Ministry of Higher Education and Scientific Research
Scientific Supervision and Evaluation Authority
Quality Assurance and Academic Accreditation Department
International Accreditation Department

Academic Program and Course Description Guide

2025

Introduction:

An educational program is a coordinated and organized set of courses that includes procedures and experiences structured as academic modules, the primary purpose of which is to build and refine graduates' skills, thereby qualifying them to meet the demands of the job market. It is reviewed and evaluated annually through internal or external audit procedures and programs, such as the external examiner program .

The academic program description provides a concise summary of the program's main features and courses, outlining the skills students are expected to acquire based on the academic program's objectives. The importance of this description lies in the fact that it serves as the cornerstone for obtaining program accreditation; it is drafted by the faculty under the supervision of the academic committees in the respective departments.

This second edition of the guide includes a description of the academic program following an update of the terminology and sections of the previous guide in light of recent developments in the educational system in Iraq. The academic program description, in its traditional format, covers the (annual, semester-based) system, as well as the adoption of the academic program description circulated pursuant to the Directorate of Studies' letter No. TM3/2906 dated May 3, 2023, regarding programs that adopt the Bologna Process as the basis for their operations. In this regard, we cannot but emphasize the importance of writing descriptions of academic

programs and courses to ensure the smooth operation of the educational process.

Concepts and Terminology:

Academic Program Description: The academic program description provides a concise summary of the program's vision, mission, and objectives, including a detailed description of the targeted learning outcomes in accordance with specific learning strategies.

Course Description: Provides a concise summary of the course's key characteristics and the learning outcomes expected of students, demonstrating whether they have made the most of the available learning opportunities. It is derived from the program description.

Program Vision: An aspirational vision of the academic program's future, aiming to be a progressive, inspiring, motivating, realistic, and practical program.
Program Mission: Briefly outlines the program's objectives and the activities necessary to achieve them, while also defining the program's development paths and directions.

Program Objectives: These are statements describing what the academic program intends to achieve within a specific time frame; they must be measurable and observable.

Curriculum Structure: All courses/subjects included in the academic program in accordance with the approved learning system (courses), whether they are required (by the Ministry, university, college, or academic department), along with the number of credit units.
Learning Outcomes: A coherent set of knowledge, skills, and values acquired by the student upon successful completion of the academic program; learning outcomes must be defined for each course in a manner that fulfills the program's objectives.

Teaching and Learning Strategies: These are the strategies used by faculty members to enhance student teaching and learning; they are plans followed to achieve learning objectives. In other words, they describe all in-class and out-of-class activities designed to achieve the program's learning outcomes.

Name of Department

Academic Program Description Form

College/Institute: Polytechnic Hawija College

Scientific Department: Oil and Gas Refining Technologies Department

Academic or Professional Program Name: Diploma in Oil and Gas Refining Technologies

Final Certificate Name: Diploma in Oil and Gas Refining Technologies

Study System: Courses

Description Preparation Date: 2025/9/8

File Completion Date: 2025/9/8

Signature:
Name of Head of Department:

Assist. Prof. Dr. Wisam Mohammed Rashid
Date: 2025/9/8

Signature:
Name of Head of Department:

Assist. Prof. Dr. Mohammed Ali Fares
Date: 2025/9/8

File Reviewed by:

Quality Assurance and University Performance Division

Name of Director of the Quality Assurance and University Performance Division:
M. M. Ahmed Abdul Khalaf
Date: 2025/9/8
Signature:

Approval of the Dean:

-1 Program Vision

The **Oil and Gas Refining Technologies** program aims to be a leading academic and technical program at the local and regional levels in preparing qualified technical professionals who possess the knowledge and practical skills in oil refining and natural gas processing technologies, and who contribute to supporting the energy sector and the petroleum industries in accordance with standards of quality, safety, sustainability, and innovation.

-2 Program Mission

The **Oil and Gas Refining Technologies** program seeks to prepare graduates who possess scientific knowledge and technical and practical skills in crude oil refining processes, natural gas processing, and the operation of production units, quality control, and industrial safety, through a state-of-the-art educational environment that emphasizes hands-on training, applied research, and partnerships with the petroleum sector, thereby meeting the needs of the job market and achieving sustainable development.

-3 Program Objectives

1. To produce specialized technical personnel with scientific and practical expertise in oil and gas refining technologies.
2. To develop curricula in line with recent advancements in the refining and petrochemical industries and the requirements of the job market.
3. To develop students' practical skills through specialized laboratories, educational workshops, and summer internships at refineries and oil facilities.
4. To equip students with the skills to operate and monitor refining and gas processing units using modern technologies and industrial control systems.
5. To reinforce concepts of quality and quality control in the testing of petroleum and gas products in accordance with local and international standards.
6. To instill a culture of occupational safety, health, and the environment (HSE) and risk management in the petroleum industry.
7. To develop skills in using engineering software and industrial simulation systems related to refining and gas operations.
8. To encourage applied scientific research and innovation in the areas of improving refining process efficiency, optimizing energy consumption, and reducing emissions.
9. Strengthening cooperation with oil refineries, oil and gas companies, and industrial institutions to provide training and employment opportunities.
10. Preparing graduates who are capable of working as part of a team, adhering to professional ethics, engaging in continuous learning, and adapting to technological developments in the energy sector.
11. Support the concepts of the circular economy and sustainability by applying

modern technologies to reduce waste and reuse by-products.

12. To contribute to community service by providing technical consulting, training courses, and scientific activities that serve the oil and gas sector.

-4 Program Accreditation
None

-5 Other External Influences
The presence of a sponsoring entity that contributes to: Linking the program to the job market or the community Facilitating employment and practical training Providing ongoing guidance for the program

Program Structure				
Program Structure	**Number of Courses**	**Credit Units**	**Percentage**	**Notes ***
University Requirements	**10**	**20**	(10–15)%	**Core Course**
College Requirements	**7**	**14**	**(16–22)%**	**Core and Non-Core**
Department Requirements	**19**	**54**	**(63–74)%**	**Core and Non-Core**
Summer Training	**Students begin on July 1 and finish on September 1 in Level 1**			**Completed and Not Completed**

Courses and Units: Department of Oil and Gas Refining Technologies / Academic Year 2025–2026

First year

First Semester

T	Course Title in Arabic	Number of Hours			Number of Units	Course Type	Notes
		N	wit h	M			
1	Petroleum Chemistry	2	3	5	5	Specializat ion	English
2	Fluid Mechanics	2	3	5	5	Specializat ion	English
3	Crude Oil Physics	2	3	5	5	Specializat ion	English
4	Mechanical Labs	-	3	3	3	Specialize d	English
5	Mathematics 1	2	-	2	2	Specializat ion	English
6	English 1	2	--	2	2	Support	English
7	Human Rights and Democracy	1	--	1	1	Support	Arabic
8	Computer Technology 1	1	1	2	2	Support	English
Total		12	13	25	25		

sconed Semester

T	Course Title in Arabic	Number of Hours			Number of Units	Course Type	Notes
		N	with	M			
1	Crude Oil Refining	2	3	5	5	Specialization	English
2	Inorganic and Analytical Chemistry	2	3	5	5	Specialization	English
3	Industrial Plant Operations	3	3	6	6	Specialized	English
4	Engineering Drawing 1	-	3	3	3	Specialization	English
5	Mathematics 2	2	-	2	2	Specialization	English
6	Arabic (Required)	2	-	2	2	Support	Arabic
7	Physical Education	1	1	2	2	Support	Arabic
	Total	12	13	25	25		

Sconed year

First semester

Article	Subject	Number of Hours per Week			Number of Units	Course Type	Notes
		N	with	M			
1	Petrochemicals	2	3	5	5	Specialized	English
2	Light Oils	2	3	5	5	Specialized	English
3	Surveying and Property Transfer	1	2	3	3	Specialized	Arabic
4	Industrial Management and Occupational Safety	2	-	2	2	Specialization	Arabic
5	Engineering Drawing 2	-	3	3	3	Specialization	English
6	Crimes of the Ba'ath Party	1	-	1	1	Support	Arabic
7	English 2	1	-	1	1	Support	English
Total		9	8	17	20		

sconed Semester

Article	Article	Number of Hours per Week			Number of Units	Course Type	Notes
		N	with	M			
1	Oil Refining	2	3	5	5	Specialization	English
2	Heavy Oils	2	3	5	5	Specialized	English
3	Heat Transfer	3	3	6	6	Specialization	English
4	Measurement and Control Techniques	2	2	4	4	Specialization	English
5	Industrial Equipment	2	2	4	4	Specialized	Arabic
6	Computer Technology 2	1	2	3	3	Support	Arabic
7	Graduation Project	2	1	3	3	Support	Arabic
Total		14	16	30	30		

Expected Learning Outcomes of the Program

Knowledge

1. Explain the basic principles of the oil and gas industry and the properties of crude oil and natural gas.
2. Explain the stages of oil refining and the production of various petroleum products.
3. Identify the components of the main refining units and their operating mechanisms.
4. Explain atmospheric and vacuum distillation processes, as well as thermal and catalytic cracking units.
5. Explain natural gas processing operations and the removal of impurities such as H_2S, CO_2, and water.
6. Apply the principles of heat and fluid transfer and industrial processes to the operation of refining units.
7. Explain the chemical and physical principles used in the refining and petrochemical industries.
8. Identify methods for testing and analyzing petroleum products in accordance with standard specifications.
9. Explain the industrial control systems used in refineries.
10. Understand the principles of occupational safety, health, and the environment (HSE) and risk management.
11. Identify the impact of the petroleum industry on the environment and methods for reducing pollution.
12. Become familiar with international standards for petroleum products and their quality.
13. Understand the principles of economics in the petroleum industry, as well as resource and energy management.
14. Familiarity with modern technologies and artificial intelligence in refinery operations and management.
15. Be familiar with the laws and regulations governing the oil and gas industry.

Skills

1. Operating oil refining units under technical supervision.
2. Conducting laboratory tests on crude oil and petroleum products.
3. Accurately using laboratory measurement and analysis equipment.
4. Reading engineering drawings and piping and instrumentation diagrams (P&IDs).
5. Monitor operating conditions and record operational data.
6. Implement standard operating procedures (SOPs).
7. Use refinery-specific engineering software and industrial simulation tools.
8. Diagnose initial operational malfunctions and assist in resolving them.
9. Implementing quality requirements and quality control during operations.
10. Implement industrial safety procedures and emergency response protocols.

Values
1. Adherence to professional ethics in the oil and gas sector. 2. Maintain the confidentiality of technical information. 3. Adherence to occupational safety and health standards. 4. Respecting regulations and instructions at work sites. 5. Protecting the environment and reducing industrial pollution. 6. Rational use of energy and natural resources. 7. Exercising professional responsibility while performing work duties. 8. Commitment to quality and continuous improvement. 9. Respecting teamwork and cooperating with others. 10. Discipline and adherence to work schedules. 11. Commitment to continuous learning and keeping up with technological developments. 12. Respect for professional and cultural diversity within the workplace. 13. Fostering a culture of innovation and creativity in problem-solving. 14. Contributing to community service and sustainable development. **15.** Compliance with local and international laws and regulations governing the oil and gas industry.

Teaching and Learning Strategies
• Theoretical Learning: Lectures, textbooks • Practical Learning: Field and laboratory training, hands-on workshops. • Project-Based Learning: Applied projects in oil and gas refining, scientific research, and encouraging students to conduct scientific research. • Collaborative Learning: Encouraging students to work together on graduation projects and in group discussions. • Use of Technology: Utilizing e-learning platforms • Professional Training: Providing opportunities for professional training using modern technologies. • Continuous Assessment: Periodic assessment of students to measure their progress; feedback to improve their performance • Experiential learning: Conduct scientific experiments; learn from mistakes and improve performance.

Assessment Methods
(Weekly exams, homework assignments, monthly and daily technical reports, discussions, field training, and a final course exam)

Faculty

Faculty Members						
Academic Rank	Specialization		Special Requirements/Skills (if any)		Number of Faculty Members	
	Total	Private			Staff	Lecturer
Assistant Professor	Chemical Engineering	Reactor Design			Faculty	
Instructor	Chemistry	Organic Chemistry			Faculty	
Teacher	Mechanical Engineering	Production			Faculty	
Teaching Assistant	Chemistry	Analytical Chemistry			Staff	
Teaching Assistant	Environmental Engineering	Environmental Engineering			Staff	
Technical Staff						
Bachelor's Degree 2	Chemistry				Faculty	
Bachelor's Degree	Fuel and Energy				Faculty	
Bachelor's Degree	Mechanical Engineering				Faculty	
Support Staff of the College						
Assistant Professor	Law				Faculty	
Assistant Professor	Arabic Language				Faculty	
Assistant Professor	Communications and Computer Networks				Faculty	
Teaching Assistant	Educational Psychology				Faculty	

Professional Development
Orientation for New Faculty Members
Training courses, workshops, and seminars in the field of oil refining Courses, Workshops, and Seminars on Teaching and Learning Courses, Workshops, and Seminars on Laboratory Equipment Courses, Workshops, and Seminars on How to Publish Scientific Research

Professional Development for Faculty Members
Training courses, workshops, and seminars in the field of oil and gas refining Development of scientific publishing skills in the agricultural field

Admission Criteria
Admission criteria approved by the Ministry of Higher Education and Scientific Research

Key Sources of Information About the Program
National Qualifications Framework (NQF) Academic Accreditation Standards Vision and Mission of the Educational Institution Previous Academic Plans Opinions and Comments from Faculty Members Student and Graduate Feedback Feedback from Employers Similar Programs at Local and International Universities Local and International Labor Market Needs

Program Development Plan
Vision To elevate the **Oil and Gas Refining Technologies** program to become a leading academic and technical program in preparing qualified technical professionals who possess practical and innovative knowledge and skills, and who are capable of supporting the oil and gas sector and manufacturing industries in accordance with quality, safety, and sustainability standards. Mission: To prepare graduates with scientific knowledge and practical skills in oil refining and gas processing technologies, industrial unit operations, quality control, and occupational safety, through a state-of-the-art learning environment and effective partnerships with the oil sector, thereby contributing to meeting the needs of the job market and supporting economic development.
Second: Development Objectives • Updating the curriculum to align with global developments in the oil and gas refining industry. • Strengthening the practical component in laboratories, workshops, and training units. • Aligning the program with the labor market requirements of oil, refinery, and gas companies. • Developing students' scientific research and innovation skills. • Integrating digital technologies, artificial intelligence, and industrial simulation into the educational process. • Developing students' skills in the areas of industrial safety and environmental protection.
Third: Developing the Curriculum • Industrial control (PLC & SCADA). • Industrial simulation of refining processes. • Artificial intelligence in the petroleum industry. • Sustainable energy and green hydrogen. • Natural gas processing and liquefied natural gas (LNG) technologies. • Modern technologies for quality control of petroleum products. • Sustainability and carbon emissions management in refineries.

