

**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

2025-2026

Ministry of Higher Education and Scientific Research

Scientific supervision and evaluation device

Department of Quality Assurance and Academic Accreditation

Academic program description form for institutes and colleges

University Name: Northern Technical University

College or Institute Name: Mosul Polytechnic College

Department Name: Non-Chemical and Petroleum Technologies

Academic or Professional Program Name: Diploma in Non-Chemical and Petroleum Technologies

Full Name: Diploma in Non-Chemical and Petroleum Technologies

System: Courses

Description Preparation Date: 1/9/2025

File Date: 3/9/2025

the signature :



Scientific Assistant: Dr. Hassan Muysar Qassim

the date: 3/9/2025

the signature:



Department Head: Dr. Wijdan Mohammad Salih

Date: 3/9/2025

The file was reviewed by the Quality Assurance and University Performance Division

Name of the official of the Quality Assurance and University Performance Division:

Ehsan Mohammad Ali

The Date: 3/9/2025

the signatur:



the signature :

Dean: Prof. Abdul Nasser

Abdul Razzaq Kashmoula

1-Program vision:

The Department of Chemical and Petroleum Industries seeks to achieve excellence and leadership in education, training, and scientific research by preparing qualified scientific and technical cadres who possess modern knowledge and skills in the fields of chemical and petroleum industries. These cadres are capable of meeting labor market requirements and contributing to the development of national industry and the achievement of sustainable development, while adhering to quality, safety, and environmental protection standards.

2-Program message:

Preparing scientifically and practically qualified technical cadres in the fields of chemical and petroleum industries, capable of meeting labor market needs and contributing to industrial development in accordance with quality, safety, and sustainability standards.

3- Program objectives

- 1-Qualifying specialized technical staff in chemical and petroleum industries.**
- 2-Providing students with modern scientific knowledge and practical skills.**
- 3-Meeting labor market requirements and the needs of the industrial sector.**
- 4-Promoting concepts of occupational safety and environmental protection.**
- 5-Supporting technical development and quality in industrial processes.**

4-Program accreditation:
Nothing

5-Other external influences:
Having a sponsor contributes to: 1-Linking the program to the job market or community 2-Providing financial, logistical, or training support 3-Facilitating employment and practical training 4- Providing ongoing guidance for the program

6.1-Program structure for first level:				
Program Structure	Number of Courses	Study Unit	Percentage	Notes *
University requirements	5	10	15.87%	
Institute requirements	4	10	15.87%	
Department requirements	8	43	%68.26	
summer training	Satisfied		-----	
Sum.	18	63	100%	

6.2-Program structure for second level				
Program Structure	Number of Courses	Study Unit	Percentage	Notes *
University requirements	5	10	17.5	
Institute requirements	4	9	15.8	
Department requirements	9	38	66.7	
Sum.	18	57	100	

7. وصف البرنامج:

جدول المقرر الدراسي للمستوى الأول

رمز المقرر	عدد الوحدات	عدد الساعات		اسم المقرر باللغة:		المتطلبات الجامعية
		العملية	النظرية	الانكليزية	العربية	

NTU101	2	0	2	English Language	اللغة الإنكليزية*	% (15-10) 5
NTU102	2	1	1	The Computer	الحاسوب	
3NTU10	2	0	2	Arabic Language	اللغة العربية*	
NTU100	2	0	2	Democracy and Human Rights	الديمقراطية وحقوق الانسان	
4NTU10	2	1	1	Sport	الرياضة (اختياري)	
	10	مجموع وحدات المتطلبات الجامعية				
MTI 100	2	0	2	Mathematics	الرياضيات*	متطلبات ال (معهد او كلية) % (22-16) 4
MTI 101	3	3	0	Mechanical Workshop	معامل ميكانيك*	
MTI 102	3	3	0	Engineering Drawing	رسم هندسي*	
MTI 103	2	0	2	Calculus	تفاضل وتكامل*	
	10	مجموع وحدات متطلبات التشكيل المعهد				
ICTI120	6	3	3	Fluid	جريان الموائع*	متطلبات القسم % (74-63) 8
ICTI121	6	3	3	Operation of Industrial Units	تشغيل الوحدات الصناعية*	
ICTI122	6	3	3	Physical Chemistry	الكيمياء الفيزيائية*	
ICTI123	6	3	3	Thermodynamics	الترمودينامك*	
ICTI124	6	3	3	Analytical and inorganic chemistry	الكيمياء التحليلية و اللاعضوية*	
ICTI129	5	2	3	Organic chemistry	الكيمياء العضوية*	
ICTI125	4	2	2	Industrial devices and equipment	اجهزة ومعدات صناعية*	
ICTI130	4	2	2	Power Sources	مصادر الطاقة*	
				تدريب صيفي		
	43	مجموع وحدات متطلبات القسم				17
	63	مجموع وحدات المتطلبات الكلية				

اللون الاسود للفصل الاول
اللون الاحمر للفصل الثاني

جدول المقرر الدراسي للمستوى الثاني

رمز المقرر	عدد الوحدات	عدد الساعات		اسم المقرر باللغة:		نوع المتطلب
		العملية	النظرية	الانكليزية	العربية	
NTU200	2	0	2	English Language	اللغة الانكليزية*	المتطلبات الجامعية (10-15) %
NTU204	2	0	2	Professional Ethics	اخلاقيات المهنة*	
NTU203	2	0	2	Baath Party Crimes in Iraq	جرائم نظام البعث في العراق	
NTU201	2	1	1	The computer	الحاسوب	
NTU202	2	0	2	Arabic language	اللغة العربية	5 مواد
	10	مجموع وحدات المتطلبات الجامعية				
MTI200	2	-	2	Research Project	*مشروع بحث	متطلبات ال (معهد او كلية) (16-22) % 4 مواد
MTI201	3	3	-	Specialized Workshop	ورشة تخصصية	
MTI202	2	2	-	Application Project	مشروع	
MTI203	2	-	2	Professional safety	*سلامة مهنية	
	9	مجموع وحدات متطلبات				
ICTI210	4	2	2	Crude oil technology	تكنولوجيا النفط الخام*	متطلبات القسم (63-74) % 9 مواد
ICTI211	4	2	2	Crude oil improvement techniques	تقنيات تحسين النفط الخام*	
ICTI212	4	2	2	Heat transmission	انتقال الحرارة*	
ICTI213	4	2	2	Mass transmission	انتقال المادة*	
ICTI214	4	2	2	Measurement techniques	تقنيات القياس*	
ICTI216	4	2	2	Materials Properties	خواص مواد	
ICTI225	5	3	2	Chemical industries	الصناعات الكيماوية*	
ICTI226	5	3	2	Organic Chemical industries	الصناعات الكيماوية العضوية*	
ICTI227	4	2	2	Petrochemicals	البتروكيماويات*	
	38	مجموع وحدات متطلبات القسم				18 مادة
	57	المجموع الكلي للمتطلبات				

اللون الاسود للفصل الاول
اللون الاحمر للفصل الثاني

8- Expected learning outcomes of the programme	
Knowledge:	
The student will be able to: 1. Familiarity with the basic principles of general chemistry, organic, inorganic, physical, and analytical. 2. .Understanding of chemical industrial processes and various production techniques. 3. .Extensive knowledge of petroleum and natural gas refining techniques. 4. .A good understanding of occupational safety fundamentals. 5. Familiarity with the equipment used in the petroleum and chemical industries.	
Skills	
1. The ability to operate and maintain chemical and petroleum industry equipment and devices. 2. The ability to accurately conduct chemical and physical experiments and tests. 3. The ability to use relevant engineering software and technical drawings. 4. The ability to implement occupational safety and security procedures in industrial environments.	
Value	
1. Respect ethical principles in industrial and petroleum work. 2. Avoid fraud and manipulation of data or analysis results. 3. Maintain the confidentiality of technical information related to the plant or institution. 4. Strictly adhere to occupational safety regulations within laboratories and industrial fields. 5. Recognize the importance of preserving the health and safety of individuals and society. 6. Assume responsibility in emergency situations and work to prevent industrial accidents. 7. Discipline and perseverance 8. Teamwork 9. Continuous learning and self-development	
9-Teaching and learning strategies	
1. Theoretical lectures 2. Practical learning 3. Project-based learning 4. Field training / internship	

5. Presentations and classroom discussions
6. Simulation and modeling
7. E-learning / Blended learning
8. Collaborative learning.

10-Evaluation methods

- 1- Pretests
- 2- Daily tests
- 3- Homework assignments to solve independently
- 4- Practical tests
- 5- Oral tests during lectures
- 6- Competitive tests between groups of students for one section
- 7- Tests to encourage scientific competition between student groups and stages
- 8- Submitting reports in the field of specialization and then discussing the reports
- 9- Semester and final exams (practical + theoretical)

Academic rank		Specialization		preparation of the teaching staff	
		General	Specialized	lecturer	staff
Dr. Wijdan Mohammed Salih	Ass.prof	Chemistry	Industrial chemistry	Staff	
Dr.Rana Sami Saeed	Ass.prof	Chemistry	Analytical chemistry	Staff	
Dr.Rawya zaglol saeed	Ass.prof	Chemistry	Physical chemistry	Staff	
Dr.Qais Mohammed abduallhameed	Lecturer	chemistry	Industrial chemistry	Staff	
Dr.Reem talal nather	Lecturer	Chemistry	Analytical chemistry	Staff	
Saba saeed mohammed	Ass. Lecturer	Chemical engineering	Oil and gas refining	Staff	
Dr.sama adnan raooof	Ass.prof	Chemistry	Inorganic Chemistry	Lecturer	
Zena amer adrees	Ass.prof	Civil Engineering	Environmental Engineering	Lecturer	
Abdul wahab fathi shareef	Ass. Lecturer	Computer science	verbal statements	Lecturer	

Ahmad salim Abdulla	Ass. Lecturer	English translation	English translation	Lecturer
Zainab adel mare	Ass. Lecturer	Political science	political systems	Lecturer
Heba Suleiman Daoud	Ass. ,Lecturer	Computer, Mathematics	Statistics	Lecturer
Suzan Mustafa Husseim	Ass. Lecturer	Arabic language	language	Lecturer

12-Professional development

Employing new teaching methods

Employing new and appropriate educational methods that serve the student's acquired - information that will help him in the areas of public and professional life

Flexibility of the curriculum to make it subject to change to keep pace with scientific - progress

Employing the necessary skills for the educational process and the necessary - techniques to obtain information

- Role model through the personality of the teacher and the extent of his influence on the student

13-Acceptance criterion

- Central admission prepared by the Ministry according to the conditions it sets

Student average in the preparatory stage, scientific and vocational stream -2

3- The department's capacity

14- The most important sources of information about the program

Methodical scientific courses

(External scientific sources (books - archives - the Internet -2

Teaching staff -3

4- Practical laboratory and research skills

15-Program development plan

1- Adding information on all topics related to peroluem and industrial chemistry

2- Learn about recent scientific developments.

3- Participation in international and local conferences.

4- Participation in scientific workshops inside and outside Iraq.

5-Hosting scientific competencies in the field of specialization

مخطط مهارات البرنامج																			
مخرجات التعلم المطلوبة من البرنامج																			
القيم										المهارات				المعرفة					اساسي أم اختياري
9ج	8ج	7ج	6ج	5ج	4ج	3ج	2ج	1ج	4ب	3ب	2ب	1ب	5أ	4أ	3أ	2أ	1أ		اسم المقرر
			/				/			/					/			essential	English Language
							/					/				/		essential	The Computer
							/					/		/			/	essential	Arabic Language
							/					/					/	essential	Democracy and Human Rights
							/					/					/	اختياري	Sport (اختياري)
								/				/					/	essential	Mathematics
								/				/					/	essential	Mechanical Workshop
							/				/						/	essential	Engineering Drawing
	/							/				/					/	essential	Calculus
						/	/					/		/			/	essential	Fluid

2025-
/2026
first

					/			/	/			/			/	/	essential	Operation of Industrial Units	ICTI121	
					/			/	/			/			/	/	essential	Physical Chemistry	ICTI122	
					/			/	/			/			/	/	essential	Thermodynamics	ICTI123	
					/			/	/			/			/	/	essential	Analytical and inorganic chemistry	ICTI124	
					/			/	/			/			/	/	essential	Organic chemistry	ICTI129	
					/			/	/			/			/	/	essential	Industrial devices and equipment	ICTI125	
					/			/	/			/			/	/	essential	Power Sources	ICTI130	
								/				/				/	essential	English Language	NTU200	
	/							/				/				/	essential	The Computer	NTU201	
							/					/				/	essential	Arabic Language	NTU202	
							/					/				/	essential	Baath Party Crimes in Iraq	NTU 203	
							/					/				/	essential	Professional Ethics	NTU 204	
							/					/				/	essential	Professional safety	MTI203	
							/	/				/				/	essential	Crude oil technology	ICTI210	
							/	/				/				/	essential	Crude oil improvement techniques	ICTI211	

							/	/				/				/	essential	Heat transmissi on	ICTI212	
							/	/				/				/	essential	Mass transmissi on	ICTI213	
							/	/				/				/	essential	Measur ement technique s	ICTI214	
							/	/				/				/	essential	Materials Properties	ICTI216	
							/	/				/				/	essential	Chemical industrie s	ICTI225	
							/	/				/				/	essential	Organic Chemical industrie s	ICTI226	
/								/	/			/			/	/	essential	Petroch emicals	ICTI227	
							/	/				/				/	essential	Applicati on Project	MTI202	
							/	/				/				/		Research Project	MTI200	
								/				/				/	essential	Specializ ed Worksho p	MTI20	

Course description

The first level

1. Higher Education Institution
Mosul Polytechnic College
2. Scientific Department
Chemical and Petroleum Industries Technologies Department
3. Course Name / Code
Arabic Language / NTU103
4. Available Modes of Attendance
1. Mandatory Weekly Lecture Schedule (Theoretical)
2. Discussions and Other Interactive Activities
5. Semester / Year
First Semester / First Level / 2025–2026
6. Total Credit/Study Hours
60 Hours
7. Course Coordinator(s)
Asst. Lect. Suzan Mustafa Hussein SUZAN_1985@ntu.edu.iq
8. Date of Description Preparation
2025/9/1
2. COURSE OBJECTIVES (MAIN PILLARS)
☐ Understand the Basics of the Arabic Language: Grasp foundational grammatical and morphological structures to ensure proper articulation and text construction.
☐ Master the Basics of Administrative Work and Drafting Official Letters: Gain the skill to compose precise official correspondence, documents, and reports according to administrative hierarchy.
☐ Avoid Common Spelling and Grammatical Errors: Prevent and eliminate structural and spelling mistakes that threaten the core integrity of the Arabic language within professional writing.
8. TEACHING AND LEARNING STRATEGIES

- **Foundational Knowledge Provision:** Providing students with core principles and subject matters related to the semester's curriculum, including comprehensive coverage of administrative letters and the linguistic errors individuals make when lacking proper language proficiency.
- **Practical Instructor-Led Problem Solving:** Resolving and breaking down a variety of applied, real-world examples directly on the board by the course instructor.
- **Linguistic Research & Error Detection Tasks:** Requiring the student to independently search for and analyze parallel vocabulary and structures within the curriculum that fall under common linguistic errors.
- **Collaborative Teamwork & Project Drafting:** Requiring students to work in groups to prepare, draft, and present reports and research papers directly related to the fields of the course.
- **Interactive Pedagogical Methods:** Employing diverse instructional techniques such as active questioning, elicitation, and structured group discussions.

11. Intended Learning Outcomes (ILOs) of the Program

Knowledge and Understanding:

- **A-1:** Identify common spelling and linguistic errors frequently occurred in administrative correspondence and official documents.
- **A-2:** Distinguish between Arabic articulation points (Makharij al-Huruf) and their phonetic characteristics in both speech and writing.
- **A-3:** Explain the morphological and grammatical rules differentiating between types of "Ta'at" (Ta'a Marbouta and Ta'a Maftouha) and their respective writing conventions.

Skills:

- **B-1:** Analyze and parse (I'rab) simple Arabic sentences used in professional and functional contexts correctly.
- **B-2:** Pronounce Arabic letters and words accurately, avoiding phonetic confusion or overlap between similar sounds.
- **B-3:** Detect and rectify linguistic, grammatical, and spelling errors in administrative texts and official documents independently.

Values and Competencies:

- **C-1:** Demonstrate a high commitment to linguistic accuracy and professional

integrity when drafting official and administrative correspondence. • C-2: Take professional responsibility for proofreading administrative documents to ensure they are completely free of linguistic errors. • C-3: Appreciate the significance of preserving the integrity and identity of the Arabic language within corporate and institutional environments.
12. Course Structure (Arabic Language 1)

Week	Hours	Unit / Topic Title	Intended Learning Outcomes (ILOs)	Teaching Methods	Assessment Methods
W1	4	Linguistic, spelling, and structural errors in administrative documents	A-1, B-3, C-2	Interactive lecture, brainstorming, and analyzing real administrative text samples	In-class discussion and proofreading exercises
W2	4	"Ta'at" and "Ha'at" in Arabic (Ta'a Marbouta, Ta'a Maftouha, and Ha'a)	A-3, B-3	Conceptual explanation, visual aids, and dictation exercises	Formative assessment and solving in-class worksheets
W3	4	Practical applications: Editing and correcting administrative letters	B-3, C-1	Cooperative learning and small group workshops	Take-home assignment (editing a short text) and a short quiz
W4	4	Articulation points: Differentiating between the letters (الضاد) and (الظاء)	A-2, B-2	Phonetic drills, audio-visual presentations, and guided pronunciation	Quick oral quiz, spelling differentiation test, and homework
W5	4	Pronunciation and articulation of similar sounds in Arabic (Continuation)	A-2, B-2, C-3	Group reading sessions and educational flashcards	Observation of student performance and individual pronunciation correction
W6	4	The Differentiating Alif (الألف الفارقة): Rules of writing and omission	A-1, B-3	Deductive teaching method and interactive whiteboard exercises	Solving various orthographic problems and discussing common mistakes
W7	4	Midterm Review & Midterm Examination	All previous ILOs	Guided revision and QA session	Official written Midterm Exam
W8	4	The Verbal Sentence: Objects in Arabic grammar (منصوبات)	B-1	Standard lecture and analytical parsing (l'rab) on	Solving grammatical parsing exercises and group

		(الأسماء / المفاعيل)		the board	discussions
W9	4	Practical grammatical parsing (I'rab) in administrative contexts	B-1, C-1	Problem-based learning (analyzing grammatically defective texts)	Pop quiz and grammatical performance evaluation
W10	4	Parts of Speech: Differentiating between Nouns (الاسم) and Verbs (الفعل)	B-1	Concept mapping, word classification games, and brainstorming	Quick quiz and homework (classifying administrative texts)
W11	4	Hamzat Al-Qat' and Hamzat Al-Wasl (Writing and pronunciation rules)	A-1, B-3	Comparative text analysis and visual aids	Diagnostic dictation test and interactive board exercises
W12	4	Intensive applications of "Hamzat" rules in official correspondence	A-1, B-3, C-2	Work environment simulation (auditing official letters)	Self-assessment and peer assessment
W13	4	Differentiating between Noon (النون) and Tanween (التنوين) and common errors	A-1, A-3	Comparative explanation and rapid writing workshops	Solving targeted spelling problems and a short quiz
W14	4	General review and comprehensive applications on editing administrative letters	B-3, C-1, C-2	Integrated practical workshop (editing and auditing)	Portfolio evaluation of students' written work
W15	4	Final Examination	All Course ILOs	-	Comprehensive final written exam

Ministry of Higher Education and Scientific Research	Educational institution
Mosul Polytechnic College Dept. Chemical and Petroleum Industries Techniques	University/Scientific Department
NTU101 English language	Course Name/Code
Technical Diploma	The program(s) you are entering into.
Weekly lesson schedule (theoretical) Discussions, scientific seminars and other extracurricular activities	Forms of attendance
first	Semester/Year
2per week	Number of study hours (total)
2025/9/1	Date
.1Course objectives	
Introducing the student to the basics of the English language with regard to developing the four language skills (speaking, listening, reading and writing).	
1- To introduce the student to the vocabulary of communication and	

academic writing in the English language.
Develop students' skills to use and practice communication in English.
Course details teaching, learning and assessment methods
Cognitive objectives: Introducing the student to the basics of the English language with regard to developing the four language skills (speaking, listening, reading and writing).
Course specific skill objectives: To familiarize the student with the vocabulary of communication and academic writing in English.
Teaching and learning methods
(Theoretical lectures / conversation lectures / interactive lectures)
Evaluation methods
(conversation exams / written exams / weekly reports / daily attendance / participation and interaction in lectures / semester and final exams))
Affective and value-based objectives: Developing students' skills to use and practice communication in the English language.
Teaching and learning methods
(Theoretical lectures / discussion groups / debates between students)))
Evaluation methods
(conversation tests / written tests / observation / student's cumulative record)))
• General and transferable skills (other skills related to employability and personal development). • Improving students' discussion skills in English • Raising students' research awareness in writing reports, research and university theses using English

Course structure					
Evaluation method	Teaching method	Unit name/topic	Required learning	Hours	Week
Test and discussion	Theoretical	Unit 1 / Hello/ Part of speech	Grammar/ Vocabulary/ Skills Work/ Everyday English	2	1

Test and discussion	Theoretical	Unit 2 / Your world/ Auxiliary verbs	Grammar/ Vocabulary/ Skills Work/ Everyday English	2	2
Test and discussion	Theoretical	Unit 3 / All about you/ Modal verbs	Grammar/ Vocabulary/ Skills Work/ Everyday English	2	3
Tests and reports	Theoretical	Unit 4 / Family and Friends Compound words	Grammar/ Vocabulary/ Skills Work/ Everyday English	2	4
Test and discussion	Theoretical	Unit 5 / The way I live Passive voice	Grammar/ Vocabulary/ Skills Work/ Everyday English	2	5
Tests and reports	Theoretical	Unit 6 / Every day Future tense	Grammar/ Vocabulary/ Skills Work/ Everyday English	2	6
Test and discussion	Theoretical	Unit 7 / My favorite Present simple+ past simple	Grammar/ Vocabulary/ Skills Work/ Everyday English	2	7
Test and discussion	Theoretical	Unit 8 / Where I live present continuous+ past continuous	Grammar/ Vocabulary/ Skills Work/ Everyday English	2	8

