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 Technical Institute
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 /7/ 2025
File Date: 1 /7/ 2025

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the signature :
Scientific Assistant:. Dr. Hassan Messar Qassim
the date: 9 /7/2025

the signature:
Department Head: Dr. Sama a Adnan Raouf

Date: 2 /7 /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:

Muhammad Khaled Youssef

The Date: 13/07/2025

the signatur:

the signature :
Dean: Prof. Abdul Nasser Abdul Razzaq Kashmoula
the date: 17/7/ 2025

1−Program vision:
The department aims to be a leading provider of education and training in chemical and petroleum technologies, fostering innovation and research, and contributing to the advancement of local and diverse industries.

2-Program message:
The Chemical and Petroleum Industries Techniques Department aims to deliver an exceptional educational experience, blending theory and hands-on practice, to produce skilled graduates who can meet market demands while embracing sustainability and innovation..

3- Program objectives
1- Train skilled technicians specializing in the chemical and petroleum industries. **2- Modernize curricula to reflect cutting-edge science and technology.** **3- Advance research and practical application through industry collaborations and projects.** **4- Prepare students with the technical and practical skills needed to succeed in their chosen fields.** **5- Promote awareness of sustainable environmental practices and industrial safety.** **6- Build partnerships with industry and academia to create student training and career opportunities.** .

4-Program accreditation:
Nothing

5-Other external influences:
Nothing

6.1-Program structure for first level:				
Program Structure	Number of Courses	Study Unit	Percentage	Notes *
University requirements	4	8	%13.1	8وحدةاجباري+4 اختياري
Institute requirements	4	10	%16.4	10اجباري
Department requirements	8	43	%70.5	43اجباري
summer training	مستوفي		ــــــــــ	
Other	16+2اختياري	61		61مطالب بها

6.2-Program structure for second level For a branch operating industrial units				
Program Structure	Number of Courses	Study Unit	Percentage	Notes *
University requirements	5	10	15.4	8اجباري
Institute requirements	1	2	3.1	2وحدة اختياري
Department requirements	12	53	81.5	50وحدة اجباري +3وحدة اختياري
	17	65	100	مطالب بها الطالب

6.3-Program structure: For an oil refining branch				
Program Structure	Number of Courses	Study Unit	Percentage	Notes *
University requirements	5	10	14.7	8اجباري
Institute requirements	1	2	2.9	2وحدة اختياري
Department requirements	13	56	82.4	53وحدة اجباري +3وحدة اختياري
	18	68	100	مطالب بها الطالب

7- Program description

Year/level	Course or course code	Name of the course or course	Hours	Note
2024-2025 first	NTU101	English Language	2	
	NTU102	Computer science	2	
	NTU103	Arabic Language	2	
	NTU100	Human Rights and Democracy	2	
	NTU104	Sport	2	
	NTU106	French Language	2	
	MTI100	Mathematics	2	
	MTI101	Mechanical Workshop	3	
	MTI102	Engineering Drawing	3	
	MTI103	Calculus	2	
	ICTI120	Fluid	6	
	ICTI121	Operation of Industrial Units	6	
	ICTI122	Physical Chemistry	6	
	ICTI123	Thermodynamics	6	
	ICTI124	Analytical and inorganic chemistry	6	
	ICTI129	Organic chemistry	5	
	ICTI225	Industrial devices and equipment	4	
	ICTI130	Power Sources	4	
2024-2025 / 2ed	2	English Language2		
	2	Professional Ethics		
	2	Crimes of the Baath system in Iraq		
	2			
	2	Arabic language		

	2	The computer		
	2	Principles of occupational safety		
	5	Industrial management		
	5	Crude oil technology		
	5	Crude oil improvement techniques		
	5	Heat transfere		
	5	Mass transfere		
	4	Measurement techniques		
	4	Principles of control		
	4	Materials Properties		
	4	Building of devices		
	5	Chemical industries 1		
	5	Chemical industries 2		
	4	Project		
	3	Environmental pollution		
	3	Quality control		

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.sama adnan raoof	Ass.prof	Chemistry	Inorganic Chemistry	Staff	
Dr.Rana Sami Saeed	Ass.prof	Chemistry	Analytical chemistry	Staff	
Dr.Rawya zaglol saeed	Ass.prof	Chemistry	Physical chemistry	Staff	
Dr.Heba Meshal awad	Lecturer	chemistry	Industrial 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		Staff	
Zena adrees amer	Lecturer	Civil Engineering	Environmental Engineering	Lecturer	
Aws zahed younis	Ass. Lecturer	Chemistry	Physical chemistry	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	
Dr.SAFA abdul sattar younis	Lecturer	Arabic language		Lecturer	
Dr.Sara maher	Lecturer			Lecturer	
Osama Amer Abdel Jalil	Ass. ,Lecturer	Petroleum Engineering		Lecturer	
Heba Suleiman Daoud	Ass. ,Lecturer	Computer, Mathematics	Statistics	Lecturer	
Rana Ghanem Abd	Ass. Lecturer	French language	French 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

first level modules / chemical and petroleum industries techniques Department

Code	UNIT	Hours		Course name		Requirement type
		P	TH	English Language	Arabic Language	
NTU101	2	0	2	English Language		University
NTU102	2	1	1	Computer science		
NTU103	2	0	2	Arabic Language		

NTU100	2	0	2	Human Rights and Democracy		
MTI100	2	0	2	الجامعية المطلوبة مجموع الوحدات		
MTI101	3	3	0	Mathematics		Institute
MTI102	3	3	0	Mechanical Workshop		
MTI103	2	0	2	Engineering Drawing		
MTI100	2	0	2	Calculus		
ICTI120	6	3	3	Fluid		Department
ICTI121	6	3	3	Operation of Industrial Units		
ICTI122	6	3	3	Physical Chemistry		
ICTI123	6	3	3	Thermodynamics		
ICTI124	6	3	3	Analytical and inorganic chemistry		
ICTI129	5	2	3	Organic chemistry		
ICTI225	4	2	2	Industrial devices and equipment		
ICTI130	4	2	2	Power Sources		
Summer training	ICTI223		استيفاء فقط	Summer training		

Second level modules / chemical and petroleum industries techniques Department

For a branch operating industrial units

Code	UNIT	Hours		Course name		Requirement type
		P	TH	English Language2	Arabic Language	
NTU200	2	-	2	English Language2		University
NTU204	2	-	2	Professional Ethics		
NTU203	2	-	2	Crimes of the Baath system in Iraq		
NTU202	2	1	1	The computer		
NTU201	2		2	Arabic language		
TIMO202	2	-	2	Principles of occupational safety		Institute
TIMO203	2	-	2	Industrial management		