Fourth: Practical Aspects and Training

- Developing oil and gas refining laboratories and equipping them with modern equipment.
- Establishing pilot plants to simulate refining operations.
- Implementing summer training programs at:
    - Oil refineries.
    - Oil and gas extraction and production companies.
    - Petroleum product distribution companies.
    - Central quality control laboratories.
- Increase the number of practical hours compared to theoretical lectures.
- Incorporation of industrial simulation programs into practical training.

Fifth: Faculty

- Encouraging faculty members to:
- Participate in specialized training courses.
- Developing skills in the use of industrial software.
- Conducting joint applied research with the oil sector.
- Participating in local and international conferences.
- Inviting experts and engineers from oil companies and refineries as visiting lecturers.

Sixth: Scientific Research and Innovation

- Establish a research unit specializing in oil and gas refining technologies.
- Supporting applied graduation projects related to industrial problems.
- Collaborating with universities, research centers, and oil companies.
- Encourage the publication of research in reputable scientific journals.
- Support innovation projects in energy efficiency and emissions reduction.

VII. Linking to the Job Market

- Signing memorandums of understanding with:
    - Oil refineries.
    - National and foreign oil companies.
    - Gas companies.
    - Oil service companies.
    - Central laboratories.
- Establishment of an advisory committee comprising representatives from the oil sector.
- Conduct a Graduate Tracer Study to evaluate program outcomes.
- Organizing academic and training visits to oil facilities.

Eighth: Infrastructure and Equipment

- Signing memorandums of understanding with:
  - Oil refineries.
  - National and foreign oil companies.
  - Gas companies.
  - Oil service companies.
  - Central Laboratories.
- Establish an advisory committee comprising representatives from the oil sector.
- Conduct a Graduate Tracer Study to evaluate the program's outcomes.
- Organizing scientific and training visits to oil facilities.

IX. Quality Assurance and Evaluation

- Implementation of academic accreditation standards.
- Conduct a periodic evaluation of the program every one or two years.
- Surveys to measure student and employer satisfaction.
- Review of learning outcomes.

Required Learning Outcomes of the Program

		Course Name	Required or Elective	Knowledge Objectives				Skill Objectives				Attitudinal Objectives				General and Transferable Skills) Other Skills Related to Employability and Personal Development			
				1a	2A	3A	4A	1B	2B	3B	4B	1C	2C	3C	4C	1D	2D	3D	4D
	Chapter 1	Petroleum Chemistry	Fundamentals	√	√		√		√	√	√	√		√	√		√	√	√
		Petroleum Physics	Fundamentals		√	√	√	√	√		√	√	√	√		√	√		√
		Fluid Flow	Basic	√	√		√	√		√	√	√	√		√		√	√	√
		Computer Skills	Basic	√	√	√		√	√	√		√	√	√	√	√		√	√
		Mathematics	Support	√		√	√	√		√	√		√	√	√	√	√		√
		Human Rights and Democracy	Support	√	√		√	√		√	√		√	√	√		√	√	√
		The Laboratory	Support	√	√	√		√	√	√	√	√	√	√		√	√	√	√
		English	Support	√		√	√		√	√	√	√		√	√	√	√	√	
	Chapter 2	Crude Oil Refining	Basic	√	√		√	√	√		√	√	√	√	√	√		√	√
		Inorganic and Analytical Chemistry	Basic	√		√	√	√	√	√		√		√	√	√	√	√	
		Operation of Industrial Units	Basic	√	√		√	√		√	√	√	√	√	√		√	√	√
		Geometric Drawing	Basic	√	√		√	√	√		√	√	√		√		√	√	√
		Mathematics	Support	√		√	√			√	√		√	√	√	√	√		√
		Arabic	Support	√	√		√	√	√	√	√	√		√	√		√	√	√
		Physical Education	Support	√	√	√		√		√	√		√	√	√	√		√	√

Required Learning Outcomes of the Program

		Course Name	Required or Elective Elective	Knowledge Objectives				Skill Objectives				Attitudinal Objectives				General and Transferable Skills) Other Skills Related to Employability and Personal Development			
				1a	2A	3A	4A	1B	2B	3B	4B	1C	2C	3C	4C	1D	2D	3D	4D
Phase 2	Semester 1	**Petrochemicals**	**Basic**		√	√	√	√		√	√	√		√	√	√	√	√	√
		Light oils	**Essential**	√	√		√	√	√	√		√	√		√	√		√	√
		Measurements and Transfer of Ownership	**Basic**	√		√	√	√	√	√	√		√	√	√		√	√	√
		Industrial Management and Occupational Safety	**Suppot**	√	√	√		√	√		√	√	√		√	√	√	√	
		Engineering Drawing 2	**Basic**	√		√	√	√		√	√		√	√	√	√	√		√
		Crimes of the Ba'ath Party	**Support**	√	√	√		√		√	√		√	√	√	√		√	√
		English 2	**Support**	√		√	√	√	√		√	√		√	√	√	√		√
		Crude Oil Refining	**Basic**	√		√	√		√	√	√	√	√	√		√	√	√	
	Semester 2	**Heavy oils**	**Base**		√	√	√	√		√		√		√	√	√		√	√
		Heat Transfer	**Fundamentals**	√	√		√	√		√	√	√	√		√	√		√	√

		Petrochemicals	**Basic**	√	√	√	√	√	√		√	√	√	√	√	√	√	√	√
		Measurement and Control Techniques	**Basic**	√		√	√	√		√			√	√	√	√	√		√
		Industrial Equipment	**Basic**	√	√		√	√	√		√	√	√		√	√	√		√
		Computer Technology 2	**Support**		√	√	√	√		√	√		√	√	√	√		√	√
		Graduation Project	**Core**	√	√	√		√		√	√		√	√	√	√	√		√

Course Description: **Human rights and democracy**

1. Course name1.	Human rights and democracy
2. code	NTU 100
3. Available attendance forms	My presence
4. Semester/year	first semester /First year
5. Date this description was prepared	5/5/2026
6. Number of study hours/ Units	30 hours / Units 2
7. Course Instructor Name	Lecturer / Amer ahmed khalil

8-Course objectives

- To introduce students to the fundamental concepts of **Human Rights** and **Democracy**.
- To enhance students' awareness of human values, justice, and freedom.
- To develop students' understanding of the legal and international foundations of human rights.
- To relate the principles of democracy to practices in public life and institutional settings.

9- Course outcomes and teaching, learning and evaluation methods

- Identify the fundamental concepts related to **Human Rights** and **Democracy**.
- Analyze legal texts related to human rights and public freedoms.
- Promote the values of human dignity, tolerance, and respect for others.
- Develop a sense of responsibility toward respecting human rights and active participation in society.

A. Cognitive Objectives

A1. Introduce students to the concepts, principles, and classifications of human rights and the scope of their application.

A2. Explain the historical development of human rights and democracy at the national and international levels.

A3. Develop students' understanding of the concepts of freedom, equality, justice, and citizenship within the framework of human rights.

A4. Familiarize students with the constitutional, legal, and international foundations of human rights, with particular reference to the Iraqi Constitution and international human rights conventions.

A5. Enable students to recognize the rights and duties of individuals and the importance of balancing rights with responsibilities in society.

B. Course-Specific Skill Objectives

B1. Develop students' ability to analyze issues related to human rights and democracy using logical and scientific approaches.

B2. Enable students to interpret legal and constitutional texts related to human rights and public freedoms.

B3. Enhance students' awareness of citizenship, social responsibility, and respect for cultural and religious diversity.

B4. Develop students' ability to identify internationally recognized human rights and understand the legal mechanisms for their protection.

B5. Encourage students to apply the principles of human rights and democracy in academic, professional, and community settings.

Teaching and Learning Methods

- Interactive lectures.
- Group discussions and seminars.
- Case studies.
- Student reports and research assignments.
- Presentations.

- Problem-based learning.
- Use of multimedia and electronic learning resources.

Assessment Methods

- Written examinations.
- Oral examinations.
- Quizzes.
- Assignments and reports.
- Classroom participation and discussions.
- Student presentations.

c. Affective and Value-Based Objectives

C1. Foster respect for human rights, equality, justice, and the rule of law.
C2. Encourage objective thinking and constructive dialogue when discussing social and national issues.
C3. Strengthen students' commitment to citizenship, tolerance, peaceful coexistence, and respect for diversity.
C4. Develop ethical responsibility toward protecting human rights and promoting democratic values in society.

Teaching and Learning Methods

- Interactive lectures.
- Discussions based on real-life examples and case studies.
- Brainstorming sessions.
- Problem-solving activities.
- Guided discussions and critical thinking exercises.
- Use of multimedia and digital learning resources.

Assessment Methods

- Written examinations.
- Short quizzes.
- Oral discussions and questioning.
- Evaluation of reports and research assignments.
- Assessment of classroom participation and presentations.
- Evaluation of students' ability to relate human rights concepts to contemporary social issues.

D. General and Transferable Skills (Employability and Personal Development)

D1. Develop research skills through the use of books, academic journals, and reliable electronic resources related to human rights and democracy.

D2. Develop the ability to analyze national constitutions, international conventions, and legal documents related to human rights.

D3. Enhance students' digital literacy by effectively using the Internet and electronic databases to access and evaluate information related to human rights and democrcy.

10-Course structure					
the week	hours	Required learning outcomes	Name of the unit/topic	Teaching method	Evaluation method
1	2	Define the concept of Human Rights and explain their fundamental objectives.	Human Rights: Definition, concepts, and objectives.	Theoretical	Monthly Examinations and Final Examination
2	2	Explain the historical development of the concept of human rights throughout different eras.	The Historical Roots and Development of Human Rights: Human rights in ancient and medieval history.	Theoretical	Monthly Examinations and Final Examination
3	2	Describe how the principles of human rights emerged in ancient civilizations.	Human Rights in Mesopotamian Civilization.	Theoretical	Monthly Examinations and Final Examination
4	2	Identify examples of ancient laws and legal codes (such as the Code of Hammurabi) that addressed human rights.	Human Rights in the Divine Religions: A special study of human rights in Islam.	Theoretical	Monthly Examinations and Final Examination
5	2	Explain how the revealed religions, particularly Islam, addressed human rights.	Human Rights in the Middle Ages: Human rights in philosophical doctrines, schools of thought, theories, charters, declarations, and	Theoretical	Monthly Examinations and Final Examination

			constitutions.		
6	2	Describe how philosophers and different schools of thought have approached the concept of human rights.	Human Rights in Modern and Contemporary History: International recognition of human rights through the League of Nations and the United Nations.	Theoretical	Monthly Examinations and Final Examination
7	2	Recognize the role of the League of Nations and the United Nations in promoting and recognizing human rights.	Regional Recognition of Human Rights: The European Convention on Human Rights (1950) and the American Convention on Human Rights (1969).	Theoretical	Monthly Examinations and Final Examination
8	2	Distinguish between democratic and non-democratic political systems. Identify the main characteristics of a democratic system.	Introduction to Democracy • Definition of Democracy. • Differences Between Democratic and Non-Democratic Systems.	Theoretical	Monthly Examinations and Final Examination
9	2	Identify the different types of democracy and provide examples of each. Explain the differences between the various forms of democracy.	Types of Democracy • Direct Democracy • Representative Democracy • Participatory Democracy	Theoretical	Monthly Examinations and Final Examination
10	2	Explain the fundamental principles of a democratic system. Relate democratic principles to universal human values.	Fundamental Principles of Democracy • Majority Rule • Rule of Law • Respect for Human Rights and Fundamental	Theoretical	Monthly Examinations and Final Examination

			Freedoms		
11	2	Recognize the student's role and responsibilities as an active citizen. Express the importance of participation in public life and community affairs.	Active Citizenship • The Concept of Citizenship • Citizens' Rights and Responsibilities • Participation in Public Life	Theoretical	Monthly Examinations and Final Examination
12	2	Explain the relationship between democracy and the protection of human rights. Analyze the importance of freedom of expression in democratic systems.	Democracy and Human Rights • The Relationship Between Democracy and the Protection of Human Rights • Freedom of Expression, Assembly, and Association	Theoretical	Monthly Examinations and Final Examination
13	2	Explain the functions of the major institutions within a democratic system. Understand the principle of the separation and balance of powers.	Institutions of a Democratic System • The Parliament • The Judiciary • The Media • Civil Society Organizations	Theoretical	Monthly Examinations and Final Examination
14-15	4	Explain the functions and roles of each institution within a democratic system. Discuss the challenges and obstacles to building and sustaining a democratic system.	Institutions of the Democratic System Challenges Facing Democrac	Theoretical	Monthly Examinations and Final Examination

11. Course development plan

- Update the course content in line with the latest national legislation and international conventions related to human rights and democracy.
- Link theoretical concepts with practical applications through case studies, classroom discussions, and practical activities.
- Diversify teaching and learning methods by incorporating interactive learning, presentations, e-learning, and collaborative learning.
- Promote a culture of human rights and the values of democracy, tolerance, citizenship, and respect for diversity among students.
- Enhance assessment methods to include written examinations, research papers, reports, presentations, and classroom participation.
- Encourage students to follow and critically analyze recent national and international developments in the field of human rights and democracy.
- Utilize modern technologies and digital resources to deliver course content and enrich the teaching and learning process.
- Conduct periodic reviews of the course based on feedback from students and faculty members, ensuring alignment with the academic program objectives and labor market requirements.

