10	4	Explain the chain rule	The Chain Rule	Lecture	H.W.
11	4	Finding the directional derivatives and gradient vectors	irectional Derivatives and Gradient Vect	Lecture	C.W.
12	4	Understanding the multiple Integrals	Multiple Integrals	Lecture	Quiz
13	4	Calculating the double integrals in cartesian coordinates	Double integrals in Cartesian coordinates	Lecture	H.W.
14	4	Calculating the double integrals in polar form	Double integrals in Polar form	Lecture	H.W.
15	4	Learning the triple integrals	Triple Integrals	Lecture	C.W

11. Course Evaluation

Homework, Classwork, Quizzes, Oral questions, Repots, Mid Exam, Final Exam
Course Evaluation: 50
Final Exam: 50

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• James Stewart, Calculus, Early Transcendentals, 7th Edition Brooks Cole (2012)
Main references (sources)	Thomas' Calculus, Thirteenth Edition George B Thomas, Massachusetts Institute of Technology - 2013.
Recommended books and references (scientific journals, reports...)	• Gilbert Strang, Edwin Herman, Calculus Volume 1 by OpenStax (2016)
Electronic References, Websites	

Course Description Form Fluid flow I

1. Course Name:
Fluid flow I
2. Course Code:
CHE212
3. Semester / Year:
1st semester / Second Year
4. Description Preparation Date:
10/9//2025
5. Available Attendance Forms:
Students' attendance is recorded in the classroom and in the Excel lists, based on the number of lectures and the dates in the schedule, and is sent weekly to the Absences Committee.
6. Number of Credit Hours (Total) / Number of Units (Total)
3 hours Theoretical – 2 hrs Lab /75 hours for the semester/6 Units
7. Course administrator's name (mention all, if more than one name)
Name: Hayder Kareem Sakran Email: hayder_sakran@mu.edu.iq
8. Course Objectives

Course Objectives	1.Introducing the student the fundamental principles of fluid flow and properties of fluid flow 2. In the process industries, many of the materials are in fluid form and must be stored, handled, pumped, and processed. 3. The fluid mechanics can be divided into two branches; "Fluid static" that means fluid at rest, and "Fluid dynamics" that means fluid in motion.
9. Teaching and Learning Strategies	
Strategy	The main strategy that will be adoped in the delivering this subject is to encourage student the basic of fluid flow to enhance engineering thinking skills through interactive classes and tutorials

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	5	To know the physical properties of fluid	Physical Properties of Fluids	lecture	H.W
2	5	Understand the shear stress	The shear stress	lecture	H.W
3	5	To distinguish between the ideal and real fluid	Ideal and real fluid	lecture	H.W
4	5	To described the flow pattern	Flow Patterns	lecture	Quiz
5	5	To study the effect of viscosity	wton's Law of Viscosity and Momen Transfer	lecture	H.W
6	5	To explain the dimensional analysis	Dimensional Analysis	lecture	H.W
7	5	To use the methods in the fluid flow	Methods of Dimensional Analysis	lecture	Exam
8	5	To use in the fluid flow	Buckingham's method (or Π-Theorem)	lecture	H.W

9	5	To application in the fluid flow	Fluid Static and Its Applications	lecture	H.W
10	5	To know the device for fluid flow measurement	Measurement of Fluid Pressure	lecture	H.W
11	5	To compare with fluid flow	Mechanical Gauges	lecture	Quiz
12	5	To know the dynamic fluid flow	Fluid Dynamic	lecture	H.W
13	5	To use the momentum fluid flow	Overall Mass Balance and Continuity Equation	lecture	Exam
14	5	To use Bernoulli's Equation	Equations of Motion	lecture	H.W
15	5	The application of Bernoulli's Equation	Modification of Bernoulli's Equation	lecture	H.W

11.Course Evaluation

Quizzes,Homework ,Siminars,Month exams,Final exam ,Oral questions and Open questions that have adefinite answer
Course evaluation (50%)
Final Exam (50%)

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Lectures Coulson, J.M. and J.F. Richardson, "Chemical Engineering", Vol.I " Fluid Flow, Heat Transfer, and Mass Transfer" 5th edition, (1998).
Main references (sources)	Holland, F.A. "Fluid Flow for Chemical Engineers" Arnold, (1980).
Recommended books and references (scientific journals, reports...)	hurmi, R.S. "A Text Book of Fluid Mechanics" 4th edition S.Chand & Company (Pvt.) LTD, (1987).
Electronic References, Websites	

Course Description Form Physical Chemistry I

1. Course Name:
Physical chemistry I
2. Course Code:
CHE213
3. Semester / Year:
1st semester - Second Year
4. Description Preparation Date:
10/9/2025
5. Available Attendance Forms:
Students' attendance is recorded in the classroom and on the Excel lists based on the number of lectures and according to the dates in the schedule, and is sent weekly to the Absences Committee.
6. Number of Credit Hours (Total) / Number of Units (Total)
3 hours Theoretical – 2 hrs Lab /75 hours for the semester/6 Units
7. Course administrator's name (mention all, if more than one name)
Name: Thabit Fadhil Email: thabit.fadil@mu.edu.iq
8. Course Objectives

Course Objectives	1.Introducing the student a reaction that can go in both forward and backward directions simultaneously is called a reversible reaction 2. In the process industries, many of the materials are in physical chemistry form and must be stored, handled, pumped, and processed. 3. At a particular point, the rates of both forward and reverse reactions become equal, and at this point, the system attains a state of equilibrium.
9. Teaching and Learning Strategies	
Strategy	The main strategy that will be adoped in the delivering this subject is to encourage student the basic of fluid flow to enhance engineering thinking skills through interactive classes and tutorials

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	5	o know the Chemical equilibriu	Chemical equilibrium	lecture	H.W
2	5	nderstand the Reversible reacti	Reversible reaction	lecture	H.W
3	5	Nature of chemical equilibrium	Nature of chemical equilibrium	lecture	H.W
4	5	To described chemical equilibrium	Characteristics of chemical equilibrium	lecture	Quiz
5	5	o study the first ,second order c reaction	The kinetic reaction	lecture	H.W
6	5	explain the Fractional life meth	Fractional life method	lecture	H.W

7	5	To use the methods in half-life time	Reaction order by half-life time	lecture	Exam
8	5	Effect of increase of temperature on reaction rate	Effect of increase of temperature on reaction rate	lecture	H.W
9	5	To application in the activation energy	Calculation of activation energy using Arrhenius equation	lecture	H.W
10	5	To know the Phase equilibrium	Phase equilibrium	lecture	H.W
11	5	The Clapeyron equation	The Clapeyron equation	lecture	Quiz
12	5	To know the Clausius-Clapeyron equation	The Clausius-Clapeyron equation	lecture	H.W
13	5	To use the Phase rule	Phase rule	lecture	Exam
14	5	To use example about phase rule	Examples	lecture	H.W
15	5	The application of Henry constant	Henry constant	lecture	H.W

11.Course Evaluation

Quizzes,Homework ,Siminars,Month exams,Final exam ,Oral questions and Open questions that have adefinite answer
Course evaluation (50%)
Final Exam (50%)

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Lectures Mathematics for Physical Chemistry Third Edition Robert G. Mortimer Department of Chemistry Rhodes College Memphis, Tennessee
Main references (sources)	*Physical Chemistry, Fourth Edition,* Robert J. Silbey ,2005
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form Chemical Eng. Principle III

1. Course Name:
Chemical Eng. Principle III
2. Course Code:
CHE 214
3. Semester / Year:
1st. Semester / 2025-2026
4. Description Preparation Date:
10/9/2025
5. Available Attendance Forms:
Recorded every week using Bologna process account
6. Number of Credit Hours (Total) / Number of Units (Total)
4 hrs. Weekly / 60 hrs. for the year / 6 Units
7. Course administrator's name (mention all, if more than one name)
Name: Prof. Dr. Ahmed Hassan Ali Email: dr.ahmedha@mu.edu.iq
8. Course Objectives

Course Objectives	• Understand the basic concepts of Chemical Eng. Principle. • Understand methods for calculating energy balance , enthalpy changes , heat of combustion and heat of formation • Understanding the concepts of humidity charts and unsteady state energy balance.

9. Teaching and Learning Strategies	
Strategy	• Developing comprehension and understanding skills. • Developing calculations and engineering skills. •Developing relationships with friends to solve problems collaboratively.

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Studying the basics of Chemical Eng. Principle	Introduction	Theoretical	Discussion
2	4	Explain examples	The first law of thermodynamics	Theoretical	Quiz
3	4	Explain about the types of energy	Work , Heat, Kinetic energy ,Potentia energy and Internal energy	Theoretical	Report
4	4	Explain closed system energy	Energy balance : Closed system	Theoretical	Quiz
5	4	Explain open system energy	Energy balance : Open system	Theoretical	Discussion
6	4	Applications for energy balance calculations.	Enthalpy calculations as a result of temperature	Theoretical	Discussion

7	4	Explain Enthalpy chang because of mixing	Enthalpy change because of mixing	Theoretical	H.W.
8	4	Explain Enthalpy changes for phase transitions	Enthalpy changes for phase transition	Theoretical	Quiz
9	4	Understanding the energy balance with reaction	Heat of reaction	Theoretical	Discussion
10	4	Explain Heat of formation	Heat of formation	Theoretical	Discussion
11	4	Understanding the Heat of Combustion	Heat of Combustion	Theoretical	Report
12	4	Explain the Unsteady state energy balance	Unsteady state energy balance	Theoretical	Discussion
13	4	Explain the Unsteady state energy balance	Unsteady state energy balance	Theoretical	H.W.
14	4	Explanation of Psychometric charts	Humidity Charts	Theoretical	Quiz
15	4	Explanation of Psychometric charts	Humidity Charts	Theoretical	Quiz

11.Course Evaluation

Daily, monthly and final exams, reports, class assignments and homework.
Formative assessment : 40 %
Summative assessment: 10% Mid exam. and 50% Final exam.

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Basic principles and calculations in chemical engineering
Main references (sources)	Elementary Principles of Chemical Processes, R.M.Felder and R.W.Rousseau
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form Pollution

1. Course Name:
Pollution
2. Course Code:
CHE 234
3. Semester / Year:
1st semester/2nd year
4. Description Preparation Date:
10/09/2025
5. Available Attendance Forms:
Attendance is recorded and managed via the application
6. Number of Credit Hours (Total) / Number of Units (Total)
2 hours per week – 30 hrs total /4 unit
7. Course administrator's name (mention all, if more than one name)
Name: Ali Salih Email: ali.salih@mu.edu.iq
8. Course Objectives

Course Objectives	Defining the concept of environmental pollution and its pollutants in general, then discussing air pollution and methods of treating it, water pollution and methods of treating it, then addressing the topics of renewable energy.
9. Teaching and Learning Strategies	
Strategy	▪ Different forms of teaching will be used to cover with objectives of the course. PowerPoint presentations for the head titles, definitions, graphs, and many useful illustrations with a summary at the end of each chapter will be presented and discussed. ▪ The PowerPoint contains information about new topics and unsolved examples, and then the whiteboard will be used to solve them and to let students see the solutions.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Environment definition	Environment pollution	Theory	Classwork & Homework
2	2	Environment definition	Climate change and greenhouse effect	Theory	Classwork & Homework
3	2	Environment definition	Acid rain	Theory	Classwork & Homework
4	2	Air pollution	Air pollution	Theory	Classwork & Homework
5	2	Air pollution	Wet Collection scrubbers	Theory	Classwork & Homework
6	2	Air pollution	The fabric filter and EPA	Theory	Classwork & Homework
7	2	Water pollution	Water pollution	Theory	Classwork & Homework

8	2	Water pollution	Water treatment	Theory	Classwork & Homework
9	2	Renewable energy	Renewable energy	Theory	Classwork & Homework
10	2	Renewable energy	Types of renewable energy	Theory	Classwork & Homework
11	2	Renewable energy	Environment pollution	Theory	Classwork & Homework
12	2	Air pollution	Climate change and greenhouse effect	Theory	Classwork & Homework
13	2	Water pollution	Acid rain	Theory	Classwork & Homework
14	2	Air pollution	Air pollution	Theory	Classwork & Homework
15	2	Water pollution	Wet Collection scrubbers	Theory	Classwork & Homework

11. Course Evaluation

Formative assessment: Quizzes 2; Online assignments 2; Onsite assignments 2; Report 1 (40%)
Midterm Exam 1: 10%
Final Exam: 50%
Total assessment: 100% (100 Marks)

12. Learning and Teaching Resources

Required textbooks	
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Second Year
Second Semester

No.	Subject	Weekly hours			Units/ ECTS
		Th.	Tut.	Lab./Pr.	
1	English Language II	2	---	---	2.00
2	Computer II	1	1	2	3.00
3	Engineering Mathematics II	3	1	---	6.00
4	Fluid Flow II	2	1	2	6.00
5	Physical Chemistry II	2	1	2	6.00
6	Properties Of Materials	2	1	--	5.00
7	Arabic language	2	--	--	2.00
	Total	**14**	**5**	**6**	**30**

Course Description Form English Language II

1. Course Name:
English Language II
2. Course Code:
UNI002
3. Semester / Year:
2nd Semester / 2025-2026
4. Description Preparation Date:
20/02/2026
5. Available Attendance Forms:
Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
2 hrs per week – in total 30 hrs. /2 ECTS
7. Course administrator's name (mention all, if more than one name)
Name: Ahmed Raad Email: ahmad_al_iraqi2000@mu.edu.iq
8. Course Objectives

Course Objectives	**This course aims to develop students' skills in speaking English, reading, listening, and writing articles, report, and learning Grammar**

9. Teaching and Learning Strategies	
Strategy	**An ability to apply knowledge of English Language; Reading, Writing, Speaking and Listening**

10. Course Structure

Week	*Hours*	*Required Learning Outcomes*	*Unit or subject name*	*Learning method*	*Evaluation method*
Week-1	*2*	*D4, D3, D2, D1*	Tenses		Quiz
Week-2	*2*	*D4, D3, D2, D1*	Present Simple		*Report*
Week-3	*2*	*D4, D3, D2, D1*	Past Simple		*Seminar*
Week-4	*2*	*D4, D3, D2, D1*	Past Tenses		*Exam*
Week-5	*2*	*D4, D3, D2, D1*	Have to		Quiz
Week-6	*2*	*D4, D3, D2, D1*	*Future Form*		*Report*
Week-7	*2*	*D4, D3, D2, D1*	Information Questions		*Seminar*
Week-8	*2*	*D4, D3, D2, D1*	The Present Perfect		*Exam*
Week-9	*2*	*D4, D3, D2, D1*	The Present Perfect		Quiz
Week-10	*2*	*D4, D3, D2, D1*	articles		*Report*
Week-11	*2*	*D4, D3, D2, D1*	Writing emails		*Seminar*
Week-12	*2*	*D4, D3, D2, D1*	Conditional		*Exam*
Week-13	*2*	*D4, D3, D2, D1*	Conditional		Quiz
Week-14	*2*	*D4, D3, D2, D1*	Model Verbs		*Report*
Week-15	*2*	*D4, D3, D2, D1*	Midterm		*Exam*

11. Course Evaluation
Quiz; 15 Mark, Report; 10 Mark, Exam; 10 Mark, Seminal; 5 Marks
12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	New Headway post intermediate

Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form Computer II

1. Course Name:
Computer2
2. Course Code:
UNI005
3. Semester / Year:
2nd / 2025-2026
4. Description Preparation Date:
20/2/2026
5. Available Attendance Forms:
Practical - Theoretical
6. Number of Credit Hours (Total) / Number of Units (Total)
60 hrs – 4 hrs per week / 3 Units
7. Course administrator's name (mention all, if more than one name)
Name: dawood zahi khutar Email: dawoodzahi@mu.edu.iq
8. Course Objectives
Course Objectives: This course aims to pave the way for students to learn how to u MATLAB and equip them with the necessary tools to master it in th respective fields. This is achieved by explaining the progra fundamentals and progressing to advanced steps such as solvi various mathematical equations, conditional statements, repetitio and 2D and 3D plotting.
9. Teaching and Learning Strategies
Strategy The applications are explained in the theoretical section and th continuously applied practically.
10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	**Introduction to matlab**		**Practical - Theoretic**	
2	4	**Data type**		**Practical - Theoretic**	
3	4	**Matrices**		**Practical -**	

				Theoretic	
4	4	**management of matrices**		**Practical - Theoretic**	
5	4	**First month exam**		**Practical - Theoretic**	
6	4	**operations of matrices**		**Practical - Theoretic**	
7	4	**conditions**		**Practical - Theoretic**	
8	4	**iteration**		**Practical - Theoretic**	
9	4	**Mid exam**		**Practical - Theoretic**	
10	4	**2d drawing**		**Practical - Theoretic**	
11	4	**3d drawing**		**Practical - Theoretic**	
12	4	**Advanced application matlab**		**Practical - Theoretic**	
13	4	**Second month exam**		**Practical - Theoretic**	

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)

Main references (sources)

Recommended books and references (scientific journals, reports...)