ICTI210	5	3	2	Crude oil technology		
ICTI211	5	3	2	Crude oil improvement techniques		
ICTI212	5	3	2	Heat transfere		
ICTI213	5	3	2	Mass transfere		
ICTI214	4	2	2	Measurement techniques		
ICTI215	4	2	2	Principles of control		
ICTI216	4	2	2	Materials Properties		
ICTI217	4	2	2	Building of devices		
ICTI218	5	3	2	Chemical industries 1		
ICTI219	5	3	2	Chemical industries 2		
NTU400	4	4	-	Project		
ICTI221	3	2	1	Environmental pollution		
ICTI222	3	2	1	Quality control		
	65					

Second level modules / chemical and petroleum industries techniques Department

For a branch oil refining branch

Code	UNIT	Hours		Course name		Requirement type
		P	TH	English Language2	Arabic Language	
NTU200	2	-	2	English Language2		University
NTU204	2	-	2	Professional Ethics		
NTU203	2	-	2	Crimes of the Baath system in Iraq		
NTU202	2	1	1	The computer		
NTU201	2		2	Arabic language		
TIMO202	2	-	2	Principles of occupational safety		Institute
TIMO203	2	-	2	Industrial management		

ICTR260	3	2	1	Oil Industrial		
ICTR261	5	3	2	Heat transfer		
ICTR262	5	3	2	Mass transfer		
ICTR263	5	3	2	Manufacture of lubricating oils		
ICTR264	5	3	2	Asphalt and Candles		
ICTR265	3	2	1	Principles of industrial machinery		
ICTR266	4	2	2	Measuring technique		
ICTR267	4	2	2	Principles of control		
ICTR268	5	3	2	Thermodynamic		
ICTR269	5	3	2	Petrochemicals industries		
ICTR270	5	3	2	Industrial chemistry's		
NTU400	4	4	-	Project		
ICTR272	3	2	1	Environmental pollution		
ICTR273	3	2	1	Oil geology		

مخطط مهارات البرنامج

السنة / المستوى	رمز المقرر	اسم المقرر	اساسي أم اختياري	مخرجات التعلم المطلوبة من البرنامج																				
				المعرفة							المهارات							القيم						
				أ1	أ2	أ3	أ4	أ5	ب1	ب2	ب3	ب4	ج1	ج2	ج3	ج4	ج5	ج6	ج7	ج8	ج9
2023-2024/ الاول	NTU101	اللغة الإنكليزية	اساسي			/					/			/				/			
	NTU102	الحاسوب	اساسي		/				/					/							
	NTU103	اللغة العربية	اساسي	/			/		/					/							
	NTU100	حقوق الانسان والديمقراطية	اساسي	/					/					/							
	NTU104	الرياضة (اختياري)	اختياري	/					/					/							
	NTU106	اللغة الفرنسية (اختياري)	اختياري																		
	MTI100	الرياضيات	اساسي	/					/				/								
	MTI101	معامل ميكانيك	اساسي	/					/				/								
	MTI102	رسم هندسي	اساسي	/						/				/							
	MTI103	تفاضل وتكامل	اساسي	/					/				/							/	
	ICTI120	جريان الموائع	اساسي	/			/		/					/	/						
	ICTI121	تشغيل الوحدات الصناعية	اساسي	/		/			/			/	/			/					
	ICTI122	الكيمياء الفيزيائية	اساسي	/		/			/			/	/			/					
	ICTI123	الثرموداينمك	اساسي	/		/			/			/	/			/					

	ICTI124	الكيمياء التحليلية و اللاعضوية	اساسي	/		/			/			/	/			/					
	ICTI129	الكيمياء العضوية	اساسي	/		/			/			/	/			/					
	ICTI225	اجهزة ومعدات صناعية	اساسي	/		/			/			/	/			/					
	ICTI130	مصادر الطاقة	اساسي	/		/			/			/	/			/					
2023- ا/2024 لثاني فرع تشغيل وحدات حرارية	NTU201	الحاسوب 2	اساسي	/					/				/							/	
	NTU202	اللغة العربية 2	اساسي	/					/					/							
	NTU 203	جرائم نظام البعث في العراق	اساسي	/					/					/							
	NTU 204	اخلاقيات المهنة	اساسي	/					/					/							
	TIMO202	مبادئ السلامة المهنية	اختياري	/					/					/							
	TIMO203	الادارة الصناعية	اختياري	/					/				/	/							
	ICTI210	تكنولوجيا النفط الخام	اساسي	/					/				/	/							
	ICTI211	تقنيات تحسين النفط الخام	اساسي	/					/				/	/							
	ICTI212	انتقال الحرارة	اساسي	/					/				/	/							
	ICTI213	انتقال المادة	اساسي	/					/				/	/							
	ICTI214	تقنيات القياس	اساسي	/					/				/	/							
	ICTI215	مبادئ السيطرة	اساسي	/					/				/	/							
	ICTI216	خواص مواد	اساسي	/					/				/	/							
	ICTI217	بناء اجهزة	اساسي	/					/				/	/							

	ICTI218	الصناعات الكيمياوية 1	اساسي	/					/				/	/					
	ICTI219	الصناعات الكيمياوية 2	اساسي	/					/				/	/					
	NTU400	المشروع اجباري	اساسي	/					/				/	/					
	ICTI221	التلوث البيئي (اختياري)	اختياري	/					/				/	/					
المستوى الثاني 2024-2025/فرع تكرير نفط	ICTI222	السيطرة النوعية (اختياري)	اختياري	/		/			/			/	/				/		/
	ICTR260	مبادئ السلامة المهنية	اختياري	/		/			/			/	/						/
	ICTR261	الادارة الصناعية	احتياري	/		/			/			/	/						/
	ICTR262	معدات صناعية		/		/			/			/	/						/
	ICTR263	انتقال الحرارة		/		/			/			/	/						/
	ICTR264	انتقال المادة		/		/			/			/	/						/
	ICTR265	صناعة زيوت التزييت		/		/			/			/	/						/
	ICTR266	الاسفلت والشموع		/		/			/			/	/						/
	ICTR267	مبادئ الاليات الصناعية		/		/			/			/	/						/
	ICTR268	تقنية القياس		/		/			/			/	/						/
	ICTR269	مبادئ السيطرة		/		/			/			/	/						/
	ICTR270	الثرموداينميك		/		/			/			/	/						/
	NTU400	بترو كيمياويات صناعية		/		/			/			/	/						/