12. Course Evaluation

No	Evaluation methods	Calendar appointment week	degree	Relative % weight
1	Midterm Exam 1(theoretical)	The seventh week	30	30
2	Midterm Exam 2(theoretical)	The twelfth week	30	30
3	Coursework Marks	Coursework Marks	10	10
4	Final Coursework Mark	The final week (End of the course)	40	40
5	Final theoretical exam	Final semester exams	60	60
	the total	100	100%	100%

13.Infrastructure	
Classrooms, laboratories, and workshops	Available
Required prescribed textbooks	Available
Main References	**United Nations.** Universal Declaration of Human Rights (UDHR). 1948.
	United Nations. International Covenant on Civil and Political Rights (ICCPR). 1966.
	United Nations. International Covenant on Economic, Social and Cultural Rights (ICESCR). 1966.
	Constitution of the Republic of Iraq (2005), particularly the provisions related to human rights and
Recommended books and references (scientific journals, reports	Human Rights and Democracy, Professor Ali Aboudi Nehme
Electronic references, Internet sites	https://www.un.org/ https://www.ohchr.org

Course Description: **Arabic Language**

1. Course name	Arabic Language
2. code	NTU103
3. Available attendance forms	My presence
4. Semester/year	second semester /First year
5. Date this description was prepared	5/5/2026
6. Number of study hours/ Units	30 hours / Units 2
7. Course Instructor Name	Lecturer / Anas fidhulla

8-Course objectives

- Enable students to understand the rules of the Arabic language and the principles of official correspondence and communication between governmental and institutional organizations.
- Introduce students to the Arabic language as the essence and symbol of cultural and national identity.
- Distinguish between language as a universal system of communication and dialect as a local form of speech.
- Develop students' ability to employ standard Arabic vocabulary in the academic writing of scientific research and formal documents.
- Enable students to write research papers and scientific articles accurately in Modern Standard Arabic (MSA).
- Help students avoid common writing errors and select appropriate and accurate vocabulary.
- Enrich students' Arabic vocabulary to enhance their communication skills and verbal competence.
- Familiarize students with selected examples of Arabic literature, both poetry and prose, to broaden their cultural and literary knowledge.
- Develop students' ability to write numbers correctly and prepare official letters and administrative requests in proper Arabic.
- Introduce students to Arabic phonetics and its relationship to the science of acoustics and physics.

9- Course outcomes and teaching, learning and evaluation methods

- Write correctly in Modern Standard Arabic, free from grammatical, spelling, and linguistic errors.
- Produce accurate academic and scientific writing using appropriate linguistic style and conventions.
- Use standard Arabic vocabulary correctly in both written and spoken communication.
- Expand linguistic knowledge by acquiring new vocabulary and understanding the meanings and proper usage of words.
- Demonstrate the ability to prepare official correspondence and administrative requests using correct formal Arabic.

10-Course structure					
the week	hours	Required learning outcomes	Name of the unit/topic	Teaching method	Evaluation method
1	2	Introduction	Introduction to Common Language Errors: The Closed Tā’ (ة), Open Tā’ (ت), and Long Tā’ Forms.	Theoretical lecture	Paper test + report
2	2	General Rules of the Arabic Language	Rules for Writing Alif (Maqṣūrah and Mamdūdah): The Solar and Lunar Letters.	Theoretical lecture	Paper test + report
3	2	Arabic Spelling (Orthography)	The Correct Use of the Letters Ḍād (ض) and Ẓā’ (ظ).	Theoretical lecture	Paper test + report
4	2	Arabic Spelling (Orthography)	Rules for Writing the Hamzah (ء).	Theoretical lecture	Paper test + report
5	2	Arabic Spelling (Orthography)	Punctuation Marks in Arabic Writing.	Theoretical lecture	Paper test + report
6	2	Fundamentals of Arabic Grammar	Nouns and Verbs: Identifying and Distinguishing Between Them.	Theoretical lecture	Paper test + report
7	2	Arabic Grammar	Objects in Arabic Grammar (Al-Mafā‘īl).	Theoretical lecture	Paper test + report
8	2	Arabic Grammar	Numbers and Their Grammatical Rules.	Theoretical lecture	Paper test + report
9-10	4	Arabic Grammar	Applications of Common Linguistic and Grammatical Errors.	Theoretical lecture	Paper test + report
11	2	Arabic Grammar	Nunation (Tanwīn), the Letter Nūn, and the Meanings of Arabic Prepositions.	Theoretical lecture	Paper test + report

12	2	Official Communication	Formal Structure of Administrative Correspondence.	Theoretical lecture	Paper test + report
13-14	4	Official Correspondence	Language and Style of Administrative Correspondence.	Theoretical lecture	Paper test + report
15	2	Official Letters and Administrative Correspondence	Samples of Official and Administrative Correspondence.	Theoretical lecture	Paper test + report

11. Course development plan

- Continuously update the curriculum to keep pace with recent developments in Arabic grammar and modern methods of teaching the Arabic language.
- Organize scientific seminars and workshops in collaboration with specialists in the Arabic language to discuss recent linguistic and educational developments.
- Monitor linguistic and social developments affecting the use of the Arabic language and incorporate them into the course content to enhance students' linguistic competence and communication skills.

12. Course Evaluation

No	Evaluation methods	Calendar appointment week	degree	Relative % weight
1	Midterm Exam 1(theoretical)	The seventh week	30	30
2	Midterm Exam 2(theoretical)	The twelfth week	30	30
3	Coursework Marks	Coursework Marks	10	10
4	Final Coursework Mark	The final week (End of the course)	40	40
5	Final theoretical exam	Final semester exams	60	60
	the total	100	100%	100%

13.Infrastructure	
Classrooms, laboratories, and workshops	Available
Required prescribed textbooks	Principles of Arabic Grammar
Main References	A Comprehensive Arabic Grammar
Recommended books and references (scientific journals, reports	The Arabic Tongue Journal
Electronic references, Internet sites	https://brill.com/view/journals/mrkz/mrkz-overview.xml

Course Description: **Engineering Drawing 1**

1. Course name	Engineering Drawing 1
2. code	PMTA127
3. Available attendance forms	My presence
4. Semester/year	First year /first semester
5. Date this description was prepared	5/5/2026
6. Number of study hours/ Units	45 hours / Units 3
7. Course Instructor Name	Lecturer / maali shakor mahmood maalisk_hwj@ntu.edu.iq

8-Course objectives

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

- Develop the skills required to use AutoCAD for drawing engineering constructions, geometric shapes, and mechanical drawings accurately.
- Understand the fundamental principles, standards, and conventions of engineering drawing.
- Become familiar with computer-aided drafting (CAD) concepts and effectively use AutoCAD software to produce technical drawings.

9- Course outcomes and teaching, learning and evaluation methods

- Demonstrate proficiency in using AutoCAD software to produce accurate engineering drawings.
- Develop the ability to prepare engineering drawings and generate orthographic projections in accordance with engineering drawing standards.
- Acquire the skills required to produce perspective drawings and apply sectional views correctly.
- Appreciate the importance of engineering drawing as a fundamental means of communication between engineering and design disciplines.
- Demonstrate discipline, organization, and professionalism during classroom and laboratory activities.
- Recognize the significance of engineering drawing as a fundamental subject in engineering education and professional practice.

10-Course structure					
the week	hours	Required learning outcomes	Name of the unit/topic	Teaching method	Evaluation method
1	3	Introduction to Engineering Drawing and AutoCAD software.	Engineering Drawing and AutoCAD	Lecture + Laboratory	Daily Quizzes
2	3	Lettering and Numbering in both Arabic and English according to engineering drawing standards.	Fundamentals of Engineering Drawing	Lecture + Laboratory	Daily Quizzes
3	3	Types of Engineering Drawing Lines, projection methods, text formatting, and construction of an arc with a given radius tangent to a given circle and a straight line.	Engineering Drawing Shapes	Lecture + Laboratory	Daily Quizzes
4	3	Construction of Regular Polygons and applications of basic geometric constructions.	Geometric Shapes	Lecture + Laboratory	Daily Quizzes
5	3	Development of Simple Geometric Solids (cylinder, cone, and pyramid) and methods of drawing simple perspective views.	Geometric Constructions and Dimensioning	Lecture + Laboratory	Daily Quizzes
6	3	Dimensioning Techniques in engineering drawing and construction of the perspective of a circle	Dimensioning	Lecture + Laboratory	Daily Quizzes

		(ellipse).			
7	3	Complex Perspective Drawing techniques.	Perspective Drawing	Lecture + Laboratory	Daily Quizzes
8	3	Theory of Orthographic Projection and drawing the three principal views of relatively complex objects.	Theory of Projection	Lecture + Laboratory	Daily Quizzes
9	3	Drawing orthographic projections of complex perspective objects.	Orthographic Projection	Lecture + Laboratory	Daily Quizzes
10	3	Constructing a perspective view from two orthographic views and determining the third view.	Determination of Orthographic Views	Lecture + Laboratory	Daily Quizzes
11	3	Theory of Sectioning in engineering drawing and its practical applications.	Theory of Sectioning	Lecture + Laboratory	Daily Quizzes
12	3	Drawing orthographic views from complex perspective drawings.	Theory of Projection	Lecture + Laboratory	Daily Quizzes
13	3	Drawing sectional perspective views using different cutting planes and directions.	Theory of Sectioning	Lecture + Laboratory	Daily Quizzes
14-15	6	Preparing a complete engineering drawing sheet including the perspective view, orthographic projections, and sectional views.	Theory of Sectioning	Lecture + Laboratory	Daily Quizzes

11 . Course development plan

- Expand the course content to provide advanced training in AutoCAD, enabling students to utilize a wider range of computer-aided design (CAD) tools and features for engineering applications.
- Keep pace with technological developments in engineering drawing by enhancing students' ability to prepare accurate engineering drawings and generate orthographic projections using modern CAD techniques.
- Strengthen students' practical skills in perspective drawing and sectional views through advanced exercises and practical applications using AutoCAD and engineering drawing standards.

12. Course Evaluation

No	Evaluation methods	Calendar appointment week	degree	Relative % weight
1	Midterm Exam 1(theoretical)	The seventh week	10	10
2	Midterm Exam 1(practical)	The seventh week	10	10
3	Midterm Exam 2(theoretical)	The twelfth week	10	10
4	Midterm Exam 2(practical)	The twelfth week	10	10
5	Coursework Marks	Coursework Marks	10	10
6	Final Coursework Mark	The final week (End of the course)	50	50
7	Final theoretical exam	Final semester exams	50	50
The Total		100	100%	100%

13.Infrastructure

Classrooms, laboratories, and workshops	Available
Required prescribed textbooks	Engineering Drawing. AutoCAD: A Problem-Solving Approach.

Main References	Engineering Drawing and Design – David A. Madsen & David P. Madsen. Technical Drawing with Engineering Graphics – Frederick E. Giesecke et al.
Recommended books and references (scientific journals, reports	International journals in engineering graphics and computer-aide design (CAD). Technical reports and manuals related to engineering drawing an AutoCAD applications. Engineering drawing standards (ISO, ANSI).
Electronic references, Internet sites	Autodesk Education (AutoCAD Learning Resources). Autodesk Knowledge Network. AutoCAD Official Documentation and Tutorials. Engineering graphics and CAD educational websites.

Physical Education Course Description
1-Course name
Physical Education
2-Course code
NTU105
3-Available attendance forms
Traditional attendance (in person) 2. Practical 3. Blended learning
4-semester/year
2026-2025 First level, Second semester
5-Number of study hours (total)/number of units
36 hours / Number of units: 2
6-Date this description was prepared
20/7/2026
7-Course supervisor name
Name: Assistant Lecturer .Hassan Ebrahem Saleh Email: hassanebrahem.hwj@ntu.edu.iq
8-(Goals Course (Objectives) • Improve students' level of physical fitness. • Develop students' fundamental motor skills and physical abilities. • Promote healthy behaviors and encourage the adoption of a physically active and healthy lifestyle.
9-Outputs The decision and methods education and learning and evaluation
A-Objectives cognitive • Explain the importance of physical activity and healthy living. • Describe the basic structure of the human body. • Identify common sports injuries and their prevention. • Understand the fundamental skills and rules of major sports..
B - **Course-Specific Skill Objectives** • Perform fundamental sports skills correctly. • Demonstrate coordination, balance, and movement control. • Apply the rules of sports during practical activities.
Teaching and Learning Methods Lectures, Visual Aids, Brainstorming, Multimedia and Video-Based Learning, Practical Sessions
Evaluation methods- Practical Assessment, Theoretical Assessment, Observation-Based Assessment

10- Course Structure : Physical Education				Theoretical (Vocabulary)	
week	watches	Required learning outcomes	Unit name/topic	Teaching method	Evaluation method
1	1	Students are expected to define physical education, explain its importance to individuals and society, and identify its main types and health, physical, and psychological benefits.	Introduction to Physical Education	Interactive lectures, brainstorming, discussion, and dialogue.	Midterm Examination, Final Examination.
2	1	Students are expected to explain the mechanism of human body movement and distinguish between the types and functions of muscles and bones.	Mechanics of Human Body Movement	Interactive lectures, brainstorming, discussion, and dialogue	Midterm Examination, Final Examination.
3	1	Students are expected to identify common sports injuries, their causes, symptoms, prevention methods, and basic first-aid procedures	Sports Injuries	Interactive lectures, brainstorming, discussion, and dialogue	Midterm Examination, Final Examination.
4	1	Students are expected to demonstrate an understanding of the fundamental basketball skills and perform them correctly..	Basic Basketball Skills	Interactive lectures, brainstorming, discussion, and dialogue	Midterm Examination, Final Examination.
5	1	Students are expected to understand and apply the basic rules of basketball during play.	Basketball Rules	Interactive lectures, brainstorming, discussion, and dialogue	Midterm Examination, Final Examination.