Electronic References, Websites

Course Description Form Engineering Mathematics II

1. Course Name:
Engineering Mathematics II
2. Course Code:
CHE221
3. Semester / Year:
2nd Semester/2nd year
4. Description Preparation Date:
01/02/2026
5. Available Attendance Forms:
Students' attendance is recorded in the classroom and on Excel sheet lists based on the number of lectures and according to the dates in the schedule, and is sent weekly to the Absences Committee.
6. Number of Credit Hours (Total) / Number of Units (Total)
4 hours weekly/ 60 hours for the semester / 6 Units
7. Course administrator's name (mention all, if more than one name)
Name: Asst. Prof. Dr. Rafea Dakhil Hussein Email: rafea.dakhil@mu.edu.iq
8. Course Objectives

Course Objectives	The mathematics course promotes mathematical skills and knowledge, effectiveness in developing proficiency in analytical reasoning, and utility in modeling and solving real-world problems. To responsibly live within and participate in the transformation of a rapidly changing, complex, and interdependent society, students must develop and unceasingly exercise their analytical abilities.

9. Teaching and Learning Strategies

Strategy	Department's program assessment outcomes, by the end of this course you should demonstrate the following relevant to the mathematics course: • Students will recognize problem-solving techniques • appropriate to a given situation, including the development of mathematical models the identification of assumptions, the understanding of the limitations of models, and the use of both graphical and numerical methods. • describe mathematical ideas from multiple perspectives • explain fundamental mathematical concepts or analyses of real-world problems to non-mathematicians. Group assignments in the classroom, the students will practice solving some questions; Homework, the students will practice solving questions on his/her own. Pop quizzes will cover the material previously discussed in class. The monthly arranged exam will cover specific topics from the lectures. The final exam will cover all materials which were discussed in class.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Explain Polar coordinates	Polar coordinates	Lecture	H.W.
2	4	Determine the area in polar coordinates	Areas and lengths in Polar coordinates	Lecture	H.W.

3	4	Finding area between polar curves	Area between polar curves	Lecture	C.W.
4	4	Estimating the length of a polar cu	Length of a polar curve	Lecture	Quiz
5	4	Learning Vectors	Vectors	Lecture	H.W.
6	4	Finding the dot product of vectors	The Dot product of vectors	Lecture	H.W.
7	4	Finding the cross product of vectors	The cross product of vectors	Lecture	C.W.
8	4	Understanding partial derivatives	Partial Derivatives	Lecture	Quiz
9	4	Determine the first and second order partial derivatives	First and second – order Partial Derivatives	Lecture	H.W.
10	4	Explain the chain rule	The Chain Rule	Lecture	H.W.
11	4	Finding the directional derivatives and gradient vectors	irectional Derivatives and Gradient Vect	Lecture	C.W.
12	4	Understanding the multiple Integrals	Multiple Integrals	Lecture	Quiz
13	4	Calculating the double integrals in cartesian coordinates	Double integrals in Cartesian coordinates	Lecture	H.W.
14	4	Calculating the double integrals in polar form	Double integrals in Polar form	Lecture	H.W.
15	4	Learning the triple integrals	Triple Integrals	Lecture	C.W

11. Course Evaluation

Homework, Classwork, Quizzes, Oral questions, Repots, Mid Exam, Final Exam
Course Evaluation: 50
Final Exam: 50

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• James Stewart, Calculus, Early Transcendentals, 7th Edition Brooks Cole (2012)
Main references (sources)	Thomas' Calculus, Thirteenth Edition George B Thomas, Massachusetts Institute of Technology - 2013.
Recommended books and references (scientific journals, reports...)	• Gilbert Strang, Edwin Herman, Calculus Volume 1 by OpenStax (2016)
Electronic References, Websites	

Course Description Form Fluid flow II

1. Course Name:

Fluid flow II

2. Course Code:

CHE222

3. Semester / Year:

Second Year

4. Description Preparation Date:

1/2/2026

5. Available Attendance Forms:

Students attendance is recorded in the classroom and on the excel lists based on the number of lectures and according to the dates in the schedule, and is sent weeklr to the Absences Committee.

6. Number of Credit Hours (Total) / Number of Units (Total)

3 hours Theoretical – 2 hrs Lab /75 hours for the semester/6 Units

7. Course administrator's name (mention all, if more than one name)

Name: Hayder Kareem Sakran
Email: hayder_sakran@mu.edu.iq

8. Course Objectives

Course Objectives	1.Introducing the student the pattern of flow will vary with the velocity, the physical properties of fluid, and the geometry of the surface 2. In the process industries, many of the materials are in fluid form and must be stored, handled, pumped, and processed. 3. Relation between Skin Friction and Wall Shear Stress

9. Teaching and Learning Strategies

Strategy	The main strategy that will be adoped in the delivering this subject is to encourage student the basic of fluid flow to enhance engineering thinking skills through interactive classes and tutorials

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	5	To know the physical properties of fluid	Friction in Pipes	lecture	H.W
2	5	Understand the shear stress	Relation between Skin Friction and Wall Shear Stress	lecture	H.W
3	5	To distinguish between the ideal and real fluid	Evaluation of Friction Factor in Straight Pipes	lecture	H.W
4	5	To described the flow pattern	Friction Losses in Noncircular Conduits	lecture	Quiz
5	5	To study the effect of viscosity	The Boundary Layer	lecture	H.W
6	5	To explain the unsteady state fluid flow	Unsteady State Problems	lecture	H.W
7	5	To use the methods in the fluid flow	Pumping of Liquids	lecture	Exam
8	5	To use in the fluid flow	Power Requirement	lecture	H.W
9	5	To application in the fluid flow	Positive Displacement Pumps	lecture	H.W

10	5	To know the device for fluid flow measurement	Centrifugal Pumps in Series and in Parallel	lecture	H.W
11	5	To compare with fluid flow	Non-Newtonian Fluids	lecture	Quiz
12	5	To know the dynamic fluid flow	Flow Measurement	lecture	H.W
13	5	To use the momentum fluid flow	Measurement by Flow Through a Constriction	lecture	Exam
14	5	To use weirs	The Notch or Weir	lecture	H.W
15	5	The application of Unsteady weirs	Unsteady State Problems	lecture	H.W

11.Course Evaluation

Quizzes,Homework ,Siminars,Month exams,Final exam ,Oral questions and Open questions that have adefinite answer
Course evaluation (50%)
Final Exam (50%)

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Coulson, J.M. and J.F. Richardson, "Chemical Engineering", Vol.I " Fluid Flow, Heat Transfer, and Mass Transfer" 5th edition, (1998).
Main references (sources)	Holland, F.A. "Fluid Flow for Chemical Engineers" Arnold, (1980).
Recommended books and references (scientific journals, reports...)	hurmi, R.S. "A Text Book of Fluid Mechanics" 4th edition S.Chand & Company (Pvt.) LTD, (1987).
Electronic References, Websites	

Course Description Form Physical Chemistry II

1. Course Name:
Physical Chemistry II
2. Course Code:
CHE223
3. Semester / Year:
2nd Semester / 2026
4. Description Preparation Date:
22/02/2026
5. Available Attendance Forms:
Students' attendance is recorded in the classroom and on Excel sheet lists based on the number of lectures and according to the dates in the schedule, and is sent weekly to the Absences Committee.
6. Number of Credit Hours (Total) / Number of Units (Total)
3 hours Theoretical – 2 hrs Lab. Per week/ 7٠ hours for the semester / 6 Un
7. Course administrator's name (mention all, if more than one name)
Name: Asst. Lecturer. Hatem Kareem Zeiad Email: hatemk1970@mu.edu.iq
8. Course Objectives

Course Objectives	1- Defining the Basic Concepts of Phase Equilibrium. 2- Understanding and Applying the Phase Rule to One-Component, Binary, and Ternary Systems. 3- Analysis of Equilibrium Diagrams and Their Impact on Chemical Processes. 4- Determination of Chemical Reaction Rates. 5- Understanding Reaction Mechanisms. 6- Applying Collision and Transition State Theories

9. Teaching and Learning Strategies

Strategy	١- Adopting an Inquiry-Based Learning approach by allowing students to deduce the system's behavior, the number of phases, and its components. 2 Applying a Collaborative Learning strategy to understand Binary and Ternary systems. ٣- Utilizing a Comparative Analysis approach by comparing (T-x) and (P-x) diagrams, or contrasting zero-order reactions with first and second-order reactions. ٤- Employing Mathematical Modeling and Inquiry strategies to understand and derive physical laws, such as rate laws, reaction mechanisms, and phase equilibrium equations. ٥-Interactive Lecturing, where in addition to the theoretical explanation, students are actively engaged to enhance their connection to the subject matter.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	5	Explain Polar coordinates	Phase Equilibrium	Lecture	H.W, Dis
2	5	Understanding single-component systems and P-T diagrams	One-Component Systems and (P-T) Diagrams	Lecture	C.W,F.B
3	5	Applications of Clapeyron's and Clausius-Clapyron's equations	The Clapeyron and Clausius-Clapeyro Equations	Lecture	H.W, C.W
4	5	Study of binary systems	binary systems	Lecture	Quiz
5	5	Explaining Raoult's and Dalton's Laws	Raoul and Dalton's Laws	Lecture	C.W,F.B
6	5	Phase Equilibrium applications (liquid-vapor)	Vapor-Liquid Equilibrium (VLE)	Lecture	H.W, Dis
7	5	Finding the cross product of vectors	Solid-liquid equilibrium in a binary system	Lecture	C.W,F.B
8	5	Study of three-component systems	Three-component systems	Lecture	Quiz
9	5	Understanding the law of velocity and measuring the reaction rate	The law of speed and measurement o reaction rate	Lecture	H.W, Dis
10	5	Study of zero-order and first-order interactions	Zero-order and first-order reactions	Lecture	C.W,F.B
11	5	Study of second- and third-order interactions	Second and third order reactions	Lecture	C.W, Dis
12	5	Explanation of the effect of temperature on the rate of reaction	The effect of temperature on the rate of reaction	Lecture	Quiz
13	5	Explanation of reaction rate theories; Reaction rate (Collision theory)	Theories of reaction rate (collision theory)	Lecture	H.W, F.B
14	5	Study of the transitional state theory	Transition State Theory	Lecture	C.W,F.B
15	5	Understanding the mechanisms of complex interactions	Mechanism of complex reactions	Lecture	H.W, Dis

11. Course Evaluation

Formative Assessment (Sessional Work): 40% (Homework 10%, Classwork 10%, Quizzes 10%, Repots 10%), Mid Exam 10%, Final Exam 50%

12. Learning and Teaching Resources

Required textbooks (curricular books any)	• Physical Chemistry by, Robert A. Alberty Seventh Edition
Main references (sources)	• Physical Chemistry FourthEdition by RobertJ.Silbey, RobertA.Alberty and MoungiG.Bawendi. • Physical Chemistry, Second Edition David W. Ball
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form: Material Properties

1. Course Name:	
Material Properties	
2. Course Code:	
CHE225	
3. Semester / Year:	
Second Semester/ 2025-2026	
4. Description Preparation Date:	
20/02/2026	
5. Available Attendance Forms:	
Theoretical/in-person	
6. Number of Credit Hours (Total) / Number of Units (Total)	
3hrs per week – 45 hrs in total / 5 Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Hasaneen Majed Houssain Email: hasanein.mahbuba@mu.edu.iq	
8. Course Objectives	
Course Objectives	Study of the types of materials and their general properties and comparison between them. The course covers the types and classifications of materials (metals and their alloys, ceramics, polymers, and composite materials). It also addresses the applications of all these materials, the effect of surrounding factors on their properties, the study of the microstructure of materials, and their mechanical properties.
9. Teaching and Learning Strategies	
Strategy	1- Enhancing a supportive and encouraging classroom environment where students feel comfortable, while also providing constructive feedback and recognizing their efforts to boost their self-confidence. 2- Using visual tools such as charts, diagrams, and physical models to clarify abstract concepts and strengthen understanding. 3- Integrating problem-based learning into the curriculum, where students work in small groups to solve real-world engineering problems related to course topics. Project-based learning enhances critical thinking, teamwork, and problem-solving skills by connecting theoretical knowledge with practical applications. 4- Regularly assessing student progress and providing timely feedback on their performance, along with offering guidance and support.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Understanding the basic principles o materials science	Introduction	Theoretical	Discussion
2	3	Understanding Material Classification Choosing Core Materials for Chemical Engineering	Classifications of Materials	Theoretical	Quiz
3	3	understand the properties of material general	Property of Material	Theoretical	Discussion
4	3	To learn about the microscopic structure of materials	Crystal systems of Materials	Theoretical	Report
5	3	To identify, study and calculate the vectors and waves within the crysta structure.	Direction and vector in crystals	Theoretical	Assignment
6	3	Study of the types of bonds between atoms and the basis of their formation	Bonds in Materials and Properties	Theoretical	Discussion
7	3	To understand crystal defects	Crytal Defect	Theoretical	Quiz
8	3	Study and understand phase diagrams	Phase Diagrams	Theoretical	Report
9	3	Study and understand Fe-C phase diagrams	Fe-C Phase Diagrams	Theoretical	Discussion
10	3	Study of nanomaterials and their applications	Nanometerial	Theoretical	Discussion
11	3	Study of ceramic materials and their applications	Ceramics	Theoretical	Report
12	3	Study of polymeric materials and how to classify them	polymers, classification, properties	Theoretical	Assignment
13	3	To learn about the types of crystalline materials	Type of Polymers	Theoretical	Quiz
14	3	To understand composite materials and their manufacturing methods	Composite materials	Theoretical	Discussion
15	3	To study mechanical properties and how to control them	Mechanical properties of material	Theoretical	Discussion

11. Course Evaluation

Daily and monthly quizzes, reports, homework assignments, and class attendance compliance.
Formative assessment: 40%
Midterm exam: 10%
Final exam: 50%

12. Learning and Teaching Resources

Required textbooks (curric books, if any)	• William D. Callister, Jr., David G. Rethwisch, Materials Science and Engineering: An Introduction, 10th Edition, Wiley & Sons, Hoboken, NJ, USA, 2018. • Myer Kutz, Handbook of Materials Selection, John Wiley & Sons, Inc., 2002.
Main references (sources)	• Askeland, D.R. (2003) The Science and Engineering of Materials. 4th Edition, Brooks/Cole, London. • William D. Callister, Jr., David G. Rethwisch, Materials Science and Engineering; 10th Edition, Wiley & Sons, Hoboken, NJ, USA, 2018.