	ICTR272	الكيمياء الصناعية		/		/		/									/		/
	ICTR273	المشروع	اساسي	/		/		/									/		/
	ICTR260	التلوث البيئي	اختياري	/		/		/									/		/
	ICTR261	جيولوجيا النفط	اختياري	/		/		/									/		/

Course description

The first level

1. Educational institution .1	Northern Technical University/Administrative Technical Colleg
1. Scientific department/center .2	Chemical industrie
1. Course name/code .3	Arabi
1. coursename/code .4	First stage/first course student
1. Semester/year .5	First semester/2024-2025 A
Total number of hours .6	2 hours per week for 15 weeks (semester)
1. The date this description was prepare .7	2025 /1/27
1. Course objectives .8	• Enable the student to read correctly. • Enable the student to write correctly and use punctuation marks well. • That the student acquires the ability to use the Arabic language correctly. • Introducing the student to the correct Arabic language words, their correct structures and methods in an interesting way. • Accustoming the student to sound, clear expressions of his ideas. • Help the student understand complex structures and ambiguous methods.

10. Course outcomes and teaching, learning and evaluation methods Learning and teaching method: discussion method, lecture method Evaluation method: daily exams, semester exams and final exam
A- Cognitive objectives • The student should recognize the common mistakes in writing the Arabic language in order to avoid them • The student should recognize punctuation marks and use them correctly • The student should distinguish between the solar lam and the lunar lam, which helps in pronouncing them correctly. • The student should differentiate between the ḍād and the ḍā', and this helps him avoid making spelling mistakes • To distinguish between a verb, a noun, and a letter. This is what his Arabic speech is based on.

B - The skills objectives of the course. B1 - Providing the student with a linguistic wealth that makes him more able to correctly express what he wants. B2- Correcting the student's tongue and protecting him from mistakes
C- Emotional and value goals C1- Developing, activating and organizing thinking C2- Working to make the student's imagination fertile by highlighting the beauty of the language and thus enabling him to express the inner beings of the soul in a sound way.
D - Transferable general and qualifying skills (other skills related to employability and personal development). D1- The ability to develop and improve his expressive skills, such as poetry and stories. D2- The ability to communicate with the outside world correctly.

10. Course structure

Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes Name of the unit/or subject Teaching method Evaluation method	Watches	Week
Daily oral test	Discussion method, lecture method	Introduction to linguistic errors - the marfutah ta' and the fatha ta'	1. Identify the types of linguistic errors. 2. Differentiating between the open ta' and the marbuta ta'	Two hours	1
Daily oral test	Discussion method, lecture method	Rules for writing extended and short alifs - solar and lunar letters	1. Differentiating between writing the extended alif and the shortened alif and the positions of writing the alif 2. Differentiating between the solar letters and the lunar letters	Two hours	2
Daily oral test	Discussion method, lecture method	Dhaad and Dhaa	Differentiating between ḍād and dha	Two hours	3
Daily oral test	Discussion method, lecture method	Writing the hamza	Enable the student to write the hamza correctly	Two hours	4
Daily oral test	Discussion method, lecture method	punctuation marks	Identify punctuation marks and write them in their correct location	Two hours	5
Daily oral test	Discussion method, lecture method	The noun, the verb, and the difference between them	1. Identify the noun and verb and explain the sign of each 2. Differentiate between a noun and a verb 3. Explaining the types of action 4. Differentiating between types of verbs	Two hours	6
Daily oral test	Discussion method, lecture method	Th nun, th frp, at th difference bellies then	Identify the types of effects and differentiate between them	Two hours	7

Daily oral test	Discussion method, lecture method	Th nun, th frp, at th difference bellies then	Enable the student to write numbers correctly	Two hours	8
Daily oral test	Discussion method, lecture method	Applications of common linguistic errors	Identify and avoid common linguistic errors	Two hours	9
Daily oral test	Discussion method, lecture method	Applications of common linguistic errors	Identify and avoid common linguistic errors	Two hours	10
Daily oral test	Discussion method, lecture method	Noun and Tanween - meanings of prepositions	1. Differentiating between nun and tanween 2. Identify the meanings of prepositions	Two hours	11
Daily oral test	Discussion method, lecture method	aspects of administrative discourse	Identify the formal aspects of administrative discourse	Two hours	12
Daily oral test	Discussion method, lecture method	The language of administrative discourse	Recognizing the language of administrative discourse	Two hours	13
Daily oral test	Discussion method, lecture method	The language of administrative discourse	Recognizing the language of administrative discourse	Two hours	14
Daily oral test	Identify examples of administrative correspondence	Examples of administrative correspondence Discussion method, lecture method Daily oral test	Identify examples of administrative correspondence	Two hours	15

10.البنية التحتية

1- Required prescribed book	• Prescribed books: Mandatory General Arabic Language for Technical Universities by Dr. Safaa Kazem Makki and Dr. Lama Muhammad Youni
Main references (sources -2	2- Main references (sources) • Clear dictation: Abdul Majeed Al-Naimi, Dahham Al-Kayyal, Dar Al-Mutanabbi Library, Baghdad, 6th edition, • 1987 AD. • Lessons in language, grammar, and dictation for state employees: Ismail Hamoud Atwan and others, Ministry of Education Press No. (3), Baghdad, 2nd edition, 1984 AD. • Arabic language for the third intermediate grade: Fatima Nazim

Al-Attabi, and others, 1st edition, 2018 AD. • General Arabic for non-specialization departments: Abdul Qadir Hassan Amin and others, Ministry of Higher Education and Scientific Research, 2nd edition, 2000 AD	
	Recommended books and references (scientific journals, reports,...
The World Wide We	B - Electronic references, Internet sites..

Course development plan.11
Correcting the linguistic errors that occurred in the fascicle to be taught and trying to add a definition to some of the terms contained in the fascicle, especially since the Arabic language fascicle was prepared for non-specialists in the Arabic language, and this leads to making the prescribed vocabulary more accurate and clear.