6	1	Students are expected to demonstrate the fundamental skills of volleyball, including serving, passing, setting, and spiking.	Basic Volleyball Skills	Interactive lectures, brainstorming, discussion, and dialogue	Midterm Examination, Final Examination.
7	1	Students are expected to understand and apply the basic rules of volleyball.	Volleyball Rules	Interactive lectures, brainstorming, discussion, and dialogue	Midterm Examination
8	1	Students are expected to demonstrate the fundamental offensive and defensive skills of handball correctly.	Basic Handball Skills	Interactive lectures, brainstorming, discussion, and dialogue	Midterm Examination, Final Examination.
9	1	Students are expected to understand and apply the basic rules of handball during matches.	Handball Rules	Interactive lectures, brainstorming, discussion, and dialogue	Midterm Examination, Final Examination.
10	1	Students are expected to demonstrate the fundamental technical skills of football (soccer) correctly.	Basic Football (Soccer) Skills	Interactive lectures, brainstorming, discussion,	Midterm Examination, Final Examination.

11	1	Students are expected to understand and apply the basic rules of football (soccer) during play.	Football (Soccer) Rules	Interactive lectures, brainstorming, discussion, and dialogue	Midterm Examination
12	1	Students are expected to identify the major track and field events, their basic rules, and their role in improving physical fitness.	Track and Field	Interactive lectures, brainstorming, discussion, and dialogue	Final Examination.

11-Course Evaluation

T	Evaluation methods	Calendar appointment (week)	degree	Relative % weight
1	Report 1	Week 4	2.5	Report 1
2	Report 2	Week 5	2.5	Report 2
3	Quiz (1)	Week 6	2	Quiz (1)
4	Questions and Discussions	Week 2	4	Questions and Discussions
5	Midterm Examination (1)	Week 7	10	Midterm Examination (1)
6	Midterm Examination (2)	Week 11	10	Midterm Examination (2)
7	Final Written Examination	Final Examination Period	40	Final Written Examination
8	Practical Application	Week 8	7	Practical Application
9	Quiz (4)	Week 3	2	Quiz (4)
10	Practical Quiz (1)	Week 1	2	Practical Quiz (1
11	Practical Quiz (2)	Week 4	0.5	Practical Quiz (2
12	Oral Questions	Weeks 9, 10, and 12	7.5	Oral Questions
13	Final Practical Examination	Final Examination Period	10	Final Practical Examination
	the total	100	100 %	100%

12-Infrastructure Statistics and Planning Experiments

Classrooms	Available
Required textbooks	Abdullah, I. M. *Scientific Principles of Sports Training*.
Main references (sources)	Al-Baqqal, Y. M. T. *Sports Training Science*.
Electronic References and Websites	https://www.physio-pedia.com/home/
Recommended Books and References *(Scientific Journals, Reports, etc.)*	Jalal El-Din, A. M. *Physiology of Physical Education and Sports Activities*.

English Language Course Description
1-Course name
English Language
2-Course code
NTU101
3-Available attendance forms
Traditional attendance (in person) 2. Practical 3. Blended learning
4-semester/year
2026-2025 First level, First semester
5-Number of study hours (total)/number of units
28 hours / Number of units: 2
6-Date this description was prepared
20/7/2026
7-Course supervisor name
Name: Assistant Lecturer .Hassan Ebrahem Saleh Email: hassanebrahem.hwj@ntu.edu.iq
8-(Goals Course (Objectives) • The student will learn to read and spell vocabulary items of various types. • The student will be able to memorize a number of essential vocabulary items that are widely use • The student will learn to understand vocabulary and its meanings through listening. • The student will be able to comprehend texts by connecting sentences after translating them.
9-Outputs The decision and methods education and learning and evaluation
A-Objectives cognitive • Read, spell, and understand the meanings of vocabulary items. • Memorize, comprehend, and use vocabulary appropriately in context. • Understand texts and questions and analyze their content. • Acquire knowledge of translation techniques and conversational skills..
B - **Course-Specific Skill Objectives** • Use vocabulary effectively in conversation and communication. • Apply theoretical knowledge in practical, real-life situations. • Practice translation and writing skills. • Prepare projects and collaborate effectively with others.
Teaching and Learning Methods Lectures-Visual Aids-Brainstorming-The Use of Multimedia and Videos
Evaluation methods- Practical Assessment, Theoretical Assessment, Observation-Based Assessment

10- Course Structure: English Language			Theoretical (Vocabulary)		
week	watches	Required learning outcomes	Unit name/topic	Teaching method	Evaluation method
1	2	By the end of the lecture, students will be able to understand the course objectives, identify the basic structure of English sentences, and construct simple, grammatically correct sentences.	Course introduction, learning objectives, course content, and the basic structure of the English sentence.	Presentation, Lecture, Question-and-Answer Sessions, Discussion	Midterm Examination, Final Examination.
2	2	By the end of the lecture, students will be able to identify and use the different types of English verbs correctly in simple sentences across a variety of contexts.	Verbs in the English Language (Types and Classifications).	Presentation, Lecture, Question-and-Answer Sessions, Discussion	Midterm Examination, Final Examination.
3	2	By the end of the lecture, students will be able to use basic greetings, introduce themselves and others, and correctly apply the verb *to be*, possessive adjectives, and contracted forms in simple English conversations.	Greetings and Introductions: What's your name?; the verb to be (am, is, are); possessive adjectives (my, your); and contracted forms (I am = I'm).	Presentation, Lecture, Question-and-Answer Sessions, Discussion	Midterm Examination, Final Examination.
4	2	By the end of the lecture, students will be able to use greetings and introductions, ask and answer questions about names, and correctly use the verb *to be*, possessive adjectives, and contracted forms in simple English conversations.	Greetings and Introductions: *What's Your Name?*; the Verb *to Be* (*am, is, are*); Possessive Adjectives (*my, your*); and Contracted Forms (*I am = I'm*).	Presentation, Lecture, Question-and-Answer Sessions, Discussion	Midterm Examination, Final Examination.
5	2	By the end of the lecture, students will be able to use greetings and introductions, ask and answer questions about names.	Greetings and Introductions: *What's Your Name?*; the Verb *to Be* (*am, is, are*); Possessive Adjectives (*my, your*); and Contracted Forms (*I am = I'm*).	Presentation, Lecture, Question-and-Answer Sessions, Discussion	Midterm Examination, Final Examination.

6	2	By the end of the lecture, students will be able to use the structures *This is…* and *These are…* correctly to refer to people and objects, distinguish between singular and plural forms, use the question *Who is s/he?* to introduce and identify people and respond appropriately, and apply these structures to construct simple English sentences and conversations.	Using *This is…*, *These are…*, and *Who is s/he?*	Presentation, Lecture, Question-and-Answer Sessions, Discussion	Midterm Examination, Final Examination.
7	2	By the end of the lecture, students will be able to apply the vocabulary and grammatical structures they have learned to solve exercises, analyze and discuss their answers, identify and correct errors, and reinforce their understanding of fundamental concepts through active participation in classroom discussions.	Exercise Practice and Discussion of Answers.	Presentation, Lecture, Question-and-Answer Sessions, Discussion	Midterm Examination
8	2	By the end of the lecture, students will be able to use appropriate English greetings and leave-taking expressions in everyday situations, distinguish between the contexts in which expressions such as *Good morning*, *Good evening*, *Good night*, and *Goodbye* are used, and employ them correctly in simple English dialogues and conversations.	Greetings: Good Morning, Good Evening, Good Night, and Goodbye.	Presentation, Lecture, Question-and-Answer Sessions, Discussion	Midterm Examination, Final Examination.
9	2	By the end of the lecture, students will be able to recognize basic English vocabulary, identify and name objects around them by asking and answering the question *"What's this in English?"* correctly, and use newly acquired vocabulary effectively in simple everyday conversations and communication.	"What's This in English?": Vocabulary and Speaking.	Presentation, Lecture, Question-and-Answer Sessions, Discussion	Midterm Examination, Final Examination.

10	2	By the end of the lecture, students will be able to use country names, numbers, pronouns,	Countries; Numbers; Personal Pronouns (*he, she, it*); Possessive Adjectives (*his, her*); and the Question *"Where's he from?"*	Presentation, Lecture, Question-and-Answer Sessions, Discussion	Midterm Examination, Final Examination.

11	2	By the end of the lecture, students will be able to apply the vocabulary and grammatical structures they have learned to solve exercises, analyze and discuss their answers, identify and correct errors, and reinforce their understanding of fundamental concepts through active participation in classroom discussions.	Exercise Practice and Discussion of Answers.	Presentation, Lecture, Question-and-Answer Sessions, Discussion	Midterm Examination
12	2	By the end of the lecture, students will be able to provide personal information about themselves in English, talk about their basic personal details, answer questions related to themselves, and use appropriate language structures for self-introduction and communication in simple everyday situations.	All About You.	Presentation, Lecture, Question-and-Answer Sessions, Discussionc	Midterm Examination, Final Examination.
13	2	By the end of the lecture, students will be able to talk about family members and friends in English, use vocabulary related to family relationships, introduce and describe people, and employ appropriate language structures to construct simple English sentences and conversations.	Family and Friends.	Presentation, Lecture, Question-and-Answer Sessions, Discussion	Midterm Examination, Final Examination.
14	2	By the end of the lecture, students will be able to describe their lifestyle, daily routines, habits, and interests in English using the Present Simple tense and appropriate vocabulary in simple sentences and conversations.	The Way I Live.	Presentation, Lecture, Question-and-Answer Sessions, Discussion	Final Examination.

11-Course Evaluation				
T	Evaluation methods	Calendar appointment (week)	degree	Relative % weigh
1	Report 1	Week 4	2	2%
2	Report 2	Week 5	2.5	2.5%
3	Quiz (1)	Week 6	3	3%
4	Quiz (2)	Week 14	3	3%

5	Quiz (3)	Week 15	1	1%
6	Midterm Examination (1)	Week 7	8	8%
7	Midterm Examination (2)	Week 11	8	8%
8	Final Written Examination	Final Examination Period	50	50%
9	Questions and Discussions	Week 15	5	5%
10	Quiz (4)	Week 3	3	3%
11	Quiz (5)	Week 1	3	3%
12	Quiz (6)	Week 4	3	3%
13	Quiz (7)	Week 14	3	3%
14	Direct Questions	Weeks 6, 8, 9, 10, 11, 12, and 13	5.5	5.5%
15	Report 1	Week 4	2	2%
	the total	100	100%	100%

12-Infrastructure Statistics and Planning Experiments	
Classrooms	Available
Required textbooks	The Headway Beginner textbook, prescribed by the Ministry, is used as the official course textbook.
Main references (sources)	The Family and Friends textbook, an Oxford curriculum designed for beginner-level learners.
-Recommended books and references (.Scientific journals, reports, etc)	YouTube

Computer Fundamentals Course Description
1-Course name
Computer Fundamentals
2-Course code
NTU103
3-Available attendance forms
Traditional attendance (in person) 2. Practical 3. Blended learning
4-semester/year
2026-2025 First level, First semester
5-Number of study hours (total)/number of units
45hours / Number of units: 2
6-Date this description was prepared
20/7/2026
7-Course supervisor name
Name: Assistant Lecturer .Hassan Ebrahem Saleh Email: hassanebrahem.hwj@ntu.edu.iq

8-(Goals Course (Objectives)

- Provide students with fundamental knowledge of computer systems, their components, functions, and generations.
- Develop skills in using operating systems, essential software, and storage media.
- Enhance awareness of information security, computer viruses, and protection methods.
- Enable effective use of the Internet and understanding of basic computer networking concepts.

9-Outputs The decision and methods education and learning and evaluation

A-Objectives cognitive

- Identify the fundamentals and components of computer systems.
- Understand operating systems and essential software applications.
- Acquire basic computer application skills.
- Recognize the importance of computers and their applications across various fields.

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B - **Course-Specific Skill Objectives**

- Operate a computer and use the operating system efficiently.
- Manage files, folders, and storage media.
- Use essential Microsoft Office applications, particularly Microsoft Word.
- Apply basic computer and Internet skills effectively.

Teaching and Learning Methods

Lectures, Visual Aids, Brainstorming, Multimedia and Video-Based Learning, Practical Sessions

Evaluation methods-

Practical Assessment, Theoretical Assessment, Observation-Based Assessment

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10- Course Structure : Computer Fundamentals — Theoretical (Vocabulary)

week	watches	Required learning outcomes	Unit name/topic	Teaching method	Evaluation method
1	1	Students are expected to identify the concept of computers and their operating principles, understand the historical development and generations of computer systems, and recognize the importance and applications of computers in various fields.	Introduction to Computers and Their Historical Development	Interactive lectures, brainstorming, discussion, and dialogue.	Midterm Examination, Final Examination.
2	1	By the end of this topic, students are expected to identify the hardware components of a computer, explain their functions, distinguish among input, output, processing, and storage units, and relate the role of each component to the overall operation of a computer.	Computer Hardware Components	Interactive lectures, brainstorming, discussion, and dialogue	Midterm Examination, Final Examination.
3	1	By the end of this topic, students are expected to identify the types of software and operating systems, explain their functions, distinguish among them, and use the basic functions of an operating system for file management and program execution.	Software and Operating Systems	Interactive lectures, brainstorming, discussion, and dialogue	Midterm Examination, Final Examination.
4	1	By the end of this topic, students are expected to use the Windows 11 operating system, manage files and folders, navigate the desktop and windows, and perform basic tasks related to program execution and system management efficiently.	Windows 11 Operating System	Interactive lectures, brainstorming, discussion, and dialogue	Midterm Examination, Final Examination.
5	1	Identify the main components of the Windows desktop and use its key features efficiently.	Desktop Components	Interactive lectures, brainstorming, discussion, and	Midterm Examination, Final Examination.

				dialogue	

6	1	By the end of this topic, students are expected to use the Start menu to access programs and settings, search for applications and files, and execute basic system commands efficiently.	Start Menu	Interactive lectures, brainstorming, discussion, and dialogue	Midterm Examination, Final Examination.
7	1	By the end of this topic, students are expected to use the This PC window to access drives, devices, and storage media, as well as browse and manage files and folders efficiently.	This PC (My Computer)	Interactive lectures, brainstorming, discussion, and dialogue	Midterm Examination
8	1	By the end of this topic, students are expected to use the Control Panel to manage system settings, configure devices and programs, and perform basic operating system configuration tasks efficiently.	Control Panel	Interactive lectures, brainstorming, discussion, and dialogue	Midterm Examination, Final Examination.
9	1	By the end of this topic, students are expected to use Windows accessories, such as Notepad, Paint, and Calculator, to perform basic tasks.	Accessories Programs	Interactive lectures, brainstorming, discussion, and dialogue	Midterm Examination, Final Examination.
10	1	By the end of this topic, students are expected to use basic multimedia programs to play and manage audio, video, and image files effectively.	Using Multimedia Programs	Interactive lectures, brainstorming, discussion,	Midterm Examination, Final Examination.