Test and discussion	Theoretical	Unit 9 / Times past	Grammar/ Vocabulary/ Skills Work/ Everyday English	2	9
Test and discussion	Theoretical	Unit 10 / We had a great time!	Grammar/ Vocabulary/ Skills Work/ Everyday English	2	10
Test and discussion	Theoretical	Unit 11 / I can do that	Grammar/ Vocabulary/ Skills Work/ Everyday English	2	11
Test and discussion	Theoretical	Unit 12 / Please and Thank you	Grammar/ Vocabulary/ Skills Work/ Everyday English	2	12
Test and discussion	Theoretical	Unit 13 / Here and now	Grammar/ Vocabulary/ Skills Work/ Everyday English	2	13
Test and discussion	Theoretical	Unit 14 / It's time to go	Grammar/ Vocabulary/ Skills Work/ Everyday English	2	14
Discussion	Theoretical	Review	Review	2	15

Structure	
New Headway Plus / Beginner/ John and / Oxford University Press / 2014 Liz Soars	Required Textbooks
1. An A-Z of English Grammar & Usage / Geoffrey Leech / Longman / 1990 2. Common Mistakes in English / T.J. Fitikides / Longman 2002 3. English Grammar in Use / Raymond Murphy / Cambridge University Press 2004	References
1. Express English / Omer Al- Hourani / Jordan	Website references

Curriculum Development Plan
1. Developing appropriate curricula for university graduates

2- Holding seminars and conferences aimed at updating curricula -1

Course title	
Calculus	
Course Code	
MTI103	
4- Semester / Academic Year:	
2nd Semester / 2026-2025	
Date of Description Preparation	
2025/9/1	
6- Available Attendance Modes	
Face-to-face lectures and Online Lectures	
7- Total Credit Hours / Total Units	
2	
8- Course Coordinator	
Heba Sulaiman Dawood :heba.sulaiman82@uomosul.edu.iq	
9- Course Objectives	
1- Develop students' understanding of mathematical concepts, principles, and theories. 2- Enhance students' ability to apply mathematical and computational operations in solving real-world problems. 3- Improve skills in logical thinking and mathematical analysis. 4- Relate mathematical knowledge to other scientific fields such as physics, economics, and computer science.	
5-	
9- Teaching and Learning Strategies	
1- Active Learning 2- Cooperative Learning 3- Technology Integration	

4- Self-Learning 5- Mathematical Inquiry						
Assessment Method	Learning Method	Unit / Course Title	Intended Learning Outcomes	Courses	Weeks	
Test	Lecture, Discussion, Video Presentations	Derivatives				Differentiation 2 1st
Test	Lecture, Discussion,	Derivatives				Derivative of Algebraic Functions 2 2nd
Test	Lecture, Discussion,	Derivatives				Chain Rule 2 3rd
Test	Lecture, Discussion,	Derivatives				Applications of Derivatives 2 4th
Test	Lecture, Discussion,	Limits				Definition of Limit 2 5th
Test	Lecture, Discussion,	Limits				Types of Limits 2 6th
Test	Lecture, Discussion,	Integration				Integration 2 7th
Test	Lecture, Discussion,	Integration				Types of Integrals 2 8th
Test	Lecture, Discussion,	Integration				Applications of Integration 2 9th
Test	Lecture, Discussion,	Integration				Examples 2 10th
Test	Lecture, Discussion,	Derivatives				Derivative of Trigonometric Functions 2 11th
Test	Lecture, Discussion,	Integration				Integration of Trigonometric Functions 2 12th
Test	Lecture, Discussion,	Derivatives				Chain Rule 2 13th
Test	Lecture, Discussion,	Integration				Integration of Trigonometric Functions 2 14th
Test	Lecture, Discussion,	Integration				Determining the curve of the function 2 15th

12- Infrastructure:	
2. 3. Required Textbooks	1. Required Textbooks
4. https://epscollege.uoanbar.edu.iq/catalog/%D8%AA%D9%81%D8%A7%D8%B6%D9%84%20%D9%88%D8%AA%D9%83%D8%A7%D9%85%D9%84-1.pdf	1- Online Lectures from the

13- Course Development Plan:
1-Reviewing the latest scientific literature.
2- Participating in relevant scientific conferences.
3- Allocating teaching and training staff time for practical application and work in operational and industrial institutions.
4- Inviting specialized professors.
5-Promoting scientific collaboration with other universities and related colleges.

1. Educational Institution / College - Institute / Scientific Department Center
Northern Technical University / Polytechnic College - Mosul / Department of Chemical and Oil Industries Technologies
1. Course Code Course Name
HUMAN RIGHT AND DEMOCRACY/Ntu100
2. Semester / Year:
2025-2026
3. Description Preparation Date:
2025/9/1
4. Available Attendance Forms:
Class-Electronic
5. Number of Credit Hours (Total) / Number of Units (Total)
2 Credit Hours
6. Course administrator's name (mention all, if more than one name)
Name: Zainab Adil Merie Email: zainab.merie@uomosul.edu.iq

7. Course Objectives					
Course Objectives		• the student gets to know basics of human rights and basics democratic regime • crystallizing awareness raising thought areas of human rights and democracy it reflects positively on the social and political field • Developing student skills and employment every single one science subject in his studies or his field of work in the future			
8. Teaching and Learning Strategies					
Strategy		Theoretical lecture, dialogue and discussions, daily assignments quiz			
9. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	2	Basics of human rights	The concept of human rights	lecture	Quiz
2.	2	The historical development of an idea human rights	The human rights in western civilization(Greek-Roman)	electric	discussion
3.	2	The human rights in inforatics era	The digital human rights	Lecture	Quiz
4.	2	The human rights in the heavenly laws	The human rights in the Islamic law	Lecture	Quiz
5.	2	The human rights classifications	The individual and collective human rights	Lecture	Oral exams
6.	2	The human rights in exceptional cases	The human rights in times of war and occupation	Lecture	discussions
7.	2	The guarantees of respect and protection of human rights	The protecting human rights at the national level	Lecture	Quiz
8.	2	The human rights in Iraq	The human rights in Iraqi constitutions	Lecture	Quiz
9.	2	The basics of the democratic regime	Introducing the concept of democracy	Lecture	discussions
10.	2	The basics of the democratic regime	The characteristics	electrical	discussions

			of ademocratic regime		
11.	2	Forms and images of the democratic regime	The direct democracy	Lecture	Quiz
12.	2	The democracy and the Islamic regime	The disperse between the democracy and the shura	Lecture	discussion s
13.	2	The electoral system as an application of democracy	The election methods	Lecture	Quiz
14.	2	The electoral system as an application of democracy	The methods of rigging elections	Lecture	reports
15.	2	The Forms of governments and contemporary governance systems	The Parliament ary system	Lecture	Quiz
1. 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					
2. Learning and Teaching Resources					
Required textbooks (curricular books, if any)			Not found book systematic		
Main references (sources)			Hameed Hanon ,human rights		
Recommended books and references (scientific journals, reports...)			1-Mohammed Aabid Aljaberey,human rights in Arabic thought 2-Hasan Shafeeq Alanie,the regimes political and constitutional comparison		
Electronic References, Websites			https://www.ohchr.org//		

1. Educational institution	Northern Technical University
2-College/Institute	Polytechnic College/Mosul
3- Scientific Department/ Center	Chemical and Petroleum Industries Technologies
4. Course Name / Code	Power Sources/ICTI130
5-Available forms of attendance	Mandatory
6-semester/ year	2025- 2026
7. Number of study hours (total)	6
8. Date of preparation of this description	1/9/2025

Module Aims

- 1. Provide the student with basic knowledge about the different types of energy sources, whether conventional or renewable, and understand the importance of each source in various industries, especially in the chemical and oil industry sectors.**
- 2. Enable the student to analyze the advantages and disadvantages of each energy source in terms of economic and environmental effectiveness.**
- 3. Enhancing the student's ability to apply energy concepts in solving problems related to energy efficiency and innovation in sustainable energy technologies.**

10- Course outputs and teaching, learning and evaluation methods

A- Knowledge Objectives

1. Introduce students to various types of renewable and non-renewable energy sources and understand the basic physical and chemical processes associated with energy production.
2. Identify energy conversion techniques from different sources.
3. Study the environmental and economic impacts of the use of various energy sources.

(b) The skill objectives of the course.

1. Ability to evaluate different energy sources in terms of efficiency and environmental feasibility.
- 2 Develop research and analysis skills in sustainable energy topics

Teaching and Learning Methods

Using the theoretical and practical lecture system, laboratory and electronic presentation (DATASHOW)

Valuation Methods

Oral Tests/Written Tests/ Reporting/Daily Attendance/ Participation and Interaction in Lectures/Quarterly and Final Exams.

C- Affective and Value Objectives

1. Promote awareness among students about the urgent need to use renewable energy sources to preserve the

environment for future generations. 2. Instill the concept of responsibility in students in dealing with energy and environmental challenges, and their role in making sustainable energy decisions at the individual and societal levels. 3. Motivate students to think creatively and develop innovative energy solutions that contribute to improving the efficiency of the use of natural resources.
D. Teaching and Learning Methods
Theoretical Lectures/Practical Lectures/ Seminars
D. Valuation Methods
Oral Tests/Written Tests/ Reporting/Daily Attendance/ Participation and Interaction in Lectures/Quarterly and Final Exams.
- Transferred general and qualifying skills (other skills related to employability and personal development). 1-The ability to effectively research and analyze information related to energy sources. 2. Enhance the ability to collaborate with others on group projects to discuss and develop sustainable energy solutions.

11. Course Structure					
Week	Theoretical Hours	The learning outcomes	Subject name	Teaching Method	Assessment Methods:
Week 1	2	- Identify the different forms of energy - Distinguishing the types of potential and kinetic energy	Introduction to Energy Sources	Presentation, Explanation, Q&A, Discussion	test
Week 2	2		Renewables	Presentation, Explanation, Q&A, Discussion	test
Week 3	2		Fossil fuels	Presentation, Explanation, Q&A, Discussion	test

Week 4	2		crude oil	Presentation, Explanation, Q&A, Discussion	test
Week 5	2		Chemical Composition of Crude Oil	Presentation, Explanation, Q&A, Discussion	test

SECOND SEMESTER					
Week	Theoretical Hours	The learning outcomes	Subject name	Teaching Method	Assessment Methods:
week6		First Exam		Presentation, Explanation, Q&A, Discussion	test
Week 7	2	- Identifying primary, secondary and improved crude oil extraction mechanisms - Understand how each of the primary mechanisms works, and know their efficiency and ability to extract crude oil	Crude Oil Extraction Mechanisms	Presentation, Explanation, Q&A, Discussion	test
Week 8	2	- Knowledge of types of renewable energies - Identify the motives for searching for renewable energy sources - Understand their advantages and disadvantages	Renewable Energy Twin	Presentation, Explanation, Q&A, Discussion	test
Week 9	2	- Understanding the mechanism of the emergence	SOLAR ENERGY	Presentation, Explanation, Q&A, Discussion	test

		of solar energy and identifying solar radiation and its types - Understanding the impact of the tilt of the Earth's axis on the amount of solar radiation			
Week 10	2	- Understanding the installation of the solar cell - Understand how the solar cell works	Solar cell	Presentation, Explanation, Q&A, Discussion	test

Chapter 3					
Week	Theoretical Hours	The learning outcomes	Subject name	Teaching Method	Assessment Methods:
Week 11		Pre-Board 2			test
Week 12	2	- Identify the main components of the wind turbine - Understanding the functions of each part of the wind turbine and the mechanism for generating electricity from it	WIND ENERGY	Presentation, Explanation, Q&A, Discussion	test
Week 13		- Types of biomass - Biomass Energy Uses	1. biomass	Presentation, Explanation, Q&A, Discussion	test
Week 14		- Understand the mechanism of methane production from anaerobic digestion - Understanding the steps to produce ethanol from agricultural crops	Production of biogas and biofuels	Presentation, Explanation, Q&A, Discussion	test
Week 15		Review		Presentation, Explanation, Q&A, Discussion	test

Substructure	
1- Required prescribed books	
2- Key References (Sources)	• technology. (2023). (n.p.): Dr. and Renewable energy: resources . Yosry Moustafa • Fundamental of petroleum.
Books and references recommended by scientific journals, reports ,....)	
B- Electronic references, websites	Related Suggested Links: https://youtu.be/cwtycCW9kOI?si=3HCKQ_dGrQn8ZgsU https://youtu.be/mGTbwFcLiTQ?si=Zmj5_AARiN3wb0va https://youtu.be/FseVfgvQpPk?si=Obomhm5P7oT6m5iS https://youtu.be/YvuN0RLw7TI?si=A2iwWZne_ZzNeNfc

13. Course Development Plan
• Organizing field visits to industrial facilities for energy sources (such as solar power plants) to enrich students with practical experiences. • Access to modern scientific research in this field. • Scientific twinning with the corresponding departments in other universities.

- 1-The Northern Technical University Educational Institution
- 2- College/Institute Polytechnic College/Mosul
- 3-Scientific Department/Center for Chemical and Petroleum Industries Technologies
- 4- Course name/code NTU102- The Computer
- 5- Available forms of attendance are mandatory

6- Semester/Year 2025-2026

7-The total number of study hours is 30 hours

8-The date this description was prepared is 5/30/2026

Course Description

Basic Information Details

- 1) Educational Institution Northern Technical University
- 2) College / Institute Polytechnic College / Mosul
- 3) Scientific Department Chemical and Petroleum Industries Technologies
- 4) Course Name / Code The Computer / NTU102
- 5) Attendance Mode Mandatory
- 6) Semester / Year 2025 - 2026
- 7) Total Study Hours 30 Hours
- 8) Date of Description Preparation 30/5/2026

.9 Course Objectives

This course aims to graduate qualified technical staff capable of:

- 1) Performing operation, maintenance, and control tasks for industrial units in chemical and petroleum plants.
- 2) Conducting laboratory tests on raw materials and finished products, ensuring compliance with standard specifications, and linking theoretical knowledge with practical application.
- 3) Familiarizing students with modern technologies used in computing and their industrial applications.
- 4) Understanding and effectively utilizing scientific material to solve technical problems.
- 5) Acquiring proficiency in reading and interpreting industrial drawings and maps using specialized computer software.

10 .Course Learning Outcomes, Teaching and Learning Methods, and Assessment

A- Cognitive (Knowledge) Objectives

- 1) Understanding Fundamentals: Enable students to understand basic computer concepts, including hardware and software components.
- 2) Using Software: Teach students how to use essential software such as word processors, spreadsheets, and presentation programs.
- 3) Developing Technical Skills: Enhance students' skills in programming, application development, and database management relevant to the department's needs.
- 4) Information Analysis: Develop data analysis skills and the use of information analysis tools to support decision-making.
- 5) Problem Solving: Strengthen critical thinking and problem-solving abilities using computer technologies.
- 6) Communication and Collaboration: Use technology to enhance online communication and collaboration skills.
- 7) Digital Security Awareness: Promote understanding of online security concepts and protecting personal and professional information.

B- Skill-Based Objectives of the Course

- a. Using Software: Develop proficiency in efficiently using various computer software, such as word processors and spreadsheets.
- b. Programming: Develop the ability to write code and understand basic programming languages (if included in the course).
- c. Problem Solving: Enhance critical thinking skills, analyze technical problems, and propose appropriate solutions.
- d. File Management: Learn to organize, store, and retrieve information effectively.
- e. Digital Communication: Acquire skills in using online communication tools, such as email and meeting platforms.
- f. Online Collaboration: Use collaborative tools and teamwork in projects.

- g. Digital Security: Develop skills in protecting personal information and understanding cybersecurity basics.

Teaching and Learning Methods

- Utilization of theoretical and practical lectures.
- Reliance on electronic computing and (DATASHOW) presentations to illustrate concepts.
- Use of multimedia (presentations, videos, illustrative posters).
- Encouraging classroom discussions and questioning to enhance understanding.

Assessment Methods

- Monthly, mid-term, and final examinations (written and practical).
- Weekly quizzes to measure student interaction and understanding of lectures.
- Evaluation of practical performance in the lab (if applicable).
- Participation in classroom discussions.

C- Affective (Attitudinal and Value) Objectives

- a. Introduce students to the reality of industrial plant operations and their vital role in nation-building and economic development.
- b. Encourage students to continuously gain practical experience and link it to theoretical principles.
- c. Instill values of precision, discipline, and commitment in acquiring knowledge and science.
- d. Enhance communication and positive interaction skills during lectures and classroom activities.

Teaching and Learning Methods for Affective Objectives

- Theoretical and practical lectures including applied examples from the industrial reality.
- Visual observations (videos and images) of industrial processes.
- Listening to scientific and practical experiences from professors and specialists.
- Directing students to research and explore online.

Assessment Methods for Affective Objectives

- Direct observation of student participation and interaction.
- Oral tests and scientific discussions.
- Evaluation of reports and research prepared by students.

General and Transferable Skills (Other Skills Related to Employability and Personal Development)

- a. Focusing on students with high mental aptitude and encouraging innovation.
- b. Promoting a culture of discussion and scientific dialogue to develop creative abilities.
- c. Developing students' mental and scientific capabilities through diverse activities.
- d. Raising the overall level of students and following up on lower-achieving students through additional support.

.11Course Structure (Weekly Plan)

Week	Hours	Required Learning Outcomes Unit / Topic Teaching Method Assessment Method
6-1	2	Defining the computer, its hardware components, software screen and known operating systems-components, and the most well Windows interface get to know the main ging their size Desktop components and icons, arranging icons, chan and name, how to copy icons, how to add information tools,

		how to change the screen wallpaper, and using a screen saver
15-6	2	knowing the main interface Word program How to operate the new file, elements, the command bar and tools, how to open a changing the default file name, and changing .the viewing range Reduce and enlarge. Show the ruler Knowing the font type and size, increasing ink, making the font italic, drawing a line under the text, how to change the font color, he alignment shape, adding bullet marks, converting determining t writing to exponential form or subform, adding effects to the text, the search method, replacing one word with another, and inserting .symbols ste, go Ways to use the following commands (select all, cut, copy, pa back one step, open and close the document, cancel go back, add a (letter, and delete a letter Insert a table, add a row, delete a row, add a column, delete a column

Lecture, case studies, discussing problem scenarios Written test (Problem-solving) / Discussion

.12 Infrastructure (Resources and References)

.1 Required Prescribed Textbooks

- Graham Brown, David Watson. "Cambridge IGCSE Information and Communication Technology", 3rd Edition.(2020)
- Alan Evans, Numan Ivianin, Mary Anne Poatsy, "Technology in Action Complete" 16th Edition.(2020)
- Ahmed Banafa. "Introduction to Artificial Intelligence (AI)". 1st Edition.(2024)
- Al-Hadari, Sabah. "Computer Basics.(2016) ."
- Dr. Adel Abdul-Nour. "Introduction to the World of Artificial Intelligence.(2005) ."

.2 Main References (Sources)

- A. Recommended Books and References: Scientific journals specialized in computer science and information technology; technical reports issued by international organizations.
- B. Electronic References and Internet Sites: E-learning platforms (e.g., Coursera, edX), technical blogs, educational YouTube channels, and official websites of software companies (Microsoft, Google).