Ministry of Higher Education and Scientific Research	Educational institution
Mosul Technical Medical Institute / Department of Chemical and Oil Industries Technologies	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
	Semester/Year
30	Number of study hours (total)
1/9/2024	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	Grammar/ Vocabulary/ Skills Work/ Everyday	2	6

		Future tense	English		
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 Liz	Required Textbooks

/ Oxford University Press / 2014 Soars	
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
3- **Semester / Academic Year:**
d Semester / 2024-2025
Date of Description Preparation
14/6/2025
5- Available Attendance Modes
son (Face-to-face lectures) and Online Lectures
6- Total Credit Hours / Total Units
2
7- Course Coordinator
Heba Sulaiman Dawood

البريد الإلكتروني
:heba.sulaiman82@uomosul.edu.iq

8- 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.	ف

9- Teaching and Learning Strategies

1- Active Learning 2- Cooperative Learning 3- Technology Integration 4- Self-Learning 5- Mathematical Inquiry	الاستراتيج

Assessment Method	arning method	nit / Course Title	Intended Learning Outcomes	Hours	eeks
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.

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1-Educational Institution	Northern Technical University
2- College/Institute	Technical Institute/Mosul
3- Scientific Department / Center	Chemical and Petroleum Industries Techniques
4. Course Name/Code	Power Sources / ICTI130
5. Available Attendance Forms	Mandatory
6. Semester/Year	1st semester / 2024-2025
7. Number of study hours (total)	60
8. Date of preparation of this description	9/ 2/ 2025

9. Course Objectives

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 sectors.
2. Enable the student to analyze the advantages and disadvantages of each energy source in terms of economic and environmental effectiveness.
3. Enhance the student's ability to apply energy concepts in solving problems related to energy efficiency and innovation in sustainable energy technologies.

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

A- Cognitive objectives

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

B - 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.

Use of theoretical and practical lecture system, laboratory and electronic presentation (data show projector)

Evaluation methods

Oral tests / written tests / report work / daily attendance / participation and interaction in lectures / semester and final exams.

C. Emotional and value goals

1. Raise awareness among students about the urgent need to use renewable energy sources to preserve the environment for future generations.
2. Instilling the concept of responsibility among students in dealing with energy and environmental challenges, and their role in making sustainable energy decisions at the individual and community levels.
3. Motivate students to think creatively and develop innovative energy solutions that contribute to improving the efficiency of natural resource use.

D. Teaching and learning methods

Theoretical lectures / practical lectures / seminars

E. Evaluation methods

Oral tests / written tests / report work / daily attendance / participation and interaction in lectures / semester and final exams.

General and qualifying skills transferred (other skills related to employability and personal development).

1- Ability to effectively research and analyze information related to energy sources.
2. Enhancethe ability to collaborate with others on group projects to discuss and develop sustainable energy solutions.

11. Course Structure

Chapter One

Theoretical hours	Topic Name	Required Learning Outcomes	Method of education

2	Introduction to Energy Sources	Recognize the different forms of energy Distinguishing the types of potential and kinetic energy	Lecture Presentation, Explanation, Q&A, Discussion
2	Non-renewable energy sources	-Identify non- renewable energy sources of both types (fossil fuel and nuclear fuel)	Lecture Presentation, Explanation, Q&A, Discussion
2	Fossil fuels	- Types (coal, crude oil, natural gas) - Understand its advantages and disadvantages	Lecture Presentation, Explanation, Q&A, Discussion
2	Crude Oil	- Understand crude oil formation theories - Understanding the petroleum system and its main parts	Lecture Presentation, Explanation, Q&A, Discussion
2	Chemical composition of crude oil	- Understand the compounds involved in the composition of crude oil and know their varieties and proportions and the consequent formation of heavy and light oil	Lecture Presentation, Explanation, Q&A, Discussion

Chapter Two			
Topic Name	**Required Learning Outcomes**	**Method of education**	**Evaluation methods**
First exam		Lecture Presentation, Explanation, Q&A, Discussion	Exam
Crude Oil Extraction Mechanisms	- Identify primary, secondary and improved crude oil recovery mechanisms - Understand how each of the primary mechanisms works, and know the percentage of its efficiency and ability to extract crude oil	Lecture Presentation, Explanation, Q&A, Discussion	Exam

enewable Energy	- Knowledge of the types of renewable energies -Identify the motives for searching for renewable energy sources - Understand their advantages and disadvantages	Lecture Presentation, Explanation, Q&A, Discussion	Exam
Solar Energy	- Understand the mechanism of the emergence of solar energy and identify the solar radiation types - Understand the effect of the tilt of the Earth's axis on the amount of solar radiation	Lecture Presentation, Explanation, Q&A, Discussion	Exam
Solar Cell	- Understand the installation of the solar cell - Understand how the solar cell works	Lecture Presentation, Explanation, Q&A, Discussion	Exam

Chapter Three			
Topic Name	**Required Learning Outcomes**	**Method of education**	**Evaluation methods**
Second exam		Lecture Presentation, Explanation, Q&A, Discussion	Exam
Wind Energy	- Identify the basic components of a wind turbine - Understand the functions of each part of the wind turbine and the mechanism of generating electricity from it	Lecture Presentation, Explanation, Q&A, Discussion	Exam
Biomass Energy	- Types of biomasses - Biomass energy uses	Lecture Presentation, Explanation, Q&A, Discussion	Exam
Production of biogas and biofuels	- Understand the mechanism of methane gas production from anaerobic digestion - Understand the steps of producing ethanol from agricultural crops	Lecture Presentation, Explanation, Q&A, Discussion	Exam

Review	Lecture Presentation, Explanation, Q&A, Discussion	Exam

12. Course Infrastructure	
Required textbooks	
Main references (sources)	• Renewable Energy: Resources and . (n.p.): Dr. Yousry Moustapha .Technology.)2023(• Fundamental of petroleum.
Books and references recommended by scientific journals, reports ,....)	
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. • Being updated to the recent scientific research in this field. • Scientific twinning with the corresponding departments in other universities.

Course Description Form

: Description

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
Technical Institute/Mosul	College/Institute -2
And oil Chemical industry technologies	Scientific Department / Center -3
NTU102- The Computer	Course name/code -4
mandatory	Available forms of attendance -5
2025-202 4	Semester / Year -6
hours per week 4	Number of study hours (total) -7
	Date of preparation of this description -8

Course objectives -9

Graduating qualified technical personnel to carry out

2- Operation, maintenance and control work on the operating devices of chemical and oil .industrial units in chemical factories, especially oil factories

3- Conducting laboratory tests on raw and finished materials and ensuring compliance with standard specifications and Linking theoretical information to practice

Informing the student about the technologies used

Understanding and using scientific materials
Familiarity with industrial drawings and maps

Course outcomes, teaching, learning and evaluation methods -10

A- Cognitive objectives

1. **Understanding the Basics**: Enable students to understand the basic concepts of computers, such ashardware andsoftware.
2. **Software Usage**: Teach students how to use basic software such as word processing, spreadsheets, and presentation programs.
3. **Developing technical skills**: Enhancing students' skills in programming, application development, and database management.
4. **Information Analysis**: Developing data analysis skills and using information analysis tools.
5. **Problem Solving**: Enhance the ability to think critically and solve problems using computer technologies.
6. **Communication and Collaboration**: Using technology to enhance communication and collaboration skills online.
7. **Digital Security Awareness**: Enhancing students' understanding of online security concepts and protecting personal information.