11	1	By the end of this topic, students are expected to use the Help tools in the operating system to search for information, solve basic problems, and benefit from available guidance and instructions.	Help Tools	Interactive lectures, brainstorming, discussion, and dialogue	Midterm Examination
12	1	By the end of this topic, students are expected to understand the principles of information security, identify major cybersecurity threats, and apply basic practices to protect data and devices while using computers and the Internet.	Information Security	Interactive lectures, brainstorming, discussion, and dialogue	Midterm Examination, Final Examination.
13	1	By the end of this topic, students are expected to understand the basics of networks and the Internet, use Internet services efficiently, and apply safe practices while connecting to the network.	Networks and the Internet	Interactive lectures, brainstorming, discussion, and dialogue	Midterm Examination, Final Examination.
14	1	By the end of this topic, students are expected to use search engines and web tools effectively to access information, evaluate its sources, and utilize it in a safe and reliable manner.	Internet Search and Web Tools	Interactive lectures, brainstorming, discussion, and dialogue	Midterm Examination, Final Examination.
15	1	By the end of this topic, students are expected to use computers in the educational process and benefit from educational applications and electronic resources for learning, research, and academic communication effectively.	Using Computers in Education	Interactive lectures, brainstorming, discussion	Final Examination.

11-Course Evaluation				
T	Evaluation methods	Calendar appointment (week)	degree	Relative % weigh
1	Report 1	Week 4	2.5	2.5
2	Report 2	Week 5	2.5	2.5
3	Quiz (1)	Week 6	2	2
4	Quiz (2)	Week 14	2	2
5	Quiz (3)	Week 15	1	1
6	Midterm Exam (1)	Week 7	7.5	7.5
7	Midterm Exam (2)	Week 11	7.5	7.5
8	Final Theoretical Exam	Final Exams	40	40
9	Practical Laboratory Application	Week 15	5	5
10	Quiz (4)	Week 3	2	2
11	Practical Quiz (1)	Week 1	1	1
12	Practical Quiz (2)	Week 4	0.5	0.5
13	Practical Quiz (3)	Week 14	1	1
14	Direct Questions	Weeks 6, 8, 9, 10, 11, 12, 13	5.5	5.5
15	Final Practical Exam	Final Exams	20	20
	the total	100	100%	100%

12-Infrastructure Statistics and Planning Experiments	
Classrooms	Available
Required textbooks	"Computer Fundamentals and Office Applications" book by Dr. Ziad Mohammed Abboud, Dr. Ghassan Hamid Abdulmajeed, and others
Main references (sources)	"Computer Principles" book by Dr. Osama Yousif Khalil.
-Recommended books and references (.Scientific journals, reports, etc)	https://academy.hsoub.com

Adscription of Unit Operation
1-Course name
Unit Operation
2-Course code
OGT 101
3-Available attendance forms
Traditional attendance (in person) 2. Field scientific attendance 3. Blended learning
4-semester/year
2026-2025 First level, first semester
5-Number of study hours (total)/number of units
45hours / Number of units: 3
6-Date this description was prepared
28/7/2026
7-Course supervisor name
Name: Assistant Professor Dr.Awad Essa Mohammed Email: awad_hwj@ntu.edu.iq
8-(Goals Course (Objectives) Public For the decision maker 1. **Introduce the fundamental principles of industrial unit operations** and their importance in petroleum refining, oil and gas, and chemical processing industries. 2. **Develop an understanding of the operating principles of industrial furnaces, pumps, steam boilers, heat exchangers, and evaporation units**, including their functions and applications. 3. **Explain the principles of heat, fluid, and energy transfer** and their relationship to the efficient operation and performance of industrial units. 4. **Familiarize students with the components, operation, and performance monitoring of industrial units** to ensure safe and reliable operation. 5. **Develop students' skills in operating industrial units, evaluating their performance, applying occupational health and safety practices, and relating theoretical knowledge to industrial applications in the petroleum and gas sectors.**
9-Outputs The decision and methods education and learning and evaluation
A-Objectives cognitive **A1- Understand the fundamental principles of industrial unit operations and their importance in petroleum and petrochemical industries.** **A2- Understand the operating principles of industrial furnaces, pumps, steam boilers, heat exchangers, and evaporation units, and identify their major components.** **A3- Understand the principles of heat, fluid, and energy transfer and their relationship to the efficient operation of industrial units.**

A4- Become familiar with modern technologies used for the operation, monitoring, and performance

B - Objectives Skills Private As scheduled .

s

B1- Develop the skills required to operate and monitor industrial furnaces, pumps, steam boilers, heat exchangers, and evaporation units according to standard operating procedures.

B2- Develop skills in analyzing basic operational problems, evaluating the performance of industrial units, and proposing appropriate solutions to improve operational efficiency.

B3- Develop the ability to apply occupational health and safety procedures during industrial unit operation, interpret basic process flow diagrams, and use process measurement and control instruments effectively.

C-Objectives emotional and the value

- Develop skills in analyzing crude oil properties and selecting appropriate refining processes.

B2- Acquire the skills required to understand and monitor the operation of basic refinery processing units.

B3- Develop the ability to interpret refinery process flow diagrams and apply occupational health and safety procedures during refinery operations.

Methods education and learning

Lessons theory Intense, Model Data with films educational, application practical in field with all a lecture

Evaluation methods-

Commitment And perseverance on the audience, reports , homework and exams Daily And monthly, exam end the chapter

10- Course Structure : Unit operation (Theoretical and Practical (Vocabulary

week	watches	Required learning outcomes	Unit name/topic	Teaching method	Evaluation method
1	3	Students recognize the concept and importance of industrial unit operations in the petroleum and gas industries and acquire the fundamental concepts of the course.	Introduction to Industrial Unit Operations	Theoretical practical	Written test Mathematical + problems interpretation of results Practical activity inside the classroom achievement test
2	3	Students explain the basic principles of industrial unit operation and the factors affecting operational efficiency.	Fundamentals of Industrial Unit Operations	Theoretical practical	Written test Mathematical + problems interpretation of results Practical activity inside the classroom achievement test
3	3	Students identify the types, components, and applications of industrial furnaces in petroleum processing.	Industrial Furnaces: Types and Components	Theoretical practical	Written test Mathematical + problems interpretation of results Practical activity inside the classroom achievement test
4	3	Students explain the operating principles of industrial furnaces, heat transfer mechanisms, and factors affecting furnace efficiency.	Operation of Industrial Furnaces	Theoretical practical	Written test Mathematical + problems interpretation of results Practical activity inside the classroom achievement test
5	3	Students identify the types, components, operating principles, and industrial applications of pumps.	Pumps: Types and Operating Principles	Theoretical practical	Written test Mathematical + problems interpretation of results Practical activity

					inside the classroom achievement test
6	3	Students explain pump operating characteristics, performance parameters, and common operational problems.	Pump Operation and Basic Maintenance	Theoretical practical	Written test Mathematical + problems interpretation of results Practical activity inside the classroom achievement test
7	3	Students identify the types and major components of steam boilers and explain the function of each component.	Steam Boilers: Types and Components	Theoretical practical	Written test Mathematical + problems interpretation of results Practical activity inside the classroom achievement test
8	3	Students explain steam generation, boiler operating procedures, and safe operating practices.	Steam Boiler Operation	Theoretical practical	Written test Mathematical + problems interpretation of results Practical activity inside the classroom achievement test
9	3	Students identify the types of heat exchangers and explain the principles of heat transfer and industrial applications.	Heat Exchangers: Types and Principles	Theoretical practical	Written test Mathematical + problems interpretation of results Practical activity inside the classroom achievement test
10	3	Students explain the factors affecting heat exchanger performance and methods for improving thermal efficiency.	Heat Exchanger Operation	Theoretical practical	Written test Mathematical + problems interpretation of results

					Practical activity inside the classroom achievement test
11	3	Students explain the principles of evaporation, types of evaporators, and their industrial applications.	Evaporation Processes	Theoretical practical	Written test Mathematical + problems interpretation of results Practical activity inside the classroom achievement test
12	3	Students apply the basic operating principles of evaporation units and explain the factors affecting evaporation efficiency.	Operation of Evaporation Units	Theoretical practical	Written test Mathematical + problems interpretation of results Practical activity inside the classroom achievement test
13	3	Students apply occupational health and safety procedures during the operation of furnaces, pumps, steam boilers, heat exchangers, and evaporation units.	Occupational Safety in Industrial Unit Operations	Theoretical practical	Written test Mathematical + problems interpretation of results Practical activity inside the classroom achievement test
14	3	Students analyze common operational problems in industrial units and propose appropriate engineering solutions.	Industrial Applications and Troubleshooting	Theoretical practical	Written test Mathematical + problems interpretation of results Practical activity inside the classroom achievement test
15	3	Students integrate the concepts of industrial unit	Comprehensive Review and Practical Applications	Theoretical practical	Written test Mathematical

		operations and apply them to practical engineering situations in preparation for the final examination.			

		.			+ problems interpretation of results Practical activity inside the classroom achievement test

11-Course Evaluation

T	Evaluation methods	Calendar appointment (week)	degree	Relative % weight
1	Report 1	Fourth week	2.5	2.5
2	Report 2	Fifth week	2.5	2.5
3	Quiz Short Test (1)	Week 6	2	2
4	Quiz Short Test (2)	Fourteenth week	2	2
5	Quiz Short Test (3)	The fifteenth week	1	1
6	Midterm Exam (1)	Week 6	7.5	7.5
7	Midterm Exam (2)	The eleventh week	7.5	7.5
8	Final theoretical exam	Final semester exams	50	50
9	Practical field project	The fifteenth week	5	5
10	Field evaluation	The third and fifth week	2	2
11	Quiz Practical Short Test (1)	First week	1	1
12	Quiz Practical Short Test (2)	Fourth week	0.5	0.5
13	Quiz Practical Short Test (3)	Fourteenth week	1	1
14	Direct questions and homework	Weeks 6, 8, 9, 10, 11, 12, and 13	5.5	5.5
15	Final practical exam	Final semester exams	10	10
	the total	100	100%	100%

12-Infrastructure Statistics and Planning Experiments

Classrooms	Available
Required textbooks	Available
Main references (sources)	
-Recommended books and references (.Scientific journals, reports, etc)	• McCabe, W. L., Smith, J. C., & Harriott, P. (2005). *Unit Operations of Chemical Engineering* (7th ed.). McGraw-Hill Education. • **ISBN:** 978-0072848238 • The classic textbook covering fluid flow, heat transfer, evaporation, and industrial equipment. • Coulson, J. M., Richardson, J. F., Backhurst, J. R., & Harker, J. H. (2019). *Coulson & Richardson's Chemical Engineering, Volume 2: Particle Technology and Separation Processes* (7th ed.). Butterworth-Heinemann.

	• Comprehensive coverage of unit operations and industrial equipment. • Sinnott, R. K., & Towler, G. (2020). *Chemical Engineering Design* (6th ed.). Butterworth-Heinemann. • Covers industrial equipment selection, process operation, and design principles. • Towler, G., & Sinnott, R. (2022). *Chemical Engineering Design: Principles, Practice and Economics of Plant and Process Design* (3rd ed.). Elsevier. • Excellent reference for industrial plant equipment and operation.
Electronic references, Internet sites	• Ganapathy, V. (2015). *Industrial Boilers and Heat Recovery Steam Generators*. CRC Press. • Baukal, C. E. (Ed.). (2013). *The John Zink Hamworthy Combustion Handbook* (2nd ed.). CRC Press. • Gary, J. H., Handwerk, G. E., & Kaiser, M. J. (2023). *Petroleum Refining: Technology and Economics* (6th ed.). CRC Press. • Speight, J. G. (2024). *The Chemistry and Technology of Petroleum* (6th ed.). CRC Press.

Adscription of Crude oil physics
1-Course name
Crude oil physics
2-Course code
OGT 103
3-Available attendance forms
Traditional attendance (in person) 2. Field scientific attendance 3. Blended learning
4-semester/year
2026-2025 First level, first semester
5-Number of study hours (total)/number of units
45hours / Number of units: 3
6-Date this description was prepared
28/7/2026
7-Course supervisor name
Name: Assistant Professor Dr.Awad Essa Mohammed Email: awad_hwj@ntu.edu.iq
8-(Goals Course (Objectives) Public For the decision maker 1. Introduce the fundamental principles of crude oil refining and their importance in the oil and gas industry. 2.Develop an understanding of crude oil composition and properties and their relationship to selecting appropriate refining processes for producing petroleum products. 3.Explain the basic physical and chemical processes used in petroleum refining, including distillation, separation, and treatment operations. 4.Familiarize students with the major refining units and equipment, their operating principles, and their roles in improving petroleum product quality. 5.Develop students' skills in analyzing refining processes, applying occupational safety practices, and relating fundamental refining concepts to the needs of the petroleum industry.
9-Outputs The decision and methods education and learning and evaluation
A-Objectives cognitive **A1-** Understand the fundamental principles of crude oil refining and their importance in the oil and gas industry

A2- Understand the composition and physical and chemical properties of crude oil and their relationship to refining processes

A3- Identify the major petroleum refining units, including distillation, treatment, and conversion units, and understand their operating principles.