1-Educational Institution	Northern Technical University
2-College/Institute	Mosul Polytechnic College
3-Scientific Department/Center	Dept. Chemical and Petroleum Industries Techniques
4-Course Name/Code	Fluid Flow ICT1120
5-Available Attendance Forms	Mandatory
6-Semester/Year	2025-2026
7-Number of Study Hours (Total)	90
8-Date of Preparation of this Description	1/9/2025

Course Objectives

The Fluid Flow course aims to provide students with the knowledge and skills necessary to understand fluid behavior and design and analysis of fluid flow systems in various engineering applications

-10Course outcomes, teaching, learning and assessment methods

A- Cognitive Objectives

Understanding the basic concepts: Students understand the basic concepts of fluid flow, such as the physical properties of fluids, the different types of flow, and the basic laws of fluid flow

Analysis and Design: Students learn how to analyze and design fluid flow systems, such as pipes and channels, and cooling and heating systems

Practical Applications: Students learn how to apply the concepts and principles of fluid flow in various engineering applications

Written Assessment: Students are assessed through written tests that aim to assess

.their understanding of the concepts and principles of fluid flow Practical Assessment: Students are assessed through practical projects that aim to . .assess their skills in analyzing and designing fluid flow systems Oral Assessment: Students are assessed through oral discussions that aim to assess .3 .their skills in explaining the concepts and principles of fluid flow
.B - Course specific skill objectives Critical Thinking: Students learn how to think critically in solving problems related to fluid . .flow Computational Skills: Students learn how to apply computational skills in solving . .problems related to fluid flow Communication Skills: Students learn how to explain concepts and principles of fluid . .flow clearly and usefully
Teaching and Learning Methods Theoretical Lesson: The lecturer introduces the concepts and principles of fluid flow in . .the form of theoretical lectures Computational Exercises: The lecturer introduces applied computational exercises on . .the concepts and principles of fluid flow Practical Projects: The lecturer introduces applied practical projects on the concepts . .and principles of fluid flow Class Discussions: The lecturer leads class discussions on the concepts and principles . .of fluid flow Use of Technology: The lecturer uses technology, such as computer programs and . .multimedia, to introduce the concepts and principles of fluid flow
Evaluation Methods Traditional Teaching Methods # Theoretical Lesson: The lecturer introduces the concepts and principles of fluid flow in . .the form of theoretical lectures Computational Exercises: The lecturer introduces applied computational exercises on . .the concepts and principles of fluid flow Practical Projects: The lecturer introduces applied practical projects on the concepts . .and principles of fluid flow Modern Teaching Methods # Use of Technology: The lecturer uses technology, such as computer programs and . .multimedia, to introduce the concepts and principles of fluid flow E-Learning: The lecturer uses electronic resources and computer programs to introduce . .the concepts and principles of fluid flow Cooperative Learning: The lecturer encourages students to work in groups and group . .projects to enhance their understanding of the concepts and principles of fluid flow Affective and Value Objectives Class discussions: The lecturer leads class discussions on the concepts and principles . .of fluid flow

Interactive exercises: The lecturer provides interactive exercises, such as educational . games and interactive activities, to enhance understanding of the concepts and principles .of fluid flow
Research projects: The lecturer encourages students to conduct research projects on . topics related to fluid flow
D- Teaching and learning methods
Practical and theoretical lectures, visual observations, listening to scientific rules in the courses from professors and the Internet.
D- Evaluation methods
Oral tests, daily tests on a regular basis and scientific discussions
General and transferable skills (other skills related to employability and personal .(development Focus on those who have a great mental ability and comprehension -1 Encourage discussion policy so that the student has a scientific creative ability - Develop students' mental and scientific abilities - Raise the level of students and follow up on weak students -

Curriculum structure-11

	Assessment Method1	Unit/Subject Name	Key Learning Outcomes	Hours	Week
Week Hours					Stage 1
Test	Lecture, discussion, presentation of explanatory ,posters	Study of the fluid at rest (pressure in the fluid, pressure distribution in the fluid	Units – SI units – other unit systems, conversion from one system to another	3	1&2
Test	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Fluids in motion (stable and unstable flow), continuity equation	Definition of fluid and its properties	3	3
Test	Lecture, discussion,presentation of videos and film	Find the flow rate of a fluid over a V-shaped barrier	Study of fluid properties (density, viscosity, compressibility, surface tension, etc.)	3	4
Test	Lecture, discussion,presentation of videos and film	Find the flow rate of a fluid over a rectangular barrier	Study of the fluid at rest	3	5&6

Test	Lecture, discussion, presentation of videos and film	Fluids in motion (stable and unstable flow), continuity equation	Fluids in motion		7
Test	Lecture, discussion, presentation of videos and film	Fluid movement with friction, types of flow and its relationship to Reynolds number	flow rate of fluid over -shaped barrier	3	8
Test	Lecture, discussion, presentation of videos and film	Derivation of Bernoulli's equation and applications of Bernoulli's equation (Orpheus, Venjouri tube, Pitot tube)	Fluid movement	3	9
Test	Lecture, discussion, presentation of videos and film	(Pressure loss in pipes and their networks)	Derivation of Bernoulli's equation	3	10&11
Test	Lecture, discussion, presentation of videos and film	Finding the pressure loss due to friction inside the pipes	(Pressure loss	3	12
Test	Lecture, discussion, presentation of videos and film	Finding the pressure loss due to the fluid passing through the reversers and valves	Finding the pressure loss	3	13
Test	Lecture, discussion, presentation of videos and film	Finding the pressure loss due to sudden narrowing of the tube	Fluid movement	3	14
Test	Lecture, discussion, presentation of videos and film	Find the pressure loss due to sudden expansion of the pipe	Derivation of Bernoulli's equation	3	15

12Infrastructure

	1- Required textbooks
Unit. Operation of chemical Eng. By maccade, Published by maccraw-hill, 3^{ed} edition 1967 Unit operation by Brown, published by willy London 1965 Priciples of unit operation by A. S . Faust published by Toppan and Willy 2nd edition 1961 Tokyo. Japan 1960 Chemical Eng Vol 1 and 2nd Coulson and Richardason by preutice- Hill 1960 Fluid mechanics for Eng. By manrice puplished by preutice- hill 1960	2- Main references (sources)
Van den Akker, Harry, and Robert F. Mudde. <i>Mass, Momentum and Energy Transport Phenomena: A Consistent Balances Approach</i>. Walter de Gruyter GmbH & Co KG, 2023. Nakayama, Yasuki. <i>Introduction to fluid mechanics</i>. Butterworth-Heinemann, 2018. Morrison, Faith A. <i>An introduction to fluid mechanics</i>. Cambridge University Press, 2013. Cengel, Yunus, and John Cimbala. <i>Ebook: Fluid mechanics fundamentals and applications (si units)</i>. McGraw Hill, 2013. Jones, Ernest Beachcroft. <i>Instrument Technology: Measurement of pressure, level, flow and temperature</i>. Butterworth-Heinemann, 2013.	A- Recommended books and references (scientific journals, reports, etc.)
https://www.youtube.com/watch?v=fTv4qZnUuNA https://www.youtube.com/watch?v=QCB32otWD0I https://www.youtube.com/watch?v=qHPaHMsXLk	B- Electronic references, Internet sites, etc.

13-Curriculum development plan

Reviewing modern scientific literature

Participating in relevant scientific conferences

Devoting teaching and training staff to application and work in operational and industrial institutions.

Hosting specialized professors

Scientific pairing with other universities and similar colleges

COURSE DESCRIPTION TEMPLATE

COURSE DESCRIPTION

This course description provides a necessary summary of the most important characteristics of the physical chemistry course, knowing the speed of the reaction, how to find the order of the reaction according to the zero, first, second, and third orders, knowing the effect of temperature on the speed of the reaction, knowing the most important terms in electrochemistry, studying Faraday's laws, types of electrical conduction, and some applications that use electrical conduction technology

Northern Technical University	Educational institution-1
Mosul Polytechnic College	Colege/Institute-2
Dept. Chemical and Petroleum Industries Techniques	Scientific -3 Department/Center
ICTI122 Physical chemistry	Course name/code-4
Mandatory	Available forms of -5 attendance
2025-2026	Semester/Year-6
3per week	Number of study hours -7 (total)
1/9/2025	Date of preparation of this -8 description

Course objectives-9

This course description provides a necessary summary of the most important characteristics of the physical chemistry course, knowing the speed of the reaction, how to find the order of the reaction according to the zero, first, second, and third orders, knowing the effect of temperature on the speed of the reaction, knowing the most important terms in electrochemistry, studying Faraday's laws, types of electrical conduction, and some applications that use electrical conduction technology

Course outcomes, teaching, learning and assessment-10

a-Cognitive scorer

Develop knowledge of the basic concepts of physical chemistry and the study of the kinetic behavior of molecules

b-Course specific skill objectives

Developing analysis skills, using modern tools and techniques, quantitative interpretation of chemical reactions, and using mathematical problems

Teaching and learning methods

Using the theoretical and practical lecture system, electronic calculator and electronic display (DATASHOW) to learn the basics of chemical engineering and chemistry

Evaluation methods

To know the extent of their interaction with the lecture and conduct weekly, semester and annual tests

-Emotional and value-based goals-c

- 1-The student learns about the work of industrial and practical operating units and their role in building the country
- 2-Encouraging the student to gain practical experience and link it to theoretical principles
- 3-Learn accuracy and discipline in receiving sciences and knowledge
- 4-learn to communicate and interact during the lecture

D-Teaching and learning methods

Practical and theoretical lectures, visual observations, listening to scientific rules in the courses from professors and the internet

d-Evaluation methods

Oral tests , daily tests on a regular basis and scientific discussions
General and transferable skills (other skills related to employability and personal development) 1-Focus on those who have a high mental capacity and comprehension 2-Encouraging discussion policy so that the student has scientific creativity 3-Developing students mental and scientific abilities 4-Raising level of students and following up on weak students

11-Course structure					
Topic name		Required learning outcomes			
Evaluation methods	Teaching method			Theoretical	week
Testing	a lecture	Kinetic theory of fluids	Understand the kinetic interpretation of molecular molecules in a system	3	The first
Testing	a lecture Presentation, explanation, questions and answers, discussion	Viscosity and surface tension	Understanding the correspondence between viscosity and internal friction between molecules and the factors affecting viscosity and knowing how molecules affect each other	3	The second week
Testing	a lecture Presentation, explanation, questions and answers, discussion	Refractive index and solids - Gibbs equation for phases	Understanding the phenomenon of refraction and distinguishing between different phases using phases	3	The third and fourth week

Chapter Two					
Testing	a lecture Presentation, explanation, questions and answers, discussion	Adsorption Solve problems-	Understand the difference between adsorption and absorption and the factors affecting adsorption and the effect of temperature	3	Week five
Testing	a lecture Presentation, explanation, questions and answers, discussion	Reaction kinetics The reaction rate - factors affecting the rate of the chemical reaction - calculating the reaction rate	Enabling the student to understand and analyze chemical reactions, distinguish between the reaction rate and the concentration of the reactants, and calculate the reaction rate	3	Week six
Testing	a lecture Presentation, explanation, questions and answers, discussion	First, second and third order reactions and the half-life time equation for the reactions	Understand how to calculate the reaction constant and reaction order	3	Seventh week

Testing	a lecture Presentation, explanation, questions and answers, discussion	Zero Order Reactions— Assign the order of the reaction	Understand how to calculate the reaction constant and reaction order	3	The eighth week
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Chapter Three					
		The effect of temperature on the reaction rate - activation energy - cofactors - problem solving	Understanding the effect of temperature on the reaction rate, how to calculate the activation energy, and the effect of the catalyst on the reaction rate		The ninth and ten Weeks
Testing	a lecture Presentation, explanation, questions and answers, discussion	Electrochemistry - Ohm's Law - Faraday's Laws - Electrolysis - Electrical Conduction	Understand the basic principles of electrochemistry such as voltage, electric current, and the electrolysis process	3	Weeks eleven and twelfth
		Calculate specific and equivalent conductivity		3	The thirteenth week

Testing	a lecture Presentation, explanation, questions and answers, discussion	Calculating the degree of dissociation of a weak electrolyte - the effect of temperature on the		3	The fourteenth week
Testing	a lecture Presentation, explanation, questions and answers, discussion	conductivity of the electrolyte mathematical equations		3	The fifteenth week
Testing	a lecture Presentation, explanation, questions and answers, discussion				

Infrastructure-12	
Physical Chemistry/Issam Abdel Hadi (teacher) (Abdul Hamid Rajab (teacher •	Required prescribed books -1
Physical Chemistry/Issam Abdel Hadi (teacher) • Abdul Hamid Rajab (teacher)	(Main references (sources -2
1 - Physical Chemistry Dr. Laila Muhammad Naguib • 2 – Physical Chemistry K. your. Sharman • Kinetic and electrochemistry Dr. Abdul Majeed Al-Dabbagh and Dr. Banan Ahmed Al-Aqrawi	Recommended books and references (..., (scientific journals, reports
• https://youtu.be/HHG99B0H-ic?si=CVGuxuWFvW8GAcYT • https://youtu.be/QSvBtaBZ3fA?si=U_KFYDaBqKbGWDN • https://youtu.be/txpLtY45qDU?si=yfseIUY4G7WqE6ie • https://youtu.be/Fo6WUZWiCL0?si=_XPDQiOxjPe2xGST https://youtu.be/D0SUVq_OjJM?si=dW6kSUTm1yp_yF2a	B - Electronic references, Internetsites

Course development plan -13
Access to modern scientific literature Participation in relevant scientific conferences The teaching and training staff is devoted to application and work in operational and industrial institutions. Hosting specialized professors Scientific pairing with other universities and corresponding colleges

COURSE DESCRIPTION TEMPLATE

COURSE DESCRIPTION

Thermodynamics focuses on the study of heat, work and energy .Thermodynamics is concerned with understanding how energy is converted between different forms and how this affects.

Northern Technical University	Educational institution-1
Mosul Polytechnic College	Colege/Institute-2

Dept. Chemical and Petroleum Industries Techniques	Scientific -3 Department/Center
Thermodynamics ICTI123	Course name/code-4
Mandatory	Available forms of -5 attendance
2025-2026	Semester/Year-6
3per week	Number of study hours -7 (total)
1/9/2025	Date of preparation of this -8 description

Course objectives-9

The course aims to provide first –level students with basic knowledge of thermodynamics . It studies everthing related to energy and its related topics, such as the first law of thermodynamics , the second law and its applications. The course aims to enable students to access the science of thermodynamics by understanding how to perform correct engineering analysisand how to deal with laws, equipment, illustrations and other data to each other to reach the outputs and enable the student to be able to understand chemical reaction by studying how heat and energy affect chemical reactions Develop analytical thinking by building the ability to use mathematical and analytical models to understand complex phenomena in thermodynamics

Course outcomes, teaching,learning and assessment-10

a-Cognitive scorer

Understand the basic concepts of thermodynamics such as heat , work and energy

b-Course specific skill objectives

Gain the skill to solve problems related to heat, work and energy and the ability to analyze the cycle of heat engines such as the carnot cycle and measure efficiency and calculate energy and develop comprehensive critical thinking skills to solve complex problems related to thermodynamics

Teaching and learning methods

Using the theoretical and practical lecture system , electronic calculator and electronic display (DATASHOW) to learn the basics of chemical engineering and chemistry

Evaluation methods To know the extent of their interaction with the lecture and conduct weekly ,semester and annual tests
-Emotional and value-based goals-c 1-The student learns about the work of industrial and practical operating units and their role in building the country 2-Encouraging the student to gain practical experience and link it to theoretical principles 3-Leam accuracy and discipline in receiving sciences and knowledge 4-learn to communicate and interact during the lecture
D-Teaching and learning methods
Practical and theoretical lectures, visual observations ,listening to scientific rules in the courses from professors and the internet
d-Evalution methods
Oral tests , daily tests on a regular basis and scientific discussions
General and transferable skills (other skills related to employability and personal development) 1-Focus on those who have a high mental capacity and comprehension 2-Encouraging discussion policy so that the student has scientific creativity 3-Developing students mental and scientific abilities 4-Raising leval of students and following up on weak students

11-Course structure					
		Topic name	Required learning outcomes		
Evaluation methods	Teaching method			Theoretical	week
Testing	a lecture Presentation, explanation, questions and answers, discussion	Gases - The effect of the volume of a gas on its pressure (Boyle's law) The effect of temperature on the volume and pressure of a gas (Charles' Law).	Understand the basic principles by learning about the basic laws of thermodynamics, such as Boyle's Law, Charles' Law, and the First and Second Laws of Thermodynamics.	3	The first week
Testing	a lecture Presentation, explanation, questions and answers, discussion	Derivation of the general gas law - calculation of the values of the gas constant (R) - density and molecular weight of gases - (Dalton's law.)	Understand the basic principles by learning about the basic laws of thermodynamics, such as Boyle's Law, Charles' Law, and the First and Second Laws of Thermodynamics.	3	The second week
Testing	a lecture Presentation, explanation, questions and answers, discussion	Diffusion of gases (Craham's law) - Ofocadero's hypothesis - Real gases	Understand the basic principles by learning about the basic laws of thermodynamics, such as Boyle's Law, Charles' Law, and the First and Second Laws of Thermodynamics.	3	The third and fourth week

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Chapter Two					
Testing	a lecture Presentation, explanation, questions and answers, discussion		Apply laws and theories to solve various problems related to heat and energy	3	
Testing	a lecture Presentation, explanation, questions and answers, discussion	Thermodynamics Isothermal process - adiabatic process - thermodynamic equilibrium - energy	Apply laws and theories to solve various problems related to heat and energy	3	Week five and six

Testing	a lecture Presentation, explanation, questions and answers, discussion	The reverse process First law of thermodynamics	Apply laws and theories to solve various problems related to heat and energy	3	Seventh week
Testing	a lecture Presentation, explanation, questions and answers, discussion	Heat capacity - the relationship between pressure and volume in the adiabatic process - the relationship between pressure and temperature in the adiabatic process - the relationship between volume and temperature in the adiabatic process	Apply laws and theories to solve various problems related to heat and energy	3	The eighth and ninth weeks

Chapter Three					
Testing	a lecture Presentation, explanation, questions and answers, discussion	Thermochemistry - heat of reaction when pressure and volume are constant, calculation of standard heat of reaction (below 25 °C), calculation of heat of reaction when T is greater than 25 °C, energy of bonds	Learn about endothermic and endothermic reactions, how to calculate the heat of reaction when pressure and volume are constant, calculate the standard heat of reaction (below 25 °C), and calculate the	3	Weeks ten and eleven

			heat of reaction when T is greater than 25 °C.		
		Solve mathematical problems		3	The twelfth week

Chapter Four (Scientific Content)					
Testing	a lecture Presentation, explanation, questions and answers, discussion	Perform accurate mathematical calculations related to energy transfer and work, including the use of mathematical equations	3		

Testing	a lecture Presentation, explanation, questions and answers, discussion	The second law of thermodynamics - Entropy, Carnot cycle (converting heat into work) and calculating the efficiency of the cycle	Perform accurate mathematical calculations related to energy transfer and work, including the use of mathematical equations	3	The thirteenth week And the fourteenth week
Testing	a lecture Presentation, explanation, questions and answers, discussion	Entropy of a mixture of gases, free energy, problems and exercises.	Perform accurate mathematical calculations related to energy transfer and work, including the use of mathematical equations		The fifteenth week

Infrastructure-12	
Physical Chemistry Book / Part One / Dr. Nabil Shaaban Mustafa	Required prescribed books -1
Basics of thermodynamics / Dr. Rahim Joy Mohi	(Main references (sources -2
Basics of thermodynamics / Dr. Rahim Joy Mohi	Recommended books and references (..., (scientific journals, reports
Thermodynamics an engineering approach Yunus A cengel Michael A boles	B - Electronic references, Internetsites

Course development plan -13
Access to modern scientific literature Participation in relevant scientific conferences The teaching and training staff is devoted to application and work in operational and industrial institutions. Hosting specialized professors Scientific pairing with other universities and corresponding colleges

Course Description Form

1.	Educational Institution / College - Institute / Scientific Department - Center
	Northern Technical University / Polytechnic College - Mosul / Department Chemical and Oil Industries Technologies
10.	Course Code Course Name
	SPORTS /Ntu104
11.	Semester / Year:
	2025-2026
12.	Description Preparation Date:
	1/9/2025
13.	Available Attendance Forms:
	☐ Weekly theoretical and practical classes. ☐ Sports discussions and activities.
14.	Number of Credit Hours (Total) / Number of Units (Total)
	30 hours (2 hours per week)
15.	Course administrator's name (mention all, if more than one name)

Name: Zainab Adil Merie

Email: zainab.merie@uomosul.edu.iq

16. Course Objectives

Course Objectives

Teaching and Learning Strategies Students should be able to:

- Identify sports activities and understand the objectives of the course.
- Understand the nature and regulations of sports laws.
- Acquire basic skills related to selected sports games.
- Recognize the mechanics of human body movement and common sports injuries.

17.

Teaching Strategies

- Preparing theoretical lectures in digital and electronic formats.
- Using examples that connect scientific content with practical applications.