These objectives help students prepare to interact effectively with technology in their daily and professional lives.

. B - The course's skill objectives

1. **Software Use**: Develop skills to use various computer programs efficiently, such as word processing and spreadsheets.
2. **Programming**: Developing the ability to write codes and understand basic programming languages.
3. **Problem Solving**: Enhance critical thinking skills and analyze technical problems.
4. **File Management**: Learn how to organize, store, and retrieve information effectively.
5. **Digital Communication**: Gain skills in using online communication tools, such as email and meeting platforms.
6. **Online Collaboration**: Use collaborative work tools and collaborate on projects.
7. **Digital Security**: Develop skills to protect personal information and understand the basics of cybersecurity.

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

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

Testing students to determine their level of interaction with the lecture and conducting weekly, .semester and annual tests

C- Emotional and value-based goals

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

-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 high mental capacity and comprehension -1
.Encouraging discussion policy so that the student has scientific creativity -2
.Developing students' mental and scientific abilities -3
.Raising the level of students and following up on weak students -4

Course structure -11

Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	Watches	The week
first stage					
Test	Lecture, discussion, presentation of explanatory posters , presentation of videos and films	Computer	Introduction to Computer: Hardware and software concepts and components; Concept of computing. Data and information: ICT applications: Linking input and output devices and peripherals to the central	2	the first

			.processing unit		
Test	Lecture, discussion, presentation of explanatory posters , presentation of videos and films	Computer	Computer Components: Computer Parts. Hardware Parts, Input and Output Units, Memory Types, Basic CPU Components, Computer Ports, Personal Computer, Personal Computer (Features and (Types	2	the second
Test	Lecture, discussion, presentation of explanatory posters , presentation of videos and films	Computer	System Introduction Graphical User Interface: Operating System; Basics of Common Operating Systems; User Interface, Using Mouse Techniques: Using Common Icons, Status Bar, Using Menu and Menu Selection, Concept of Folders and Directories, Opening and Closing Different Windows; Creating .Shortcuts	2	the third
Test	Lecture, discussion, presentation of explanatory posters , presentation of videos and films	Computer	Word Processing: Word Processing Basics: Opening and Closing Documents: Creating and Manipulating Text: Formatting Text; Table Manipulation; Spell Checking, Language Setting and Synonyms; Printing aWord Document .	2	Fourth
Test	Lecture, discussion, presentation of explanatory posters , presentation of videos and films	Computer	Spreadsheet: Spreadsheet basics; working with cells, formulas and functions, editing a spreadsheet, .printing a spreadsheet	2	Fifth
Test	Lecture, discussion, presentation of explanatory posters , presentation of videos and	Computer	Drecentoti Presentation Software : Create presentations. Prepare and present slides: Slide show. Take printouts of .presentations/printouts	2	Sixth

	films				
Test	Lecture, discussion, presentation of explanatory posters , presentation of videos and films	Computer	Introduction to the Internet and Web Browsers: Computer Networks, Local and Wide Area Networks, Internet Concept and Applications, Internet Connection, World Wide Web, Search Engines in Web Browsers, Understanding URL: :Domain NameIP Address	2	Seventh
Test	Lecture, discussion, presentation of explanatory posters , presentation of videos and films	Computer	Communications and Email: Email Basics Get an email account: Send and receive email; Access emails sent using email: Collaborate on .documents	2	The eighth
Test	Lecture, discussion, presentation of explanatory posters , presentation of videos and films	Computer	**Computer Troubleshooting: Identify and solve common problems that computer users encounter with hardware and software. Basic troubleshooting techniques and tools to diagnose and solve .problems**	2	Ninth

Infrastructure -12	
raham brown, david watson. "Cambridge IGCSE Information and Communication Technology", 3rd Edition (2020) Alall Evans, Numan ivianin , niwy Ani Patty, "Technology in Action Complete" 16th Edition (2020). Ahmed Banara . "Introduction to Artificial Intelligence (AI)". Ist Edition (2024). Urban to Urban Researcher. "Computer Basics" 2016	Required textbooks -1 Main references (sources) -2 A- Recommended books and references (scientific journals, reports, (.etc

Dr. Adel Abdel Nour: Introduction to the World of Artificial Intelligence "2005	...B - Electronic references, websites

Curriculum development plan -13
Review of modern scientific literature Participation in relevant scientific conferences .Freeing the teaching and training staff to apply and work in operational and industrial institutions Hosting specialized professors Scientific affiliation with other universities and similar colleges

1-Educational Institution	orthern Technical University
2-College/Institute	Technical Institute/Mosul
3-Scientific Department/Center	Chemical and Petroleum Industries Technologies
4-Course Name/Code	Fluid Flow ICTI120
5-Available Attendance Forms	Mandatory
6-Semester/Year	2024-2025
7-Number of Study Hours (Total)	90
8-Date of Preparation of this Description	2024-2025

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 their skills in .3 .explaining the concepts and principles of fluid flow

.objectives B - Course specific skill

.flow Critical Thinking: Students learn how to think critically in solving problems related to fluid .