Recommended books and references (scientific journals, reports...)	• James F. Shackelford, Introduction to Materials Science for Engineers, 8th Edition, Pearson Higher Education, Inc., NJ, USA, 2015.
Electronic References, Website	Materials Data Book - University of Cambridge: http://www.mdp.eng.cam.ac.uk/web/library/enginfo/cueddatabooks/materials.pdf

Arabic Language Course Description Form

13. Course Name:	
Arabic Language and Literature	
14. Course Code:	
UNI011	
15. Semester / Year: Year	
2nd semester / 2025–2026	
16. Description Preparation Date:	
20/2/2026	
17. Available Attendance Forms:	
In-Person – via Excel Sheet	
18. Number of Credit Hours (Total) / Number of Units (Total)	
30 hours total – 2 hrs per week / 2 units	
19. Course Coordinator / Instructor: (mention all, if more than one name)	
Name: Assistant Lecturer Abbas Fadil Ghiyadh Email: abbas_fadil@mu.edu.iq	
20. Course Objectives	
Course Goals	1- Enabling students to acquire Arabic language skills and understand its issues at all levels: phonetic, morphological, grammatical, semantic, stylistic, and writing levels. 2- Developing the ability to interpret theories, concepts, and key terminology in Arabic linguistics. 3- Improving students' listening, reading, and expressive skills. 4- Strengthening students' connection with Arab and Islamic heritage so that they can draw from its moral and social values in ways compatible with contemporary Arab society.

	5- Advancing Arabic linguistic and literary knowledge in an educational and cultural manner. 6- Refining creative and literary talents and developing the ability to appreciate language and distinguish high-quality texts from weak ones. 7- Applying linguistic knowledge in reading, writing, speaking, and listening so that students can write reports in correct Arabic and avoid grammatical, spelling, and stylistic errors. 8- Promoting habits of self-learning among students and encouraging lifelong learning attitudes.
21.	Teaching and Learning Strategies
Strategy	The teaching strategy can be described as a roadmap that guides students toward the optimal use of language in their academic and practical lives, while developing creativity and language skills and helping them avoid different types of linguistic errors: grammatical, morphological, spelling, and stylistic. The strategies used vary depending on the course content, the learners' levels, and individual differences among students. The most important strategies include: Active learning strategy to break monotony and involve students in the learning process so they become the central element in it, dialogue strategy, storytelling strategy, project-based learning strategy, role-exchange strategy, self-learning strategy and interactive learning.

22. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Understanding the concept of number and counted noun	Introduction to Arabic grammar and the rules of number and counted noun in terms of masculine and feminine forms	Lecture	Oral questions
2	2	Understanding the concept of poetry and selecting texts from Al-Mutanabbi	Al-Mutanabbi: biography, characteristics of his poetry, poetic themes, and literary status	Lecture and discussion	General cultural oral questions
3	2	Analyzing texts from the poetry of Badr Shakir Al-Sayyab	Al-Sayyab: biography, poetic characteristics, and poems	Lecture and analysis of poetic verses and Qur'anic verses	Written daily quiz
4	2	Identifying particles that carry meanings of other particles	Types of particles, their uses, and meanings	Lecture and practical application on literary texts	Daily test
5	2	Recognizing words that are written but not pronounced and applying them in texts	Language skills and their uses (positions of addition and deletion)	Critical readings and open discussion to express viewpoints in appreciating and understanding texts	Cultural participation through a research paper
6	2	Understanding types of sentences in Arabic and constructing sentences according to their rules	Inna and its " sisters": number, function, meanings, and types of predicate	Lecture and grammatical analysis of literary and Qur'anic texts	Homework

7	2	Understanding sentence types and their construction	Kana and its " sisters": number, function, meanings, conditions of use, and types of predicate	Written exam	Written exam
8	2	Applied analysis of writing the hamza	Forms of hamza and rules of writing it	Critical reading and discussion	Report
9	2	Identifying characteristics of Al-Jawahiri's poetry	Al-Jawahiri: biography, characteristics of his poetry, and poems	Lecture and grammatical applications on texts and Qur'anic verses	Homework
10	2	Understanding rules of academic writing	Spelling and punctuation marks	Lecture and practical exercises	In-class assignment
11	2	Understanding incorrect words and expressions	Common mistakes	Analytical lecture	Report
12	2	Understanding the main lexical schools and their features	Arabic lexicography	Lecture and linguistic exercises	In-class test
13	2	Understanding rhetoric and the limits of brevity and elaboration	Brevity and elaboration	Lecture and grammatical exercises	Google Forms test
15	2	Understanding rhetoric and the limits of brevity and elaboration	Prose poetry in contemporary Arabic poetry	Seminar discussion	Critical paper

23. Course Evaluation

- Written examinations
- Daily and surprise quizzes
- Assessing students' level of understanding of the course material
- Oral questions
- Reports
- Critical and research papers

24. Learning and Teaching Resources	
Required Textbooks (curricular books, if any)	Prepared lectures based on the curriculum approved by the department.
Main references (sources)	• Ibn Aqil's Commentary on Ibn Malik's Alfiyya • Qatr al-Nada wa Ball al-Sada by Ibn Hisham al-Ansari • How to Master Arabic Grammar by Ahmed Iskandar • How to Master Rhetoric by Ahmed Iskandar
Recommended books and references (scientific journals, reports…)	• Iraqi Language Academy – Al-Manhal – Noor Library • Arabic Language Academy in Cairo
Electronic References, Websites	https://youtube.com/playlist?list=PLUbGxXvC8t7GC9xxO9JFfwR-Z_xPvMJv-&si=Q-AEnHbXfAyvBCt1

Third Year
First Semester

No.	Subject	Weekly hours			Units/ ECTS
		Th.	Tut.	Lab./Pr.	
1	Engineering analysis	2	1	---	3.00
2	Mass transfer I	3	1	---	6.00
3	Heat transfer I	2	1	2	6.00
4	Industrial management	2	---	---	3.00
5	Reactor design I	3	1	---	6.00
6	Thermodynamic I	3	1	---	6.00
	Total	15	5	2	30
		22			

Course Description Form Engineering Analysis

1. Course Name:	
Engineering Analysis	
2. Course Code:	
CHE311	
3. Semester / Year:	
First semester/ 3rd stage	
4. Description Preparation Date:	
1/9/2025	
5. Available Attendance Forms:	
In-person	
6. Number of Credit Hours (Total) / Number of Units (Total)	
3 hrs. (CL.+Tut.) Weekly / 45 hrs.for semester / 3 ECTS	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Ali A Hassan Email: ali.alkhafaji@mu.edu.iq	
8. Course Objectives	
Course Objectives	• Provide students with a strong foundation in analytical and numerical methods relevant to chemical engineering applications. • Equip students with the ability to formulate and solve engineering problems using mathematical models, including differential equations and linear algebra techniques. • Develop student proficiency in applying software tools such as MATLAB and Excel for solving engineering analysis problems. • Enhance students' understanding of physical and chemical processes through quantitative problem-solving and interpretation of results. • Strengthen the ability to select appropriate analytical or numerical approaches for modeling real-world systems in chemical engineering. • Foster critical thinking and problem-solving skills essential for analyzing, designing, and optimizing chemical processes.
9. Teaching and Learning Strategies	
Strategy	**Lectures and Conceptual Explanations** Structured lectures to introduce core theoretical concepts such as differential equations, linear algebra, and numerical methods relevant to chemical engineering. Use of visual aids and real-world examples to enhance comprehension. **Active Learning and In-Class Problem Solving** Engaging students in group discussions and collaborative problem-solving sessions to reinforce theoretical knowledge through practical application. Solving numerical problems in class to develop analytical thinking and numerical skills. **Utilization of Engineering Software** Hands-on training in software tools like MATLAB and Excel for implementing numerical algorithms and modeling engineering processes. Assignments requiring use of software to solve complex engineering problems.

	Continuous Assessment and Feedback Frequent quizzes, homework assignments, and short tests to monitor student progress and provide timely feedback. Encouragement of self-assessment and peer review to enhance learning outcomes.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Understand and apply fundamental mathematical techniques, including differential equations and linear algebra, relevant to chemical engineering problems. Analyze and model chemical engineering processes using appropriate analytical and numerical methods. Develop and implement numerical algorithms for solving engineering problems using computational tools such as MATLAB and Excel. Interpret and critically evaluate the results obtained from analytical and numerical solutions in the context of chemical engineering applications.	First Order Ordinary Differential Equations – Part One	**Lectures** Delivery of core theoretical concepts by the instructor, supported by examples and visual aids to facilitate comprehension. **Interactive Discussions** Engaging students in question-and-answer sessions, group discussions, and peer-to-peer learning to deepen conceptual understanding. **Problem-Based Learning** Hands-on problem-solving activities during class sessions that encourage application of theory to real-world engineering problems. **Continuous Assessment and Feedback** Regular quizzes, homework, and tests with timely feedback to monitor progress and identify areas for improvement.	*Daily quizzes *Monthly exams *Reports *Homework assignments
2	3		First Order Ordinary Differential Equations – Part Two		
3	3		Second Order Ordinary Differential Equations – Part One		
4	3		Tutorial		
5	3		Tutorial		
6	3		Second Order Ordinary Differential Equations – Part Two		
7	3		Second Order Ordinary Differential Equations – Part Three		
8	3		Tutorial		
9	3		igher Order Differential Equations – P One		
10	3		Tutorial		
11	3		Second Month Exam		
12	3		Simultaneous Differential Equations		
13	3		Special Functions – Part One		
14	3		Special Functions – Part Two		
15	3		Tutorial		

11. Course Evaluation

Daily, monthly and final exams, reports, class assignments and homework.
Course evaluation 40 %, Mid exam. 10%, Final exam. 50%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1- V.G. Jenson and G.V. Jeffreys "mathematical methods in chemical engineering", 2nd edition (1981) 2- "applied mathematics and modeling for chemical engineering" 3- "partial differential equations in engineering problems"
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	PROCESS MODELING, SIMULATION, AND CONTROL FOR CHEMICAL ENGINEERS

Course Description Form Mass Transfer I

1. Course Name

Mass Transfer I

2. Course Code

CHE312

3. Semester / Year

semester 1 / 2025-2026

4. Description Preparation Date

1/9/2025

5. Available Attendance Forms

Attendance

6. Number of Credit Hours (Total): (60) / Number of Units (Total): (3 Units)

4 hrs. (CL.+Tut.) Weekly / 60 hrs.for semester / 6 ECTS

7. Course administrator's name (mention all, if more than one name)

Name: Prof. Dr. Anas Bdiwi Salman
Email: dr.anas.bdiwi@mu.edu.iq

8. Course Objectives

Course Objectives	The objectives of this course are to understand the principles of diffusion with different modes, calculation of mass transfer coefficients, understanding the mass transfer theories, understanding the gas-liquid absorption operation, understanding the liquid-liquid extraction operation.

9. Teaching and Learning Strategies

Strategy	The main part of the teaching and learning strategies is the class lecture, and this part will be supported with tutorials, quizzes and exams, reports, seminars.

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Understanding diffusion	Diffusion	Attendance	Quiz
2	4	Understanding modes of diffusion	Modes of diffusion	Attendance	Tutorial
3	4	Understanding mass transfer theories	Mass transfer theories	Attendance	Quiz and report
4	4	Admitting calculations of diffusivi for gases and liquids	Calculations of diffusivity	Attendance	Quiz
5	4	Derivation of MTC	Mass transfer coefficient	Attendance	Quiz
6	4	Understanding the principles of absorption	Absorption	Attendance	Reports
7	4	Calculation of minimum liquid flow rate	Minimum liquid flow rate	Attendance	Reports
8	4	Understanding the design and calculations of packed column height with individual MTC	Calculations of packed absorption colum based on individual MTC	Attendance	Quiz
9	4	Understanding the design and calculations of packed column height with overall MTC	Calculations of packed absorption colum based on overall MTC	Attendance	Tutorial

10	4	Derivation of simplified calculations method	Simplified methods for packed columns	Attendance	Quiz
11	4	Understanding the tray tower calculations	Absorption tray columns	Attendance	Tutorial
12	4	Understanding the principles of liquid-liquid extraction systems	Liquid-liquid extraction	Attendance	Exam
13	4	Understanding the equilibrium relations for ternary systems	Equilibrium relations and equilibrium plots for ternary systems	Attendance	Quiz
14	4	Understanding the calculations of single stage extraction	Single stage extraction	Attendance	Quiz
15	4	Understanding the calculations of multiple stages calculations	Multiple stages extraction	Attendance	Tutorial

11.Course Evaluation

Daily, monthly and final exams, reports, class assignments and homework.
Course evaluation 40 %, Mid exam. 10%, Final exam. 50%

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Chemical engineering Vol.1, Chemical engineering Vol.2
Main references (sources)	Separation processes, Sedar
Recommended books and references (scientific journals, reports...)	Mass transfer operations, Treybal
Electronic References, Websites	

Course Description Form Heat Transfer I

1. Course Name:

Heat Transfer I

2. Course Code:

CHE313

3. Semester / Year:

1st. Semester / 2025-2026

4. Description Preparation Date:

1 / 9 /2025

5. Available Attendance Forms:

Recorded every week using google form and then sent to the department

6. Number of Credit Hours (Total) / Number of Units (Total)

3 hrs.(CL.+Tut).+2 hours (Lab) Weekly / 75 hrs. for semester / 6ECTS

7. Course administrator's name (mention all, if more than one name)

Name: Asst. Prof. Dr. Ghazi Faisal Naser
Email: ghazi_faisal@mu.edu.iq

8. Course Objectives

Course Objectives	• Understand the basic concepts of heat transfer. • Understand methods for calculating heat transfer by conduction, convection, and radiation. • Understanding the methods of calculating the thickness of thermal insulators and how to choose the appropriate type.

9. Teaching and Learning Strategies

Strategy	• Developing comprehension and understanding skills. • Developing calculations and engineering skills. • Developing relationships with friends to solve problems collaboratively.