Learning Strategies

- Asking direct questions to all students to assess their understanding and enhance participation.
- Encouraging interaction among students through questions and answers and providing an environment that enables students to manage discussions and presentations

18. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
16.	2	Knowledge and its practical application	Sports: Concept, Types, and Importance	Theoretical and Practical	Tests and Reports
17.	2	Knowledge and its practical application	Human Body Movement Mechanism	Theoretical and Practical	Tests and Reports

		n			
18.	2	Knowledge and its practical application	Common Sports Injuries	Theoretical and Practical	Tests and Reports
19.	2	Knowledge and its practical application	Basic Skills of Basketball	Theoretical and Practical	Tests and Reports
20.	2	Knowledge and its practical application	International Basketball Rules	Theoretical and Practical	Tests and Reports
21.	2	Knowledge and its practical application	Basic Skills and International Rules of Table Tennis	Theoretical and Practical	Tests and Reports
22.	2	Knowledge and its practical application	Basic Skills and International Rules of Volleyball	Theoretical and Practical	Tests and Reports
23.	2	Knowledge and its practical application	Swimming	Theoretical and Practical	Tests and Reports
24.	2	Knowledge and its practical application	Basic Skills and International Rules of Tennis	Theoretical and Practical	Tests and Reports
25.	2	Knowledge and its practical application	Basic Skills of Handball	Theoretical and Practical	Tests and Reports
26.	2	Knowledge and its practical application	International Handball Rules	Theoretical and Practical	Tests and Reports
27.	2	Knowledge and its practical application	Track and Field Events (Types and International Rules)	Theoretical and Practical	Tests and Reports

		cal appli cation			
28.	2	Knowledge and its practical application	Basic Skills of Football (Soccer)	Theoretical and Practical	Tests and Reports
29.	2	Knowledge and its practical application	Management of Sports Competitions and Tournaments	Theoretical and Practical	Tests and Reports
30.	2	Knowledge and its practical application	Sports Laws and Regulations	Theoretical and Practical	Tests and Reports

3. Course Evaluation

- Oral assessment through student participation in discussions.
- Written examinations.
- Observation.
- Student cumulative record

4. Learning and Teaching Resources

• Required textbooks (available in the department and college library).	• (available in the department and college library).
Main references and sources (available in department and college library)	(available in the department and college library)
Recommended supporting books and references (scientific journals, reports, etc.)	(scientific journals, reports, etc.)
Internet resources	Internet resources

نموذج وصف المقرر

11- اسم المقرر:	
Mathematics	
1. رمز المقرر	
:MTI100	
2. الفصل الدراسي / السنة:	
الفصل الاول/2025-2026	
3. تاريخ إعداد الوصف	
1/9/2025	
4. أشكال الحضور المتاحة	
حضور محاضرات مباشرة ومحاضرات الكترونية	
5. عدد الساعات المعتمدة (الإجمالي) / عدد الوحدات (الإجمالي) :	
2	
6. اسم مسؤول المقرر (اذكر جميع الأسماء، إذا كان هناك أكثر من اسم واحد)	
الاسم: هبة سليمان داود البريد الإلكتروني: heba.sulaiman82@uomosul.edu.iq	
7. أهداف المقرر	
6- تنمية فهم الطالب للمفاهيم والمبادئ والنظريات الرياضية 7- تعزيز قدرة الطالب على تطبيق العمليات الحسابية والرياضية في حل المشكلات الواقعية 8- تطوير مهارات التفكير المنطقي والتحليل الرياضي. 9- ربط المعرفة الرياضية بمجالات علمية أخرى مثل الفيزياء , الاقتصاد, الحاسوب.	الأهداف
8. استراتيجيات التدريس والتعلم	

الاستراتيجية 6- التعلم النشط 7- التعلم التعاوني 8- استخدام التكنولوجيا 9- التعلم الذاتي 10- الاستقصاء الرياضي						
9. بنية المقرر (تذكر جميع المفردات النظرية والعملية)						

Assessment Metho	learning method	Unit / Course Title	Inten ded Lear ning Outc ome s	Hours	weeks
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11-Course Structure					
Assessment Method	learning method	Unit Name / Topic:	Required Learning Outcomes:	ho urs	we ek
First Stage					
Test	Lecture, Discussion, Video Presentations	Mathematics / Matrices	Identifying Types of Matrices and Performing Arithmetic Operations	2	1st
Test	Lecture, Discussion, Video Presentations	Finding the Capacity and Rank of Matrices	Finding the Capacity and Rank of Matrices	2	2nd
Test	Lecture, Discussion, Video Presentations	Arithmetic Operations	Performing Matrix Multiplication and Conditions for Matrix Multiplication	2	3rd
Test	Lecture, Discussion, Video Presentations	Arithmetic Operations	examples	2	4th
Test	Lecture, Discussion, Video Presentations	rank of Matrices	Finding the Trace and Rank of Matrices	2	5th
Test	Lecture, Discussion, Video Presentations	Inverse of Matrices	Inverse of Matrices	2	6th

Test	Lecture, Discussion, Video Presentations	Matrices	System of Linear Equations		7th
Test	Lecture, Discussion, Video Presentations	System of Linear Equations	Homogeneous and Non-Homogeneous Linear Equations	2	8th
Test	Lecture, Discussion, Video Presentations	Determinants	Determinant of a Matrix	2	9th
Test	Lecture, Discussion, Video Presentations	Determinants	Methods for Finding the Determinant	2	10th
Test	Lecture, Discussion, Video Presentations	Determinants	Cramer's Rule for Finding Variable Values	2	11th
Test	Lecture, Discussion, Video Presentations	Determinants	Properties of Determinants	2	12th
Test	Lecture, Discussion, Video Presentations	Statistics	An Introduction to Statistics, Data Types, and Data Representation Methods	2	13th
Test	Lecture, Discussion, Video Presentations	Statistics	Measures of Central Tendency	2	14th
Test	Lecture, Discussion, Video Presentations	Statistics	Measures of Dispersion (Variability)	2	15th

10- Infrastructure:	
6. Required Textbooks	5. Required Textbooks
7. https://epscollege.uoanbar.edu.iq/catalog/%D8%AA%D9%81%D8%A7%D8%B6%D9%84%20%D9%88%D8%AA%D9%83%D8%A7%D9%85%D9%84-1.pdf	2- Online Lectures from the

11- Course Development Plan:
1-Reviewing the latest scientific literature. 2- Participating in relevant scientific conferences. 3- Allocating teaching and training staff time for practical application and work in operational and industrial institutions. 4- Inviting specialized professors. 5-Promoting scientific collaboration with other universities and related colleges.

1. Educational Institution	Northern Technical University
2. College/Institute	Polytechnic College/Mosul
3. Department/Center	Chemical and Petroleum Industrial Techniques
4. Course Name/Code	Analytical and Inorganic Chemistry/ICTI124
5. Available Attendance Methods	Required
6. Semester/Year	2025-2026
7. Total Credit Hours	90 hours
8. Date of Preparation of this Description	1/9/2025

10-Course Outcomes, Teaching and Learning Methods, and Assessment
A- Cognitive Objectives • To introduce the student to theoretical knowledge that enables them to understand the role of chemistry in the natural and engineering sciences, atomic structure, electron configuration, the relationships between elements in the periodic table, the different types of chemical bonds, and how molecules are formed. The student will also gain practical experience through laboratory experiments that enhance understanding of chemical theories and learn how to use laboratory tools and equipment correctly and safely.
. B - Course-specific skills objectives Upon completion of the lesson (lecture), the student will be able to: Solve problems in analyzing and solving chemical equations; apply chemical principles in calculating molar mass, concentration, and equilibrium of chemical reactions; enhance theoretical understanding of chemical reactions; identify different types of chemical reactions to interpret results; develop critical thinking skills and apply chemical knowledge in various life situations; and enhance the ability to conduct simple chemical experiments and understand their results.
Teaching and Learning Methods Theoretical lectures to explain fundamental concepts and industrial processes. Presentations and visual aids to illustrate chemical reactions and techniques. Practical experiments and laboratories to enhance applied understanding of concepts. Discussions and problem-solving to develop critical and analytical thinking. Field visits to factories (if applicable) to connect theory with practical application. .Research projects and reports to promote self-directed learning and practical application
Assessment Methods • Theoretical tests to measure understanding and comprehension. • Reports and research projects to assess practical application and analysis. • Laboratory experiments and practical reports to measure practical skills. • Class participation and discussions to assess critical thinking. •Continuous assessment through assignments and quizzes..

C. Affective and Value-Based Objectives

- To enhance awareness of the importance of chemistry in economic and social development.
- To develop a sense of environmental responsibility and commitment to sustainability standards.
- To instill work ethics and safety in chemical laboratories.
- To encourage cooperation and teamwork in problem-solving.
- To promote accuracy and discipline in carrying out chemical processes..

D. Teaching and Learning Methods

- Theoretical lectures to explain fundamental concepts.

D. Assessment Methods

Theoretical tests to measure understanding and comprehension.

Reports and projects to assess application and analysis.

- Laboratory experiments to measure practical skills.
- Class participation to assess critical thinking.
- Continuous assessment through assignments and quizzes.
- General and transferable skills (other skills related to employability and personal development).
- Developing problem-solving skills in laboratory preparations.
- Enhancing research and analytical skills to develop chemical processes.
- Developing the ability to work and communicate effectively in a healthy environment, adhering to the principles of chemical safety and security.
- Acquiring time management and organizational skills for project implementation.
- Promoting awareness of safety and sustainability in chemical work environments.

-Course Structure

Assessment Method	Teaching Method	Unit/Topic Name	Required Learning Outcomes	Hours	Week
The first stage					
Testing	Lecture,	General Chemistry	Knowledge	3	1

	discussion		and application		
Testing	Lecture, discussion	The Periodic Table	Knowledge and application	3	2
Testing	Lecture, discussion	Periodical Table	Knowledge and application	3	3
Testing	Lecture, discussion	Properties of the Periodic Table	Knowledge and application	3	4
Testing	Lecture, discussion	Properties of the Periodic Table	Knowledge and application	3	5
Testing	Lecture, discussion	Properties of Bases and Acids	Knowledge and application	3	6
Testing	Lecture, discussion	Methods of Expressing Analytical and Volumetric Concentration / Molarity and Molality	Knowledge and application	3	7
					8
Testing	Lecture, discussion	Mole fraction	Knowledge and application	3	9
Testing	Lecture, discussion	Relationship between normality and molarity	Knowledge and application	3	10
Testing	Lecture, discussion	Percentage of solutions	Knowledge and application	3	11
Testing	Lecture, discussion	Solution concentrations	Knowledge and application	3	12
Testing	Lecture, discussion	Weight factor	Knowledge and application	3	13
Testing	Lecture, discussion	UV spectroscopy	Knowledge and application	3	14

Testing	Lecture, discussion	Infrared spectroscopy	Knowledge and application	3	15
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12- Infrastructure		-
Main References (Sources(		
1. 1-Quantitative Chemical Analysis" by Daniel C. Harris10 : Edition2022 : 2- Chemistry: The Central Science" by Theodore E. Brown, H. Eugene LeMay, Bruce E. Bursten, and Catherine J. /Murphy15 : ط Edition2022 : 3- Chemistry: A Molecular Approach" by Nivaldo J. Tro : 6th Edition2023 : • 1-ntroduction to Analytical Chemistry" by Douglas A. Skoog and Donald M. West8 : الطبعة:th Edition 2004 • :		

13- Curriculum Development Plan
Reviewing recent scientific literature Participating in relevant scientific conferences Dedicating teaching and training staff to practical application and work in operational and industrial institutions Hosting specialized professors Scientific collaboration with other universities and similar colleges

1- Educational Institution				Northern Technical University			
Course Title	First Level	Credit Hours			Weekly Schedule		
Organic Chemistry		Theoretical	Practical	The Total	Theoretical	Practical	the total
		3	2	5	3	2	5
2- College/Institute				Polytechnic College/Mosul			
3- Scientific Department / Center				Chemical and Petroleum Industries Techniques			
4- Course Name / Code				Organic Chemistry ICTI129			
5- Available Attendance Forms				Mandatory			
6- Semester / Year				2025-2026			
7- Total Study Hours				75			
8- Date of Preparation of This Description				1/9/2025			

9- Course Objectives

Introducing students to the fundamental concepts of hydrocarbons and organic compounds, including their structure, types, and classification.

- Enabling students to interpret the relationship between the structure of organic compounds and their properties, and to understand nomenclature methods according to the IUPAC
- Training students on nomenclature systems and preparation methods for organic compounds using various practical activities.
- Analyzing the effect of temperature, chain length, and branching on the properties of organic compounds.
- Evaluating the reactivity and stability of organic compounds in chemical reactions based on their physical and chemical properties.

10- Course Outcomes, Teaching, Learning and Assessment Methods

A- Cognitive Objectives

- Introducing students to the fundamental concepts of organic chemistry, including the structure of organic compounds and types of chemical bonds.
- Enabling students to apply the IUPAC system to correctly name organic compounds, including alkanes, alkenes, and alkynes.
- Exploring the physical and chemical properties of organic compounds and how they affect the behavior of compounds in chemical reactions.
- Understanding the types of chemical reactions occurring between organic compounds, including addition, substitution, and elimination reactions.

Equipping students with skills to prepare various organic compounds, with a focus on essential laboratory techniques and safe practices.

B- Course-Specific Skill Objectives.

- **By the end of the lecture, the student will be able to:**
 1. Accurately define the fundamental terminology of Organic Chemistry
 2. Correctly classify organic compounds according to their functional groups.
 3. Apply the IUPAC system to correctly name various organic compounds.
 4. Accurately draw the structural formula of various hydrocarbon organic compounds.
 5. Analyze a specific chemical reaction and identify its type (addition,

substitution, etc.) by drawing a balanced reaction scheme.

- 6. Evaluate the effect of temperature on organic compounds with varying chain lengths, branching, and hydrogen bonds.

Teaching and Learning Methods

Use of theoretical and practical lecture systems, computer-aided instruction and electronic presentation (DATASHOW)

Assessment Methods

Testing students to assess their engagement with lectures, and conducting weekly, mid-term, and annual exams.

C- Affective and Value Objectives

Memorizing terminology and nomenclature such as alkanes, alkenes, and functional groups.

Classifying organic compounds according to their functional groups effectively.

Providing lessons and training materials on nomenclature.

Drawing the structural formula of hydrocarbon organic compounds based on understanding of the nomenclature system.

Identifying the type of reaction through scientific activities and theoretical lessons.

Analyzing and discussing the effect of temperature on the properties of organic compounds.

D- Teaching and Learning Methods

Practical and theoretical lectures, visual observations, and listening to scientific principles in courses from instructors and the internet.

E- Assessment Methods

Oral exams, periodic daily tests, and scientific discussions.

- General and Transferable Qualifying Skills (Other Skills Related to Employability and Personal Development).

- 1- Focus on students with high mental aptitude and comprehension capacity.
- 2- Encouraging a discussion policy so that students develop scientific creative ability.
- 3- Developing students' mental and scientific capabilities.
- 4- Raising student performance levels and following up with weaker students.

11- Course Structure

Wee	Hour	Required Learning	Unit Name	Teaching Method	Assessme
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k	s	Outcomes			nt Method
1 & 2	3	Knowledge & Application	Hydrocarbon s	Lecture Presentation, explanation, Q&A, discussion	Exam
3	3	Knowledge & Application	Alkanes	Lecture Presentation, explanation, Q&A, discussion	Exam
4	3	Knowledge & Application	Alkenes	Lecture Presentation, explanation, Q&A, discussion	Exam
5	3	Knowledge & Application	Alkynes and Aromatic Compounds	Lecture Presentation, explanation, Q&A, discussion	Exam
6	3	Knowledge & Application	Alcohols	Lecture , Presentation, explanation, Q&A, discussion	Exam
7	3	Knowledge & Application	Ethers	Lecture, Presentation, explanation, Q&A, discussion	Exam
Week	Hours	Required Learning Outcomes	Unit Name	Teaching Method	Assessme nt Method
8 & 9	3	Knowledge & Application	Ketones and Aldehydes	Presentation, explanation, Q&A, discussion Lecture	Exam
10 & 11	3	Knowledge & Application	Esters and Carboxylic Acids	Lecture, presentation, explanation, Q&A, discussion	Exam
12	3	Knowledge & Application	Amines	Presentation, explanation, Q&A, discussion	Exam

13	3	Knowledge & Application	Amides	Lecture	Exam
14	3	Knowledge & Application	Chemical Reactions	Presentation, explanation, Q&A, discussion	Exam
15	3	Knowledge & Application	Polymers	Presentation, explanation, Q&A, discussion	Exam

12- Infrastructure

1- Required Textbooks	
2- Main References (Sources)	1. R. Chang, General Chemistry: The Essential Concepts, 5th ed., 2008 2. J.W. Hill and R.H. Petrucci, General Chemistry: An Integrated Approach, 2nd ed., 1999. 3. Patricia Eldredge, R.H. H and, LLC, General Chemistry-Principles, Patterns, and Applications, 2011. (http://www.saylor.org/books) 4. David W. Ball, Introductory Chemistry, Cleveland State University, 2011, (http://www.saylor.org/books) 5. J. E. Brady, J. W. Russel and J.R. Holum, General Chemistry: Principles and Structure, 5th ed., 2006. 6. S. S. Zumdahl and S.A. Zumdahl, Chemistry, 7th ed., 2007
A- Recommended Books and References (Scientific Journals, Reports, ...)	
B- Electronic References, Websites...	

13- Course Development Plan

Reviewing current scientific literature.
Participating in relevant scientific conferences.

Dedicating teaching and training staff to apply and work in operational and industrial institutions.
 Hosting specialized faculty members.
 Academic collaboration with other universities and peer colleges.

The second level:

Northern Technical University	Educational institution -1
Mosul Polytechnic College I	College/Institute -2
Dept. Chemical and Petroleum Industries Techniques	Scientific Department / -3 Center
Chemical industries/ ICTI225	Course name/code -4
Mandatory or optional	Available forms of -5 attendance
2025-202 6	Semester / Year -6
2 per week	Number of study hours -7 (total)
1/9/2025	-8 Date this description was prepared

9 - General description of the course

is a branch of chemistry that focuses on the application of chemistry Industrial chemical principles to large-scale production processes. Industrial chemistry involves the development and manufacture of chemicals, products, and processes that contribute to the production of goods such as plastics, fertilizers, pharmaceuticals, and food . Industrial chemistry also involves the study of chemical reactions, the design of chemical processes, improving efficiency, .reducing costs, and ensuring safety

General objectives

Enhancing students' manual and technical skills through practical learning , introducing students to the different stages of production and processes used in the industry , introducing students to the different fields of work in industries and opportunities for professional .development

Specific objectives

After studying this subject, the student will be able to study the physical and chemical changes in production plans that occur in a . number of industries

Behavioral objectives or learning outcomes

- Behavioral objectives refer to the desired outcomes that education seeks to achieve in students' behaviors. They can be classified into several . categories
- 1- :Cognitive objectives
 - .Promote understanding and critical thinking
 - .Develop research and analysis skills
- 2- :Skill objectives
 - .Mastering specific skills, such as using tools or implementing techniques
 - .Improve teamwork and collaboration skills

Course structure					
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	Watch es	The week
Stage 2					
Test	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Industrial chemical methods	Knowledge -1 Skills -2 3- critical thinking	2	the first
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	Watch es	The week

Stage 2					
Discussions, written and oral tests	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Chemical processes, physical processes, chemical reactors and their forms	Knowledge -1 Skills -2 Critical thinking -3	2	the second
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	Watch es	The week
Discussions, written and oral tests	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Sewage and industrial wastewater treatment	Knowledge -1 Skills -2 Critical thinking -3	2	the third
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	Watch es	The week
Discussions, written and oral tests	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Ceramic and porcelain industry	Knowledge -1 Skills -2 Critical thinking -3	2	Fourth
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	Watch es	The week
Discussions, written and oral tests	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Glass industry chemical) properties and . (types	Knowledge -1 Skills -2 Critical thinking -3	2	Fifth
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	Watch es	The week
Discussions, written and oral tests	Lecture, discussion, presentation of explanatory	Cement industry (types and specifications,	Knowledge -1 Skills -2 Critical thinking -3	2	Sixth

	posters, presentation of videos and films	(raw materials			
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	Watch es	The week
Discussions, written and oral tests	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Table salt and sodium compounds industry	Knowledge -1 Skills -2 Critical thinking -3	2	Seventh
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	Watch es	The week
Discussions, written and oral tests	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Sulfur (types, properties, production and (uses	Knowledge -1 Skills -2 Critical thinking -3	2	The eighth
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	Watch es	The week
Discussions, written and oral tests	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Sulfuric acid industry and its uses	Knowledge -1 Skills -2 Critical thinking -3	2	Ninth
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	Watch es	The week
Discussions, written and oral tests	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Chemical fertilizers their) benefits and (types	Knowledge -1 Skills -2 Critical thinking -3	2	tenth
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	Watch es	The week

Discussions, written and oral tests	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Nitrogen fertilizers, urea	Knowledge -1 Skills -2 Critical thinking -3	2	eleventh
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	Watch es	The week
Discussions, written and oral tests	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Phosphate fertilizer industry	Knowledge -1 Skills -2 Critical thinking -3	2	twelfth
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	Watch es	The week
Discussions, written and oral tests	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Ammonium sulphate, ammonium nitrate	Knowledge -1 Skills -2 Critical thinking -3	2	thirteenth
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	Watch es	The week
Discussions, written and oral tests	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Nitric acid production by hoco method	Knowledge -1 Skills -2 Critical thinking -3	2	fourteenth
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	Watch es	The week
Discussions, written and oral tests	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Industrial gases	Knowledge -1 Skills -2 Critical thinking -3	2	fifteenth

Infrastructure	
Available in free education and the institute's library	Required Textbooks
Available in free education and the institute's library	Main References (Sources)
Internet	Electronic references, websites
Curriculum Development Plan	
Develop curricula that are appropriate to the developments in local .industries	

description Course:

Course description provides A brief summary of the main characteristics of the course and the learning outcomes expected of the student, demonstrating whether he has made the most of .the available learning opportunities

Northern Technical University	Educational institution -1
Mosul Polytechnic College	College/Institute -2
Dept. Chemical and Petroleum Industries Techniques	Scientific Department / -3 Center
Organic Chemical industries/ ICTI226	Course name/code -4
Mandatory or optional	Available forms of -5 attendance

2025-202 6	Semester / Year -6
2 per week	Number of study hours -7 (total)
2025/9/1	-8 Date this description was prepared

9 - General description of the course

is a branch of chemistry that focuses on the application of chemistry Industrial chemical principles to large-scale production processes. Industrial chemistry involves the development and manufacture of chemicals, products, and processes that contribute to the production of goods such as plastics, fertilizers, pharmaceuticals, and food . Industrial chemistry also involves the study of chemical reactions, the design of chemical processes, improving efficiency, .reducing costs, and ensuring safety

General objectives

Enhancing students' manual and technical skills through practical learning , introducing students to the different stages of production and processes used in the industry , introducing students to the different fields of work in industries and opportunities for professional .development

Specific objectives

After studying this subject, the student will be able to study the physical and chemical changes in production plans that occur in a number of industries.