A4- Become familiar with recent technological developments in crude oil refining and petroleum product

B - Objectives Skills Private As scheduled .

b1.Analyze experimental data using appropriate statistical methods
b2Choose the most appropriate experimental design based on the nature of the research problem

C-Objectives emotional and the value

- Develop skills in analyzing crude oil properties and selecting appropriate refining processes.

B2- Acquire the skills required to understand and monitor the operation of basic refinery processing units.

B3- Develop the ability to interpret refinery process flow diagrams and apply occupational health and safety procedures during refinery operations.

Methods education and learning

Lessons theory Intense, Model Data with films educational, application practical in field with all a lecture

Evaluation methods-

Commitment And perseverance on the audience, reports , homework and exams Daily And monthly, exam end the chapter

10- Course Structure : crude oil refining (Theoretical and Practical (Vocabulary

week	watches	Required learning outcomes	Unit name/topic	Teaching method	Evaluation method
1	3	Introduction to Crude Oil Refining and Its Importance	Students recognize the concept, objectives, and importance of crude oil refining in the oil and gas industry and acquire the fundamental concepts of the course.	Theoretical practical	Written test Mathematical + problems interpretation of results Practical activity inside the classroom achievement test
2	3	Crude Oil Composition and Constituents	Students describe the chemical composition and major constituents of crude oil and explain their influence on refining processes.	Theoretical practical	Written test Mathematical + problems interpretation of results Practical activity inside the classroom achievement test
3	3	Classification and Properties of Crude Oil	Students classify crude oils according to density, sulfur content, and physicochemical properties and explain their impact on refinery process selection.	Theoretical practical	Written test Mathematical + problems interpretation of results Practical activity inside the classroom achievement test
4	3	Atmospheric Distillation of Crude Oil	Students explain the principles of atmospheric distillation, the components of the distillation column, and the separation of petroleum fractions.	Theoretical practical	Written test Mathematical + problems interpretation of results Practical activity inside the classroom achievement test
5	3	Vacuum Distillation	Students explain the principles and importance of vacuum distillation in processing heavy petroleum fractions.	Theoretical practical	Written test Mathematical + problems interpretation of results Practical activity

					classroom achievement test
6	3	Petroleum Treating and Purification Processes	Students describe petroleum treatment processes, including sulfur removal, and explain their role in improving product quality.	Theoretical practical	Written test Mathematical + problems interpretation of results Practical activity inside the classroom achievement test
7	3	Thermal and Catalytic Cracking	Students explain the principles of thermal and catalytic cracking and their role in increasing the production of light petroleum products.	Theoretical practical	Written test Mathematical + problems interpretation of results Practical activity inside the classroom achievement test
8	3	Catalytic Reforming	Students explain the catalytic reforming process and its importance in improving gasoline octane number and producing aromatic hydrocarbons.	Theoretical practical	Written test Mathematical + problems interpretation of results Practical activity inside the classroom achievement test
9	3	Alkylation and Isomerization Processes	Students explain the principles of alkylation and isomerization and their role in enhancing gasoline quality.	Theoretical practical	Written test Mathematical + problems interpretation of results Practical activity inside the classroom achievement test
10	3	Refinery Units and Equipment	Students identify the major refinery processing units and essential equipment and explain	Theoretical practical	Written test Mathematical + problems interpretation of results

			their operating principles.		

					Practical activity inside the classroom achievement test
11	3	Petroleum Products and Their Specifications	Students identify the major petroleum products, their applications, and the standard quality specifications for each product.	Theoretical practical	Written test Mathematical + problems interpretation of results Practical activity inside the classroom achievement test
12	3	Refinery Process Flow Diagrams	Students interpret refinery process flow diagrams and trace the movement of crude oil through refining units.	Theoretical practical	Written test Mathematical + problems interpretation of results Practical activity inside the classroom achievement test
13	3	Occupational Safety and Environmental Protection in Refineries	Students apply occupational health, safety, and environmental protection principles in refinery operations.	Theoretical practical	Written test Mathematical + problems interpretation of results Practical activity inside the classroom achievement test
14	3	Industrial Applications and Refinery Operational Problems	Students analyze common refinery operational problems and propose appropriate engineering solutions.	Theoretical practical	Written test Mathematical + problems interpretation of results Practical activity inside the classroom achievement test
15	3	Comprehensive Review and Practical	Students integrate the concepts of crude oil	Theoretical practical	Written test Mathematical

		Applications	refining and apply their knowledge to practical refinery operations in preparation for the final examination.		

		.			+ problems interpretation of results Practical activity inside the classroom achievement test

11-Course Evaluation

T	Evaluation methods	Calendar appointment (week)	degree	Relative % weight
1	Report 1	Fourth week	2.5	2.5
2	Report 2	Fifth week	2.5	2.5
3	Quiz Short Test (1)	Week 6	2	2
4	Quiz Short Test (2)	Fourteenth week	2	2
5	Quiz Short Test (3)	The fifteenth week	1	1
6	Midterm Exam (1)	Week 6	7.5	7.5
7	Midterm Exam (2)	The eleventh week	7.5	7.5
8	Final theoretical exam	Final semester exams	50	50
9	Practical field project	The fifteenth week	5	5
10	Field evaluation	The third and fifth week	2	2
11	Quiz Practical Short Test (1)	First week	1	1
12	Quiz Practical Short Test (2)	Fourth week	0.5	0.5
13	Quiz Practical Short Test (3)	Fourteenth week	1	1
14	Direct questions and homework	Weeks 6, 8, 9, 10, 11, 12, and 13	5.5	5.5
15	Final practical exam	Final semester exams	10	10
	the total	100	100%	100%

12-Infrastructure Statistics and Planning Experiments

Classrooms	Available
Required textbooks	Available
Main references (sources)	
-Recommended books and references (.Scientific journals, reports, etc)	Speight, J. G. (2024). The Chemistry and Technology of Petroleum (6th ed.). CRC Press. ISBN: 9781032476942 Comprehensive reference on crude oil properties, composition, and refining. Gary, J. H., Handwerk, G. E., & Kaiser, M. J. (2023). Petroleum Refining: Technology and Economics (6th ed.). CRC Press. Standard textbook for petroleum refining and crude oil processing. Nelson, W. L. (1985, reprinted). Petroleum Refinery Engineering (4th ed.). McGraw-Hill. A classic reference on refinery engineering and crude oil characteristics. Hsu, C. S., & Robinson, P. R. (Eds.). (2019). Practical Advances in Petroleum Processing (Vols. 1–2).

	Springer. Covers petroleum properties and modern processing technologies.
Electronic references, Internet sites	Speight, J. G. (2022). *Introduction to Petroleum Technology, Economics, and Politics*. Wiley.

Adscription of Crude oil physics
1-Course name
Crude oil physics
2-Course code
OGT 101
3-Available attendance forms
Traditional attendance (in person) 2. Field scientific attendance 3. Blended learning
4-semester/year
2026-2025 First level, first semester
5-Number of study hours (total)/number of units
45hours / Number of units: 3
6-Date this description was prepared
28/7/2026
7-Course supervisor name
Name: Assistant Professor Dr.Awad Essa Mohammed Email: awad_hwj@ntu.edu.iq
8-(Goals Course (Objectives) Public For the decision maker 1. Understand the fundamental principles of physics and their applications in the oil and gas industry. 2. Explain the physical properties of crude oil, including density, viscosity, and surface tension, and their effects on production and refining processes. 3. Understand heat transfer, fluid flow, and pressure principles related to petroleum equipment and processing operations. 4. Apply physical laws to solve basic engineering problems related to oil and gas technologies. 5. Develop skills in performing physical measurements and laboratory experiments and analyzing their results using standard laboratory equipment. 6. Prepare students for advanced courses in oil and gas refining technologies by providing a solid foundation in applied physics.
9-Outputs The decision and methods education and learning and evaluation

A-Objectives cognitive

- Enable students to acquire fundamental knowledge of crude oil physics and explain the physical properties of crude oil and their relationship to production and refining processes.

Teaching and Learning Methods: Lectures, scientific discussions, and multimedia presentations.

Assessment Methods: Quizzes, midterm examinations, and the final examination.

- Enable students to understand the principles of fluid mechanics, heat transfer, pressure, and energy, and apply them to explain basic petroleum processes and phenomena.

Teaching and Learning Methods: Problem-solving sessions, practical examples, and interactive learning.

Assessment Methods: Homework assignments, written examinations, and classroom participation.

- Enable students to relate physical theories to basic laboratory experiments, analyze experimental results based on scientific and engineering principles, and follow laboratory safety procedures.

Teaching and Learning Methods: Laboratory experiments, practical training, and observation-based learning.

Evaluation methods: Midterm exam, short reports.

B - Objectives Skills Private As scheduled .

b1.Analyze experimental data using appropriate statistical methods

b2Choose the most appropriate experimental design based on the nature of the research problem

C-Objectives emotional and the value

C1- Enhancing students' awareness of the importance of accuracy and scientific integrity in collecting, analyzing, and interpreting data. C2- Developing the spirit of cooperation and teamwork in implementing projects and analyzing experiences within study groups.

C3- Promote respect for others' opinions and appreciation for constructive criticism when discussing and analyzing experimental results. C4- Developing a positive attitude towards using statistical methods in scientific research and agricultural or scientific decision-making. C5-Instilling discipline and commitment to scientific research ethics

Methods education and learning

Lessons theory Intense, Model Data with films educational, application practical in field with all a lecture

Evaluation methods-

Commitment And perseverance on the audience, reports , homework and exams Daily And monthly, exam end the chapter

10- Course Structure : Crude oil physics (Theoretical and Practical (Vocabulary

week	watches	Required learning outcomes	Unit name/topic	Teaching method	Evaluation method
1	3	Introduction to Crude Oil Physics and Its Importance	Students recognize the concept of crude oil physics, its importance, and its applications in production, transportation, and refining processes.	Theoretical practical	Written test Mathematical + problems interpretation of results Practical activity inside the classroom achievement test
2	3	Physical Properties of Crude Oil	Students identify the physical properties of crude oil, including density, specific gravity, and viscosity, and explain their engineering significance.	Theoretical practical	Written test Mathematical + problems interpretation of results Practical activity inside the classroom achievement test
3	3	Classification and Characteristics of Crude Oil	Students describe the different types of crude oil and explain the factors affecting crude oil quality.	Theoretical practical	Written test Mathematical + problems interpretation of results Practical activity inside the classroom achievement test
4	3	Pressure and Temperature in Petroleum Systems	Students explain the effects of pressure and temperature on crude oil behavior during production, storage, and transportation.	Theoretical practical	Written test Mathematical + problems interpretation of results Practical activity inside the classroom achievement test
5	3	Heat Transfer in Petroleum Operations	Students explain the mechanisms of heat transfer (conduction, convection, and radiation) and their petroleum applications.	Theoretical practical	Written test Mathematical + problems interpretation of results Practical activity

		statistical results. To suggest strategies to reduce errors and improve the accuracy of .results			inside the classroom achievement test
6	3	Fluid Mechanics and Petroleum Applications	Students understand the principles of fluid mechanics and their application to crude oil flow in pipelines and equipment.	Theoretical practical	Written test Mathematical + problems interpretation of results Practical activity inside the classroom achievement test
7	3	Flow in Pipelines and Pressure Loss	Students analyze flow patterns and determine the factors affecting pressure losses during crude oil transportation.	Theoretical practical	Written test Mathematical + problems interpretation of results Practical activity inside the classroom achievement test
8	3	Measurement of Crude Oil Physical Properties	Students become familiar with the instruments and methods used to measure density, viscosity, flash point, and other physical properties.	Theoretical practical	Written test Mathematical + problems interpretation of results Practical activity inside the classroom achievement test
9	3	Properties of Petroleum Liquids and Gases	Students explain the behavior of petroleum liquids and gases under different operating conditions.	Theoretical practical	Written test Mathematical + problems interpretation of results Practical activity inside the classroom achievement test
10	3	Fundamentals of Thermodynamics in Petroleum Engineering	Students understand the concepts of energy, work, and the first and second laws of	Theoretical practical	Written test Mathematical + problems interpretation of results

			thermodynamics and their petroleum applications.		