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 student has a scientific creative ability Encourage discussion policy so that the - 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, 3ed 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. *Mass, Momentum and Energy Transport Phenomena: A Consistent Balances Approach*. Walter de Gruyter GmbH & Co KG, 2023. Nakayama, Yasuki. *Introduction to fluid mechanics*. Butterworth-Heinemann, 2018. Morrison, Faith A. *An introduction to fluid mechanics*. Cambridge University Press, 2013. Cengel, Yunus, and John Cimbala. *Ebook: Fluid mechanics fundamentals and applications (si units)*. McGraw Hill, 2013. Jones, Ernest Beachcroft. *Instrument Technology: Measurement of pressure, level, flow and temperature*. 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	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**

نموذج وصف المقرر

وصف المقرر:

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 Technical Institute	Colege/Institute-2
Chemical and petroleum industries channel	Scientific Department/Center-3
ICTI122 Physical chemistry	Course name/code-4
Mandatory	Available forms of attendance-5
2025-2024	Semester/Year-6

	Number of study hours (total)-7
	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-Leam accuracy and discipline in receiving sciences and knowledge

4-leam 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		
		Theoretical	week
Kinetic theory of fluids	Understand the kinetic interpretation of molecular molecules in a system	3	The first
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
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				
		Understand the difference between adsorption and absorption and the factors affecting adsorption and the effect of temperature		
tion, s,	Adsorption Solve problems-		3	Week five
tion, s,	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
tion, s,	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
tion, s,	Zero Order Reactions— Assign the order of the reaction	Understand how to calculate the reaction constant and reaction order	3	The eighth week

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
estions scussion	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 elevenand twelfth
	Calculate specific and equivalent conductivity		3	The thirteenth week

tions	Calculating the degree of dissociation of a weak electrolyte - the effect of temperature on the		3	The fourteenth week
, stions ,	conductivity of the electrolyte mathematical equations		3	The fifteenth week
ecture tion, stions swers,				

ussion				

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, Internet sites

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

نموذج وصف المقرر

وصف المقرر:

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 Technical Institute	Colege/Institute-2
Chemical and petroleum industries channel	Scientific Department/Center-3
Thermodynamics ICTI123	Course name/code-4
Mandatory	Available forms of attendance-5
2025-2024	Semester/Year-6
90	Number of study hours (total)-7
	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-leam 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		
		Theoretical	week
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
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
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

Chapter Two			
	Apply laws and theories to solve various problems related	3	

tion, s,		to heat and energy		
tion, s,	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
tion, s,	The reverse process First law of thermodynamics	Apply laws and theories to solve various problems related to heat and energy	3	Seventh week
tion, s,	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					
estions		Thermochemistry - heat of reaction when pressure and volume are constant,	Learn about endothermic and endothermic reactions, how to calculate the heat of	3	Weeks ten and eleven

scussion	calculation of standard heat of reaction (below 25 °C), calculation of heat of reaction when T is greater than 25 °C, energy of bonds	reaction when pressure and volume are constant, calculate the standard heat of reaction (below 25 °C), and calculate the heat of reaction when T is greater than 25 °C.		
	Solve mathematical problems		3	The twelfth week

Chapter Four (Scientific Content)				
tions	Perform accurate mathematical calculations related to energy transfer and work, including the use of mathematical equations		3	
, stions ,	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

ecture tion, stions swers, ussion	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, Internet sites

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

The second level

Course Description Model

Course Description:

The course "Principles of Control" aims to present the fundamental concepts related to control systems in various systems, the difference between open-loop and closed-loop systems, and the advantages and disadvantages of each type. It covers how to represent systems using mathematical equations and understand system behavior. The course also introduces various control techniques and methods, such as proportional, integral, and derivative control.

• Educational Institution	• Northern Technical University
• College/Institute	• Technical Institute/Mosul
• Scientific Department/Center	• Chemical and Petroleum Industries Technologies
• Course Name/Code	• Principles of Control
• Available Attendance Forms	• Mandatory or Elective

• Semester/Year	• 2024-2025
• Total Credit Hours	• 30 hours
• Date of Preparation of this Description	• 2/2025

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

	Behavioral Objective or Learning Outcome Detail	Assessment Mechanism
	• Explains the basic scientific concepts of control principles.	1. Oral Exam
	• Reviews the different types of methods for connecting electrical circuits.	2. Written Exam
	• Ability to design simple control systems using techniques such as proportional and integral control.	3. Oral Exam
	• Uses the fundamental concepts of control systems to analyze the behavior of various systems.	4. Written Exam

11- Course Structure

Week	Hours	Required Learning Outcomes	Unit Name / Topic	Teaching Method	Assessment Method
1		• Identify and Analyze Types of Errors in Measurements. • Evaluate Accuracy in Measurements and Determine Methods for Improvement. • Apply Concepts of Errors and Accuracy in Practical Projects and Measure System Performance.	Errors , Accuracy and Measurement	• Lecture • Discussion • Poster Presentations • Video and Film Presentations	Exam
2 and 3		• Understand Basic Principles of Electricity, Including Electrical Energy and	Principles of Electricity , Electrical	• Lecture • Discussion • Poster	Exam

		Electric Force. • Apply Ohm's Law and Analyze Simple Electrical Circuits. • Identify and Analyze Components of Basic Electrical Circuits, Such as Resistors and Capacitors.	energy and Electrical power , Ohm s Law , Resistors, Capacitors	Presentations • Video and Film Presentations	
4		• Understand Types of Basic Electrical Measuring Instruments, Such as Voltage Meters (V), Current Meters (A), and Power Meters (AVO). • Identify and Interpret Readings from Electrical Measuring Instruments. • Correctly Use Electrical Measuring Instruments to Measure Voltage, Current, and Power in Electrical Circuits.	Electrical measuring , Instruments , The (V,A,AVO) meters	• Lecture • Discussion • Poster Presentations • Video and Film Presentations	Exam
5		• Understand Basic Principles of Magnetism and Electromagnetism. • Identify and Analyze the Effects of Electric Currents on Magnetism. • Understand Types of Electric Currents, Such as Direct Current (DC) and Alternating Current (AC), and Analyze and Design Using Inductors.	Magnetism , Electrical Magnetism , Direct current , Alternating current , Inductors	• Lecture • Discussion • Poster Presentations • Video and Film Presentations	Exam
6		• Understand Basic	Electric circuit	• Lecture	Exam

		Principles of Electrical Circuits. • Apply Kirchhoff's Voltage Law (KVL) and Kirchhoff's Current Law (KCL) to Analyze Electrical Circuits. • Solve Electrical Circuit Problems Using Kirchhoff's Laws.	, Kirchhoff ، s Law	• Discussion • Poster Presentations • Video and Film Presentations	
7		• Understand the Operating Principle of the Wheatstone Bridge for Measuring Resistances. • Use the Wheatstone Bridge to Accurately Measure Resistances. • Understand Methods for Measuring Electrical Power, Such as Using a Wattmeter.	Whetstone Bridge , Power Measurement	• Lecture • Discussion • Poster Presentations • Video and Film Presentations	Exam
8		• Understand Basic Control Principles in Unit Operations, Such as Controlling Temperature, Pressure, and Speed. • Identify Types of Control Systems, Such as Open Loop and Closed Loop Systems. • Understand the Operating Principle of Closed Loop Control Systems, Including the Feedback Loop.	Principles of control in unit operation , control system open and closed	• Lecture • Discussion • Poster Presentations • Video and Film Presentations	Exam
9,10 and 11		• Understand Types of Control Modes, Such as Batch Process Control and Continuous Process Control.	Batch process control (on – off) and continues control	• Lecture • Discussion • Poster Presentations • Video and Film	Exam