Behavioral objectives or learning outcomes

- Behavioral objectives refer to the desired outcomes that education seeks to achieve in students' behaviors. They can be classified into several categories
- 4- :Cognitive objectives
- .Promote understanding and critical thinking
 - .Develop research and analysis skills
- 5- :Skill objectives
- .Mastering specific skills, such as using tools or implementing techniques
 - .Improve teamwork and collaboration skills

Course structure					
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	Watch es	The week
Stage 2					
Test	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Vegetable oils , industry extraction, purification and hydrogenation	Knowledge -1 Skills -2 6- critical thinking	2	the first
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	Watch es	The week
Stage 2					
Discussions, written and oral tests	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Soap making	Knowledge -1 Skills -2 Critical thinking -3	2	the second
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	Watch es	The week
Discussions, written and oral tests	Lecture, discussion, presentation of explanatory posters, presentation	Detergent industry	Knowledge -1 Skills -2 Critical thinking -3	2	the third

	of videos and films				
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	Watch es	The week
Discussions, written and oral tests	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Sugar production from beets and sugar cane	Knowledge -1 Skills -2 Critical thinking -3	2	Fourth
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	Watch es	The week
Discussions, written and oral tests	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Brewing industry, pure alcohol, acetic acid and vinegar	Knowledge -1 Skills -2 Critical thinking -3	2	Fifth
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	Watch es	The week
Discussions, written and oral tests	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Paper making	Knowledge -1 Skills -2 Critical thinking -3	2	Sixth
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	Watch es	The week
Discussions, written and oral tests	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Polymers and polymerization processes	Knowledge -1 Skills -2 Critical thinking -3	2	Seventh
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	Watch es	The week

Discussions, written and oral tests	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Classification of polymers	Knowledge -1 Skills -2 Critical thinking -3	2	The eighth
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	Watch es	The week
Discussions, written and oral tests	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Polymerization Mechanics	Knowledge -1 Skills -2 Critical thinking -3	2	Ninth
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	Watch es	The week
Discussions, written and oral tests	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Plastics Its uses and types	Knowledge -1 Skills -2 Critical thinking -3	2	tenth
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	Watch es	The week
Discussions, written and oral tests	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Plastics Its uses and types	Knowledge -1 Skills -2 Critical thinking -3	2	eleventh
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	Watch es	The week
Discussions, written and oral tests	Lecture, discussion, presentation of explanatory posters, presentation	Rubber industry and its types	Knowledge -1 Skills -2 Critical thinking -3	2	twelfth

	of videos and films				
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	Watch es	The week
Discussions, written and oral tests	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	rubber vulcanization	Knowledge -1 Skills -2 Critical thinking -3	2	thirteenth
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	Watch es	The week
Discussions, written and oral tests	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Dyes, their properties and types	Knowledge -1 Skills -2 Critical thinking -3	2	fourteenth
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	Watch es	The week
Discussions, written and oral tests	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Synthetic fiber industry	Knowledge -1 Skills -2 Critical thinking -3	2	fifteenth

Infrastructure	
Available in free education and the institute's library	Required Textbooks
Available in free education and the institute's library	Main References (Sources)
Internet	Electronic references, websites
Curriculum Development Plan	

Develop curricula that are appropriate to the developments in local industries

1-Educational Institution	Northern Technical University
2-College/Institute	Mosul Polytechnic College
3-Scientific Department/Center	Dept. Chemical and Petroleum Industries Techniques
4-Course Name/Code	Heat transfer ICTI120
5-Available Attendance Forms	Mandatory
6-Semester/Year	2026-2025
7-Number of Study Hours (Total)	90
8-Date of Preparation of this Description	2025/9/1

Course Objectives

The objectives of the Heat Transfer course are to enable students to understand the scientific and technical foundations of heat transfer in different systems and their practical applications

-10Course outcomes, teaching, learning and assessment methods

A- Cognitive Objectives

1. Understanding the basic concepts: Students understand the basic concepts of heat transfer, such as heat transfer methods

2. Analysis and design: Students learn how to analyze and design heat transfer systems, such as exchangers, cooling and heating systems

3. Practical applications: Students learn how to apply the basic concepts and principles of heat transfer in various engineering applications

1. Written assessment: Students are assessed through written tests that aim to assess their understanding of the basic concepts and principles of heat transfer

2. Practical assessment: Students are assessed through practical projects that aim to assess their skills in analyzing and designing heat transfer systems

3. Oral assessment: Students are assessed through oral discussions that aim to assess their skills in explaining the basic concepts and principles of heat transfer

.B - Course specific skill objectives

1. Critical Thinking: Students learn how to think critically in solving problems related to heat transfer
2. Computational Skills: Students learn how to apply computational skills in solving problems related to heat transfer
3. Communication Skills: Students learn how to explain the basic concepts and principles of heat transfer clearly and meaningfully

Teaching and Learning Methods

1. Theoretical Lesson: The lecturer presents the basic concepts and principles of heat transfer in the form of theoretical lectures
2. Computational Exercises: The lecturer presents applied computational exercises on the basic concepts and principles of heat transfer
3. Practical Projects: The lecturer presents applied practical projects on the basic concepts and principles of heat transfer
4. Class Discussions: The lecturer leads class discussions on the basic concepts and principles of heat transfer
5. Use of Technology: The lecturer uses technology, such as computer programs and multimedia, to present the basic concepts and principles of heat transfer

Evaluation Methods

Traditional teaching methods

- 1- Theoretical lesson: The lecturer presents the basic concepts and principles of heat transfer in the form of theoretical lectures
- 2- Computational exercises: The lecturer presents applied computational exercises on the basic concepts and principles of heat transfer
- 3- Practical projects: The lecturer presents applied practical projects on the basic concepts and principles of heat transfer
- 4- Modern teaching methods, Use of technology: The lecturer uses technology, such as computer programs and multimedia, to present the basic concepts and principles of heat transfer
- 5- E-learning: The lecturer uses electronic resources and computer programs to present the basic concepts and principles of heat transfer
- 6- Cooperative learning: The lecturer encourages students to work in groups and group projects to enhance their understanding of the basic concepts and principles of heat transfer

Affective and Value Objectives

- 1- Class discussions: The lecturer leads class discussions on the basic concepts and principles of heat transfer.
- 2- Interactive exercises: The lecturer provides interactive exercises, such as educational games and interactive activities, to enhance understanding of the basic concepts and principles of heat transfer.
- 3- Research projects: The lecturer encourages students to conduct research projects on topics related to heat transfer

D- Teaching and learning methods					
Practical and theoretical lectures, visual observations, listening to scientific rules in the courses from professors and the Internet.					
D- Evaluation methods					
Oral tests, daily tests on a regular basis and scientific discussions					
General and transferable skills (other skills related to employability and personal development) Focus on those who have a great mental ability and comprehension -1 Encourage discussion policy so that the student has a scientific creative ability - Develop students' mental and scientific abilities - Raise the level of students and follow up on weak students -					
Curriculum structure-11					
	Assessment Method1	Unit/Subject Name	Key Learning Outcomes	Hours	Week
Week Hours					Stage 1
Test	Lecture, discussion, presentation of explanatory posters	Basic principles - Thermal processes - Basic forms of heat transfer	Basic knowledge of heat transfer	3	1
Test	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Heat conduction in steady state - Feuer's law - Thermal conductivity coefficient - Conduction through single flat walls - Conduction through compound plane walls - Thermal resistance	Knowledge of the methods of heat transfer by conduction and their laws	3	2
Test	Lecture, discussion, presentation of videos and film	Conduction through single cylindrical walls - Conduction through compound cylindrical walls -	Knowledge of the methods of heat transfer by conduction and their laws through walls	3	3

		Conduction through spherical walls.			
Test	Lecture, discussion, presentation of videos and film	Heat transfer by convection - free and forced convection - convection coefficient - the most important non-dimensional groups (Reynolds number, Krashoff number, Prandtl number, Nusselt number)	Knowing the methods of heat transfer by conduction and their laws through cylindrical walls	3	4
Test	Lecture, discussion, presentation of videos and film	Heat transfer by combined effect of conduction and convection - Heat transfer between two fluids through a flat wall - Heat transfer between two fluids through a cylindrical wall	Knowing the methods of heat transfer by convection and their laws		5
Test	Lecture, discussion, presentation of videos and film	Heat exchangers / Types of heat exchangers / Heat balance in heat exchangers Heat balance in condensers.	Knowing the methods of heat transfer by conduction and convection and their laws	3	6
Test	Lecture, discussion, presentation of videos and film	Shell and tube heat exchangers (single-pass shell and two-pass shell, two-pass shell and four-pass shell).	Knowing the types of exchanges	3	7
Test	Lecture, discussion, presentation of videos and film	Heat transfer with phase change - Heat transfer from condensed vapors - Condensation in the form of a film - Condensation in the form of drops	Laws	3	8
Test	Lecture,	Heat transfer by	Specific to exchanges	3	9&10

	discussion, presentation of videos and film	radiation. Reflectivity and absorption in solids - Stefan and Boltzmann - Radiation between real surfaces.			
Test	Lecture, discussion, presentation of videos and film	Radiation laws (Stephen-Boltzmann law of total radiation - Kirchhoff radiation law), heat exchange by radiation between black and non-black surfaces	Methods of condensation	3	11
Test	Lecture, discussion, presentation of videos and film	Heat transfer by radiation. Reflectivity and absorption in solids - Stefan and Boltzmann - Radiation between real surfaces.		3	13&12
Test	Lecture, discussion, presentation of videos and film	Radiation laws (Stephen-Boltzmann law of total radiation - Kirchhoff radiation law), heat exchange by radiation between black and non-black surfaces		3	14&15

12Infrastructure	
	1- Required textbooks
	2- Main references (sources)
Van den Akker, Harry, and Robert F. Mudde. <i>Mass, Momentum and Energy Transport Phenomena: A Consistent Balances Approach</i>. Walter de Gruyter GmbH & Co KG, 2023. Nakayama, Yasuki. <i>Introduction to fluid mechanics</i>. Butterworth-Heinemann, 2018. Morrison, Faith A. <i>An introduction to fluid mechanics</i>. Cambridge University Press, 2013. Cengel, Yunus, and John Cimbala. <i>Ebook: Fluid mechanics fundamentals and applications (si units)</i>. McGraw Hill, 2013. Jones, Ernest Beachcroft. <i>Instrument Technology: Measurement of pressure, level, flow and temperature</i>. Butterworth-Heinemann, 2013.	A- Recommended books and references (scientific journals, reports, etc.)
https://www.youtube.com/watch?v=fTv4qZnUuNA https://www.youtube.com/watch?v=QCB32otWD0I https://www.youtube.com/watch?v=qHPaHMvsXLk https://www.youtube.com/watch?v=1tkIQ5x7W8k	B- Electronic references, Internet sites, etc.
13-Curriculum development plan	
Reviewing modern scientific literature Participating in relevant scientific conferences Devoting teaching and training staff to application and work in operational and industrial institutions.	

Course Description Operation of Industrial Units:

This course introduces students to the fundamental principles of operating **trial Units** unit operations used in chemical and petroleum industries, with emphasis on the mechanisms of solid, liquid, and gas separation as well as material handling techniques. The course covers pumps and compressors, pump arrangements in series and parallel, particle settling velocity, Stokes' and Newton's regimes, and mechanical separation equipment such as cyclone separators, centrifuges, and froth flotation units. It also addresses porosity, packed beds, fixed-bed reactors, and fluidized-bed reactors. The course aims to develop students' skills in performing operational calculations, analyzing equipment performance, and operating industrial units efficiently and safely.

1. Educational Institution

Northern Technical University

2. College / Institute

Mosul Polytechnic College

3. Scientific Department / Center

Chemical and Petroleum Industries Technologies

4. Course Title / Code

Operation of Industrial Units / ICTI121

5. Available Attendance Modes

Mandatory

6. Semester / Academic Year

2025–2026

7. Total Study Hours

8. Date of Preparing this Course Description

2025/9/1

9. Course Objectives

- Introduce the fundamental principles of operating mechanical units used in chemical and petroleum industries.
- Understand the mechanisms of solid, liquid, and gas separation using various mechanical separation equipment.
- Study different types of pumps and compressors and methods of operating pumps in series and parallel.
- Calculate particle settling velocities and distinguish between Stokes' and Newton's settling regions.
- Understand the operating principles of mechanical separation devices such as cyclones, centrifuges, and froth flotation units.
- Study the characteristics of granular media, porosity, and their effects on industrial processes.
- Understand the principles of operation of packed beds, fixed-bed reactors, and fluidized-bed reactors.
- Develop skills in operational calculations and performance analysis of mechanical equipment and units.

10. Course Learning Outcomes, Teaching and Learning Methods, and Assessment Methods

A. Knowledge Objectives

Upon successful completion of the course, students will be able to:

- Understand the basic concepts of mechanical unit operations in chemical and petroleum industries.
- Explain the operating principles of pumps and compressors and their arrangements in series and parallel.
- Understand mechanical separation processes including sedimentation, cyclone separation, centrifugation, and froth flotation.
- Explain Stokes' and Newton's settling regimes and the factors affecting particle settling velocity.
- Understand the properties of granular media, porosity, and packing materials and their influence on industrial operations.
- Explain the operating principles of fixed-bed and fluidized-bed reactors.
- Understand the fundamentals of operation and maintenance of mechanical units in industrial processes.

B. Course-Specific Skills Objectives

Students will be able to:

- Operate pumps and compressors safely and correctly, including series and parallel configurations.
- Calculate particle settling velocities and apply Stokes' and Newton's laws in practical engineering problems.

- Analyze the performance of mechanical separation equipment such as cyclones, centrifuges, and froth flotation systems.
- Utilize operational data to evaluate the efficiency of mechanical equipment in industrial processes.
- Conduct laboratory experiments involving mechanical unit operations with accuracy and efficiency.
- Diagnose simple equipment malfunctions and propose appropriate corrective actions.
- Apply occupational health and safety procedures during operation and maintenance activities.

Teaching and Learning Methods

- Theoretical lectures explaining the concepts and principles of mechanical unit operations.
- Problem-solving sessions and engineering calculations.
- Laboratory experiments to demonstrate equipment operation and industrial applications.
- Demonstrations and modern educational tools to explain industrial processes.
- Classroom discussions and cooperative learning activities to enhance understanding and knowledge exchange.

Assessment Methods

- Quizzes to evaluate continuous understanding of fundamental concepts.
- Midterm and Final Examinations to assess theoretical knowledge and engineering calculations.
- Laboratory reports to evaluate practical performance and understanding of equipment operation.
- Homework assignments and engineering calculations related to pumps and mechanical separation processes.
- Practical laboratory assessments to evaluate equipment operation skills.
- Classroom participation and scientific discussions.

C. Affective and Value-Based Objectives

Students will:

- Develop a positive attitude toward the importance of mechanical unit operations in chemical and petroleum industries.
- Strengthen values of accuracy, discipline, and academic integrity in conducting experiments and engineering calculations.
- Adhere to occupational safety procedures during equipment operation and laboratory activities.

Teaching and Learning Methods

- Classroom discussions emphasizing safety, accuracy, and professional responsibility.
- Cooperative laboratory work to promote teamwork, accountability, and commitment.
- Linking theoretical concepts to real industrial applications to highlight the importance of quality and discipline.
- Practical training on equipment operation to reinforce occupational safety practices.
- Encouraging self-learning and responsibility in completing tasks and experiments.

Assessment Methods

- Quizzes and short tests.
- Midterm and final examinations.
- Laboratory reports and practical evaluations.
- Homework assignments and engineering calculations.
- Observation of laboratory performance and compliance with safety procedures.
- Assessment of classroom participation and engagement.

D. Transferable Skills

Students will develop:

- Problem-solving and analytical skills related to mechanical operations in industrial environments.
- Teamwork and collaboration skills through laboratory and practical activities.
- Technical communication and engineering report-writing skills.
- Competence in operating and handling mechanical equipment efficiently.
- Critical thinking and decision-making skills in selecting appropriate operating methods.
- Self-learning abilities to keep pace with developments in industrial operation technologies.

10. Course Structure:

Week	Hours	Topic	Intended Learning Outcomes				Teaching Method	Assessment Method
1	2	Introduction to Mechanical Units and Safety	Identify mechanical unit operations and safety requirements				Lecture	Quiz
2	2	Pumps and Their Types	Distinguish between pump types and operating principles	Lecture + Demonstration	Assignment			
3	2	Pumps in Series and Parallel	Calculate pump performance and select suitable configurations	Lecture + Problems	Test			
4	2	Compressors and Industrial Fans	Identify compressor types and applications	Lecture	Quiz			

5	2	Sedimentation and Particle Settling Velocity	Calculate settling velocity and analyze influencing factors	Problems + Lecture	Assignment			
6	2	Stokes' and Newton's Regimes	Distinguish flow regimes and apply appropriate equations	Lecture + Problem Solving	Test			
7	2	Cyclone Separators	Understand cyclone operation and perform efficiency calculations	Lecture + Applications	Report			
8	2	Centrifuges	Explain centrifugal separation and perform operational calculations	Lecture + Problems	Midterm Exam			
9	2	Porosity and Granular Media Properties	Calculate porosity and evaluate its effect on flow behavior	Lecture + Applications	Assignment			
10	2	Packed Beds	Analyze packing characteristics and pressure-drop calculations	Lecture + Problems	Test			
11	2	Fixed-Bed Reactors	Understand structure and operation of fixed-bed reactors	Lecture + Examples	Quiz			

12	2	Fluidized-Bed Reactors	Explain fluidization principles and minimum fluidization velocity	Problem Solving	Report			
13	2	Froth Flotation	Explain flotation mechanisms , efficiency factors, and industrial applications	Lecture + Demonstrations	Assignment + Quiz			
14	2	Piping Systems, Valves, and Auxiliary Units	Identify industrial network components and operating principles	Lecture + Discussion	Test			
15	2	Comprehensive Review and Industrial Applications	Integrate course concepts with industrial processes	Discussion + Presentations	Final Examination			

12. Infrastructure

Required Textbooks

Mechanical Unit Operations

Main References

- Coulson, J. M., & Richardson, J. F. *Chemical Engineering, Volumes 1 & 2*. Butterworth-Heinemann.
- Geankoplis, C. J. *Transport Processes and Separation Process Principles*. Pearson Education.
- Perry, R. H., & Green, D. W. *Perry's Chemical Engineers' Handbook*. McGraw-Hill.

Recommended References

- Modern textbooks in mechanical unit operations, separation processes, and applied chemical engineering.
- Peer-reviewed journals in chemical engineering and industrial processes, including:
 - Chemical Engineering Science
 - Industrial & Engineering Chemistry Research
 - Separation and Purification Technology

Electronic Resources

- University websites offering chemical engineering courses and lectures.
- Scientific databases and digital libraries providing access to recent research papers and technical publications.

13. Course Development Plan

- Periodically update course content to reflect advances in mechanical unit operations and industrial separation technologies.
- Strengthen practical training through additional laboratory experiments and real industrial applications.
- Incorporate industrial case studies from chemical and petroleum processing facilities.
- Encourage students to utilize electronic resources and recent scientific literature to enhance self-learning skills.
- Promote collaboration with industrial sectors to provide field-training opportunities that support learning outcomes.

Course Description (Mass Transfer)

This course covers the fundamental principles and mechanisms of mass transfer, including molecular diffusion, convective mass transfer, and interphase mass transfer. It focuses on the study of mass transfer applications in industrial processes such as absorption, distillation, extraction, and drying, as well as the analysis and design of selected equipment used in chemical and petroleum industries.

1. Educational Institution

Northern Technical University

2. College / Institute

Mosul Polytechnic College

3. Scientific Department / Center

Chemical and Petroleum Industries Technologies

4. Course Title / Code

Mass Transfer / ICTI213

5. Available Attendance Modes

Mandatory

6. Semester / Academic Year

2025–2026

7. Total Study Hours

8. Date of Preparing this Course Description

2025/9/1

9. Course Objectives

- Introduce the fundamental concepts and mechanisms of mass transfer in engineering and industrial systems.
- Understand diffusion laws and mass transfer principles and apply them to engineering problems.
- Study mass transfer between different phases (gas–liquid, liquid–liquid, and solid–liquid systems).
- Analyze mass transfer coefficients and the factors affecting them.
- Identify industrial operations based on mass transfer such as absorption, distillation, extraction, and drying.
- Perform engineering calculations related to mass transfer and understand the design and operation of selected separation units.

10. Course Learning Outcomes, Teaching, Learning and Assessment Methods

A. Knowledge Objectives

Students will be able to:

- Understand the fundamental concepts and principles of mass transfer and its various mechanisms.
- Explain diffusion laws, mass transfer coefficients, and the factors affecting mass transfer rates.
- Distinguish between different types of mass transfer in multiphase systems.
- Understand the fundamentals of mass transfer operations such as absorption, distillation, extraction, and drying.

- Explain the theoretical principles involved in the design and operation of mass transfer equipment used in chemical and petroleum industries.

B. Course-Specific Skills Objectives

Students will be able to:

- Apply mass transfer laws and equations to solve engineering problems.
- Calculate diffusion rates and mass transfer coefficients in industrial systems.
- Analyze the performance of mass transfer operations such as absorption, distillation, extraction, and drying.
- Utilize engineering data, charts, and diagrams in mass transfer calculations.
- Conduct laboratory experiments related to mass transfer and accurately interpret experimental results.

Teaching and Learning Methods

- Theoretical lectures explaining mass transfer concepts, principles, and engineering applications.
- Problem-solving sessions and practical exercises to develop analytical and calculation skills.
- Laboratory experiments to demonstrate mass transfer phenomena and connect theory with practical applications.
- Demonstrations and modern instructional tools for explaining industrial processes.
- Classroom discussions and cooperative learning activities to enhance understanding and exchange ideas among students.

Assessment Methods

- Quizzes to evaluate understanding of fundamental concepts.
- Midterm and final examinations to assess theoretical knowledge and engineering calculations.
- Homework assignments and problem-solving exercises related to mass transfer.
- Laboratory reports to evaluate practical performance and analysis of experimental results.
- Projects and applied studies related to mass transfer operations.
- Classroom participation and scientific discussions to assess continuous engagement and understanding.

C. Affective and Value-Based Objectives

Students will:

- Participate actively in classroom discussions concerning mass transfer concepts and principles.
- Engage in interactive exercises and educational activities that enhance understanding of mass transfer phenomena.
- Conduct research projects on topics related to mass transfer and separation processes.

Teaching and Learning Methods

- Classroom discussions to promote awareness of accuracy and academic integrity in engineering work.

- Cooperative learning activities in laboratories to foster responsibility, teamwork, and commitment.
- Relating theoretical concepts to real industrial applications to emphasize quality and professional ethics.
- Practical laboratory training to reinforce adherence to occupational health and safety procedures.

Assessment Methods

- Observation of students' behavior during laboratory work regarding safety and discipline.
- Evaluation of teamwork, cooperation, and participation in practical activities.
- Monitoring punctuality in submitting assignments and reports.
- Assessment of academic honesty in recording and reporting results.
- Evaluation of classroom participation and constructive scientific discussions.

D. Transferable Skills

Students will develop:

- Analytical and problem-solving skills related to mass transfer operations.
- Teamwork and collaboration skills through laboratory activities and applied projects.
- Scientific communication and technical report-writing skills.
- Competence in using engineering charts, graphs, and software tools for analysis.
- Critical thinking and decision-making skills in selecting appropriate engineering solutions.
- Self-learning skills to keep pace with developments in chemical and petroleum engineering.