					Practical activity inside the classroom achievement test
11	3	Applications of Crude Oil Physics in Refining Processes	Students relate physical principles to petroleum refining units and evaluate their effects on process performance.	Theoretical practical	Written test Mathematical + problems interpretation of results Practical activity inside the classroom achievement test
12	3	Laboratory Measurements and Physical Testing	Students identify laboratory instruments and perform basic measurements and data interpretation.	Theoretical practical	Written test Mathematical + problems interpretation of results Practical activity inside the classroom achievement test
13	3	Laboratory Safety in Crude Oil Physics	Students apply laboratory safety procedures while handling petroleum materials and conducting experiments.	Theoretical practical	Written test Mathematical + problems interpretation of results Practical activity inside the classroom achievement test
14	3	Problem Solving in Crude Oil Physics	Students apply physical principles to solve engineering problems related to crude oil and petroleum operations.	Theoretical practical	Written test Mathematical + problems interpretation of results Practical activity inside the classroom achievement test
15	3	Comprehensive Review and Practical Applications	Students integrate the concepts learned throughout the course and apply them to practical petroleum engineering situations in preparation for the final examination.	Theoretical practical	Written test Mathematical

		.			+ problems interpretation of results Practical activity inside the classroom achievement test

11-Course Evaluation				
T	Evaluation methods	Calendar appointment (week)	degree	Relative % weight
1	Report 1	Fourth week	2.5	2.5
2	Report 2	Fifth week	2.5	2.5
3	Quiz Short Test (1)	Week 6	2	2
4	Quiz Short Test (2)	Fourteenth week	2	2
5	Quiz Short Test (3)	The fifteenth week	1	1
6	Midterm Exam (1)	Week 6	7.5	7.5
7	Midterm Exam (2)	The eleventh week	7.5	7.5
8	Final theoretical exam	Final semester exams	50	50
9	Practical field project	The fifteenth week	5	5
10	Field evaluation	The third and fifth week	2	2
11	Quiz Practical Short Test (1)	First week	1	1
12	Quiz Practical Short Test (2)	Fourth week	0.5	0.5
13	Quiz Practical Short Test (3)	Fourteenth week	1	1
14	Direct questions and homework	Weeks 6, 8, 9, 10, 11, 12, and 13	5.5	5.5
15	Final practical exam	Final semester exams	10	10
	the total	100	100%	100%

12-Infrastructure Statistics and Planning Experiments	
Classrooms	Available
Required textbooks	Available
Main references (sources)	

-Recommended books and references (.Scientific journals, reports, etc)	Speight, J. G. (2024). The Chemistry and Technology of Petroleum (6th ed.). CRC Press. ISBN: 9781032476942 Comprehensive reference on crude oil properties, composition, and refining. Gary, J. H., Handwerk, G. E., & Kaiser, M. J. (2023). Petroleum Refining: Technology and Economics (6th ed.). CRC Press. Standard textbook for petroleum refining and crude oil processing. Nelson, W. L. (1985, reprinted). Petroleum Refinery Engineering (4th ed.). McGraw-Hill. A classic reference on refinery engineering and crude oil characteristics. Hsu, C. S., & Robinson, P. R. (Eds.). (2019). Practical Advances in Petroleum Processing (Vols. 1–2). Springer. Covers petroleum properties and modern processing technologies.
Electronic references, Internet sites	Speight, J. G. (2022). *Introduction to Petroleum Technology, Economics, and Politics*. Wiley.

Course Description: Mathematics 1

1. Course name	Mathematics 1
2. code	TIH110
3. Available attendance forms	My presence
4. Semester/year	First year / first semester
5. Date this description was prepared	5/5/2026
6. Number of study hours (total)	30 hours / Units 2
7. Course Instructor Name	Assistant Lecturer / FATAH AHMED HASSAN . mohammedaldabbagh@ntu.edu.iq
8. **Course objectives**	

To equip students with the fundamental mathematical knowledge and skills that enhance logical and analytical thinking, enable them to solve problems systematically, apply mathematical concepts in real-life and scientific contexts, and foster academic values such as discipline, accuracy, and teamwork.

Course Learning Objectives

- Acquire the mathematical knowledge required for the prescribed topics and understand the concepts underlying each mathematical principle.
- Develop an understanding of the fundamental nature of mathematics as an integrated system of basic mathematical concepts that provides a strong foundation for studying other mathematical disciplines.
- Be able to apply appropriate methods for solving equations.
- Be able to solve partial differential equations.
- Be able to calculate the area and volume of geometric figures and solids.
- Be able to solve problems involving differentiation and integration.

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

A. Course Learning Outcomes

Definition:

Course Learning Outcomes (CLOs) are the knowledge, skills, and values that the course aims to develop in students.

Importance:

They provide learners with a clear understanding of what they are expected to know and be able to do upon successful completion of the course. They also serve as a foundation for course design, delivery, and assessment.

How They Are Determined:

Course Learning Outcomes are developed in alignment with the objectives and intended learning outcomes of the academic program to which the course belongs.

B. Course Skill Objectives

1. Develop the ability to graph mathematical functions.
2. Develop the ability to perform vector analysis.

Teaching and Learning Methods

1. Theoretical lectures.

Assessment Methods

1. Written examinations.
2. Assignments.
3. Reports.

C. Affective and Value-Based Objectives

1. Enhance students' self-confidence.
2. Develop effective time management skills and encourage productive use of time.
3. Foster a spirit of healthy competition among students.

Teaching and Learning Methods

1. Classroom lectures.
2. Use of modern instructional tools, including calculators and Internet-based resources.

Assessment Methods

1. Written examinations.
2. Assignments.
3. Reports.

D. General and Transferable Skills (Employability and Personal Development Skills)

1. Develop the ability to analyze moments and apply them in the fields of irrigation and engineering.
2. Develop the ability to determine velocity and acceleration using applications of differential calculus.

10. Course structure					
the week	hours	Required learning outcomes	Name of the unit/topic	Teaching method	Evaluation method
1	2	Properties of Trigonometric Ratios	Trigonometric Ratios	Theoretical lecture	Questions and Answers, Discussion , ritten Examination
2	2	Logarithms	Logarithms	Theoretical lecture	Questions and Answers, Discussion , ritten Examination
3	2	Introduction to Differentiation	Differentiation	Theoretical lecture	Questions and Answers, Discussion , ritten Examination
4	2	Differentiation Rules for Algebraic Functions	Differentiation	Theoretical lecture	Questions and Answers, Discussion , ritten Examination
5	2	Derivative of Composite Functions (Chain Rule)	Differentiation	Theoretical lecture	Questions and Answers, Discussion , ritten Examination
6	2	Tutorial and Exercises	Differentiation	Theoretical lecture	Questions and Answers, Discussion , ritten Examination
7	2	Implicit Differentiation, Derivatives of Trigonometric Functions, and Inverse Trigonometric Functions	Differentiation	Theoretical lecture	Questions and Answers, Discussion , ritten Examination
8	2	Tutorial and Exercises	Differentiation	Theoretical lecture	Questions and Answers, Discussion , ritten Examination
9	2	Rules of Differentiation	Derivatives	Theoretical lecture	Questions and Answers, Discussion , ritten Examination

10	2	Advanced Differentiation Rules	Derivatives	Theoretical lecture	Questions and Answers, Discussion , ritten Examination
11	2	Derivatives of Logarithmic Functions	Derivatives	Theoretical lecture	Questions and Answers, Discussion , ritten Examination
12	2	Tutorial and Exercises	Derivatives	Theoretical lecture	Questions and Answers, Discussion , ritten Examination
13	2	Introduction to Integration	Integration	Theoretical lecture	Questions and Answers, Discussion , ritten Examination
14	2	Advanced Integration Techniques	Integration	Theoretical lecture	Questions and Answers, Discussion , ritten Examination
15	2	Tutorial and Exercises	Integration	Theoretical lecture	Questions and Answers, Discussion , ritten Examination

11. Course development plan

- Analyze the course and identify development needs, including reviewing the current Course Learning Outcomes (CLOs).
- Update the course content and diversify teaching and learning methods.
- Monitor recent scientific and technological developments and continuously improve assessment methods.

12. Course Evaluation				
No	**Evaluation methods**	**Calendar appointment week**	**degree**	**Relative % weight**
1	Midterm Exam 1(theoretical)	The seventh week	30	30
2	Midterm Exam 2(theoretical)	The twelfth week	30	30
3	Coursework Marks	Coursework Marks	10	10
4	Final Coursework Mark	The final week (End of the course)	40	40
5	Final theoretical exam	Final semester exams	60	60
	the total	100	100%	100%

13. Infrastructure	
Classrooms, laboratories, and workshops	Available
Required prescribed textbooks	Available
Main References	Teaching bag for mathematics
	Calculas book
	Thomas Calculus 12th edition George B. Thomas .
	Maurice D. Weir.
Recommended books and references (scientific journals, reports	Journal of Mathematics Education
Electronic references, Internet sites	https://ar.wikipedia.org/wiki/%D9%85%D8%AC%D9%84%D8%A9_%D8%A7%D9%84%D8%B1%D9%8A%D8%A7%D8%B6%D9%8A%D8%A7%D8%AA

1. Course name	Mathematics 2
2. code	TIH111
3. Available attendance forms	My presence
4. Semester/year	First year /Second Semester
5. Date this description was prepared	5/5/2026
6. Number of study hours (total)	30 hours / Units 2
7. Course Instructor Name	Lecturer / FATAH AHMED HASSAN mohammedaldabbagh@ntu.edu.iq
8. **Course objectives**	

To equip students with the fundamental mathematical knowledge and skills that enhance logical and analytical thinking, enable them to solve problems systematically, apply mathematical concepts in real-life and scientific contexts, and foster academic values such as discipline, accuracy, and teamwork.

Course Learning Objectives

- Acquire the mathematical knowledge required for the prescribed topics and understand the concepts underlying each mathematical principle.
- Develop an understanding of the fundamental nature of mathematics as an integrated system of basic mathematical concepts that provides a strong foundation for studying other mathematical disciplines.
- Be able to apply appropriate methods for solving equations.
- Be able to solve partial differential equations.
- Be able to calculate the area and volume of geometric figures and solids.
- Be able to solve problems involving differentiation and integration.

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

A. Course Learning Outcomes

Definition:

Course Learning Outcomes (CLOs) are the knowledge, skills, and values that the course aims to develop in students.

Importance:

They provide learners with a clear understanding of what they are expected to know and be able to do upon successful completion of the course. They also serve as a foundation for course design, delivery, and assessment.

How They Are Determined:

Course Learning Outcomes are developed in alignment with the objectives and intended learning outcomes of the academic program to which the course belongs.

B. Course Skill Objectives

1. Develop the ability to graph mathematical functions.
2. Develop the ability to perform vector analysis.

Teaching and Learning Methods

1. Theoretical lectures.

Assessment Methods

1. Written examinations.
2. Assignments.
3. Reports.

C. Affective and Value-Based Objectives

1. Enhance students' self-confidence.
2. Develop effective time management skills and encourage productive use of time.
3. Foster a spirit of healthy competition among students.

Teaching and Learning Methods

1. Classroom lectures.
2. Use of modern instructional tools, including calculators and Internet-based resources.

Assessment Methods

1. Written examinations.
2. Assignments.
3. Reports.

D. General and Transferable Skills (Employability and Personal Development Skills)

1. Develop the ability to analyze moments and apply them in the fields of irrigation and engineering.
2. Develop the ability to determine velocity and acceleration using applications of differential calculus.

10. Course structure					
the week	hours	Required learning outcomes	Name of the unit/topic	Teaching method	Evaluation method
1	2	Matrices and Determinants	Matrices	Theoretical lecture	Paper test + report
2	2	Types of Matrices	Matrices	Theoretical lecture	Paper test + report
3	2	Basic Algebraic Operations on Matrices	Matrices	Theoretical lecture	Paper test + report
4	2	Finding Determinants of 3×33 \times 33×3 Matrices	Matrices	Theoretical lecture	Paper test + report
5	2	Systems of Linear Equations	Systems of Linear Equations	Theoretical lecture	Paper test + report
6	2	Cramer's Rule	Cramer's Rule	Theoretical lecture	Paper test + report
7	2	Applied Exercises	Cramer's Rule	Theoretical lecture	Paper test + report
8	2	Vectors and Scalar Quantities	Vectors	Theoretical lecture	Paper test + report
9	2	Algebraic Operations on Vectors	Vectors	Theoretical lecture	Paper test + report
10	2	Applied Exercises	Vectors	Theoretical lecture	Paper test + report
11	2	Complex Numbers	Complex Numbers	Theoretical lecture	Paper test + report
12	2	Algebraic Operations on Complex Numbers	Complex Numbers	Theoretical lecture	Paper test + report
13	2	Applied Exercises	Complex Numbers	Theoretical lecture	Paper test + report
14	2	Forms of Representing Complex Numbers	Complex Numbers	Theoretical lecture	Paper test + report
15	2	Applied Exercises	Complex Numbers	Theoretical lecture	Paper test + report

11. Course development plan

- Analyze the course and identify development needs, including reviewing the current Course Learning Outcomes (CLOs).
- Update the course content and diversify teaching and learning methods.
- Monitor recent scientific and technological developments and continuously improve assessment methods.

12. Course Evaluation

No	Evaluation methods	Calendar appointment week	degree	Relative % weight
1	Midterm Exam 1(theoretical)	The seventh week	30	30
2	Midterm Exam 2(theoretical)	The twelfth week	30	30
3	Coursework Marks	Coursework Marks	10	10
4	Final Coursework Mark	The final week (End of the course)	40	40
5	Final theoretical exam	Final semester exams	60	60
	the total	100	100%	100%

13.Infrastructure	
Classrooms, laboratories, and workshops	Available
Required prescribed textbooks	Available
Main References	Teaching bag for mathematics
	Calculas book
	Thomas Calculus 12th edition George B. Thomas .
	Maurice D. Weir.