		• Identify Types of Control in Batch Processes, Such as On-Off Control.
		• Understand Types of Control Controllers, Such as:
		  • P Controller (Proportional)
		  • I Controller (Integral)
		  • D Controller (Derivative)
		  • PI Controller (Proportional-Integral)
		  • PD Controller (Proportional-Derivative)
		  • PID Controller (Proportional-Integral-Derivative)
			modes Controllers : P , I ,D , PI ,PD PID	Presentations	

12		• Understand the Concept of Dead Time and Its Impact on System Performance. • Identify Dead Time in Various Systems. • Understand the Concept of Time Constant and Its Effect on System Response. • Calculate the Time Constant for Different Systems.	Dead time , Time constant	• Lecture • Discussion • Poster Presentations • Video and Film Presentations	Exam
13		• Understand the Operating Principles of Hydraulic Regulators, Electric Regulators, and Pneumatic Regulators.	Hydraulic Regulators , Electric Regulators , Pneumatic	• Lecture • Discussion • Poster Presentations • Video and	Exam

		• Identify Types of Hydraulic, Electric, and Pneumatic Regulators. • Understand Applications of Hydraulic, Electric, and Pneumatic Regulators in Various Systems. • Analyze the Performance of Hydraulic, Electric, and Pneumatic Regulators in Different Conditions.	Regulators	Film Presentations	
14		1. Understand How to Read and Interpret Control Circuit Diagrams. 2. Identify Symbols and Standards Used in Control Circuit Diagrams. 3. Understand How to Represent Components and Control Systems in Circuit Diagrams. 4. Design Simple Control Circuit Diagrams.	Regulation circuit diagrams and symbols	• Lecture • Discussion • Poster Presentations • Video and Film Presentations	Exam
15		• Understanding the principles of process control for heat exchangers, such as controlling temperature and pressure.	Process control for heat exchanger , distillation and Reactors	• Lecture • Discussion • Poster Presentations • Video and Film	Exam

		• Identifying types of process control for distillation, such as controlling temperature, pressure, and flow. • Understanding the principles of process control for reactors, such as controlling temperature, pressure, and flow.		Presentations	

Infrastructure	
Required Textbooks	
• Main References (Sources)	• "Process Control: Modeling, Design, and Simulation" لجون ت. تاكر (John T. Tucker) • "Chemical Process Control: A Practical Approach" لجورج ستيب (George Stephanopoulos) • "Process Dynamics and Control" لداريل إم. بيرد (Darryl M. Bird) "Control Systems Engineering" لnorman s. nise
Recommended Books and References (Scientific Journals, Reports,...)	• مجلة "IEEE Transactions on Control Systems Technology" • مجلة "Journal of Process Control" مجلة "Control Engineering Practice"
• Electronic References, Websites,...	• "Process Control Systems" على موقع "ScienceDirect" • "Control Systems" على موقع "SpringerLink" "Process Dynamics and Control" على موقع "Google Books"

13 - **Curriculum Development Plan**
Review of Recent Scientific Literature **Participation in Relevant Scientific Conferences** **Full Engagement of Teaching and Training Staff in Operational and Industrial Institutions** **Hosting Specialized Professors**

Scientific Collaboration with Other Universities and Equivalent Colleges

Northern Technical University	Educational institution -1
Technical Institute/Mosul	College/Institute -2
And oil Chemical industry technologies	Scientific Department / -3 Center
Chemical Industries Theory 9 **ICTI21**	Course name/code -4
Mandatory or optional	Available forms of -5 attendance
2025-202 4	Semester / Year -6
30	Number of study hours -7 (total)
2025/2/3	-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	Watches	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	Watches	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	Watches	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	Watches	The week
Discussions, written	Lecture, discussion, presentation	Ceramic and porcelain	Knowledge -1 Skills -2	2	Fourth

and oral tests	of explanatory posters, presentation of videos and films	industry	Critical thinking -3		
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	Watches	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	Watches	The week
Discussions, written and oral tests	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Cement industry (types and specifications, (raw materials	Knowledge -1 Skills -2 Critical thinking -3	2	Sixth
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	Watches	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	Watches	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	Watches	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	Watches	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	Watches	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	Watches	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	Watches	The week
Discussions, written and oral tests	Lecture, discussion, presentation of explanatory posters,	Ammonium sulphate, ammoniu	Knowledge -1 Skills -2 Critical thinking -3	2	thirteenth

	presentation of videos and films	m nitrate			
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	Watches	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	Watches	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
Technical Institute/Mosul	College/Institute -2
And oil Chemical industry technologies	Scientific Department / -3 Center
Chemical Industries Theory 2) 9 **ICTI21 (**	Course name/code -4
Mandatory or optional	Available forms of -5 attendance
2025-202 4	Semester / Year -6
30	Number of study hours -7 (total)
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- .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	Watches	The week
Stage 2					
Test	Lecture, discussion, presentation of explanatory posters, presentation	Vegetable oils , industry extraction, purification and hydrogenation	Knowledge -1 Skills -2 6- critical thinking	2	the first

	of videos and films				
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	Watches	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	Watches	The week
Discussions, written and oral tests	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Detergent industry	Knowledge -1 Skills -2 Critical thinking -3	2	the third
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	Watches	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	Watches	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	Watches	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	Watches	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	Watches	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	Watches	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	Watches	The week
Discussions, written and oral tests	Lecture, discussion, presentation of explanatory posters, presentation of videos and	Plastics Its uses and types	Knowledge -1 Skills -2 Critical thinking -3	2	tenth

	films				
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	Watches	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	Watches	The week
Discussions, written and oral tests	Lecture, discussion, presentation of explanatory posters, presentation of videos and films	Rubber industry and its types	Knowledge -1 Skills -2 Critical thinking -3	2	twelfth
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	Watches	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	Watches	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	Watches	The week
Discussions,	Lecture, discussion,	Synthetic	Knowledge -1	2	fifteenth

written and oral tests	presentation of explanatory posters, presentation of videos and films	fiber industry	Skills -2 Critical thinking -3		

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	Technical Institute/Mosul
3-Scientific Department/Center	Chemical and Petroleum Industries Technologies
4-Course Name/Code	Heat transfer ICTI120
5-Available Attendance Forms	Mandatory
6-Semester/Year	2024-2025
7-Number of Study Hours (Total)	90
8-Date of Preparation of this Description	2024-2025