11. Course Structure

Week	Hours	Topic	Intended Learning Outcomes	Teaching Method	Assessment Method
1	2	Introduction to Mass Transfer and Basic Concepts	Define mass transfer, its types, and significance	Lecture	Quiz
2	2	Diffusion Laws (Fick's Laws)	Understand and apply diffusion laws	Lecture + Problem Solving	Assignment
3	2	Molecular Diffusion	Calculate diffusion rates	Problem Solving	Test
4	2	Interphase Mass Transfer	Distinguish between different phase systems	Lecture	Quiz
5	2	Mass Transfer Coefficients	Calculate coefficients and identify influencing factors	Lecture + Exercises	Assignment
6	2	Absorption	Analyze absorption processes	Lecture + Examples	Test
7	2	Absorption Applications and Problems	Solve absorption-related problems	Practical Exercises	Assignment
8	2	Distillation	Understand distillation	Theoretical	Midterm

Week	Hours	Topic	Intended Learning Outcomes	Teaching Method	Assessment Method
			principles	Lecture	Examination
9	2	Distillation Stage Calculations	Apply engineering calculations	Problem Solving	Assignment
10	2	Extraction	Analyze extraction processes	Lecture	Test
11	2	Drying	Understand drying mechanisms	Lecture + Examples	Quiz
12	2	Mass Transfer in Multicomponent Systems	Analyze complex systems	Problem Solving	Assignment
13	2	Design of Mass Transfer Equipment	Understand equipment design principles	Lecture + Case Studies	Assignment
14	2	Advanced Industrial Applications	Relate concepts to industrial practice	Discussion	Test
15	2	Comprehensive Review	Reinforce concepts and solve sample problems	Review Session	Final Examination

12. Infrastructure

Required Textbooks

To be specified.

Main References

1. Treybal, R. E., *Mass-Transfer Operations*, 3rd Edition, McGraw-Hill.
2. Geankoplis, C. J., *Transport Processes and Separation Process Principles*, 5th Edition, Pearson Education.
3. Welty, J. R., Wicks, C. E., Wilson, R. E., & Rorrer, G. L., *Fundamentals of Momentum, Heat, and Mass Transfer*, Wiley.
4. McCabe, W. L., Smith, J. C., & Harriott, P., *Unit Operations of Chemical Engineering*, McGraw-Hill.

Recommended References

- Peer-reviewed research articles in chemical engineering and petroleum industries.
- Technical reports issued by industrial companies and organizations related to mass transfer and separation processes.
- Specialized scientific journals, including:
 - Chemical Engineering Science
 - Industrial & Engineering Chemistry Research

Electronic Resources

- Websites of universities and scientific institutions providing lectures and specialized references in mass transfer and chemical engineering.

13. Course Development Plan

- Regularly update course content to keep pace with modern developments in mass transfer and separation processes.
- Strengthen the practical component through additional laboratory experiments and modern industrial applications.
- Relate course topics to real-world challenges and applications in chemical and petroleum industries.
- Encourage students to utilize electronic resources and recent scientific literature to develop self-learning and research skills.

Course Description (Measurement Techniques)

The course aims to introduce students to the fundamentals of measurement techniques and their importance in engineering and industrial applications. It covers measurement systems, units, sources of errors, and calibration procedures.

The course addresses electrical and industrial measuring instruments, circuit analysis using Ohm's Law and Kirchhoff's Laws, and different circuit connection methods.

It also focuses on the measurement of industrial variables such as pressure, temperature, flow rate, and liquid level using appropriate sensors and instruments.

The course equips students with the skills required to analyze measurement results, reduce errors, and apply measurement techniques in industrial processes and control systems.

1. Educational Institution

Northern Technical University

2. College / Institute

Mosul Polytechnic College

3. Scientific Department / Center

Dept. Chemical and Petroleum Industries Techniques

Measurement Techniques / ICTI214

5. Attendance Mode

Mandatory

6. Academic Year

2025–2026

7. Total Study Hours

8. Date of Preparing the Course Description

2025/9/1

9. Course Objectives

- Understand the basic concepts and principles of measurement and their importance in engineering and industrial applications.
- Recognize measurement units, standards, and calibration procedures used in different measurement systems.
- Identify different types of electrical and industrial measuring instruments and understand their operating principles.
- Apply Ohm's Law and Kirchhoff's Laws in electrical measurements and circuit analysis.
- Measure electrical quantities such as voltage, current, resistance, and power using appropriate instruments.
- Measure industrial variables such as temperature, pressure, flow rate, liquid level, and displacement.
- Understand the operating principles of sensors and transducers used in measurement systems.
- Explain the principles of flow measurement devices such as Pitot tubes, Orifice plates, and Venturi meters.
- Recognize the role of control valves and measurement and control systems in industrial processes.
- Analyze measurement results and evaluate accuracy, sensitivity, repeatability, and reliability.

10. Course Learning Outcomes, Teaching, Learning, and Assessment Methods

A. Knowledge Objectives

Upon completion of the course, students will be able to:

- Acquire fundamental knowledge of measurement techniques, measurement systems, units, and standards.
- Understand the operating principles of electrical and industrial measuring instruments and circuit analysis laws such as Ohm's and Kirchhoff's Laws.

- Recognize methods for measuring industrial variables and evaluating measurement accuracy and error sources.

B. Course-Specific Skills Objectives

Students will be able to:

- Use electrical and industrial measuring instruments correctly and safely.
- Measure and analyze industrial variables such as pressure, temperature, flow rate, and liquid level.
- Apply basic laws (Ohm's Law and Kirchhoff's Laws) to solve practical problems and analyze electrical circuits.

Teaching and Learning Methods

- Theoretical lectures to explain fundamental concepts of measurement techniques.
- Practical laboratory sessions to train students in the use of measuring instruments.
- Demonstrations illustrating the operation of instruments and measurement procedures.
- Problem-solving exercises and practical applications to enhance understanding and data analysis.
- Classroom discussions and interactive learning activities.

Assessment Methods

- Quizzes to assess continuous understanding of fundamental concepts.
- Midterm and Final Examinations to evaluate academic achievement.
- Laboratory Reports to assess practical performance and understanding of instruments.
- Homework assignments and problem-solving exercises to strengthen analytical skills.

C. Affective and Value-Based Objectives

Students will:

- Develop a positive attitude toward the importance of measurement techniques in engineering and industrial applications.
- Strengthen values of accuracy and scientific integrity in conducting measurements and recording results.
- Adhere to occupational safety standards while using measuring instruments in laboratories and industrial environments.

Teaching and Learning Methods

- Practical and theoretical lectures, visual observations, and scientific resources provided by instructors and online materials.

D. Assessment Methods

- Evaluation of student behavior during laboratory work regarding safety compliance and accuracy.
- Observation of teamwork, cooperation, and participation in practical activities.
- Assessment of discipline and punctuality in submitting reports and assignments.
- Evaluation of responsibility and scientific honesty in recording experimental results.
- Assessment of classroom participation and constructive engagement in discussions.

Transferable Skills

Students will develop:

- Problem-solving and logical analysis skills related to measurement systems and technical faults.
- Communication and teamwork skills through laboratory activities and collaborative projects.
- Competence in using modern instruments and technologies, enhancing employability in industrial sectors.
- Critical thinking and decision-making skills in selecting measurement methods and instruments.

1. Educational institution	Northern Technical University
2-College/Institute	Polytechnic College/Mosul
3- Scientific Department/ Center	Chemical and Petroleum Industries Technologies
4. Course Name / Code	OCCUPATIONAL SAFETY
5-Available forms of attendance	Mandatory
6-semester/ year	2025- 2026
7. Number of study hours (total)	30
8. Date of preparation of this description	2025/9/1

Module Aims

Giving the student a comprehensive overview of the basic principles of the concept of occupational safety and the related administrative, technical and organizational activities. Teaching him all occupational risks in the work environment, the means necessary to prevent them, the most important pollutants of air, water and soil, standard equipment for each substance and ways to prevent them

10- Course outputs and teaching, learning and evaluation methods

A- Defined Objectives

- 1) Understand occupational safety concepts: Introduce students to the principles of occupational safety and their importance in the work environment.
- 2) Familiarize yourself with basic concepts such as occupational hazards, accidents, and injuries. Recognize occupational hazards: Identify different types of hazards in the work environment (chemical, physical, biological, psychological, etc.).
- 3) Understand how risks are assessed and categorized according to their severity and likelihood of occurrence.
- 4) Knowledge of legislation and regulations: Learn about local and international laws

and regulations related to occupational safety and health.

- 5) Understand the rights and duties of workers and employers in the field of occupational safety.
- 6) Learn prevention procedures: Acquire knowledge about preventive procedures to reduce accidents and injuries.
- 7) Learn about personal protective equipment (e.g. helmets, gloves, goggles) and how to use them.
- 8) Understand emergency and evacuation plans: Learn how to develop and implement emergency plans in the event of a fire, chemical spill, or other disaster.

(b) The skill objectives of the course.

1. Recognize occupational hazards Ability to identify sources of risk in the work environment.
2. Use personal protective equipment (PPE) Master the use of protective equipment such as helmets, gloves, goggles, and safety shoes.
3. Applying safety procedures in the work environment Ability to implement safety protocols specific to each profession.
4. Handling fires and first aid Using fire extinguishers correctly.
5. Analyze incidents and take preventive measures
6. Handling Hazardous Materials
7. Follow occupational safety regulations and laws

Teaching and Learning

The study of occupational safety relies on a combination of educational methods that integrate theoretical and applied aspects to ensure a deep understanding of occupational hazards and methods of prevention. Here are some effective ways to teach and learn about occupational safety:

First: Theoretical methods, interactive lectures, e-learning, discussions and panel discussions, scientific manuals and references.

Second: Applied Methods: Practical Training in the Work Environment, Simulation and Virtual Reality (VR): Emergency and Evacuation Trainings:

Problem-Based Learning (PBL): Workshops and field trials.

Valuation Methods

The methods of evaluating and studying occupational safety are based on a combination of theoretical tests and practical applications to ensure that students are ready to work in hazardous environments. Continuous assessment and hands-on training helps improve their preventive skills, contributing to reducing accidents and achieving a safe work environment.

C- Affective and Value Objectives

Emotional and value goals help create a safer work environment by building positive behaviors in individuals, leading to fewer incidents and improved professional performance. The safety of individuals starts from the internal conviction of their importance before they are just rules to be followed.

D. Teaching and Learning Methods

Practical and theoretical lectures, visual observations and listening to scientific rules in courses from professors and the Internet					
D. Valuation Methods					
Periodic oral and daily tests and scientific discussions					
- Transferred general and qualifying skills (other skills related to employability and personal development). 1- Focus on those who have great intellectual ability and understanding 2- Encouraging the policy of discussions so that the student enjoys scientific creativity 3- Developing students' mental and scientific abilities 4- Raising the level of students and following up on vulnerable students					
11. Course Structure					
Week	Hours	Intended Learning Outcomes	Module Name/ or Topic	Teaching Method	Method of Evaluation
1	2	Knowledge and application	The meaning of occupational safety Occupational safety objectives The importance of occupational safety The body responsible for occupational safety	Lecture, discussion, presentation of videos and films	Prueba
2	2	Knowledge and application	Accidents , possibility of accidents , causes of accidents Types of accidents (death) Total disability, permanent disability, minor injuries, moderate injuries, occupational injuries, occupational diseases, industrial safety measurement	Lecture 4	Prueba
3	2	Knowledge and application	a. Causes of mechanical accidents b. Incident Prevention Methods	Lecture 4	Prueba
4	2	Knowledge and application	Risks of chemicals : Classification and division of chemicals according to their danger Physiological effects of chemicals - on the organism Symptoms and images of poisoning with chemicals	Lecture 4	Prueba
5	2	Knowledge and application	The bad effects of chemicals on the organs and systems of the human body and the diseases that cause them (nervous system , digestive system, respiratory system, urinary system, circulatory system, skin)	Lecture 4	Prueba

6.	2	Knowledge and application	Risks of pollution of the environment , pollution of the atmosphere with solid and gaseous substances, industrial dust, pollution in river water.	Lecture 4	Prueba
7.	2	Knowledge and application	Recommendations and precautions when dealing with chemicals and first aid when poisoning with chemicals	Lecture 4	Prueba
8.	2	Knowledge and application	Pots and vessels of compressed gases and liquid gases, transport by carts, transport by locomotives and trucks, transport of pots and vessels of pressure and gases, injuries resulting from transport , precautions and recommendations when transporting flammable and inflammable materials, and gas containers.	Lecture 4	Prueba
9.	2	Knowledge and application	Electrical hazards,electricity and the impact of electricity, electrical appliances and equipment, prevention of electricity and first aid when injured by electric current	Lecture 4	Prueba
10.	2	Knowledge and application	Physical and natural factors of the work environment, vibration , sound and noise Effects of severe vibrations and sounds on humans at work , unusual atmospheric pressures	Lecture 4	Prueba
11.	2	Knowledge and application	Lighting and radiation: correct lighting rules, radiation risks - measuring the radiation percentage - internal regulation of the temperature of the human body - controlling the temperature in the work environment -ventilation, heating and cooling issues,methods of measuring thermal factors	Lecture 4	Prueba
12.	2	Knowledge and application	Fires and their types:The theory of ignition and types of fires, the causes of fires,how to prevent fires, and the organization of fire prevention.	Lecture 4	Prueba
13.	2	Knowledge and application	Fire theory, fire extinguishers, explosions, fire department duties, fire extinguishers, first aid for burn injuries	Lecture 4	Prueba
14.	2	Knowledge	Training and awareness in occupational	Lecture 4	Prueba

		and application	safety issues -Courses and training for various cadres - Means of raising awareness in occupational safety		
15.	2	Knowledge and application	Posters , films, exhibitions, articles, seminars, occupational safety week, personal protective equipment used in the industry and its types - the use of personal protective equipment	Lecture 4	Prueba

S substructure	
1- Required prescribed books	1. Barbarian , Adam , Occupational Health and Safety, 2005. 2. Helmy , Ahmed and Al-Afouk , Abdel Moneim , Occupational Safety and Health, Cairo , 3. Dar Al-Kutub Al-Ilmiyyah Publishing House, 2000 AD .
2- Key References (Sources)	1.ahmed , s.,kwan , j& ming F. &pui ho , d. , site safety management in hong kong 2000. 1. Abdul Rahman Al-Issawi , Industrial Psychology, Dar Al-Fikr Al-Arabi for Printing, Publishing and Distribution Beirut Lebanon. 2003. 2. Ashraf Abdel Ghani, Industrial Psychology and its Applications, Modern University Office, Alexandria, 2001 .
R ecommended books anrences (s cientific journals, reports)	1- Occupational prevention, d. Jamal Mengele, Academic Book Center, from page 201 to page 220 . -Nichan, Margossian, Risques Professionnels, Caractéristiques, Règlementation, Prévention,éditeurDunod, 2eme édition, Paris, 2006, p :1 2. d. 'ahmad hasan albarei-da. rami aihmad albarei, alwasit fi altashriyat alaijtimaeiati, aljuz 'al 'awal althawrat alsinaeiati wa 'atharaha aliai jtimaeiat walqanuniata, dar alnahdat alearabiati, 2009.
B - Electronic references, w ebsites	1- Islam Dusuqi Abdulnasuqi, The General Theory of International Accountability without error, Thematic International Accountability, Center for Arab Studies for Publishing and Distribution, 2016 Edition. 2-Amla Nawr Al-Din Taher, Civil Liability for Environmental Damage to Natural Resources, Dar Al-Imamah Al-Jadida, Alexandria,2018. 3-Khalid Al-Iraqi, The Environment Contaminated and Protected, Dar Al-Nahda Al-Arabiya, Cairo ,2011 .
	13. Course Development Plan
	Access to modern scientific literature Participation in relevant scientific conferences

Availability of teaching and training staff to apply and work in operational and industrial institutions.
 Hosting specialized professors
 Scientific pairing with other universities and corresponding colleges

Module Description

This course focuses on studying the principles and techniques used in improving the quality of crude oil and converting it into high-value petroleum products. The course deals with the basic processes in oil refineries such as thermal and catalytic cracking, hydrogenation, and desulfurization, in addition to learning about the chemical and physical processing techniques used to improve the properties of oil products

1. Educational institution	Northern Technical University
2-College/Institute	Polytechnic College/Mosul
3- Scientific Department/ Center	Chemical and Petroleum Industries Technologies
4. Course Name / Code	ICTI211 Crude Oil Optimization Techniques
5-Available forms of attendance	Mandatory
6-semester/ year	2025- 2026
7. Number of study hours (total)	5
8. Date of preparation of this description	

Module Aims

- Distinguish between physical and chemical processes used in refineries, such as distillation, cracking and hydrogenation.
- . Explain the basic principles of operation of the various oil improvement units, and identify the operational variables affecting the efficiency of each process.
- . Analyze the impact of crude oil components on the selection of appropriate processing technology.

10- Course outputs and teaching, learning and evaluation methods

A- Defined Objectives

Distinguish the different processes used to optimize crude oil in principle and application

(b) The skill objectives of the course.

To ensure continuous learning and follow-up of recent technical developments in the field of oil improvement.

. Demonstrate initiative in research and self-analysis to resolve operational issues related to refining units

Teaching and Learning

Using the theoretical and practical lecture system, the electronic calculator and the electronic presentation

(DATASHOW)

Valuation Methods Testing students to see how they interact with the lecture and conducting weekly, quarterly and annual tests
C- Affective and Value Objectives 1-The student learns about the work of industrial and practical operating units and their role in building the country 2- Encouraging the student to acquire practical experience and linking it to theoretical principles 3- Learn accuracy and discipline in receiving science and knowledge 4- Learning to communicate and interact during the lecture
D. Teaching and Learning Methods Practical and theoretical lectures, visual observations and listening to scientific rules in courses from professors and the Internet
D. Valuation Methods Periodic oral and daily tests and scientific discussions
- Transferred general and qualifying skills (other skills related to employability and personal development). 1- Focus on those who have great intellectual ability and understanding 2- Encouraging the policy of discussions so that the student enjoys scientific creativity 3- Developing students' mental and scientific abilities 4- Raising the level of students and following up on vulnerable students
10- Course outputs and teaching, learning and evaluation methods
A- Defined Objectives Distinguish the different processes used to optimize crude oil in principle and application
(b) The skill objectives of the course. To ensure continuous learning and follow-up of recent technical developments in the field of oil improvement. . Demonstrate initiative in research and self-analysis to resolve operational issues related to refining units
Teaching and Learning Using the theoretical and practical lecture system, the electronic calculator and the electronic presentation (DATASHOW)
Valuation Methods Testing students to see how they interact with the lecture and conducting weekly, quarterly and annual tests
C- Affective and Value Objectives 1-The student learns about the work of industrial and practical operating units and their role in building the country 2- Encouraging the student to acquire practical experience and linking it to theoretical principles

3- Learn accuracy and discipline in receiving science and knowledge
4- Learning to communicate and interact during the lecture
D. Teaching and Learning Methods
Practical and theoretical lectures, visual observations and listening to scientific rules in courses from professors and the Internet
D. Valuation Methods
Periodic oral and daily tests and scientific discussions
- Transferred general and qualifying skills (other skills related to employability and personal development).
1- Focus on those who have great intellectual ability and understanding
2- Encouraging the policy of discussions so that the student enjoys scientific creativity
3- Developing students' mental and scientific abilities
4- Raising the level of students and following up on vulnerable students

Week	Time	theoretical			
1, 2	2	Be able to define the reforming process and explain its objective in improving the quality of petroleum products.	Structural Repair	Presentation, Explanation, Q&A, Discussion	test.
3,4,5	2	Clarify the difference between compositional repair and cracking (thermal or catalytic) in principle and function.	to fix the synthetic	Presentation, Explanation, Q&A, Discussion	test.

		Understand the importance of the process in converting light hydrocarbons (naphtha) into high-value compounds,			
6,7,8,9	2	Able to: Define the isomerization process and explain the principle of its chemical action (transformation of straight chains into branched ones). Distinguish isomerization from other transformation processes such as fracturing or structural repair	Isomerization	Presentation, Explanation, Q&A, Discussion	test.

10,11,12	2	Definition of the concept of supporting operations and its role in the operation of oil and gas facilities.	Supporting operations and pollution of the environment as a result of the oil	Presentation, Explanation, Q&A, Discussion		test .

		Identify the main types of supporting operations	industry		
13,14,15	2	Definition of environmental pollution resulting from the activities of the oil industry. Identify the types of pollution associated with oil,		Presentation, Explanation, Q&A, Discussion	test .

Infrastructure	
1- Required prescribed books	Oil Manufacturing by Yahya Mahmoud and Essam Abdul Hadi)
2- Key References (Sources)	Dr. Imad Al-Dabouni et al. Oil Constructed Installation
Recommended books and references (scientific journals, reports ,.)	Fuel Technology D. Jabir Shenshul

13. Course Development Plan
Access to modern scientific literature Participation in relevant scientific conferences Availability of teaching and training staff to apply and work in operational and industrial institutions. Hosting specialized professors Scientific pairing with other universities and corresponding colleges

1-Educational Institution	Northern Technical University
2-College / Institute	Polytechnic College / Mosul
3-Scientific Department / Center	Chemical and Petroleum Industries Techniques Department

4-Course Name / Code	Materials Properties / ICTI216
5-Available Attendance Modes	Compulsory (Mandatory)
6-Semester / Year	2025–2026
7-Total Class Hours	90 Hours
8-Date of Preparation	2025/9/1
9-Course Objectives	The student will gain complete familiarity and thorough knowledge of materials classification, their diverse properties, and their resistance to various types of structural loads, as well as their durability against environmental exposure over time. Therefore, the course requires studying the fundamental rules, laws, and theories that govern the behavior and properties of engineering materials under different operational conditions, alongside the applied and practical study of these engineering materials.