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Studying the basics of heat transfer	Introduction	Theoretical	Quiz
2	3	Explain examples	Supplemental examples	Theoretical	Report
3	3	Explain about the types and methods of heat transfer.	Types of Heat Transfer	Theoretical	Report
4	3	Explain examples	Supplemental examples	Theoretical	Quiz

5	3	Explain the methods of heat transfer by conduction	Heat conductance	Theoretical	Discussion
6	3	Applications for transfer methods	Supplemental problems	Theoretical	Discussion
7	3	Explain heat transfer by one-direction conduction	One dimensional steady state conduction	Theoretical	H.W.
8	3	Explain examples	Supplemental examples	Theoretical	Quiz
9	3	Understanding the heat transfer in different forms	Radial systems(Cylinder and sphere)	Theoretical	Discussion
10	3	Explain examples	Supplemental examples	Theoretical	Discussion
11	3	Understanding the working principle of the thermal resistors	Thermal resistors	Theoretical	Report
12	3	Explain the importance of the heat transfer coefficient	Overall heat transfer coefficient	Theoretical	Discussion
13	3	Explanation of methods for calculating the thickness of thermal insulation	Critical thickness of insulator	Theoretical	H.W.
14	3	Explanation of heat generation methods and their applications	Heat generation (Heat source)	Theoretical	Quiz
15	3	Explaining the methods of heat dissipation through fins in various forms.	Fins	Theoretical	Quiz

12.Course Structure (LAB)					
Week	**Hours**	**Required Learning Outcomes**	**Unit or Topic Name**	**Learning Method**	**Evaluation Method**
1	2	To identify the tools and equipment available in the laboratory.	Introduction	Practical	Discussion
2	2	To identify hazards and safe handling procedures for equipment and safety requirements.	Safety and Security Requirements	Practical	Discussion
3	2	Steady State Conduction through a Uniform Plane Wall	Steady State Conduction through a Uniform Plane Wall	Practical	Discussion
4	2	=	= Use of the Fourier Rate Equation	Practical	Report
5	2	Use of the Fourier Rate Equation	= Determination of Thermal Conductivity (Constant of Proportionality)	Practical	Discussion
6	2	=	= Overall Heat Transfer Coefficient for Differentiating Materials in Series	Practical	Report
7	2	Determination of Thermal Conductivity (Constant of Proportionality)	=	Practical	Discussion
8	2	=		Practical	Discussion
9	2	Overall Heat Transfer Coefficient for Differing		Practical	Report

		Materials in Series			
10	2	=		Practical	Discussion
11	2	Relationship of Temperature Gradient to Cross-Sectional Area		Practical	Discussion
12	2	=		Practical	Discussion
13	2	Review of experimental procedures	Comprehensive Review	Practical	Report
14	2	Oral and written discussion	Exam	Practical	Discussion

12.Course Evaluation

Daily, monthly and final exams, reports, class assignments and homework.
Course evaluation 40 %, Mid exam. 10%, Final exam. 50%

13.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Holman, J.P., Heat Transfer, Tenth Edition, McGraw-Hill (2010).& Yunus, A. C.., Heat and Mass Transfer, McGraw-Hill.
Main references (sources)	1-Cao, E., Heat transfer in process engineering, McGraw-Hill. 2-Serth, R.W., Process Heat Transfer, Principles and Applications, Elsevier
Recommended books and references (scientific journals, reports...)	https://onlinelibrary.wiley.com/journal/26884542
Electronic References, Websites	https://byjus.com/physics/heat-transfer-conduction-convection-and-radiation/

Course Description Form Industrial Management

1. Course Name:
Industrial Management
2. Course Code:
CHE314
3. Semester / Year:
1St Semester / year
4. Description Preparation Date:
1/09/2025
5. Available Attendance Forms:
Student's attendance is recorded in the classroom and on the Excel list based on the number of lectures and according to the dates in the schedule, and is sent weekly to the Absences Committee.
6. Number of Credit Hours (Total) / Number of Units (Total)
2 hours weekly/ 30 hours for semester / 3 ECTS
7. Course administrator's name (mention all, if more than one name)
Name: Prof. Dr. Haider Tawfiq Naeem Email: haidertn@mu.edu.iq
8. Course Objectives

Course Objectives	1. **Linking the Engineering and Managerial Aspects:** o Enabling students to understand the relationship between production and administrative processes. o Recognizing the importance of planning and organizing in improving the efficiency of chemical production. 2. **Developing Analytical Skills and Decision-Making:** o Making effective decisions in managing operations and production units. 3. **Improving Industrial Performance:** o Understanding the basic principles of production, quality control, equipment maintenance, and inventory management. o Applying modern management methods (Production and Total Quality Management - TQM). 4. **Preparing Students for the Industrial Job Market:** o Qualifying students for supervisory and administrative roles in chemical plants. o Gaining knowledge about industrial environments, organizational behavior, and work ethics. 5. **Promoting Safety and Sustainability Concepts:** o Integrating industrial safety principles and environmental management into planning and production. o Understanding sustainable management of resources and chemical processes.

9. Teaching and Learning Strategies

Strategy	**a.** Essential facts, concepts, and principles along with an understanding of the constraints faced by engineers in making sound decisions. **b.** Fundamental mathematics, sciences, and technologies relevant to the field. **c.** Core ideas and concepts of management. **d.** Improving computational and engineering problem-solving skills.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**2**	Understand the production and operation	INTRODUCTION TO PRODUCTION AND OPERATION MANAGEMENT TYPES OF PRODUCTIONS	lecture	H.W
2	**2**	Understand the production and operation	INTRODUCTION TO PRODUCTION AND OPERATION MANAGEMENT TYPES OF PRODUCTIONS	lecture	H.W
3	**2**	Explain the plant location	PLANT LOCATION & LAYOUT	lecture	H.W
4	**2**	Explain the material handling	Principles of Material Handling	lecture	Quiz
5	**2**	Understand the quality control	QUALITY CONTROL	lecture	Report
6	**2**	Explain the types of qualities & Understand the TQM	Details Q.C. & QUALITY ASSURANCES -TQM	lecture	H.W
7	**2**	Explain ISO 9000 & ISO1400	Types of ISO 9000, ISO1400	lecture	Exam
8	**2**	Understand the Formulation	LINEAR PROGRAMMING PROBLEM I— FORMULATION	lecture	H.W
9	**2**	Explain the Graphical	LINEAR PROGRAMMING PROBLEM II— GRAPHICAL METHOD	lecture	H.W
10	**2**	Explain the Graphical	LINEAR PROGRAMMING PROBLEM II— GRAPHICAL METHOD	lecture	Report
11	**2**	Explain the algebraic	ALGEBRAIC METHOD	lecture	Quiz
12	**2**	Understand the assignment	ASSIGNMENT PROBLEMS	lecture	H.W
13	**2**	Understand the sequences	SEQUENCING	lecture	Quiz
14	**2**	Explain sequence	SEQUENCING	lecture	H.W
15	2	REPETED			Exam

11. Course Evaluation

Daily, monthly and final exams, reports, class assignments and homework.
Course evaluation 40 %, Mid exam. 10%, Final exam. 50%

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	• Lectures • Production and Operation Management, S. A. KUMAR, N. SURASH, Second Edition, 2008, 2006 New Age International (P) Ltd., Publishers. • Engineering Economy, Leland Blank, A. Traquin, SEVENTH EDITION, 2012 McGraw-Hill,USA
Main references (sources)	• Industrial Engineering & Management , Jacobs University Undergraduate Handbook IEM - Matriculation Fall 2015 • Production and Operation Management, S. A. KUMAR, N. SURASH, Second Edition, 2008, 2006 New Age International (P) Ltd., Publishers.
Recommended books and references (scientific journals, reports...)	• Lectures of global universities • Scientific Webs
Electronic References, Websites	• Libraries of websites for international universities

Course Description Form Reactor Design

1. Course Name:	
Reactor Design I	
2. Course Code:	
CHE315	
3. Semester / Year:	
1st Semester/year	
4. Description Preparation Date:	
1/9/2025	
5. Available Attendance Forms:	
Students' attendance is recorder in the classroom and on Excel lists based on lectures' number and according to the dates in the schedule, and is sent weekly to the Absences committee.	
6. Number of Credit Hours (Total) / Number of Units (Total)	
4 hrs. (CL.+Tut.) Weekly / 60 hrs.for semester / 6 ECTS	
7. Course administrator's name (mention all, if more than one name)	
Name: Asst. Prof. Dr. Forat Yasir AlJaberi Email: furatyasir@mu.edu.i	
8. Course Objectives	
Course Objectives	1- Preparing qualified engineers in the field of chemical reactor design (CRD) to keep pace with contemporary developments and meet the requirements of the country's scientific and economic development plans 2- Improve their skills in analysis, design, operation and use of modern laboratory equipment and software to design several types of reactors. 3- Improve their ability to communicate verbally with scientific societies to visualize and explain work in a more sophisticated way, as well as developing their ability to conduct applied research that can contribute in serving the community. 4- Communicate with state service institutions related to the nature of the program by providing engineering advice and participating or holding seminars and discussions 5- Improving their understanding of professional ethics, sustainability and occupational safety that allows them to be influential engineers in society by finding solutions to industrial facilities problems related to the program
9. Teaching and Learning Strategies	
Strategy	The main strategy that will be adopted in delivering this subject of chemical reactor design is to understand the chemical reaction engineering throughout the chemical reactors through interactive classes and tutorials.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Understand the concept of CRD	Basic concept of CRD	Lecture	H.W.
2	4	Understand the chemical reaction engineering	Chemical reaction engineering throughout the chemical reactors	Lecture	H.W.
3	4	To estimate the performance requirements	The performance requirements	Lecture	Quiz
4	4	Yield, selectivity, limiting and excess reactants	Performance indicators	Lecture	H.W.
5	4	Understand the kinetics of homogeneous and heterogeneous reactors	Homogeneous and heterogeneous reactors	Lecture	H.W.
6	4	Explain the differences between the elementary and non-elementary reactions	Elementary and non-elementary reactions	Lecture	Exam
7	4	To estimate the rate equations	Rate reaction equation	Lecture	H.W.
8	4	Temperature dependent term	Rate reaction equation-temp.	Lecture	H.W.
9	4	concentration dependent term	Rate reaction equation-conc.	Lecture	H.W.
10	4	Understand the concepts of Thermodynamics of the chemical reactions	Thermodynamics of the chemical reactions	Lecture	Quiz
11	4	Conduct the rate constant and the order of the chemical reaction	The rate constant	Lecture	H.W.
12	4	Understand the types of the chemical reactions	Types of the chemical reactions	Lecture	H.W.
13	4	Explain the concepts of the homogeneous catalyzed reactions	Homogeneous catalyzed reactions	Lecture	Quiz
14	4	Understand the gaseous reactions throughout the chemical reactors	The gaseous reactions	Lecture	H.W.
15	4	Explain the basic Concepts of choosing the best reactor type	The appropriate reactor type	Lecture	Exam

11. Course Evaluation

Daily, monthly and final exams, reports, class assignments and homework.
Course evaluation 40 %, Mid exam. 10%, Final exam. 50%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	- Lectures - Chemical Reaction Engineering by Levenspiel, Octave, Joun Wiley & Sons, 1999, (3rd Editions).
Main references (sources)	- Chemical Reactor Design by Harriott, Peter, Marcel Dekker Publisher, 2003, (1st Editions). - Elements of Chemical Reaction Engineering by Fogler, H. Scott, Prentice -Hall, 2004, (4th Editions).
Recommended books and references (scientific journals, reports...)	Scientific websites.
Electronic References, Websites	Libraries websites for international universities.

Course Description Form: Thermodynamics I

1. Course Name:
Thermodynamics I
2. Course Code:
CHE316
3. Semester / Year:
1st Semester / 2025-2026
4. Description Preparation Date:
1/9/2025
5. Available Attendance Forms:
Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
4 hrs. (CL.+Tut.) Weekly / 60 hrs.for semester / 6 ECTS
7. Course administrator's name (mention all, if more than one name)
Name: Assit. Prof. Dr. Ali Samir Email: ali.samir@mu.edu.iq
8. Course Objectives

Course Objectives	The course objectives are to understand the basic concepts of thermodynamics, introducing the first law of thermodynamics, understanding the ideal and actual system's behavior including heat effects, conducting the energy balance for open and closed system.
9. Teaching and Learning Strategies	
Strategy	The main part of the teaching and learning strategies is the class lecture, and this part will be supported with tutorials, quizzes and exams, reports, seminars.

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Understanding basic concepts	Basic concepts	Attendance	Quiz
2	4	Applying 1st law of thermodynamics	First law of thermodynamics	Attendance	Tutorial
3	4	Understanding reversible process	Reversible Process	Attendance	Quiz and repo
4	4	Understanding equilibrium princip	Equilibrium and thermodynamics	Attendance	Quiz
5	4	Applying energy balance for closed and open systems	Energy balance for closed and open syste	Attendance	Quiz
6	4	Understanding phase rule	The phase rule	Attendance	Reports
7	4	Calculations of PVT systems	Equations of state	Attendance	Reports
8	4	Calculations of real systems	Generalized correlation	Attendance	Quiz
9	4	Admitting heat effects calculations	Heat effects	Attendance	Tutorial

10	4	Understanding sensible heat	Sensible heat	Attendance	Quiz
11	4	Understanding laten heat calculations	Latent heat	Attendance	Tutorial
12	4	Understanding the use of standard heat of formation	Standard heat of formation	Attendance	Exam
13	4	Understanding the calculations of heat of reaction	Standard heat of reaction	Attendance	Quiz
14	4	Calculation of heat of reaction at different temperatures	Temperature dependance of heat of reaction	Attendance	Quiz
15	4	Admitting heat calculations for industrial process	Heat effects of industrial processes	Attendance	Tutorial

11.Course Evaluation

Quiz 10%
Report 10%
Seminar 10%
Class activities: 5 %
Homework: 5%
Mid exam 10%
Final exam: 50

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Introduction to chemical engineering thermodynamics, Smith, 9th edition
Main references (sources)	Thermodynamics: An Engineering Approach 8th Edition Yunus A. Cengel, Michael A. Boles McGraw-Hill, 2015
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Third Year
Second Semester

No.	Subject	Weekly hours			Units
		Th.	Tut.	Lab.	
1	Numerical Methods	2	--	2	5.00
2	Mass Transfer II	3	1	---	5.00
3	Heat Transfer II	2	1	2	5.00
4	Reactor Design II	3	1	---	5.00
5	Thermodynamic II	3	1	---	5.00
6	Equipment design I	3	1	--	5.00
	Total	16	5	4	30
		25			

Course Description Form Numerical Methods

1. Course Name:
Numerical Methods
2. Course Code:
CHE321
3. Semester / Year:
2nd / 3rd stage
4. Description Preparation Date:
20/2/2026
5. Available Attendance Forms:
In-person
6. Number of Credit Hours (Total) / Number of Units (Total)
4 hrs.(CL.+Lab)) Weekly / 60 hrs. for semester / 5 ECTS
7. Course administrator's name (mention all, if more than one name)
Name: Mahmoud Abdulameer Sharshoh Email: mahmoud.sharshoh@mu.edu.iq
8. Course Objectives

Course Objectives	• **Develop Mathematical Algorithmic Thinking:** To transform theoretical mathematical concepts into logical algorithms that can be implemented and solved via computer software. • **Solve Complex Problems:** To provide alternative tools for solving mathematical problems that lack exact analytical solutions or are too complex for traditional methods. • **Balance Accuracy and Efficiency:** To enable students to select the most appropriate numerical technique that achieves maximum accuracy with minimum computational cost and time. • **Error Analysis and Management:** To study the nature of computational errors, such as round-off and truncation errors, and learn how to maintain numerical stability. • **Bridge Math and Practical Applications:** To apply mathematical frameworks to real-world engineering and scientific scenarios that require precise numerical data for practical implementation.

9. Teaching and Learning Strategies

Strategy	**Active Learning** • Incorporates group discussions, in-class problem solving, and interactive exercises. • Aims to stimulate critical thinking and numerical analysis skills. **Utilization of Engineering Software** • Tools such as MATLAB and Excel are used to implement numerical methods in practice. • Enhances the connection between theoretical concepts and practical applications. **Continuous Assessment and Feedback** • Includes quizzes, homework assignments, and immediate feedback to improve performance and identify areas of weakness. **Integration with Real Engineering Applications** • Applies to areas such as thermal analysis, structural analysis, and fluid flow to solve differential equations numerically.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Listening to the instructor's explanation of concepts such as solving nonlinear equations or numerical integration. Using graphical representations to illustrate convergence in iterative methods. Implementing numerical algorithms manually or through software tools such as MATLAB	Solution of non-linear Equatio	**Knowledge and Understanding** *Acquire essential facts, concepts, principles, and theories of chemical engineering, along with an understanding of the constraints that engineers face when making decisions. *Comprehend fundamental mathematics, science, and relevant technologies necessary for chemical engineering applications. **Subject-Specific Skills** *Ability to identify and classify various differential equations that describe a wide range of chemical engineering processes. *Familiarity with commonly used methods for modeling and simulating engineering systems and processes. *Ability to distinguish and evaluate the most effective approaches for solving differential equations in engineering contexts	*Daily quizzes *Monthly exams *Reports *Homework assignments
2	4		Simple Iteration Method & Bisection Method		
3	4		Newton- Raphson Method		
4	4		Matrices		
5	4		1st month exam		
6	4		Direct & Indirect Method		
7	4		Curve Fitting & Numerical Interpolation		
8	4		Finite Differences Method & Forward, Backward, and Cente Expressions		
9	4		Newton & Lagrange Forms		
10	4		2nd moth exam		
11	4		Numerical Differentiation		
12	4		Numerical Integration		
13	4		Solution of Ordinary Differential Equation O.D.E		
14	4		Finite Differences Method for Solution of Differential Equations		

15	4		3rd moth exam		

11. Course Evaluation

Daily, monthly and final exams, reports, class assignments and homework.
Course evaluation 40 %, Mid exam. 10%, Final exam. 50%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	• Burden, R. L., Faires, J. D., & Burden, A. M. (2015). *Numerical Analysis* (10th ed.). Cengage Learning. • Chapra, S. C., & Canale, R. P. (2021). *Numerical Methods for Engineers* (8th ed.). McGraw-Hill Education.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form Mass Transfer II

1. Course Name

Mass Transfer II

2. Course Code

CHE322

3. Semester / Year

semester 2 / 2025-2026

4. Description Preparation Date

20/2/2026

5. Available Attendance Forms

Attendance

6. Number of Credit Hours (Total): (60) / Number of Units (Total)

4 hrs. (CL.+Tut.) Weekly / 60 hrs.for semester / 5 ECTS

7. Course administrator's name (mention all, if more than one name)

Name: Prof. Dr. Anas Bdiwi Salman
Email: dr.anas.bdiwi@mu.edu.iq

8. Course Objectives

Course Objectives	The objectives of this course are to understand the principles of solid-liquid extraction, simple distillation, multi stage distillation calculations, understanding the humidification and drying operations, understanding the evaporation operation.