Recommended books and references (scientific journals, reports	Journal of Mathematics Education
Electronic references, Internet sites	https://ar.wikipedia.org/wiki/%D9%85%D8%AC%D9%84%D8%A9_%D8%A7%D9%84%D8%B1%D9%8A%D8%A7%D8%B6%D9%8A%D8%A7%D8%AA

Course Description: Agricultural Pumps and Pulleys.
1-Course Name
Analytical Chemistry
2-Course Code
TIH 101
3-Available Attendance Formats
Traditional (In-Person) Attendance 2. Fieldwork 3. Blended Learning
4-Semester/Year
2025–2026, First Level, Second Semester
5-Total Class Hours / Number of Units
45 hours / 3 units
6-Date this description was prepared
September 8, 2025
7-Course Instructor
Name: Dr. Wissam Mohammed Rashid Email: drwisam_hwj@ntu.edu.iq
8-Course Objectives (General Course Objectives) .
9- Course Outcomes, Teaching and Learning Methods, and Assessment
A – Knowledge Objectives:
B – Skill-Based Objectives of the Course
Teaching and Learning Methods Theoretical Lectures Visual Aids Brainstorming Use of multimedia and videos Field Observation
Assessment Methods Practical Assessment Theoretical Assessment Occupational Safety Skills Assessment Observation- and Audit-Based Assessment

10- Course Structure: Tractors and Agricultural Machinery Theoretical Vocabulary					
Week	Hours	Required Learning Outcomes	Course Title	Learning Method	Assessment Method
1	1	The Analytical Process and Chemical Measurements	Explain the steps of the analytical process. - Distinguishes between accuracy and precision. - Applies the rules of significant figures and error handling in chemical measurements.	Interactive lecture, brainstorming, dialogue and discussion,	Midterm exam, final exam
2	1	Units of concentration: molar, formal, standard, and molality	Identifies different units of concentration. - Switches between different focus units. - Selects the appropriate unit of measurement for various analytical applications.	Interactive lectures, brainstorming, dialogue, and discussion,	Midterm exam, final exam
3	1	Stoichiometric Calculations and Solution Preparation	Perform stoichiometric calculations accurately. - Calculates the quantities of substances needed to prepare standard solutions. - Describes the steps for preparing standard solutions correctly.	Interactive lectures, brainstorming, dialogue, and discussion,	Midterm exam, final exam
4	1	Methods of gravimetric analysis: gravimetric analysis by precipitation	Explains the principle of gravimetric analysis by precipitation. - Identifies the conditions for forming a good	Interactive lecture, brainstorming, dialogue, and discussion,	Midterm exam, final exam

			precipitate. - Calculates the concentration of the substance based on the results of gravimetric analysis		
5	1	Methods of Gravimetric Analysis: Gravimetric Analysis by Volatilization	Explains the principle of gravimetric analysis by volatilization. - Selects the appropriate method for determining volatile substances. - Analyzes the results of gravimetric measurements and calculates the amount of the substance.	Interactive lecture, brainstorming, dialogue, and discussion,	Midterm Exam
6	1	Methods of Gravimetric Analysis: Particle Gravimetric Analysis	Explains the basics of gravimetric analysis using particles. - Selects methods for collecting and separating particles. - Evaluates sources of error affecting the results	Interactive lecture, brainstorming, dialogue, and discussion,	Midterm Exam
7	1	Volumetric Analysis Methods: Titrations Based on Acid–Base Reactions	Explains the principles of acid-base titrations. - Selects the appropriate indicator for the endpoint. - Calculates solution concentrations using titration data	Interactive lecture, brainstorming, dialogue and discussion,	Short assignments + discussions
8	1	Volumetric Analysis Methods: Titrations Based on Complexation Reactions (EDTA Titration)	Explains the principle of EDTA titrations. - Identifies the factors affecting complex formation. - Calculates metal ion concentrations using EDTA titrations	Interactive lecture, brainstorming, dialogue, and discussion,	Short assignments + discussions

9	1	Volumetric Analysis Methods: Titrations Based on Oxidation-Reduction Reactions	Explains the principles of oxidation and reduction reactions in titrations. - Balances oxidation-reduction equations. - Calculates concentrations of substances using redox titration data	Interactive lectures, brainstorming, dialogue, and discussion,	Short assignments + discussions
10	1	Volumetric Analysis Methods: Precipitation Titrations	Describes the principles of precipitation titration. - Selects the appropriate reagent for titration. - Calculates ion concentrations based on titration results	Interactive lectures, brainstorming, dialogue, and discussion,	Midterm Exam
11	1	Spectroscopic Analysis Methods: Ultraviolet-Visible (UV-Vis) Spectroscopy	Explains the basics of molecular absorption and Beer-Lambert's law. - Explains the ultraviolet and visible spectra. - Calculates the concentration of samples using calibration curves	Interactive lecture, brainstorming, dialogue, and discussion,	Midterm Exam
12	1	Spectroscopic Analysis Methods: Atomic Absorption Spectroscopy (AAS)	Explains the principle of atomic absorption spectroscopy. - Identifies the components of an AAS instrument and the function of each. - Interprets the results of trace element analysis	Interactive lectures, brainstorming, dialogue, and discussion,	Short assignments + discussions
13	1	Methods of Electrochemical Analysis	Explains the basic principles of electrochemical analysis.	Interactive lectures, brainstorming,	Short assignments + discussions

			- Distinguishes between different electrochemical methods. - Interprets the electrical data used in chemical analysis	dialogue, and discussion,	
14	1	Potentiometric Analysis Methods	Explains the principle of potentiometric measurements. - Describes the use of reference and selective electrodes. - Calculates the concentration of substances using potentiometric measurements and calibration curves.	Interactive lecture, brainstorming, dialogue, and discussion,	Assignments: short s + discussions
15	1	Review Week and Final Exam Preparation	Integrates the core concepts of the course. - Solves comprehensive problems covering all topics in the course. - Assesses readiness for the final exam.	Interactive lecture, brainstorming, dialogue, and discussion,	Quiz, Final Exam

Curriculum Development Plan

Updating Scientific Content

Review the course vocabulary annually and incorporate the latest applications in analytical chemistry, such as modern spectroscopic techniques, digital analytical instruments, and artificial intelligence applications in chemical data analysis

Developing Teaching Strategies

Adopting active learning, problem-based learning (PBL), practical case studies, collaborative learning, and student presentations

Strengthening the practical component

Increasing integration between theoretical lectures and laboratory experiments, and incorporating practical applications for preparing solutions, titrations, and the use of modern analytical instruments

Use of technology

Utilizing e-learning platforms, virtual simulations of laboratory experiments, and data analysis software such as Excel and Origin

Developing Student Skills

Enhancing skills in critical thinking, quantitative analysis, problem-solving, teamwork, scientific reporting, and oral presentation

Quality Assurance

Regularly collecting feedback from students and faculty, analyzing course outcomes and pass rates, and using this feedback to improve content, teaching methods, and assessment

Continuous Improvement

Periodically reviewing the course description to ensure it aligns with academic accreditation standards and targeted learning outcomes, and updating the syllabus as needed.

12. Course Evaluation

T	Assessment Methods	Assessment Date (Week)	Grade	Relative Weight %
1	Report 1	Week 4	2.5	2.5
2	Report 2	Week 5	2.5	2.5
3	Short Quiz (1)	Week 6	2	2
4	Short Quiz (2)	Week 14	2	2
5	Short Quiz (3) Quiz	Week 15	1	1
6	Midterm Exam (1)	Week 6	7.5	7.5
7	Midterm Exam (2)	Week 11	7.5	7.5
8	Final Theory Exam	Final Exams	40	40
9	Practical Field Project	Week 15	5	5
10	Field Assessment	Weeks 3 and 5	2	2
11	Short Practical Test (1) Quiz	Week 1	1	1
12	Short Practical Test (2) Quiz	Week 4	0.5	0.5
13	Short Practical Test (3) Quiz	Week 14	1	1
14	In-Class Questions and Homework Assignments	Weeks 6, 8, 9, 10, 11, 12, and 13	5.5	5.5
15	Final Practical Exam	Final Exams	20	20
	Total	100	100%	100%

12. Teaching and Learning Resources

First: Required Textbooks	▪ First: Required Textbooks
Fundamentals of Analytical Chemistry.	▪ Fundamentals of Analytical Chemistry.
Quantitative Chemical Analysis.	▪ Quantitative Chemical Analysis.
Electronic References, Websites	https://agriculture.newholland.com/

Course Description: Agricultural Pumps and Pulleys.
1-Course Name
Petroleum Chemistry
2-Course Code
TIH 101
3-Available Attendance Formats
Traditional (In-Person) 2. Field Study 3. Blended Learning
4-Semester/Year
2025–2026, First Level, First Semester
5-Total Class Hours / Number of Units
75 hours / 5 units
6. Date this description was prepared
September 8, 2025
7-Course Instructor
Name: Dr. Wissam Mohammed Rashid Email: drwisam_hwj@ntu.edu.iq
8-Course Objectives (General Course Objectives) To graduate qualified technical personnel capable of performing operation, maintenance, and control tasks for operational equipment in petroleum industrial units at the refinery, including and conducting laboratory tests on raw materials and finished products and verifying their compliance with standard specifications, as well as linking theoretical knowledge to practical application. - Familiarize students with the techniques used. - Understanding scientific materials and their application. - Familiarity with industrial drawings and diagrams. - Perform maintenance work on industrial units.
9. Course Outcomes, Teaching and Learning Methods, and Assessment
A – Knowledge Objectives: 1. To familiarize students with the methods of operating and controlling various petroleum industrial equipment and units and carrying out petroleum production operations. 2. Students will compare laboratory tests of raw materials and products. 3. Students will use drawings, maps, and industrial diagrams related to mechanical or petroleum laboratories. 4. Perform quality control procedures to ensure that the product complies with

international and Iraqi standards.

5. Link theoretical and practical information to improve industrial practices.

B. Course-Specific Skill Objectives

1. Students will acquire the skill of conducting laboratory analy
2. Use laboratory and chemical workshop equipment properly, with attention to safety
the interpretation of res
3. Students will be able to create graphs and diagrams related to the practical lab sessi
4. Students will acquire calculator sk

Teaching and Learning Methods

of a combination of theoretical and practical lectures, electronic calculators, and digital projectors
TASHOW) to teach the fundamentals of petroleum and gas engineering

Assessment Methods

ing students to assess their engagement with the lecture, and administering weekly, semester,
annual exams.

Affective and Values-Based Objectives/

1- Students will learn about the operation of industrial and practical units and their rol
the nation's developm
2- Students are encouraged to gain practical experience and relate it to theoretical princip
3- Students will learn precision and discipline in acquiring scientific knowle

Students will learn to communicate and interact during lectures

10. Course Structure: Tractors and Agricultural Machinery

Theoretical Concepts

Week	Hours	Required Learning Outcomes	Topic Name	Learning Method	Assessment Method
1	1	Introduction to a Brief History of crude oil	**Historical Introduction**	Interactive lecture, brainstorming, dialogue, and discussion,	Midterm exam, final exam
2	1	Understanding the stages of formation crude oil	**Formation of Crude Oil**	Interactive lecture, brainstorming,	Midterm Exam, Final Exam

				dialogue and discussion,	
3	1	Understanding methods of evaluating crude oil	**Assessment of Crude Oil**	Interactive lectures, brainstorming, dialogue and discussion,	Midterm exam, final exam
4	1	Identifying the of crude oil	**Crude Oil Specifications**	Interactive lectures, brainstorming, dialogue, and discussion,	Midterm exam, final exam
5	1	Introduction to distillation curves	**Distillation Curves**	Interactive lecture, brainstorming, dialogue and discussion,	Midterm Exam
6	1	Introduction to a Brief History of crude oil	**Historical Introduction**	Interactive lecture, brainstorming, dialogue, and discussion,	Midterm Exam
7	1	Identifying the Properties of of Refining Products) Properties petroleum gases (	**Product Characteristics Refining**	Interactive lecture, brainstorming, dialogue, and discussion,	Short Assignments + Discussions
8	1	Identifying the characteristics of Refining Products (Properties of Naphtha and Gasoline)	**Properties of Refining**	Interactive lecture, brainstorming, dialogue, and discussion,	Short assignments + discussions
9	1	Identifying the Properties of of Refining Products) Properties Kerosene and (	**Properties of Refining**	Interactive lecture, brainstorming, dialogue, and discussion,	Short assignments + discussions

10	1	Identifying the characteristics of of Refining Products (Properties of heavy and light)	**Characteristics of Refining**	Interactive lectures, brainstorming, dialogue, and discussion,	Midterm Exam
11	1	Identifying the Properties of of solids and semisolids	**Properties of Solids and Semisolid solid**	Interactive lectures, brainstorming, dialogue, and discussion,	Midterm Exam
12	1	**Identifying phase behavior or a mixture of three components**	Phase Behavior	Interactive lecture, brainstorming , dialogue and discussion,	Assignments: short s + discussions
13	1	**Understanding the Properties of of natural gas / Composition of natural gas Understanding the relationships Riedel Vapor Pressure**	Properties of natural gas / Composition of Natural Gas	Interactive lecture, brainstorming, dialogue, and discussion,	Short assignments + discussions
14	1	Understanding the heat and its relationships	Combustion Heat	Interactive lecture, brainstorming, dialogue, and discussion,	Short Assignments + Discussions
15	1	Understanding the limits and safety measures	Explosion Limits	Interactive lecture, brainstorming, dialogue and discussion,	Short quiz, final exam

Curriculum Development Plan

Updating scientific content to keep pace with recent developments in the field of tractors and agricultural machinery.

- Strengthen the practical and applied aspects of operating and maintaining agricultural equipment.
- Develop students' skills in using modern agricultural technologies.
- Align the curriculum with the needs of the agricultural sector and the job

market.
- To reinforce concepts of occupational safety and the maintenance of agricultural equipment.

12- Course Evaluation

T	Assessment Methods	Calendar Date (Week)	Grade	Relative Weight %
1	Report 1	Week 4	2.5	2.5
2	Report 2	Week 5	2.5	2.5
3	Short Quiz (1)	Week 6	2	2
4	Short Quiz (2)	Week 14	2	2
5	Short Quiz (3) Quiz	Week 15	1	1
6	Midterm Exam (1)	Week 6	7.5	7.5
7	Midterm Exam (2)	Week 11	7.5	7.5
8	Final Theory Exam	Final Exams	40	40
9	Practical Field Project	Week 15	5	5
10	Field Assessment	Weeks 3 and 5	2	2
11	Short Practical Test (1) Quiz	Week 1	1	1
12	Short Practical Test (2) Quiz	Week 4	0.5	0.5
13	Short Practical Test (3) Quiz	Week 14	1	1
14	In-Class Questions and Homework Assignments	Weeks 6, 8, 9, 10, 11, 12, and 13	5.5	5.5
15	Final Practical Exam	Final Exams	20	20
	Total	100	100%	100%

12. Teaching and Learning Resources

Required Textbooks	▪ A. Required Textbooks
Required Primary References (Sources)	▪ The Chemistry and Technology of Petroleum.
Recommended Books and References (Scientific Journals, Reports, etc.)	▪ Petroleum Refining: Technology and Economics.
Electronic References, Websites	https://www.eia.gov/?utm_source=chatgpt.com