Domain / Target	Detailed Description
10-Course Intended Learning Outcomes (ILOs)	Understanding Foundations: Comprehend the essential concepts of stress, strain, deformation, and Poisson's ratio. Engineering Calculations: Demonstrate the ability to calculate the center of gravity, moment of inertia, and various structural stresses (thermal, shear, torsion, and bending). Materials Knowledge: Differentiate between the properties of ferrous and non-ferrous metals and analyze their crystal structures. Failure and Corrosion Control: Diagnose diverse types of corrosion, apply metal protection methods, and evaluate stresses in thin-walled shells and pressure vessels. General Skills: Apply engineering problem-solving methodologies, collaborate effectively in teams, and author technical reports.

Domain / Target	Detailed Description
A-Cognitive Objectives (Knowledge & Understanding)	Definition: Gain total familiarity with the concepts of stress, strain, structural deformation, and Poisson's ratio. Mechanical Computation: Master the physical laws used to calculate tensile, compressive, shear, torsional, and bending stresses. Engineering Analysis: Comprehend mathematical methods for extracting the center of gravity and moment of inertia for structural cross-sections. Classification: Distinguish the physical and mechanical properties of ferrous metals, non-ferrous metals, and their respective industrial alloys. Diagnostics: Identify the metallic crystal structures, classify types of electrochemical corrosion, and master prevention methods.
B-Course-Specific & Professional Skills	Critical Thinking: Analyze complex structural stress profiles and diagnose root causes of failure and degradation in engineering materials. Computational Skills: Compute structural loads, bending moments, cross-sectional centers of gravity, and material deformation ratios mathematically. Communication Skills: Draft and present engineering technical reports, and clearly articulate complex structural material charts and diagrams.

C-Affective and Value Objectives	Scientific Integrity: Maintain strict accuracy, precision, and objectivity when recording and reporting materials testing data. Positive Interaction: Cultivate a collaborative team-driven mindset through structured classroom debates and shared engineering projects. Professional Responsibility: Promote acute awareness regarding proper material selection and the critical impact of corrosion on public safety and environmental sustainability.
D-Teaching and Learning Methods	Theoretical & Practical Lectures: Delivery of core principles followed by visual observations and active listening to engineering rules. Interactive Numerical Exercises: Solving applied engineering problems alongside interactive classroom tasks to sharpen mechanical analysis skills. Technology & Projects: Implementing computer simulation software, utilizing modern digital platforms, and assigning students targeted mini-research projects.
D-Assessment Methods	Continuous (Formative) Assessment: Periodic oral examinations, continuous daily quizzes, and technical evaluation during active scientific classroom discussions. Summative Assessment: Midterm and final examinations (comprising both written theoretical papers and hands-on laboratory tests) to measure computational and cognitive competencies.
Routine Assessment Elements	Continuous execution of periodic oral tests, routine daily quizzes, and structured scientific debates.

E-General & Transferable Skills (Employability & Personal Development)	1. Maximizing and accelerating the potential of students possessing high mental capacity and exceptional retention capabilities.2. Instilling an open-discussion academic policy to nurture students' scientific creativity, confidence, and innovative capabilities.3. Broadening the intellectual boundaries, critical thinking faculties, and core scientific competencies of the students.4. Elevating the collective academic standard of the entire classroom while establishing dedicated follow-ups to support and uplift lower-performing students.
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11. Course Structure (Stage TWO / Second Year)

Week	Hours	Required Learning Outcomes (ILOs)	Unit Name / Topic	Teaching Method	Assessment Method
1	2	Identify fundamental concepts of force, stress, strain, and mechanical	Force, Stress, strain, deformation.	Lecture, Q&A, Discussion	Daily Quiz & Oral Participation
2	2	Understand calculations for tensile and compressive stresses, and apply Poisson's ratio for	Tension And compression, poisson ratio.	Lecture, Solving Examples, Discussion	Homework Assignment Evaluation
3	2	Calculate stresses and thermal expansion	Thermal stress.	Lecture, Presentation,	Pop Quiz
4	2	Study the geometric shapes of structural	Geometric properties of sections.	Lecture, Illustrative Poster Exhibition	Scientific Discussion &
5	2	Demonstrate the ability to locate and calculate	Center of gravity.	Lecture, Solving Dynamic Exercises	Midterm Written Exam
6	2	Understand and extract the moment of inertia	Moment of Inertia.	Lecture, Computational	Periodic Problem-
7	2	Comprehend shear stress and its	Shear, Drilling and cutting disks, sheet	Lecture, Explanatory Video	Oral Test & Discussion
8	2	Compute torsional stresses resulting from	Torsion stress, Bending angle.	Lecture, Interactive Explanation,	Specialized Engineering
9	2	Understand bending forces in beams and	Bending, Bending stress.	Lecture, Presentation, Solving	Continuous Periodic Test

Week	Hours	Required Learning Outcomes (ILOs)	Unit Name / Topic	Teaching Method	Assessment Method
10	2 Hours	Understand longitudinal and hoop stresses in	Stresses in Shells (Part 1): Thin-walled	Theoretical Lecture, Presentation, and	Quiz & Participation
11	2 Hours	Analyze stresses in spherical pressure vessels and compute thickness parameters and safety factors under internal pressure.	Stresses in Shells (Part 2): Spherical pressure vessels, thickness calculations, and safety factors under pressure.	Theoretical Lecture, Engineering Charts Display, and Discussion	Homework Evaluation (Problem Sheet)
12	2 Hours	Differentiate between chemical and galvanic corrosion mechanisms and identify metallic crystal lattice systems.	Corrosion & Crystal Structure (Part 1): Types of corrosion (Galvanic, Pitting), crystal lattice of metals.	Lecture, Visual Displays, and Interactive Videos	Oral Test & Classroom Discussion
13	2 Hours	Comprehend metal protection methods against corrosion (coatings, cathodic protection) and identify crystal lattice defects.	Corrosion & Crystal Structure (Part 2): Methods of corrosion prevention (Coatings, Cathodic protection), crystal defects.	Lecture, Illustrative Posters of Protection Methods	Mini-Scientific Report Evaluation
14	2 Hours	Study the classification of ferrous metals, the	Iron-Based Metals & Steel (Part 1):	Theoretical Lecture, Thermal Equilibrium	Pop Written Quiz
15	2 Hours	Comprehend the mechanical and	Iron-Based Metals & Steel (Part 2):	Lecture, General Course Review, and	Final Course Examination

12. Infrastructure

Category	Details & Specifications
1. Required Textbooks	<i>Science of Materials Technology and their Resistance</i> (The ministerial curriculum / official training package approved for the department).
2. Main References (Sources)	Gere, J. M., & Goodno, B. J. - <i>Mechanics of Materials</i> , Cengage Learning. Callister, W. D., & Rethwisch, D. G. - <i>Materials Science and Engineering: An Introduction</i> , Wiley. Hibbeler, R. C. - <i>Mechanics of Materials</i> , Pearson. Beer, F. P., Johnston, E. R., & DeWolf, J. T. - <i>Mechanics of Materials</i> , McGraw-Hill. Jones, E. B. - <i>Instrument Technology & Materials Characterization</i> , Butterworth-Heinemann.
A. Recommended Books & References (Scientific Journals, Reports, etc.)	Scientific journals published by the American Society for Testing and Materials (ASTM International). Technical reports and codes issued by the American Society of Mechanical Engineers (ASME), specifically the Boiler and Pressure Vessel Code (BPVC) for pressure vessels and tanks. Recent research papers and technical reports published by national petroleum institutes regarding corrosion mitigation in pipelines and industrial equipment.
B. Electronic References & Websites	Interactive visual links and video lectures dedicated to explaining materials testing, resistance, and crystal structures: Mechanics and Resistance of Materials – <i>Educational Link 1</i> Stress-Strain Curves and Metallurgy Testing – <i>Educational Link 2</i> Corrosion Phenomenon and its Impact on Oil Pipelines – <i>Educational Link 3</i> Lattice and Crystal Structure of Metals – <i>Educational Link 4</i>

13. Course Development Plan

- **Modernizing Content:** Integrating newly developed smart alloys and **Composite Materials** into the syllabus.
- **Conference Engagement:** Urging faculty to participate in international material science and hydro corrosion conferences.
- **Industrial Internships:** Sending staff on periodic field placements inside refineries and engineering insps labs.
- **Expert Guest Lectures:** Hosting industry specialists (NDT, welding, and corrosion experts) to students.
- **Academic Integration:** Coordinating with technological universities to update laboratory experiment training packages.

1. Educational Institution

Northern Technical University

2. College/Institute	Polytechnic College/Mosul	
3. Department/Center	Chemical and Petroleum Industrial Techniques	
4. Course Name/Code	Petrochemicals/ ICTI227	
5. Available Attendance Methods	Required	
6. Semester/Year	2025-2026	
7. Total Credit Hours	60 hours	
8. Date of Preparation of this Description	2025/9/1	
9- Course objectives Upon completion of this unit, students will be able to conduct and design laboratory experiments in petrochemical and industrial chemistry. They will gain a comprehensive understanding of various petrochemical industries, their environmental impacts, and the skills and tools necessary to assess and manage these impacts scientifically. Students will be able to contribute to the comprehensive development plan, utilizing science to advance society scientifically and culturally, and to provide environmental services to oil, gas and petrochemical companies..		
-10-Course Outcomes, Teaching and Learning Methods, and Assessment		
A- Cognitive Objectives Understanding the fundamental principles and chemical reactions in industrial processes. • Identifying raw materials and methods for manufacturing chemical compounds. • Studying production techniques and improving the efficiency of industrial processes. • Understanding safety standards and environmental considerations in industry. • Analyzing and evaluating the impact of chemical industries on the environment and the economy. .		
B - Course-specific skills objectives The student's familiarity with the theoretical knowledge that the basis of petrochemicals is the chemical materials extracted from oil, and an understanding of the importance of petrochemical industries, which are used in thousands of production processes and are distributed across many fields, such as the medical field, where they are primarily used to manufacture medicines such as penicillin and aspirin, and treatments for AIDS and arthritis. They are also used in the manufacture of prosthetics and many medical devices.		

Teaching and Learning Methods

Theoretical lectures to explain fundamental concepts.

- Presentations and visual aids to illustrate industrial processes.
- Laboratory experiments to enhance practical application.
- Discussions and problem-solving to develop critical thinking.
- Projects and research to promote self-directed learning.

(Field visits to connect knowledge with practical application (where applicable) •

D. Assessment Methods

Theoretical tests to measure understanding and comprehension.

- Reports and projects to assess application and analysis.
- Laboratory experiments to measure practical skills.
- Class participation to assess critical thinking.
- Ongoing assessment through assignments and quizzes.

- General and transferable skills (other skills related to employability and personal development):

- Developing problem-solving skills in industrial processes.
- Enhancing research and analytical skills for improving chemical processes.
- Developing the ability to work and communicate effectively in an industrial environment.
- Acquiring time management and organizational skills for project implementation.
- Promoting awareness of safety and sustainability in chemical work environments.

11-Course Structure

Assessment Method	Teaching Method	Unit/Topic Name	Required Learning Outcomes	Hours	Week
The second stage					
Testing	Lecture, discussion	Petrochemicals	Knowledge and application	2	1

Testing	Lecture, discussion	Separation Methods	Knowledge and application	2	2
Testing	Lecture, discussion	Evaluation of Oil and its Derivatives	Knowledge and application	2	3
Testing	Lecture, discussion			2	4
Testing	Lecture, discussion	Petrochemicals, Petrochemical Industries, Activities Related to Petrochemical Industries, Petroleum Products, and Natural Gas	Knowledge and application	2	5
Testing	Lecture, discussion	Synthesis Gas and its Uses	Knowledge and application	2	6
Testing	Lecture, discussion	Petrochemicals from Methanol	Knowledge and application	2	7
Testing	Lecture, discussion	Acetylene and Carbon Black	Knowledge and application	2	8
Testing	Lecture, discussion	Polyethylene	Knowledge and application	2	9
Testing	Lecture, discussion	Polyvinyl Chloride	Knowledge and application	2	10
Testing	Lecture, discussion	Polystyrene and Polyvinyl Acetate	Knowledge and application	2	11
Testing	Lecture, discussion	Polyvinyl Alcohol	Knowledge and application	2	12
Testing	Lecture, discussion	Ethanol: Preparation and Uses	Knowledge and application	2	13
Testing	Lecture,	Ethylene Alsteldehyde and its	Knowledge and	2	14

	discussion	Uses	application		
Testing	Lecture, discussion	Acrylic Acid	Knowledge and application	2	15

12- Infrastructure	
Main References (Sources	
1. الدكتور حازم قاسم يحيى ,الدكتور فائز عبدالقادر جميل, كتاب البتروكيماويات ,جامعة بغداد, 1984/7/1 2- كتاب الصناعات البترولية والبتروكيماوية/للدكتور سالم بن سليم الذياب/الطبعة الاولى 1996 •المصادر المقترحة: -1"Petrochemicals in Nontechnical Language" by Donald L. Burdick and William L. Leffler (2022) 2-Greenwood, H.C. (1925). "Acetylene: Its Properties, Manufacture and Uses".• Woods, G. (1988). وChapman and 3-Hall "Chemistry of Acetylene". Springer 4-Donnet, J.B., Bansal, R.C., Wang, M.J. (1993). "Carbon Black: Science and Technology". CRC Press 5-Liebhafsky, H.H. (1968). "Fundamentals of Carbon Black". Reinhold Publishing Corporation.	

13- Curriculum Development Plan
Reviewing recent scientific literature Participating in relevant scientific conferences Dedicating teaching and training staff to practical application and work in operational and industrial institutions

Hosting specialized professors
Scientific collaboration with other universities and similar colleges

1. Higher Education Institution
Mosul Polytechnic College
2. Scientific Department
Chemical and Petroleum Industries Technologies Department
3. Course Name / Code
Arabic Language / NTU103
4. Available Modes of Attendance
1. Mandatory Weekly Lecture Schedule (Theoretical)
2. Discussions and Other Interactive Activities
5. Semester / Year
Second Semester / Second Level / 2025-2026
6. Total Credit/Study Hours
60 Hours
7. Course Coordinator(s)
Asst. Lect. Suzan Mustafa Hussein SUZAN_1985@ntu.edu.iq
8. Date of Description Preparation
2025/9/1
2. COURSE OBJECTIVES (MAIN PILLARS)
☐ Understand the Basics of the Arabic Language: Grasp foundational grammatical and morphological structures to ensure proper articulation and text construction.
☐ Master the Basics of Administrative Work and Drafting Official Letters: Gain the skill to compose precise official correspondence, documents, and reports according to administrative hierarchy.
☐ Avoid Common Spelling and Grammatical Errors: Prevent and eliminate structural and spelling mistakes that threaten the core integrity of the Arabic language within professional writing.
8. TEACHING AND LEARNING STRATEGIES

- **Foundational Knowledge Provision:** Providing students with core principles and subject matters related to the semester's curriculum, including comprehensive coverage of administrative letters and the linguistic errors individuals make when lacking proper language proficiency.
- **Practical Instructor-Led Problem Solving:** Resolving and breaking down a variety of applied, real-world examples directly on the board by the course instructor.
- **Linguistic Research & Error Detection Tasks:** Requiring the student to independently search for and analyze parallel vocabulary and structures within the curriculum that fall under common linguistic errors.
- **Collaborative Teamwork & Project Drafting:** Requiring students to work in groups to prepare, draft, and present reports and research papers directly related to the fields of the course.
- **Interactive Pedagogical Methods:** Employing diverse instructional techniques such as active questioning, elicitation, and structured group discussions.

11. Intended Learning Outcomes (ILOs) of the Program

Knowledge and Understanding:

- **A-1:** Identify common spelling and linguistic errors frequently occurred in administrative correspondence and official documents.
- **A-2:** Distinguish between Arabic articulation points (Makharij al-Huruf) and their phonetic characteristics in both speech and writing.
- **A-3:** Explain the morphological and grammatical rules differentiating between types of "Ta'at" (Ta'a Marbouta and Ta'a Maftouha) and their respective writing conventions.

Skills:

- **B-1:** Analyze and parse (I'rab) simple Arabic sentences used in professional and functional contexts correctly.
- **B-2:** Pronounce Arabic letters and words accurately, avoiding phonetic confusion or overlap between similar sounds.
- **B-3:** Detect and rectify linguistic, grammatical, and spelling errors in administrative texts and official documents independently.

Values and Competencies:

- **C-1:** Demonstrate a high commitment to linguistic accuracy and professional

- integrity when drafting official and administrative correspondence.
- **C-2:** Take professional responsibility for proofreading administrative documents to ensure they are completely free of linguistic errors.
 - **C-3:** Appreciate the significance of preserving the integrity and identity of the Arabic language within corporate and institutional environments.

12. Course Structure (Arabic Language 1)

Week	Hours	Intended Learning Outcomes (ILOs)	Unit / Topic Title	Teaching Methods	Assessment Methods
W1	4	A-1, B-1	Present Tense Verbs (الفعل المضارع) & Genitive Cases (المجرورات)	Interactive lecture, grammar analysis, and structural drilling	In-class text analysis and formative grammar exercises
W2	4	A-1, B-1	Grammatical Appositives (التوابع) & Accusative Cases (المنصوبات)	Comparative explanation, syntax mapping, and board applications	Solving contextual grammar worksheets and group discussion
W3	4	B-1	Practical Syntactic Parsing (إعراب) on Accusatives and Genitives	Cooperative learning and small-group text auditing	Short quiz and evaluated in-class parsing exercises
W4	4	A-1, B-3	Number Rules (الأعداد) & Noun Declension/Inflection (تصريف الأسماء)	Structural illustration, deductive method, and writing workshops	Quick quiz, spelling accuracy test, and take-home assignment
W5	4	B-3	Advanced Applications on Morphological Inflection and Number Formats	Applied problem-solving and work-environment simulation	Diagnostic test and interactive board exercises
W6	4	A-1, B-3	The Arabic Lexicon (المعجم العربي): Structure and Retrieval Methods	Explanatory presentation, dictionary-search drills, and hands-on practice	Practical retrieval test and evaluating common lexicon errors
W7	4	All previous ILOs	Midterm Review & Midterm Examination	Guided revision and QA session	Official written Midterm Exam
W8	4	A-2, C-3	Rhetoric: Badi' Science (علم البديع) and its Literary Impact	Textual analysis, brainstorming, and critical reading of rhetorical styles	Analytical group discussion and rhetoric recognition exercises
W9	4	A-2, C-3	Practical Applications on Rhetorical Devices in Official Texts	Problem-based learning (enhancing text aesthetics and professional tone)	Pop quiz and assessment of student written modifications
W10	4	A-2, C-3	Poetry and Prose in the Islamic Era and Subsequent Periods	Contextual lecture, literary reading, and concept mapping	Quick quiz and homework (critical reflection on selected prose)
W11	4	A-1, B-3	Hamzat Al-Qat' and Hamzat Al-Wasl (Writing and pronunciation rules)	Comparative text analysis, visual aids, and interactive boards	Diagnostic dictation test and solving orthographic worksheets
W12	4	A-1, B-3	Advanced Applications of "Hamzat" Rules in Administrative	Work environment simulation (auditing official	Self-assessment and peer-to-peer editing evaluation

			Correspondence	letters for spelling)	
W13	4	A-1, B-3	Numbers in the Arabic Language (الأعداد في اللغة العربية) - Advanced Formats	Formulaic breakdown, syntax rules for numbered nouns, and rapid writing	Targeted math-to-text translation problems and a short quiz
W14	4	B-3, C-1, C-2	General Review and Comprehensive Applications on Administrative Letter Editing	Integrated practical workshop (simulated professional auditing and drafting)	Portfolio evaluation of students' written work during the semester
W15	4	All Course ILOs	Final Examination	-	Comprehensive final written exam

Course:

Name: The crimes of the Baath regime in Iraq

1. Course Code:

2. Semester / Year:

2025-2026

3. Description Preparation Date:

2025/9/1

4. Available Attendance Forms:

In-person and electronic education

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

Two hours per week / The number of hours required to implement the stu material is (60) hours					
6. Course administrator's name (mention all, if more than one name)					
Name: Zainab Adil Merie Email:zainab.merie@uomosul.edu.iq					
7. Course Objectives					
Course Objectives		1-The course aims for the student to be aware of the crimes committed by the Baath regime in Iraq. 2- Striving to crystallize the student’s creative thinking, which focuses on the ability to recall information or experiences stored in his mind and propose quick alternatives, as well as striving to crystallize his cognitive thinking. 3- To be able to diagnose every scientific word or subject and use it in his study or field of work in the future.			
8. Teaching and Learning Strategies					
Strategy		. Lectures accompanied by explanation and clarification. 2. Discussion and brainstorming. 3. Video lectures. 4. Using illustrative and applied examples to enrich the scientific material. 5. Discussions and research groups. 6. Scientific competitions. 7. Theoretical and analytical research and reports, discussed and evaluated. 8. Presentation of the PowerPoint article. 9. Using e-learning via Google Classroom			
9. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 112 1	2 (hours)	Weekly student evaluation/theor etical discussions	General introduction	Live and electronic education, video lectures, and the use of maps	Written/oral exams, homework assignments, and preparing research reports
		Weekly student evaluation/theor etical discussions	Chapter One: The crimes of the Baath regime according to the Law of the Supreme Iraqi Criminal Court in 2005	Live and electronic education, video lectures, and the use of maps	Written/oral exams, homework assignments, and preparing research reports