9. Teaching and Learning Strategies

Strategy	The main part of the teaching and learning strategies is the class lecture, and this part will be supported with tutorials, quizzes and exams, reports, seminars.

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Understanding the principles of leaching	Solid-liquid extraction	Attendance	Quiz
2	4	Understanding the principles of batch leaching	Batch leaching process	Attendance	Tutorial
3	4	Understanding the calculations of single stage leaching	Continuous leaching, single stag	Attendance	Quiz and report
4	4	Understanding the calculation multi-stage leaching	Continuous leaching, multi-stag	Attendance	Quiz
5	4	Understanding the principles of distillation	Distillation	Attendance	Quiz
6	4	Understanding the calculations of batch distillation	Batch distillation calculations	Attendance	Reports
7	4	Understanding the principles of flash distillation	Flash distillation	Attendance	Reports

8	4	Understanding the principles of continuous distillation	Continuous multi-stage calculatio	Attendance	Quiz
9	4	Conducting the graphical method stage calculations	McCabe-Thiele method	Attendance	Tutorial
10	4	Conducting analytical stages calculations	Lewis-Sorel method	Attendance	Quiz
11	4	Understanding the multi-components distillation calculations	Multi-components distillation	Attendance	Tutorial
12	4	Understanding the principles of humidification	Humidification	Attendance	Exam
13	4	Understanding the use of psychrometric chart	Psychrometric charts	Attendance	Quiz
14	4	Understanding the principles of evaporation, single effect	Evaporation, single effect	Attendance	Quiz
15	4	Understanding the principles of evaporation, multiple effects	Evaporation, multiple effects	Attendance	Tutorial

11.Course Evaluation

Daily, monthly and final exams, reports, class assignments and homework.
Course evaluation 40 %, Mid exam. 10%, Final exam. 50%

12.Learning and Teaching Resources

Required textbooks (curricular books, if any	Chemical engineering Vol.1, Chemical engineering Vol.2
Main references (sources)	Separation processes, Sedar
Recommended books and references (scientific journals, reports...)	Mass transfer operations, Treybal
Electronic References, Websites	

Course Description Form Heat Transfer II

1. Course Name:

Heat Transfer II

2. Course Code:

CHE323

3. Semester / Year:

2nd. Semester / 2025-2026

4. Description Preparation Date:

20/2/2026

5. Available Attendance Forms:

Recorded every week using google form and then sent to the department

6. Number of Credit Hours (Total) / Number of Units (Total)

3 hrs.(CL.+Tut).+2 hours (Lab) Weekly / 75 hrs. for semester / 5 ECTS

7. Course administrator's name (mention all, if more than one name)

Name: Asst. Prof. Dr. Ghazi Faisal Naser
Email: ghazi_faisal@mu.edu.iq

8. Course Objectives

Course Objectives	• Calculating the time required for heat transfer. • Understanding the thickness of the boundary layer and its relationship to the flow of various fluids. • Understanding the types of heat exchangers, their methods of operation, and their applications. • Studying the steps of heat exchanger design.

9. Teaching and Learning Strategies

Strategy	• Developing comprehension and understanding skills. • Developing calculations and engineering skills. • Developing relationships with friends to solve problems collaboratively.

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Calculating the time required for heat transfer	Unsteady state conduction	Theoretical	Discussion
2	3	Explain examples	Supplemental examples	Theoretical	Report
3	3	Studying the boundary	hermal boundary layer : aminar and turbulent flo	Theoretical	Report

		layer with condition s			
4	3	Explain examples	Supplemental examples	Theoretical	H.W.
5	3	Understanding the relation between heat transfer and fluid flow in different types	Analogy between fluid friction& heat transfer	Theoretical	Discussion
6	3	Explain examples	Supplemental examples	Theoretical	Discussion
7	3	Explain the work concept of heat exchangers	Heat Exchangers (part I	Theoretical	H.W.
8	3	Explain examples	Supplemental examples	Theoretical	Quiz
9	3	Explain the work concept of heat exchangers	Heat Exchangers(part II	Theoretical	Discussion
10	3	Explain examples	Supplemental examples	Theoretical	H.W.
11	3	Understanding the principle of convection heat transfer	Heat transfer by convection(External &Internal)	Theoretical	Report
12	3	Explain examples	Supplemental examples	Theoretical	Discussion
13	3	Understanding the principle of natural convection heat transfer	Heat transfer by convection(Natural)	Theoretical	H.W.
14	3	Explain examples	Supplemental problems	Theoretical	Quiz
15	3	Explain the concept of radiation heat transfer	Heat transfer by radiatio	Theoretical	Quiz
12.Course Structure (LAB)					

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Evaluation Method
1	2	To identify the tools and equipment available in the laboratory.	Introduction	Practical	Discussion
2	2	To identify hazards and safe handling procedures for equipment and safety requirements.	Safety and Security Requirements	Practical	Discussion
3	2	To demonstrate the effect of contact resistance on thermal conduction between adjacent materials.	Effect of Contact Resistance on Thermal Conductivity	Practical	Discussion
4	2		=	Practical	Report
5	2	To understand the application of poor conductors (insulators) and determine the thermal conductivity k (the constant of proportionality) of an insulator.	Application and Thermal Conductivity of Insulators	Practical	Discussion
6	2		=	Practical	Report
7	2	To measure the temperature distribution along an extended surface and compare the result with a theoretical analysis.	Temperature Distribution along an Extended Surface	Practical	Discussion
8	2		=	Practical	Report
9	2	To calculate the heat transfer from an extended surface resulting from the combined modes of free	Heat Transfer by Free Convection and Radiation	Practical	Discussion

		convection and radiation heat transfer.			
10	2		=	Practical	Report
11	2	To measure the temperature distribution for steady-state energy conduction through the wall of a cylinder.	Radial Temperature Distribution for Steady State Conduction	Practical	Discussion
12	2	Review experimental procedures.	Comprehensive Review	Practical	Discussion
13	2	Oral and written discussion.	Exam	Practical	Discussion

13.Course Evaluation

Daily, monthly and final exams, reports, class assignments and homework.
Course evaluation 40 %, Mid exam. 10%, Final exam. 50%

١4.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Holman, J.P., Heat Transfer, Tenth Edition, McGraw-Hill (2010).& Yunus, A. C.., Heat and Mass Transfer, McGraw-Hill.
Main references (sources)	1-Cao, E., Heat transfer in process engineering, McGraw-Hill. 2-Serth, R.W., Process Heat Transfer, Principles and Applications, Elsevier
Recommended books and references (scientific journals, reports...)	https://onlinelibrary.wiley.com/journal/26884542
Electronic References, Websites	https://byjus.com/physics/heat-transfer-conduction-convection-and-radiation/

Course Description Form Reactor Design

1. Course Name:

Reactor Design II

2. Course Code:

CHE324

3. Semester / Year:

2st Semester/3rd year

4. Description Preparation Date:

20/2/2026

5. Available Attendance Forms:

Students' attendance is recorder in the classroom and on Excel lists based on lectures' number and according to the dates in the schedule, and is sent weekly to the Absences committee.

6. Number of Credit Hours (Total) / Number of Units (Total)

4 hrs. (CL.+Tut.) Weekly / 60 hrs.for semester / 5 ECTS

7. Course administrator's name (mention all, if more than one name)

Name: Asst. Prof. Dr. Forat Yasir AlJaberi
Email: furatyasir@mu.edu.i

8. Course Objectives

Course Objectives	1- Improve students' skills in designing several types of reactors, such as PFR, CSTR, etc. 2- Enhance their ability to communicate verbally with scientific societies to visualize and explain work in a more sophisticated way, as well as developing their ability to conduct applied research that can contribute in serving the community. 3- Enhancing their understanding of professional ethics, sustainability and occupational safety that allows them to be influential engineers in society by finding solutions to industrial facilities problems related to the program. 4- Designers must first consider the thermodynamics involving the equilibrium of reaction before investigating the chemical kinetics in relation to the reaction mechanisms.

9. Teaching and Learning Strategies

Strategy	The main strategy that will be adopted in delivering this subject of chemical reactor design is to understand the chemical reaction engineering throughout the chemical reactors through interactive classes and tutorials.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Understand the main concepts of CRD	Fundamental Concepts Used in CRD	Lecture	H.W.
2	4	Considering a liquid system	Liquid system via the chemical reactors	Lecture	H.W.
3	4	To estimate the overall balances	Material Balance	Lecture	Quiz

4	4	To estimate the overall balances	Energy Balance	Lecture	H.W.
5	4	Understand the Important terms used in reactor design	Steady-state operation	Lecture	H.W.
6	4	Define isothermal reactions	Ideal Isothermal Reactors	Lecture	Exam
7	4	Classifying types of reactors	Batch reactors	Lecture	H.W.
8	4	Classifying types of reactors	Plug flow reactors	Lecture	H.W.
9	4	Classifying types of reactors	Continuous stirred tank reactor	Lecture	H.W.
10	4	Understand the change of volume	Variable volume reactors	Lecture	Quiz
11	4	Conduct the differences among chemical reactors	Size comparison of single reactors	Lecture	H.W.
12	4	Understand the effect of reaction order	Variation of reaction ratio for second-order reactions	Lecture	H.W.
13	4	Explain the performance of multi-PFR-reactors	Combinations of PFRs	Lecture	Quiz
14	4	Explain the performance of multi-CSTR-reactors	Stirred Tank Reactors in Series	Lecture	H.W.
15	4	Explain the performance of multi-flow-reactors	Reactors of different types in Series	Lecture	Exam

11. Course Evaluation

Daily, monthly and final exams, reports, class assignments and homework.
Course evaluation 40 %, Mid exam. 10%, Final exam. 50%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	- Lectures - Chemical Reaction Engineering by Levenspiel, Octave, Joun Wiley & Sons, 1999, (3rd Editions).
Main references (sources)	- Chemical Reactor Design by Harriott, Peter, Marcel Dekker Publisher, 2003, (1st Editions). - Elements of Chemical Reaction Engineering by Fogler, H. Scott, Prentice -Hall, 2004, (4th Editions).
Recommended books and references (scientific journals, reports...)	Scientific websites.
Electronic References, Websites	Libraries websites for international universities.

Course Description Form Thermodynamics II

1. Course Name:

Thermodynamics II

2. Course Code:

CHE325

3. Semester / Year:

2nd Semester / 2025-2026

4. Description Preparation Date:

20/2/2026

5. Available Attendance Forms:

Attendance

6. Number of Credit Hours (Total) / Number of Units (Total)

4 hrs. (CL.+Tut.) Weekly / 60 hrs.for semester / 5 ECTS

7. Course administrator's name (mention all, if more than one name)

Name: Assit. Prof. Dr. Ali Samir
Email: ali.samir@mu.edu.iq

8. Course Objectives

Course Objectives	The course objectives are to understand the second law of thermodynamics, entropy, heat engines, application of thermodynamics to flow processes, and steam power plants.

9. Teaching and Learning Strategies

Strategy	The main part of the teaching and learning strategies is the class lecture, and this part will be supported with tutorials, quizzes and exams, reports, seminars.

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	understanding the second law of thermodynamics	The second law of thermodynamics	Attendance	Quiz
2	4	Understanding the calculations of heat engines and heat pumps	Heat engines and heat pumps	Attendance	Tutorial
3	4	Applying the second law for entropy change calculations	Entropy changes for ideal system	Attendance	Quiz and repo
4	4	Understanding the difference betw the ideal work and the lost work	Calculations of ideal work and lost work	Attendance	Quiz
5	4	Understanding the fundamental property relations	Fundamental property relations	Attendance	Quiz
6	4	Calculations of residual properties	Residual properties	Attendance	Reports
7	4	Applying the generalized property relations	Generalized property relations	Attendance	Reports
8	4	Using the thermodynamic diagrams	Thermodynamic diagrams	Attendance	Quiz
9	4	Applying the thermodynamic principles for flow processes	Duct flow of compressible fluid	Attendance	Tutorial
10	4	Energy balance calculations for turbines	Turbines	Attendance	Quiz

11	4	Energy balance for compression processes	Compression processes	Attendance	Tutorial
12	4	understanding the steam power plants principles	Steam power plants	Attendance	Exam
13	4	Compare the different kinds of steam power plants cycles	Carnot, Rankin, and practical cycles	Attendance	Quiz
14	4	Understanding the refrigeration cycle	Refrigeration	Attendance	Quiz
15	4	Understanding heat pumps	Heat pumps	Attendance	Tutorial

11.Course Evaluation

Quiz 10%
Report 10%
Seminar 10%
Class activities: 5 %
Homework: 5%
Mid exam 10%
Final exam: 50

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Introduction to chemical engineering thermodynamics, Smith, 9th edition
Main references (sources)	Thermodynamics: An Engineering Approach 8th Edition Yunus A. Cengel, Michael A. Boles McGraw-Hill, 2015
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form Equipment Design I

1. Course Name:
Equipment Design 1
2.Course Code:
CHE 326
3.Semester / Year:
٢nd Semester/3rd year
4.Description Preparation Date:
20/2/2026
5.Available Attendance Forms:
Students' attendance is recorded in the classroom and on Excel lists based on the number of lectures and according to the dates in the schedule, and is sent weekly to the Absences Committee.
6.Number of Credit Hours (Total) / Number of Units (Total)
4 hrs. (CL.+Tut.) Weekly / 60 hrs.for semester / 5 ECTS
7.Course administrator's name (mention all, if more than one name)
Name: Dr. Ali A Hassan Email: ali.alkhafaji@mu.edu.iq
8.Course Objectives

Course Objectives	• Introducing students to the fundamentals of chemical engineering equipment design. • Developing students' skills to solve problems facing the chemical industry. • Providing the labor market with graduates with high capabilities and competence in equipment design. • Raising awareness about developing graduates' skills to find employment opportunities in investment companies and private sector companies.

9.Teaching and Learning Strategies

Strategy	The main strategy that will be adopted in delivering this subject is to encourage student participation in design exercises to enhance engineering thinking skills through interactive classes and tutorials.

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Understand the basic concept of chemical Engineering	Basic Concepts of Process Design	Lecture	H.W.
2	4	To explain the chemical anatomy	The Anatomy of Chemical Manufacturing Process	Lecture	H.W.
3	4	Explaining the flow sheet types	Flow-sheeting	Lecture	H.W.