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

Understanding the basic concepts: Students understand the basic concepts of heat transfer, .1 .
such as heat transfer methods
Analysis and design: Students learn how to analyze and design heat transfer systems, such as .2.2
.exchangers, cooling and heating systems
Practical applications: Students learn how to apply the basic concepts and principles of heat .3
.transfer in various engineering applications

Written assessment: Students are assessed through written tests that aim to assess their .1
.understanding of the basic concepts and principles of heat transfer
Practical assessment: Students are assessed through practical projects that aim to assess their .2
skills in analyzing and designing heat transfer systems
Oral assessment: Students are assessed through oral discussions that aim to assess their skills in .3
.explaining the basic concepts and principles of heat transfer

.objectives B - Course specific skill

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

Teaching and Learning Methods

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

Evaluation Methods

Traditional teaching methods
Theoretical lesson: The lecturer presents the basic concepts and principles of heat transfer in the .1

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

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

	,posters				
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 - Conduction through spherical walls.	Knowledge of the methods of heat transfer by conduction and their laws through walls	3	3
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	Heat exchangers / Types of heat exchangers / Heat	Knowing the methods of heat transfer by conduction and convection and their	3	6

	film	balance in heat exchangers Heat balance in condensers.	laws		
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, discussion,presentation of videos and film	Heat transfer by radiation. Reflectivity and absorption in solids - Stefan and Boltzmann - Radiation between real surfaces.	Specific to exchanges	3	9&10
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,present	Radiation laws (Stephen-Boltzmann		3	14&15

	ation of videos and film	law of total radiation - Kirchhoff radiation law), heat exchange by radiation between black and non-black surfaces			

12Infrastructure	
	1- Required textbooks
	2- Main references (sources)
Van den Akker, Harry, and Robert F. Mudde. *Mass, Momentum and Energy Transport Phenomena: A Consistent Balances Approach*. Walter de Gruyter GmbH & Co KG, 2023. Nakayama, Yasuki. *Introduction to fluid mechanics*. Butterworth-Heinemann, 2018. Morrison, Faith A. *An introduction to fluid mechanics*. Cambridge University Press, 2013. Cengel, Yunus, and John Cimbala. *Ebook: Fluid mechanics fundamentals and applications (si units)*. McGraw Hill, 2013. Jones, Ernest Beachcroft. *Instrument Technology: Measurement of pressure, level, flow and temperature*. 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=1tklQ5x7W8k	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**

..

Northern Technical University	Educational institution-1
Mosul Technical Institute	Colege/Institute-2
Chemical and petroleum industries channel	Scientific Department/Center-3
I ICTI211 Crude Oil Improvement Techniques	Course name/code-4
Mandatory	Available forms of attendance-5
2025-2024	Semester/Year-6
	Number of study hours (total)-7
	Date of preparation of this -8 description

Course objectives-9

•• Distinguish between the physical and chemical processes used in refineries, such as distillation, cracking, .and hydrogenation

Explain the basic operating principles of various oil refinery 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 • ... •

Course outcomes, teaching,learning and assessment-10

a-Cognitive scorer Distinguish the different processes used in crude oil refinement . .in terms of principle and application

b-Course specific skill objectives

Must be committed to continuous learning and keep abreast of new technological developments in the field of oil refinery improvement. Must demonstrate initiative in research and self-analysis to solve ..operational problems related to refining units

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-leam 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	petroleum derivatives processing	The student understands the concept of “petroleum processing” and its impor	2	The first

			tance in improving the quality of petroleum produ..cts		
Testing	a lecture Presentation, explanation, questions and answers, discussion	Chemical treatment	Definition of chemical processing and explanation of its objectives in refining and improving petroleum products	2	The second week

Testing	a lecture Presentation, explanation, questions and answers, discussion	Hydrotreating and catalyst	Definition of hydrogenation and its importance in removing impurities and improving the quality of petroleum produ..cts	2	The third Week
	a lecture Presentation, explanation, questions and answers, discussion	Thermal cracking	To be able to: .1 Define thermal cracking and explain	2	Fourth and fifth week

			how it works in converting large molecules into smaller .ones		

Chapter Two					
Testing	a lecture Presentation, explanation, questions and answers, discussion	catalytic cracking	To be :able to Define the catalytic cracking process and its operating princip .le Explain the difference between	2	Week six

			catalytic cracking and thermal cracking in terms of mechanism, conditions, and product.s		
Testing	a lecture Presentation, explanation, questions and answers, discussion	catalyst cracking	Be able to Define the catalyst cracking process and explain the difference between it and thermal cracking..g	2	Seventh week
Testing	a lecture Presentation, explanation, questions and answers, discussion	Hydrocracking	To be :able to .1 Define the hydrocracking	2	Eighth and ninth week

			process and explain the difference between it, thermal cracking, and catalytic cracking		
Testing	a lecture Presentation, explanation, questions and answers, discussion	Hydrogenation	The student knows the hydrogenation process and explains the difference between hydrogenation and hydrotr.eating	2	The tenth week

Chapter Three			

Testing	a lecture Presentation, explanation, questions and answers, discussion	Oil composition reform	Be able to define the reforming process and explain its purpose in improving the quality of petroleum produc.ts Explain the difference between reforming and cracking (thermal or catalytic) in terms of princip	2	Week Eleven and Week Twelve
		Azmara		2	The thirteenth week

			le and functio .n Able :to .1 Define the proces s of isomer ization and explain its chemic al princip le (conve rting straigh t chains to branch ed .ones) .2 Disting uish isomer ization from other conver sion		

			processes such as cracking or synthetic reforming		

Testing	a lecture Presentation, explanation, questions and answers, discussion	Supporting operations and environmental pollution resulting from the oil industry	1. Define the concept of supporting operations and their role in the operation of oil and gas facilities.	2	The fourteenth week and

Testing	a lecture Presentation, explanation, questions and answers, discussion		Identify the main types of supporting operations.	2	The fifteenth week
Testing	a lecture Presentation, explanation, questions and answers, discussion				

Infrastructure-12	
Oil Manufacturing Prepared by Yahya Mahmoud and Essam (Abdel Hadi	Required prescribed books -1
Dr. Imad Al-Dabouni and others. Oil origin and composition.)	(Main references (sources -2
• Fuel Technology Dr. Jaber Shanshul	Recommended books and references (...,(scientific journals, reports

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