2	22	2 (hours)	Weekly student evaluation/theoretical discussions	The concept of crimes and their definitions in comparative sciences	Live and electronic education, video lectures, and the use of maps	Written/oral exams, homework assignments, and preparing research reports
			Weekly student evaluation/theoretical discussions	Crime departments	Live and electronic education, video lectures, and the use of maps	Written/oral exams, homework assignments, and preparing research reports
3		2 (hours)	Weekly student evaluation/theoretical discussions	The crimes of the Baath regime as documented by the Iraqi Supreme Criminal Court	Live and electronic education, video lectures, and the use of maps	Written/oral exams, homework assignments, and preparing research reports
			Weekly student evaluation/theoretical discussions	Types of international crimes	Live and electronic education, video lectures, and the use of maps	Written/oral exams, homework assignments, and preparing research reports
4		2 (hours)	Weekly student evaluation/theoretical discussions	Decisions issued by the Iraqi Supreme Criminal Court	Live and electronic education, video lectures, and the use of maps	Written/oral exams, homework assignments, and preparing research reports
			Weekly student evaluation/theoretical discussions	Chapter Two: Psychological and social crimes and their effects and the most prominent violations of the Baathist regime in Iraq	Live and electronic education, video lectures, and the use of maps	Written/oral exams, homework assignments, and preparing research reports
5		2 (hours)	Weekly student evaluation/theoretical discussions		Live and electronic education, video lectures, and the use of maps	Written/oral exams, homework assignments, and preparing research reports
			Weekly student		Live and	Written/oral

		evaluation/theoretical discussions		electronic education, video lectures, and the use of maps	exams, homework assignments, and preparing research reports
6	2 (hours)	Weekly student evaluation/theoretical discussions	Psychological crimes	Live and electronic education, video lectures, and the use of maps	Written/oral exams, homework assignments, and preparing research reports
		Weekly student evaluation/theoretical discussions	Psychological effects of crimes	Live and electronic education, video lectures, and the use of maps	Written/oral exams, homework assignments, and preparing research reports
7	2 (hours)	Weekly student evaluation/theoretical discussions	Social crimes	Live and electronic education, video lectures, and the use of maps	Written/oral exams, homework assignments, and preparing research reports
		Weekly student evaluation/theoretical discussions	The Baathist regime's position on religion	Live and electronic education, video lectures, and the use of maps	Written/oral exams, homework assignments, and preparing research reports
8	2 (hours)	Weekly student evaluation/theoretical discussions		Live and electronic education, video lectures, and the use of maps	Written/oral exams, homework assignments, and preparing research reports
		Weekly student evaluation/theoretical discussions	The Baathist regime's position on religion	Live and electronic education, video lectures, and the use of maps	Written/oral exams, homework assignments, and preparing research reports
	2 (hours)	Weekly student evaluation/theoretical	Violating Iraqi laws	Live and electronic education,	Written/oral exams, homework

9		discussions		video lectures, and the use of maps	assignments, and preparing research reports
		Weekly student evaluation/theoretical discussions	Pictures of human rights violations and crimes of power	Live and electronic education, video lectures, and the use of maps	Written/oral exams, homework assignments, and preparing research reports
10	2 (hours)	Weekly student evaluation/theoretical discussions	Pictures of human rights violations and crimes of power	Live and electronic education, video lectures, and the use of maps	Written/oral exams, homework assignments, and preparing research reports
		Weekly student evaluation/theoretical discussions	Some decisions regarding political and military violations of the Baath regime	Live and electronic education, video lectures, and the use of maps	Written/oral exams, homework assignments, and preparing research reports
11	2 (hours)	Weekly student evaluation/theoretical discussions	Prison and detention places of the Baath regime	Live and electronic education, video lectures, and the use of maps	Written/oral exams, homework assignments, and preparing research reports
		Weekly student evaluation/theoretical discussions	Chapter Three: Environmental crimes of the Baath regime in Iraq	Live and electronic education, video lectures, and the use of maps	Written/oral exams, homework assignments, and preparing research reports
12	2 (hours)	Weekly student evaluation/theoretical discussions	Military and radioactive contamination and mine explosions	Live and electronic education, video lectures, and the use of maps	Written/oral exams, homework assignments, and preparing research reports
		Weekly student evaluation/theoretical discussions	The use of internationally prohibited weapons and the dangers of mines	Live and electronic education, video lectures, and	Written/oral exams, homework assignments, and

				the use of maps	preparing research reports
	2 (hours)	Weekly student evaluation/theoretical discussions	Contamination with radioactive materials	Live and electronic education, video lectures, and the use of maps	Written/oral exams, homework assignments, and preparing research reports
		Weekly student evaluation/theoretical discussions	The impact of radioactive materials on the health of citizens in the southern governorates	Live and electronic education, video lectures, and the use of maps	Written/oral exams, homework assignments, and preparing research reports
14	2 (hours)	Weekly student evaluation/theoretical discussions	Destruction of cities and villages (scorched earth policy)	Live and electronic education, video lectures, and the use of maps	Written/oral exams, homework assignments, and preparing research reports
		Weekly student evaluation/theoretical discussions		Live and electronic education, video lectures, and the use of maps	Written/oral exams, homework assignments, and preparing research reports
15	2 (hours)	Weekly student evaluation/theoretical discussions	Sectarianism in Islam	Live and electronic education, video lectures, and the use of maps	Written/oral exams, homework assignments, and preparing research reports
		Weekly student evaluation/theoretical discussions	Drying the marshes	Live and electronic education, video lectures, and the use of maps	Written/oral exams, homework assignments, and preparing research reports

10. Course Evaluation

- 1-Written tests
- 2-Oral tests (daily - weekly)
- 3- Homework from the college website (home work)
- 4- Preparing research reports

11. Learning and Teaching Resources

Required textbooks (curricular books, if any)	There is a specific methodological book, which is the book "Crimes of the Baath Regime in Iraq" (a course for all public and private universities).
Main references (sources)	1. Laws of Military Occupation, Ihsan Hindi. 2. International responsibility for committing genocide, Ayman Abdel Aziz Salama 3. Environmental crimes of the Baath regime in Iraq, Hussein Aliwi Al-Ziyadi, Abbas Atiya Al-Quraishi Recent sources: books, research, and articles taken from the International Information Network (the Internet).
Recommended books and references (scientific journals, reports...)	Research groups - workshops - video lectures
Electronic References, Websites	Electronic teaching aids, electronic maps, and websites Relying on various research and reports from the International Information Network (the Internet). In addition to relying on research and books published on international websites such as Research Gate

1- Course name:	.19
Professional Ethics	
2- Course code:	.
NTU 204	
3- Semester/Year	.20
2025/2026	
4- Date this description was prepared	.21
2025/9/1	
5- Available forms of attendance	.22
In-person education	
6- Number of study hours (total) / Number of units (total)	.23
10 hours per week / The number of hours required to implement the study (2) material is (30) hours	
7-Name of the course supervisor (if more than one name is mentioned)	.24
Name: Assistant Teacher Zainab Adel Marai	

Course objectives .25

The course aims for the student to be familiar with the ethics of professional -1 behavior Seeking to crystallize creative thinking in the student, which focuses on the -2 ability to recall information or experiences stored in his mind and propose quick alternatives, as well as seeking to crystallize cognitive thinking in him To be able to diagnose each scientific term or material and employ it in his -3 studies or field of work in the future	Subject objectives
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Teaching and learning strategies .26

.Lectures accompanied by explanation and clarification .1 .Discussion and brainstorming .2 .Video lectures .3 Using illustrative and applied examples to enrich the scientific material .4 .Discussion groups and research groups .5 .Scientific competitions .6 Theoretical and analytical research and reports, their discussion and .7 evaluation .Presenting the material in PowerPoint .8 Using e-learning via Google Classroom and .9	Strategy
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Course Structure 9

Evaluation method	Learning method	Unit or topic poison	Required learning outcomes	The hours	The week
Written/oral tests, homework and research report preparation	For live and online education, video lectures and the use of concept maps	General introduction	Weekly student evaluation / theoretical discussions	two) 2 (hours	1
Written/oral tests, homework and research report preparation	Live and online education, video lectures and the use of concept maps	The concept of ethics, profession and its origin	Weekly student evaluation / theoretical discussions	two) 2 (hours	1
Written/oral tests, homework and research report preparation	Live and online education, video lectures and the use of concept maps	Professional ethics	Weekly student evaluation / theoretical discussions	two) 2 (hours	2
Written/oral tests, homework and research report preparation	Live and online education, video lectures and the use of concept maps	Values and professional ethics	Weekly student evaluation / theoretical discussions	two) 2 (hours	3
Written/oral tests, homework and	Live and online education, video	Behavioral deviations	Weekly student evaluation / theoretical	two) 2	4

research report preparation	lectures and the use of concept maps	and professional ethics	discussions	(hours	
Written/oral tests, homework and research report preparation	Live and online education, video lectures and the use of concept maps	ns and methods of publishing ethical values of the profession	Weekly student evaluation / theoretical discussions	two)2 (hours	5
Written/oral tests, homework and research report preparation	Live and online education, video lectures and the use of concept maps	Engineering ethics	Weekly student evaluation / theoretical discussions	two)2 (hours	6
Written/oral tests, homework and research report preparation	Live and online education, video lectures and the use of concept maps	Code of Ethics for the Engineering Profession of the Federation of Arab Engineers	Weekly student evaluation / theoretical discussions	two)2 (hours	7
Written/oral tests, homework and research report preparation	Live and online education, video lectures and the use of concept maps	Technician Ethics in Continuing Education and Training	Weekly student evaluation / theoretical discussions	two)2 (hours	8
Written/oral tests, homework and research report preparation	For live and online education, video lectures and the use of concept maps	Characteristics and duties of a health cadre member	Weekly student evaluation / theoretical discussions	two) 2 (hours	9
Written/oral tests, homework and research report preparation	For live and online education, video lectures and the use of concept maps	Patient rights	Weekly student evaluation / theoretical discussions	two)2 (hours	10
Written/oral tests, homework and research report preparation	For live and online education, video lectures and the use of concept maps	Health care worker relationship with the community	Weekly student evaluation / theoretical discussions	two)2 (hours	11
Written/oral tests, homework and research report preparation	For live and online education, video lectures and the use of concept maps	The role of health personnel in sustainable health development	Weekly student evaluation / theoretical discussions	two) 2 (hours	12
Written/oral tests, homework and research report preparation	For live and online education, video lectures and the use of concept maps	Professional Ethics for Business Organizations	Weekly student evaluation / theoretical discussions	two) 2 (hours	13
Written test		Comprehensive exam for all subjects	Weekly student evaluation / theoretical	two) 2 (hours	14

Written/oral tests, homework and research report preparation	For live and online education, video lectures and the use of concept maps	General review	discussions Weekly student evaluation / theoretical discussions	2 hours	15
					1
					2
					3
					4
					5
					6
					7
					8
					9
					10
					11
					12
					13
					14
Course Evaluation					.27
Written tests (semi-annual - annual) -1 Oral tests (daily - weekly) -2 Homework from the college website -3 Preparing research reports -4					
Learning and teaching resources					.28
There is a specific textbook, which is the book of professional ethics / Northern Technical University / Mosul Technical Institute			Required textbooks (methodology if any)		
Fakhreya Youssef Muhammad, .1 'Personality Behavior and Its Relationship to Some Psychological Variables', Cairo, 2001 Hussein Al-Darini, Introduction to .2 Psychology, Dar Al-Kindi, Amman Recent Sources: Research and Articles .3 .Taken from the Internet			Main References (Sources)		
Research groups _ Workshops _ Video lectures			Recommended supporting books and references (scientific journals, reports, etc.)		
teaching methods _ Electronic maps _ Electronic websites And relying on various research and reports from the international information network (the Internet). In addition to relying on research and books published through international			Electronic references, websites		

electronic websites such as www.health.gov.auL Electronic	
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College: Mosul Polytechnic College

Stage/Level 2

Semester: 1

Weekly Hours: 2 Theory, 2 Practical

Credit Units: 4

Code: ICTI210

Course Type: Both Theory and Practical

Date this description was prepared 1/9/2025

Course Description

This course focuses on providing students with information and fundamental principles of petroleum, starting from exploration and extraction processes, through chemical composition and processing, to evaluation and various uses of petroleum.

General Objectives

Upon completion of this unit, the student will be able to understand the history of oil, theories of its origin, and the properties and derivatives of oil, as well as how to handle them scientifically.

The student will be able to contribute to achieving the comprehensive development plan and utilize science to advance society scientifically and culturally, and to provide environmental services to oil and natural gas companies.

Specific Objectives:

- To familiarize the student with the theoretical knowledge of petroleum and the fact that petroleum is the lifeblood of the world.
- To enable the student to understand how to compare petroleum derivatives.
- To equip the learner with petroleum evaluation skills.

Behavioral Objectives or Learning Outcomes

Upon completion of the lesson (lecture), the student will be able to:

- Identify the basic materials that make up petroleum and the types of chemical compounds that comprise it.
- Differentiate between petroleum derivatives.
- Evaluate petroleum and its derivatives.

Prerequisites: • General Chemistry

Behavioral objectives or basic learning outcomes
Behavioral Objective or Learning Outcome Details and Assessment Mechanism:
Understanding the origin of oil and its extraction///// methods (daily and monthly exams)
Understanding the basic components of oil///// (reports)
Understanding how oil is classified//////// (oral questions and answers)

Teaching Methods (Select a variety of teaching methods to suit student needs and course content)

Method or Approach - Justification for Selection:

1. PowerPoint: Abundant images and visual aids
2. Experiential learning: Encourages creativity and helps students learn from mistakes
3. Blended learning: Combines traditional and technological learning using the internet
4. Kinesthetic learning: Maintains students' visual and physical attention
5. Brainstorming: Suitable for assessing student understanding

Week 3: Chemical Composition of Petroleum (Organic Compounds/Hydrocarbons) - Lecture, Presentation, Explanation, Q&A, Discussion, Written Tests

Week 4 :Non-hydrocarbon organic compounds: Lecture, presentation, explanation, Q&A, discussion, written tests

Week 5: General Crude Oil Classification - Lecture, Presentation, Explanation, Q&A, Discussion, Theoretical Tests Detailed Commercial

Week 6: Crude Oil Evaluation and Specifications - Specific Gravity - Lecture, Presentation, Explanation, Sulfur Content, Potential Spillage, Carbon Residue, Behavior Factor, Q&A, Discussion, Written Exam

Week 7: Crude Oil Evaluation and Specifications - Reference Guide - Lecture, Presentation, Explanation, Q&A, Discussion, Written Exams

Week 8: Crude oil processing and natural gas separation processes: lecture, presentation, explanation, Q&A, discussion, and theoretical tests.

Week 9: Crude Oil Refining, Crude Oil Stabilization - Lecture, Presentation, Explanation, Q&A, Discussion, Theory Tests

Week 10: Crude Oil Refining - Importance of Refining - Lecture, Presentation, Explanation, Q&A, Discussion, Theory Tests

Week 11, Lessons 2 & 3: Crude Oil Distillation. Crude oil distillation and operating conditions: lecture, presentation, explanation, Q&A, discussion, and theoretical tests.

Week 12: Liquefied Gas - Lecture, Presentation, Explanation, Naphtha
Jet Fuel Q&A, Discussion, Theory Tests

Week 13: Light Refining Products - Gasoline and Octane Number - Lecture, Presentation, Explanation, Q&A, Discussion, Theory Tests

Week 14: Kerosene - Lecture, Presentation, Explanation, Q&A, Discussion, Theory Tests

Week 15: Heavy Refining Products (Oils and Asphalt) - Lecture, Presentation, Explanation, Q&A, Discussion, Theory Tests

the course description into English:

Educational Institution Northern Technical University

College/Institute Polytechnic College / Mosul

Academic Department/Center Chemical and Petroleum Industries Technologies

Course Name/Code 201NTU - The Computer

Available Attendance Forms Mandatory

Semester/Year 2025 - 2026

Total Study Hours 30 hours

Date of Description Preparation 30/5/2026

Course Objectives

By the end of this course, the student will be able to:

1. Understand the basic concept of computer networks and their hardware and software components.
2. Distinguish between different types of networks according to geographical scope (LAN, MAN, WAN).
3. Identify network topologies and basic networking devices (Hubs, Switches, Routers).
4. Understand the difference between wired and wireless communication media and master their appropriate uses.
5. Recognize the Internet infrastructure, Domain Name Systems (DNS), and communication protocols.
6. Acquire basic principles of information security and network protection.

Course Learning Outcomes, Teaching and Learning Methods, and Assessment

A- Cognitive Objectives (Theoretical Knowledge)

By the end of the course, the student will be knowledgeable and aware of:

Cognitive Outcomes

- 1) What a network is and its basic components
- 2) How networks are classified and the differences between each type
- 3) What networking devices are and when each is used
- 4) How data is transmitted via cables or wirelessly
- 5) How the Internet works and its fundamental protocols
- 6) What cybersecurity risks are and how to protect networks from them

These objectives help students prepare for effective interaction with technology in their daily and professional lives.

Teaching and Learning Methods:

- Use of theoretical and practical lecture systems
- Electronic computing and electronic presentation (DATASHOW) to learn computer basics

Assessment Methods:

- Student testing to measure their interaction with the lecture
- Conducting weekly, midterm, and annual examinations

B- Specific Skill Objectives of the Course (Practical Skills)

Skill Description

- 1) Identifying and Classifying Physical Equipment The student's ability to visually and practically distinguish between different networking devices (Hub, Switch, Router) and understand the practical function of each when encountered in real life
- 2) Cable Preparation and Connection Skill in selecting the appropriate type of cable (UTP, Coaxial, or Fiber Optics) according to need, and knowing how to terminate and connect UTP cables (e.g., installing RJ45 connectors) according to proper standards
- 3) Dealing with Wi-Fi Networks Skill in setting up and securing a simple wireless (Wi-Fi) network, selecting the appropriate broadcast channel, and changing encryption settings (e.g., WPA2)
- 4) Navigating Network Settings Ability to access network adapter settings in the operating system, change IP addresses and DNS settings, and use basic network diagnostic commands (e.g., Ping, ipconfig, Tracert)
- 5) Designing a Simple Network Topology Skill in drawing and planning a topology for a small network (e.g., a home network or computer lab) and selecting appropriate devices and cables for it

These skills help students interact effectively with technology and apply it in various fields.

C- Affective and Value Objectives

Objective

- 1) The student recognizes the operation of industrial and practical units and their role in building the country
- 2) Encouraging the student to acquire practical experience and connect it to theoretical principles
- 3) Learning accuracy and discipline in receiving knowledge and science
- 4) Learning communication and interaction during lectures

Teaching and Learning Methods:

- Practical and theoretical lectures
- Visual observations
- Listening to scientific rules in courses from professors and the Internet

Assessment Methods:

- Oral examinations
- Regular daily tests
- Scientific discussions

D- General and Transferable Employability Skills (Other Skills Related to Employability and Personal Development)

- 1 Focus on those with strong mental ability and high comprehension
- 2 Encouraging a policy of discussion so that the student enjoys scientific creative ability
- 3 Developing students' mental and scientific capabilities
- 4 Raising the level of students and following up on weak students

Course Structure (Weekly Plan)

◆ Stage: Second

Week	Hours	Required Learning Outcomes Unit/Topic Name Teaching Method Assessment Method
1-7	2	Introduction to Excel and how to operate it, identifying the basic elements of its

		window, understanding worksheets, how to add, delete, rename, move, and create a new workbook, change filename, insert/hide rows and columns. Understanding horizontal and vertical ranges, opening new files, saving files, renaming and storing them. Methods of entering numbers and data, performing modifications, inserting/deleting rows and columns, adjusting row height and column width. Font and alignment group, inserting images, page layout, worksheet tab coloring, text formatting, showing tabs, cell formatting, rotating text at specific angles, text wrapping, merging cells, adding shapes, page layout, changing margins, changing paper size, adding worksheet backgrounds. Understanding mathematical formulas and logical functions containing numbers, order of operations, using parentheses, methods of finding sum, arithmetic mean, maximum and minimum values, result, count, inserting charts, evaluation, copying formulas or changing cell references, data sorting and filtering, saving and printing Microsoft Excel Lecture, discussion, explanatory posters, video and film presentations Testing
8-15	2	Study of the Internet: What is the Internet and networks, the position of the Internet network, types of computer networks, and basic communication devices in networks. What is meant by the Internet network and types of computer networks. Methods of connecting to the Internet: Dial-up via telephone, landline connection via fiber optics, satellites, wireless technology (Wi-Fi), and mobile data (3G, 4G). The Internet, websites, browsing, and a detailed explanation of the browser framework. Identifying types of Internet browsers, methods of saving web pages, and web services Networks and the Internet Lecture, discussion, explanatory posters, video and film presentations Testing

Infrastructure (Sources and References)

A. Required Prescribed Textbooks

Book Author(s) Publication Date Notes

1 Computer Networking: A Top-Down Approach (9th Edition) James F. Kurose & Keith Ross 2025 Most recent, most widely adopted reference

2 Computer Networks: Data Communications, Internet and Security Ata Elahi & Alex Cushman 2024 Practical book following ACM curriculum guidelines

B. Main References (Sources)

1- Recommended Books and References (Scientific Journals, Reports, etc.)

- IEEE journals in the field of networks and communications
- ACM journals in the field of computing and networks
- Technical reports issued by Internet standards organizations (IETF)

2- Electronic References, Internet Websites

- Cisco Networking Academy - www.netacad.com
- W3Schools - www.w3schools.com (for learning web basics)
- GeeksforGeeks - www.geeksforgeeks.org (for explaining networking concepts)
- YouTube Channels (e.g., NetworkChuck, Professor Messer)

Additional Course Notes

1. Integration of Units: The course consists of two main parts:

- Weeks 1-7: Focus on Microsoft Excel skills (basic office skills)
- Weeks 8-15: Focus on Networking and Internet basics (specialized content)

2. Nature of the Course: It transitions students from individual computer skills (Excel) to communication and networking concepts, making it an important foundational course.

3. Library Recommendations: Provide both print and electronic copies of the prescribed textbooks, with continuous updates given the rapid developments in the field of networking.