4	4	Explain the PED diagrams	Piping and Instruments Diagram	Lecture	Quiz
5	4	Explain the types of valves and the purpose of using each type	Valves selection	Lecture	H.W.
6	4	To understand the students of controller types and how their type	General Instrument and Controller Symbols	Lecture	H.W.
7	4	Explain how to make the preliminary cost of the projects	Cost Estimations	Lecture	Exam
8	4	To exercise the cost estimation	Examples of cost estimation	Lecture	H.W.
9	4	Explain the fundamentals of plant layouts	Plant Layout	Lecture	H.W.
10	4	Explain the process vessels	Process Vessels	Lecture	H.W.
11	4	Understanding how to make equipment selection	Equipment Selection	Lecture	Quiz
12	4	Make a preliminary design of the decanter	Equipment Separation, liq.-liq. Sep.	Lecture	H.W.
13	4	Make a preliminary design of a knockout drum	Equipment Separation, gas-liq. Sep.	Lecture	Quiz
14	4	Make a preliminary design of a cyclone	Equipment Separation, gas-solid Sep.	Lecture	H.W.
15	4	Explain in detail the pressure vessels	Pressure Vessels	Lecture	Exam

11.Course Evaluation

Daily, monthly and final exams, reports, class assignments and homework.
Course evaluation 40 %, Mid exam. 10%, Final exam. 50%

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	▪ Lectures. ▪ Peters M, Timmerhause K.D and West R, "Plant Design and Economics for Chemical Engineers," 5th edition, McGraw-Hill, (2003). ▪ Coke A.K., "Ludwig Applied Process Design of Chemical and Petrochemical Plant," vol. 1, 4th edition, Gulf professional Publisher, (2007).
Main references (sources)	▪ R. K. Sinnott,"Chemical Engineering Design", Chemical Engineering Volume 6, Fourth edition, Elsevier Butterworth-Heinemann, (2005).
Recommended books and references (scientific journals, reports…)	Lectures of global universities, Scientific websites
Electronic References, Websites	Libraries websites for international universities

Fourth Year
First Semester

No.	Subject	Weekly hours			Units
		Th.	Tut.	Lab.	
1	Units Operating I	3	---	---	3
2	Processes Control I	3	1	---	3
3	Petrochemical Industries I	2	---	---	2
4	Equipment Design I	3	---	---	3
5	Petroleum Refining I	3	1	---	3
6	Computer Applications	2	--	3	3
7	English Language IV	1	1	---	1
8	Engineering Project I	3	2	---	3
	Total	20	5	3	21
		28			

Course Description Form Unit operations I

1. Course Name:	
Unit operations I	
2. Course Code:	
CHE411	
3. Semester / Year: 2025-2026	
1st Semester/year	
4. Description Preparation Date:	
01/09/2025	
5. Available Attendance Forms:	
Students' attendance is recorder in the classroom and on Excel lists based on lectures' number and according to the dates in the schedule, and is sent weekly to the Absences committee.	
6. Number of Credit Hours (Total) / Number of Units (Total)	
3 hours weekly/45 hours for the semester / 3 Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Prof. Dr. Raid Tarik Al-khateeb Email: dr.raidt@mu.edu.iq	
8. Course Objectives	
Course Objectives	1- Preparing qualified engineers in the field of units operations to keep pace with contemporary developments and meet the requirements of the country's scientific and economic development plans 2- Develop their skills in analysis, design, operation and use of modern laboratory equipment and software to conduct practical experiments 3- Develop their ability to communicate verbally with scientific societies to visualize and explain work in a more sophisticated way, as well as developing their ability to conduct applied research that can contribute in serving the community. 4- Communicate with state service institutions related to the nature of the program by providing engineering advice and participating or holding seminars and discussions 5- Improving their understanding of professional ethics, sustainability and occupational safety that allows them to be influential engineers in society by finding solutions to industrial facilities problems related to the program
9. Teaching and Learning Strategies	
Strategy	The main strategy that will be adopted in delivering this subject of learn that different units operations that concerned with the exploitation of units on a commercial scale. This course will give the basics of the field and how to obtain additional information as you require it in your careers and will give you good opportunity to understand the methods of solving units' operations problems and consider that in your graduation work.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Understand the concept of Boundary layer	Introduction to Boundary laye	Lecture	H.W.
2	3	Understand the streamline portion of the Boundary layer	The streamline portion of the Boundary layer for Momentum transfer.	Lecture	H.W.
3	3	Understand the turbulent portion of the Boundary layer	he turbulent portion of the Bounda layer for Momentum transfer	Lecture	Quiz
4	3	Understand the Boundary layer for Mass and Heat transfer.	he Boundary layer for Mass and H transfer.	Lecture	H.W.
5	3	Understand the Momentum Transfer	ntroduction to Momentum Transfe	Lecture	H.W.
6	3	Understand the concept of Heat, and Mass Transfer.	Introduction to Heat, and Mass Transfer.	Lecture	Exam
7	3	Understand the Reynolds analogy .	Reynolds analogy .	Lecture	H.W.
8	3	Understand the Taylor-Prantl modification	aylor-Prantl modification and Flow pipe .	Lecture	H.W.
9	3	Understand the Non-Newtonian Fluid	ntroduction to Non- Newtonian Flu	Lecture	H.W.
10	3	Understand the Flow of Power-Law Fluids	Flow of Power-Law Fluids in pipe	Lecture	Quiz
11	3	Understand the liquid Mixing	Introduction to liquid Mixing.	Lecture	H.W.
12	3	Application of Agitation Equipment.	Agitation Equipment.	Lecture	H.W.
13	3	Explain the Standard Turbine Design.	Standard Turbine Design.	Lecture	Quiz
14	3	Understand the Power Curve	Power Curve	Lecture	H.W.
15	3	Explain the Power consumed by agitator .	Power consumed by agitator.	Lecture	Exam

11. Course Evaluation

Quizzes, Homework, Seminars, Month exams, Final exam, and open questions that have a definite answer.
Course evaluation: 30%
Final exam: 70%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	- Lectures - Chemical engineering volume 1 and 2
Main references (sources)	1- Transport process and unit operation 2- Principles of mass transfer and separation processes 3-Principles of unit operation 4-Unit operation of chemical engineering
Recommended books and references (scientific journals, reports...)	Scientific websites.
Electronic References, Websites	Libraries websites for international universities.

Course Description Form Processes Control

1. Course Name:	
Processes Control	
2. Course Code:	
CHE412	
3. Semester / Year:	
1st Semester/year 2025-2026	
4. Description Preparation Date:	
1/9/2025	
5. Available Attendance Forms:	
Students' attendance is recorder in the classroom and on Excel lists based on lectures' number and according to the dates in the schedule, and is sent weekly to the Absences committee.	
6. Number of Credit Hours (Total) / Number of Units (Total)	
4 hours weekly/60 hours for the semester / 3 Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Prof. Dr. Anas Bdiwi Salman Email: dr.anas.bdiwi@mu.edu.iq	
8. Course Objectives	
Course Objectives	1- Preparing qualified engineers in the field of processes control to keep pace with contemporary developments and meet the requirements of the country's scientific and economic development plans 2- Develop their skills in analysis, design, operation and use of modern laboratory equipment and software to conduct practical experiments of control tools used in chemical and petrochemical plants. 3- Develop their ability to communicate verbally with scientific societies to visualize and explain work of controlling processes in a more sophisticated way, as well as developing their ability to conduct applied research that can contribute in serving the community. 4- Improving their understanding of professional ethics, sustainability and occupational safety that allows them to be influential engineers in society by finding solutions to industrial facilities problems of control issues related to the program
9. Teaching and Learning Strategies	
Strategy	The main strategy that will be adopted in delivering this subject of processes control is to understand the chemical reaction engineering throughout the chemical reactors through interactive classes and tutorials.
10. Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Understand the concept of processes design (PC)	Introduction	Lecture	H.W.
2	4	Understand the performance of PC	Representative Process Control Problems	Lecture	H.W.
3	4	To introduce the basic concepts	Introductory concepts	Lecture	Quiz
4	4	Typical PC system	An industrial perspective of a typical process control problem	Lecture	H.W.
5	4	Understand the application of PC system	Illustrative examples	Lecture	H.W.
6	4	Explain the main hardware elements	Control System Hardware Elements	Lecture	Exam
7	4	To classify the PC systems	Classification of process control strategies	Lecture	H.W.
8	4	To analyze PC diagrams	Process Control Diagrams	Lecture	H.W.
9	4	concentration dependent term	Theoretical models of chemical processes	Lecture	H.W.
10	4	Understand the DF	Degrees of freedom analysis	Lecture	Quiz
11	4	Conduct the mathematical relation using LT	Laplace transforms of representative functions	Lecture	H.W.
12	4	Application of LT	Solution of differential equations by Laplace transform techniques	Lecture	H.W.
13	4	Explain the types of PC models	Transfer Function Models	Lecture	Quiz
14	4	Understand the 1st order PC system	First-Order systems	Lecture	H.W.
15	4	Explain the effect of different inputs	Response of First-Order Systems to Various Inputs	Lecture	Exam

11. Course Evaluation

Quizzes, Homework, Seminars, Month exams, Final exam, and open questions that have a definite answer.
Course evaluation: 30%
Final exam: 70%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	- Lectures - Process System Analysis and Control by Coughanowr, Donald, Joun Wiley & Sons, 1991, (2nd Editions).
Main references (sources)	- Essentials od Process Control by Michael L. Luyben and Willium L. Luyben, McGraw - Hall Publisher, 1997, (1st Editions). - Process Modeling, Simulation, And Control For Chemical Engineers by Willium L. Luyben, Marcel Dekker Publisher, 1996, (2nd Editions).
Recommended books and references (scientific journals, reports...)	Scientific websites.
Electronic References, Websites	Libraries websites for international universities.

Course Description Form Petrochemical Industries I

1. Course Name:

Petrochemical Industries I

2. Course Code:

CHE 41٣

3. 3. Semester / Year:

First Semesters/ 2025-2026

4. Description Preparation Date:

1/ 9/ 2025

5. Available Attendance Forms:

Excel Form

6. Number of Credit Hours (Total) / Number of Units (Total)

2 hrs./week/30 hours for the semester
3 units

7. Course administrator's name (mention all, if more than one name)

Name: Ali Salih
Email: **ali.salih@mu.edu.iq**

8. Course Objectives

Course Objectives	Teaching the students polymers technologies and classification ,processing , physical and chemical properties of polymers

9. Teaching and Learning Strategies

Strategy	▪ Different forms of teaching will be used to cover with objectives of the course. PowerPoint presentations for the head titles, definitions, graphs, and many useful illustrations with a summary at the end of each chapter will be presented and discussed. ▪ The PowerPoint contains information about new topics and unsolved examples, and then the whiteboard will be used to solve them and to let students see the solutions.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Polymerization technology	Definition and nomnclatı	theory	Class work &homework
2	2	Polymerization technology	Polymers classification	theory	Class work &homework
3	2	Polymerization technology	Polymers classification	theory	Class work &homework
4	2	Polymerization technology	Reaction kinetics	theory	Class work &homework
5	2	Polymerization technology	Preparation methods	theory	Class work &homework
6	2	Polymerization technology	Physical properties	theory	Class work &homework

7	2	Processing technologies	Mixing and pelletizing	theory	Class work &homework
8	2	Processing technologies	Rolling and kneading	theory	Class work &homework
9	2	Processing technologies	Storage and transportation	theory	Class work &homework
10	2	Polymer manufacturing process	Polythene	theory	Class work &homework
11	2	Polymer manufacturing process	Polythene	theory	Class work &homework
12	2	Polymer manufacturing process	Phenol formaldehyde	theory	Class work &homework
13	2	Polymer manufacturing process	Phenol formaldehyde	theory	Class work &homework
14	2	Polymer manufacturing process	nylon	theory	Class work &homework
15	2	Polymer manufacturing process	nylon	theory	Class work &homework

11. Course Evaluation

Formative assessment: Quizzes 2; class wsok **(30 %)**
Final Exam: **70%**
Total assessment: **100% (100 Marks)**

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form Equipment Design

1. Course Name:

Equipment Design I

2. Course Code:

CHE414

3. Semester / Year:

1st Semester/2025-2026

4. Description Preparation Date:

1/09/2025

5. Available Attendance Forms:

Students' attendance is recorded in the classroom and on Excel lists based on the number of lectures and according to the dates in the schedule, and is sent weekly to the Absences Committee.

6. Number of Credit Hours (Total) / Number of Units (Total)

3 hours weekly/45 hours for the semester/ ٣ Units

7. Course administrator's name (mention all, if more than one name)

Name: Prof. Ihsan Habib Dakhil
Email: em2ihsan@mu.edu.iq

8. Course Objectives

Course Objectives	• Introducing students to the fundamentals of chemical engineering equipment design. • Developing students' skills to solve problems facing the chemical industry. • Providing the labor market with graduates with high capabilities and competence in equipment design. • Raising awareness about developing graduates' skills to find employment opportunities in investment companies and private sector companies.

9. Teaching and Learning Strategies

Strategy	The main strategy that will be adopted in delivering this subject is to encourage student participation in design exercises to enhance engineering thinking skills through interactive classes and tutorials.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Understand the basic concept of chemical Engineering	Basic Concepts of Process Design	Lecture	H.W.
2	3	To explain the chemical anatomy	The Anatomy of Chemical Manufacturing Process	Lecture	H.W.
3	3	Explaining the flow sheet types	Flow-sheeting	Lecture	H.W.

4	3	Explain the PED diagrams	Piping and Instruments Diagram	Lecture	Quiz
5	3	Explain the types of valves and the purpose of using each type	Valves selection	Lecture	H.W.
6	3	To understand the students of controller types and how their type	General Instrument and Controller Symbols	Lecture	H.W.
7	3	Explain how to make the preliminary cost of the projects	Cost Estimations	Lecture	Exam
8	3	To exercise the cost estimation	Examples of cost estimation	Lecture	H.W.
9	3	Explain the fundamentals of plant layouts	Plant Layout	Lecture	H.W.
10	3	Explain the process vessels	Process Vessels	Lecture	H.W.
11	3	Understanding how to make equipment selection	Equipment Selection	Lecture	Quiz
12	3	Make a preliminary design of the decanter	Equipment Separation, liq.-liq. Sep.	Lecture	H.W.
13	3	Make a preliminary design of a knockout drum	Equipment Separation, gas-liq. Sep.	Lecture	Quiz
14	3	Make a preliminary design of a cyclone	Equipment Separation, gas-solid Sep.	Lecture	H.W.
15	3	Explain in detail the pressure vessels	Pressure Vessels	Lecture	Exam

11. Course Evaluation

Quizzes, Homework, Seminars, Monthly exams, Final exam, Oral questions, and Open questions that have a definite answer.
Course evaluation (30 %)
Final exam (70 %)

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	▪ Lectures. ▪ Peters M, Timmerhause K.D and West R, "Plant Design and Economics for Chemical Engineers," 5th edition, McGraw-Hill, (2003). ▪ Coke A.K., "Ludwig Applied Process Design of Chemical and Petrochemical Plant," vol. 1, 4th edition, Gulf professional Publisher, (2007).
Main references (sources)	▪ R. K. Sinnott,"Chemical Engineering Design", Chemical Engineering Volume 6, Fourth edition, Elsevier Butterworth-Heinemann, (2005).
Recommended books and references (scientific journals, reports...)	Lectures of global universities, Scientific websites
Electronic References, Websites	Libraries websites for international universities

Course Description Form Petroleum Refining

1. Course Name:
Petroleum Refining 1
2. Course Code:
CHE 415
3. Semester / Year:
First Semesters/ 2025-2026
4. Description Preparation Date:
1/ 9/ 2025
5. Available Attendance Forms:
Excel Form
6. Number of Credit Hours (Total) / Number of Units (Total)
4 hrs./week/60 hours for the semester 4 units
7.Course administrator's name (mention all, if more than one name)
Name: Adil Hatem Rashid Email: adil.hatem@mu.edu.iq adilhatem6@gmail.com
8.Course Objectives

Course Objectives	• Introducing fourth-year students to the nature of crude oil and the petroleum products that can be obtained through various refining and processing operations, as well as studying the most important of these operations. • Providing the labor market with highly qualified and competent graduates to work in petroleum refining fields. Raising awareness about developing graduates' skills to find employment opportunities in investment companies and private sector companies.
2. Teaching and Learning Strategies	
Strategy	• Delivering lectures using a projector and showing educational videos. • Classroom and extracurricular assignments. • Directing students to websites they can use to develop their knowledge and skills. Directing questions and discussions in the classroom.

3. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4		Introduction& Chemical Compositi Of Petroleum.	Lecture + Application	C.W
2	4		Physical & Thermodynamic Properties of Petroleum.	Lecture + Application	C.W
3	4		Classification of Crudes & Petroleum	Lecture + Application	C.W

			Products.		
4	4		Petroleum Refining Processes – Introduction, Desalting processes	Lecture + Application	C.W
5	4		Atmospheric & Vacuum Distillatic		exam
6	4		Class Review & First Month Exam.	Lecture + Application	C.W
7	4		Treating Processes	Lecture + Application	C.W
8	4		Cooking	Lecture + Application	C.W
9	4		Visbreaking	Lecture + Application	C.W
10	4		Second Month Exam	Lecture + Application	C.W
11	4		Catalytic Cracking		exam
12	4		Catalytic Hydrocracking	Lecture + Application	C.W
13	4		Catalytic Reforming & Isomerization.	Lecture + Application	C.W
14	4		Alkylation & Plymerization	Lecture + Application	C.W
15	4		Class Review	Lecture + Application	C.W

4. Course Evaluation

Formative assessment: Quizzes; Online assignments; Onsite assignments; Report 1, monthly exam
Cours evaluation 70%
Total assessment: 100% (100 Marks)

5. Learning and Teaching Resources

Required textbo (curricular books, if a	
Main referen (sources)	• R. C. Uttam, **Fundamentals of Petroleum and Petrochemical Engineering,** 8-Taylor & Francis Group, 2011. • S. J. David & R. P. Peter, **Handbook of Petroleum Processing**, Published by Springer, 2006. • M. R. Riazi, **Characterization and Properties of Petroleum Fractions**, First ed., USA, 2005. • S. Vastly, **Crude Oil Chemistry,** Marcel Dekker, Inc., 2003. • James G. Speight, **Handbook of Petroleum Product Analysis**, A John Wiley & Sons, Inc., Publication, 2002. • J. H. Gary & G. E. Handwerk, **Petroleum Refining, Technology & Economics,** 4th ed., Marcel Dekker, Inc., 2001. • **Petroleum Refining Vol. 1,2,3,4.** • B. K. Bhaskara Rao, **Modern Petroleum Refining Processes**, Edn. 3, Oxford & IBH Publishing Company Pvt. Ltd. New Delhi.

Recommended books and references (scientific journals, reports...)	
Electronic Referenc Websites	

Course Description Form Computer Applications I

1. Course Name:	
Computer Applications I	
2. Course Code:	
ENG 416	
3. Semester / Year:	
1st Semester / 2025-2026	
4. Description Preparation Date:	
٢٠٢٦/٢/١٢	
5. Available Attendance Forms:	
Attendance is recorded and managed via Excel sheet	
6. Number of Credit Hours (Total) / Number of Units (Total)	
٥ hours weekly /75 hours for semester /3 Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Mahmoud abdulameer Sharshoh Email: mahmoud.sharshoh@mu.edu.iq	
8. Course Objectives	
Course Objectives	**Introducing final year students to the Hysys simulation program and its application to simulating problems related to material and energy balance processes, equipment design, and cost calculations.**
9. Teaching and Learning Strategies	
Strategy	A variety of teaching methods will be used to cover the course objectives. The theoretical foundations for each topic will be presented and discussed, followed by practical application examples simulating a chemical engineering process, tailored to the lecture objectives. A summary will be provided at the end of each chapter.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	5	Learning the simulation	Introduction to Hysys	Lecture + Application	C.W
2	5	Using Equation of state	Equation of state	Lecture + Application	C.W
3	5	Using Case Study	Case Study	Lecture + Application	C.W
4	5	Learning Modeling of Pump	Modeling of Pump	Lecture + Application	C.W
5	5		Monthly exam		exam
6	5	Learning Modeling of Expander	Modeling of Expander	Lecture + Application	C.W
7	5	Learning Modeling of Compressor	Modeling of Compressor	Lecture + Application	C.W
8	5	Learning Modeling of Air Cooler	Modeling of Air Cooler	Lecture + Application	C.W
9	5	Learning Modeling of Fired Heater	Modeling of Fired Heater	Lecture + Application	C.W
10	5	Calculating Bubble and Dew point calculation	Bubble and Dew point calculatior	Lecture + Application	C.W
11	5		Monthly exam		exam
12	5	Learning Modeling of Flash separator	Modeling of Flash separator	Lecture + Application	C.W
13	5	Using Logical operation Unit	Logical operation Unit	Lecture + Application	C.W
14	5	Learning Modeling the Conversion reactor	Conversion reactor Modeling of	Lecture + Application	C.W
15	5	Learning the Modeling Equilibrium reactor	Equilibrium reactor Modeling of	Lecture + Application	C.W

11. Course Evaluation

Formative assessment: Quizzes; Online assignments; Onsite assignments; Report 1, monthly exam
Cours evaluation ٧٠%
Total assessment: **100% (100 Marks)**

12. Learning and Teaching Resources

Required textbo (curricular books, if a	Chaves, I. D. G., López, J. R. G., Zapata, J. L. G., Robayo, A. L., & Niño, G. R. (2015). "Process analysis and simulation in chemical engineering. In Process Analysis and Simulation in Chemical Engineering". Springer.
Main referen (sources)	Chaves, I. D. G., López, J. R. G., Zapata, J. L. G., Robayo, A. L., & Niño, G. R. (2015). "Process analysis and simulation in chemical engineering. In Process Analysis and Simulation in Chemical Engineering". Springer.
Recommended books and references	• Foo, D. C. Y. (2022). Chemical Engineering Process Simulation. Academic Press. ISBN: 9780128231521

(scientific journals, reports...)	• Hamid, M. K. A.(2007) "Hysys: An introduction to chemical engineering simulation."
Electronic Referenc Websites	• https://www.mindluster.com/course/9852/Aspen-HYSYS-Basics • https://esupport.aspentech.com/T_course?id=a3p4P000000kjbxQAA * https://chemicalengineeringguy.com/the-blog/process-simulation/the-best-way-to-learn-aspen-plus-hysys/

Course Description Form English Language I

1. Course Name:	
English Language I	
2. Course Code:	
U411	
3. Semester / Year:	
First Semester / 2025-2026	
4. Description Preparation Date:	
01/09/2025	
5. Available Attendance Forms:	
Attendance	
6. Number of Credit Hours (Total) / Number of Units (Total)	
2 hrs per week, total of 30 hrs. /2 ECTS	
7. Course administrator's name (mention all, if more than one name)	
Name: Ahmed Raad Email: ahmad_al_iraqi2000@mu.edu.iq	
8. Course Objectives	
Course Objectives	**This course aims to develop students' skills in speaking English, reading, listening, and writing articles, report, and learning Grammar**
9. Teaching and Learning Strategies	
Strategy	**An ability to apply knowledge of English Language; Reading, Writing, Speaking and Listening**

10. Course Structure					
Week	*Hours*	*Required Learning Outcomes*	*Unit or subject name*	*Learning method*	*Evaluation method*
Week-1	*2*	*D4, D3, D2, D1*	Tenses		Quiz
Week-2	*2*	*D4, D3, D2, D1*	Present Simple		*Report*
Week-3	*2*	*D4, D3, D2, D1*	Past Simple		*Seminar*
Week-4	*2*	*D4, D3, D2, D1*	Past Tenses		*Exam*
Week-5	*2*	*D4, D3, D2, D1*	Have to		Quiz
Week-6	*2*	*D4, D3, D2, D1*	*Future Form*		*Report*
Week-7	*2*	*D4, D3, D2, D1*	Information Questions		*Seminar*
Week-8	*2*	*D4, D3, D2, D1*	The Present Perfect		*Exam*
Week-9	*2*	*D4, D3, D2, D1*	The Present Perfect		Quiz
Week-10	*2*	*D4, D3, D2, D1*	articles		*Report*
Week-11	*2*	*D4, D3, D2, D1*	Writing emails		*Seminar*
Week-12	*2*	*D4, D3, D2, D1*	Conditional		*Exam*
Week-13	*2*	*D4, D3, D2, D1*	Conditional		Quiz
Week-14	*2*	*D4, D3, D2, D1*	Model Verbs		*Report*
Week-15	*2*	*D4, D3, D2, D1*	Midterm		*Exam*

11. Course Evaluation
Quiz; 15 Mark, Report; 10 Mark, Exam; 10 Mark, Seminal; 5 Marks

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	**New Headway post intermedia**
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Fourth Year
Second Semester

No.	Subject	Weekly hours			Units
		Th.	Tut.	Lab.	
1	Units Operating II	3	---	--	3
2	Processes Control II	3	1	---	3
3	Petrochemical Industries II	2	---	---	2
4	Equipment Design II	3	---	---	3
5	Petroleum Refining II	3	1	---	3
6	Computer Applications II	2	---	3	3
7	Chemical Eng. Lab. II	3	---	---	3
8	Engineering Project II	3	2	---	2
	Total	22	4	3	23
		29			

Course Description Form Unit Operation II

1. Course Name:	
Unit operations II	
2. Course Code:	
CHE421	
3. Semester / Year:	
2nd Semester/year	
4. Description Preparation Date:	
20/2/2026	
5. Available Attendance Forms:	
Students' attendance is recorder in the classroom and on Excel lists based on lectures' number and according to the dates in the schedule, and is sent weekly to the Absences committee.	
6. Number of Credit Hours (Total) / Number of Units (Total)	
3 hours weekly/45 hours for the semester / 3 Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Prof. Dr. Raid Tarik ALkateeb Email: dr.raidt@mu.edu.iq	
8. Course Objectives	
Course Objectives	1- Preparing qualified engineers in the field of units operations to keep pace with contemporary developments and meet the requirements of the country's scientific and economic development plans 2- Develop their skills in analysis, design, operation and use of modern laboratory equipment and software to conduct practical experiments 3- Develop their ability to communicate verbally with scientific societies to visualize and explain work in a more sophisticated way, as well as developing their ability to conduct applied research that can contribute in serving the community. 4- Communicate with state service institutions related to the nature of the program by providing engineering advice and participating or holding seminars and discussions 5- Improving their understanding of professional ethics, sustainability and occupational safety that allows them to be influential engineers in society by finding solutions to industrial facilities problems related to the program
9. Teaching and Learning Strategies	
Strategy	The main strategy that will be adopted in delivering this subject of learn that different units operations that concerned with the exploitation of units on a commercial scale. This course will give the basics of the field and how to obtain additional information as you require it in your careers and will give you good opportunity to understand the methods of solving units' operations problems and consider that in your graduation work.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1	3	Understand the concept of packed column	Introduction to fluid flow through packed column	Lecture	H.W.
2	3	Understand the Advantages and disadvantage of Packed column	Advantages and disadvantage of Packed column	Lecture	H.W.
3	3	Understand the Streamline flow in Packed column.	Streamline flow in Packed column.	Lecture	Quiz
4	3	Understand the Turbulent flow in Packed column	Turbulent flow in Packed column	Lecture	H.W.
5	3	Understand the Flow of particles though fluids	Flow of particles though fluids	Lecture	H.W.
6	3	Understand the concept of Fluidization..	Introduction to Fluidization.	Lecture	Exam
7	3	Understand the Minimum fluidization	Minimum fluidization	Lecture	H.W.
8	3	Understand the Separation Techniques	Types of Separation Techniques	Lecture	H.W.
9	3	Understand the Sedimentation process.	Introduction to Sedimentation process	Lecture	H.W.
10	3	Understand the Equipment's for Sedimentation.	Equipment's for Sedimentation.	Lecture	Quiz
11	3	Understand the Filtration process.	Introduction to Filtration process.	Lecture	H.W.
12	3	Application of Filtration Equipment.	Classification of Filtration Equipment's	Lecture	H.W.
13	3	Explain the Types of filters.	Types of filters	Lecture	Quiz
14	3	Understand the Centrifugal process.	Introductions to Centrifugal process.	Lecture	H.W.
15	3	Application of Centrifugal Equipment.	Equipment's for Centrifugal.	Lecture	Exam

11. Course Evaluation

Quizzes, Homework, Seminars, Month exams, Final exam, and open questions that have a definite answer.
Course evaluation: 30%
Final exam: 70%

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	- Lectures - Chemical engineering volume 1 and 2
Main references (sources)	1- Transport process and unit operation 2- Principles of mass transfer and separation processes 3-Principles of unit operation 4-Unit operation of chemical engineering
Recommended books and references (scientific journals, reports...)	Scientific websites.
Electronic References, Websites	Libraries websites for international universities.

Course Description Form Processes Control II

1. Course Name:
Processes Control II
2. Course Code:
CHE422
3. Semester / Year:
2st Semester/ 2025-2026
4. Description Preparation Date:
20/2/2026
5. Available Attendance Forms:
Students' attendance is recorder in the classroom and on Excel lists based on the number of lectures and according to the dates in the schedule, and is sent weekly to the Absences committee.
6. Number of Credit Hours (Total) / Number of Units (Total)
4 hours weekly/60 hours for the semester / 3 Units
7. Course administrator's name (mention all, if more than one name)
Name: Prof. Dr. Anas Bdiwi Salman Email: dr.anas.bdiwi@mu.edu.iq
8. Course Objectives

Course Objectives	1- Develop students' skills in analysis, design, operation and use of modern laboratory equipment and software to conduct practical experiments of control tools used in chemical and petrochemical plants. 2- Develop their ability to communicate verbally with scientific societies to visualize and explain work of controlling processes in a more sophisticated way, as well as developing their ability to conduct applied research that can contribute in serving the community. 3- Improving their understanding of professional ethics, sustainability and occupational safety that allows them to be influential engineers in society by finding solutions to industrial facilities problems of control issues related to the program
9. Teaching and Learning Strategies	
Strategy	The main strategy that will be adopted in delivering this subject of processes control is to understand the chemical reaction engineering throughout the chemical reactors through interactive classes and tutorials.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Understand the Lead-Lag PC systems	The Lead/Lag System	Lecture	H.W.
2	4	Understand the pure gain of PC	Pure Gain Systems	Lecture	H.W.
3	4	To introduce the pure capacity PC systems	Pure Capacity Systems	Lecture	Quiz
4	4	Understand the 2nd order PC system	Second-Order Systems	Lecture	H.W.
5	4	Understand the application of 2nd order PC systems	Physical Examples of Second-Order Systems	Lecture	H.W.
6	4	Explain the effect of different inputs	Response of Second-Order Systems to Various Inputs	Lecture	Exam
7	4	To understand the PC errors	Steady-state error analysis	Lecture	H.W.
8	4	To analyze PC outputs	Advantages and disadvantages of st error coefficients	Lecture	H.W.
9	4	Dynamic PC systems	Dynamic error coefficients	Lecture	H.W.
10	4	To understand PC graphically	Block diagram development 1	Lecture	Quiz
11	4	To represent PC graphically	Block diagram development 2	Lecture	H.W.
12	4	To understand PC graphically	Signal flow graphs 1	Lecture	H.W.
13	4	To represent PC graphically	Signal flow graphs 2	Lecture	Quiz
14	4	Understand the stable systems	Stability	Lecture	H.W.

15	4	To analyze stable system	Routh-Hurwitz stability criterion	Lecture	Exam

11. Course Evaluation

Quizzes, Homework, Seminars, Month exams, Final exam, and open questions that have a definite answer.
Course evaluation: 30%
Final exam: 70%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	- Lectures - Process System Analysis and Control by Coughanowr, Donald, Joun Wiley & Sons, 1991, (2nd Editions).
Main references (sources)	- Essentials od Process Control by Michael L. Luyben and Willium L. Luyben, McGraw -Hall Publisher, 1997, (1st Editions). - Process Modeling, Simulation, And Control For Chemical Engineers by Willium L. Luyben, Marcel Dekker Publisher, 1996, (2nd Editions).
Recommended books and references (scientific journals, reports...)	Scientific websites.
Electronic References, Websites	Libraries websites for international universities.

Course Description Form Chemical Industries II

13. Course Name:

Chemical Industries II

14. Course Code:

CHE 423

15. Semester / Year:

2nd Semester 2025-2026

16. Description Preparation Date:

23/2/2026

17. Available Attendance Forms:

Students' attendance is recorded in the classroom and on Excel lists based on the numbe of lectures and according to the dates in the schedule, and is sent weekly to the Absences Committee.

18. Number of Credit Hours (Total) / Number of Units (Total):

2 hours per week/ 2

19. Course administrator's name (mention all, if more than one name)

Name: Ali Salih
Email: ali.salih@mu.edu.iq

20. Course Objectives

Course Objectives	Teaching the students polymers technologies and classification ,processing , physical and chemical properties of polymers

21. Teaching and Learning Strategies

Strategy	▪ Different forms of teaching will be used to cover with objectives of the course. PowerPoint presentations for the head titles, definitions, graphs, and many useful illustrations with a summary at the end of each chapter will be presented and discussed. ▪ The PowerPoint contains information about new topics and unsolved examples, and then the whiteboard will be used to solve them and to let students see the solutions.

22.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Polymerization technology	Definition and nomnclature	theory	Class work &homework
2	2	Polymerization technology	Polymers classification	theory	Class work &homework
3	2	Polymerization technology	Polymers classification	theory	Class work &homework
4	2	Polymerization technology	Reaction kinetics	theory	Class work &homework
5	2	Polymerization technology	Preparation methods	theory	Class work &homework
6	2	Polymerization technology	Physical properties	theory	Class work &homework
7	2	Processing technologies	Mixing and pelletizing	theory	Class work &homework
8	2	Processing technologies	Rolling and kneading	theory	Class work &homework
9	2	Processing technologies	Storage and transportation	theory	Class work &homework
10	2	Polymer manufacturing process	Polythene	theory	Class work &homework
11	2	Polymer manufacturing process	Polythene	theory	Class work &homework
12	2	Polymer manufacturing process	Phenol formaldehyde	theory	Class work &homework
13	2	Polymer manufacturing process	Phenol formaldehyde	theory	Class work &homework
14	2	Polymer manufacturing process	nylon	theory	Class work &homework
15	2	Polymer manufacturing process	nylon	theory	Class work &homework

23. Course Evaluation

Formative assessment: Quizzes 2; class wsok **(30 %)**
Final Exam: **70%**
Total assessment: **100% (100 Marks)**

24.Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form Equipment Design

13. Course Name:	
Equipment Design 2	
14. Course Code:	
CHE424	
15. Semester / Year:	
2nd Semester/2025-2026	
16. Description Preparation Date:	
20/2/2026	
17. Available Attendance Forms:	
Students' attendance is recorded in the classroom and on Excel lists based on the number of lectures and according to the dates in the schedule, and is sent weekly to the Absences Committee.	
18. Number of Credit Hours (Total) / Number of Units (Total)	
3 hours weekly/45 hours for the semester/ 5 Units	
19. Course administrator's name (mention all, if more than one name)	
Name: Prof. Ihsan Habib Dakhil Email: em2ihsan@mu.edu.iq	
20. Course Objectives	
Course Objectives	• Introducing students to the fundamentals of chemical engineering equipment design. • Developing students' skills to solve problems facing the chemical industry. • Providing the labor market with graduates with high capabilities and competence in equipment design. • Raising awareness about developing graduates' skills to find employment opportunities in investment companies and private sector companies.
21. Teaching and Learning Strategies	
Strategy	The main strategy that will be adopted in delivering this subject is to encourage student participation in design exercises to enhance engineering thinking skills through interactive classes and tutorials.

22. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Understand the basic concept of chemical Engineering	Basic Concepts of Process Design	Lecture	H.W.
2	3	To explain the chemical anatomy	The Anatomy of Chemical Manufacturing Process	Lecture	H.W.
3	3	Explaining the flow sheet types	Flow-sheeting	Lecture	H.W.
4	3	Explain the PED diagrams	Piping and Instruments Diagram	Lecture	Quiz

5	3	Explain the types of valves and the purpose of using each type	Valves selection	Lecture	H.W.
6	3	To understand the students of controller types and how their type	General Instrument and Controller Symbols	Lecture	H.W.
7	3	Explain how to make the preliminary cost of the projects	Cost Estimations	Lecture	Exam
8	3	To exercise the cost estimation	Examples of cost estimation	Lecture	H.W.
9	3	Explain the fundamentals of plant layouts	Plant Layout	Lecture	H.W.
10	3	Explain the process vessels	Process Vessels	Lecture	H.W.
11	3	Understanding how to make equipment selection	Equipment Selection	Lecture	Quiz
12	3	Make a preliminary design of the decanter	Equipment Separation, liq.-liq. Sep.	Lecture	H.W.
13	3	Make a preliminary design of a knockout drum	Equipment Separation, gas-liq. Sep.	Lecture	Quiz
14	3	Make a preliminary design of a cyclone	Equipment Separation, gas-solid Sep.	Lecture	H.W.
15	3	Explain in detail the pressure vessels	Pressure Vessels	Lecture	Exam

23. Course Evaluation

Quizzes, Homework, Seminars, Monthly exams, Final exam, Oral questions, and Open questions that have a definite answer.
Course evaluation (30 %)
Final exam (70 %)

24. Learning and Teaching Resources

Required textbooks (curricular books, if any)	▪ Lectures. ▪ Peters M, Timmerhause K.D and West R, "Plant Design and Economics for Chemical Engineers," 5th edition, McGraw-Hill, (2003). ▪ Coke A.K., "Ludwig Applied Process Design of Chemical and Petrochemical Plant," vol. 1, 4th edition, Gulf professional Publisher, (2007).
Main references (sources)	▪ R. K. Sinnott,"Chemical Engineering Design", Chemical Engineering Volume 6, Fourth edition, Elsevier Butterworth-Heinemann, (2005).
Recommended books and references (scientific journals, reports...)	Lectures of global universities, Scientific websites
Electronic References, Websites	Libraries websites for international universities

Course Description Form Petroleum Refining 2

1. Course Name:
Petroleum Refining II
6. Course Code:
CHE 425
7. Semester / Year:
Second Semester / 2025-2026
8. Description Preparation Date:
9/1/2026
9. Available Attendance Forms:
Attendance is recorded and managed via Excel sheet
10. Number of Credit Hours (Total) / Number of Units (Total)
4 hrs./week/60 hours for the semester 3 units
11. Course administrator's name (mention all, if more than one name)
Name: Adil Hatem Rashid Email: adil.hatem@mu.edu.iq adilhatem6@gmail.com
12. Course Objectives

Course Objectives	• Introducing fourth-year students to the nature of crude oil and the petroleum products that can be obtained through various refining and processing operations, as well as studying the most important of these operations. • Providing the labor market with highly qualified and competent graduates to work in petroleum refining fields. Raising awareness about developing graduates' skills to find employment opportunities in investment companies and private sector companies.
13. Teaching and Learning Strategies	
Strategy	• Delivering lectures using a projector and showing educational videos. • Classroom and extracurricular assignments. • Directing students to websites they can use to develop their knowledge and skills. Directing questions and discussions in the classroom.

14. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4		Gaseous Fuels 1	Lecture + Application	C.W
2	4		Gaseous Fuels 2	Lecture + Application	C.W
3	4		Gaseous Fuels 3	Lecture + Application	C.W
4	4		Product Blending 1	Lecture + Application	C.W

5	4		Product Blending 2		exam
6	4		Product Blending 3	Lecture + Application	C.W
7	4		Product Blending 4	Lecture + Application	C.W
8	4		Lubricating Oils 1	Lecture + Application	C.W
9	4		Lubricating Oils 2	Lecture + Application	C.W
10	4		Lubricating Oils 3	Lecture + Application	C.W
11	4		Lubricating Oils 4		exam
12	4		Class Review & First Month Exam.	Lecture + Application	C.W
13	4		Product Blending 1	Lecture + Application	C.W
14	4		Product Blending 2	Lecture + Application	C.W
15	4		Class Review	Lecture + Application	C.W

15. Course Evaluation

Formative assessment: Quizzes; Online assignments; Onsite assignments; Report 1, monthly exam
Cours evaluation 70%
Total assessment: 100% (100 Marks)

16. Learning and Teaching Resources

Required textbo (curricular books, if a	
Main referen (sources)	• R. C. Uttam, **Fundamentals of Petroleum and Petrochemical Engineering,** 8-Taylor & Francis Group, 2011. • S. J. David & R. P. Peter, **Handbook of Petroleum Processing**, Published by Springer, 2006. • M. R. Riazi, **Characterization and Properties of Petroleum Fractions**, First ed., USA, 2005. • S. Vastly, **Crude Oil Chemistry,** Marcel Dekker, Inc., 2003. • James G. Speight, **Handbook of Petroleum Product Analysis**, A John Wiley & Sons, Inc., Publication, 2002. • J. H. Gary & G. E. Handwerk, **Petroleum Refining, Technology & Economics,** 4th ed., Marcel Dekker, Inc., 2001. • **Petroleum Refining Vol. 1,2,3,4.** • B. K. Bhaskara Rao, **Modern Petroleum Refining Processes**, Edn. 3, Oxford & IBH Publishing Company Pvt. Ltd. New Delhi.
Recommended books and references (scientific journals, reports...)	
Electronic Referenc Websites	

Course Description Form Computer Applications II

1. Course Name:
Computer Applications II
2. Course Code:
CHE 426
13. Semester / Year:
2nd Semester / 2025-2026
14. Description Preparation Date:
1/9/2026
15. Available Attendance Forms:
Attendance is recorded and managed via Excel sheet
16. Number of Credit Hours (Total) / Number of Units (Total)
∘ hours weekly /75 hours for Semester/ 3 Units
17. Course administrator's name (mention all, if more than one name)
Name: Mahmoud abdulameer Sharshoh Email: mahmoud.sharshoh@mu.edu.iq
18. Course Objectives

Course Objectives	**Introducing final year students to the Hysys simulation program and its application to simulating problems related to material and energy balance processes, equipment design, and cost calculations.**
19. Teaching and Learning Strategies	
Strategy	A variety of teaching methods will be used to cover the course objectives. The theoretical foundations for each topic will be presented and discussed, followed by practical application examples simulating a chemical engineering process, tailored to the lecture objectives. A summary will be provided at the end of each chapter.

20. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	5	Learning the Modeling of CSTR	Modeling of CSTR	Lecture + Application	C.W
2	5	Learning the Design of CSTR	Design of CSTR	Lecture + Application	C.W
3	5	Learning the Modeling of PFR	Modeling of PFR	Lecture + Application	C.W
4	5	Learning the Design of PFR	Design of PFR	Lecture + Application	C.W
5	5		Monthly Exam		exam
6	5	Learning the Modeling of Heat Exchanger	Modeling of Heat Exchanger	Lecture + Application	C.W
7	5	Learning the Design of Heat Exchanger	Design of Heat Exchanger	Lecture + Application	C.W

8	5	Learning the Modeling of Distillation column	Modeling of Distillation column	Lecture + Application	C.W
9	5	Learning the Design of Distillation column	Design of Distillation column	Lecture + Application	C.W
10	5	Learning the Modeling of Absorption column	Modeling of Absorption column	Lecture + Application	C.W
11	5	Learning the Modeling of Liquid-Liquid extraction	Modeling of Liquid-Liquid extracti		exam
12	5		Monthly exam	Lecture + Application	C.W
13	5	Learning the Modeling of Leaching	Modeling of Leaching	Lecture + Application	C.W
14	5	Using Petroleum Assay	Petroleum Assay	Lecture + Application	C.W
15	5	Learning Level Tank Control	Level Tank Control	Lecture + Application	C.W

21. Course Evaluation

Formative assessment: Quizzes; Online assignments; Onsite assignments; Report 1, monthly exam
Cours evaluation 70%
Total assessment: 100% (100 Marks)

22. Learning and Teaching Resources

Required textbo (curricular books, if a	Chaves, I. D. G., López, J. R. G., Zapata, J. L. G., Robayo, A. L., & Niño, G. R. (2015). "Process analysis and simulation in chemical engineering. In Process Analysis and Simulation in Chemical Engineering". Springer.
Main referen (sources)	Chaves, I. D. G., López, J. R. G., Zapata, J. L. G., Robayo, A. L., & Niño, G. R. (2015). "Process analysis and simulation in chemical engineering. In Process Analysis and Simulation in Chemical Engineering". Springer.
Recommended books and references (scientific journals, reports...)	• Foo, D. C. Y. (2022). Chemical Engineering Process Simulation. Academic Press. ISBN: 9780128231521 • Hamid, M. K. A.(2007) "Hysys: An introduction to chemical engineering simulation."
Electronic Referenc Websites	• https://www.mindluster.com/course/9852/Aspen-HYSYS-Basics • https://esupport.aspentech.com/T_course?id=a3p4P000000kjbxQAA * https://chemicalengineeringguy.com/the-blog/process-simulation/the-best-way-to-learn-aspen-plus-hysys/

Course Description Form Chemical Engineering LAB II

1. Course Name:

Chemical Engineering LAB II

2. Course Code:

CHE 428

3. Semester / Year:

2nd Semester 2025-2026

4. Description Preparation Date:

20/2/2026

5. Available Attendance Forms:

6. Number of Credit Hours (Total) / Number of Units (Total):

3 hours . weekly/ 45 hours for Semester /3 Units

7. Course administrator's name (mention all, if more than one name)

Name: Thabit Fadhil
Email: thabit.fadil@mu.edu.iq

8. Course Objectives

Course Objectives	**Teach students practical experiments in the fuel refinry laboratory, unit operation laboratory, and control laboratory.**

9. Teaching and Learning Strategies

Strategy	The experiments are applied practically to the students in a group system. The students conduct the experiment practically, obtain the results, and then prepare a report for each experiment.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Fuel refinery lab	Density of crude oil	practical	boratory work reports
2	3	Fuel refinery lab	Viscosity of crude oil	practical	boratory work reports
3	3	Fuel refinery lab	Flash point of crude oil	practical	boratory work reports
4	3	Fuel refinery lab	Boiling point	practical	boratory work reports
5	3	Fuel refinery lab	Ash content	practical	boratory work reports
6	3	Fuel refinery lab	Simple distillation	practical	boratory work reports
7	3	Unit operation lab	Drying	practical	boratory work reports
8	3	Unit operation lab	Sedimentation	practical	boratory work reports
9	3	Unit operation lab	Sieve analysis	practical	boratory work reports
10	3	Unit operation lab	Reynolds number	practical	boratory work reports

11	3	Control lab	On/off level switch	practical	boratory work a reports
12	3	Control lab	Differential level switch	practical	boratory work a reports
13	3	Control lab	Manual operation of Normally Closed solenoid valve	practical	boratory work a reports
14	3	Control lab	Manual control of peristaltic outlet pump speed	practical	boratory work a reports
15	3	Control lab	Manual control of Heater	practical	boratory work a reports

11. Course Evaluation

Formative assessment: Quizzes 2; Report s **(50 %)**
Final Exam: **50%**
Total assessment: **100% (100 Marks**)

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	