Northern Technical University

First Cycle – Bachelor's degree (B.Sc.) – Bachelor's degree in Engineering Technological for Chemical and Petroleum

بكالوريوس في هندسة تقنيات الصناعات الكيمياوية والنفطية(الدورة الأولى)

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1. Mission & Vision Statement

Vision Statement

Our vision is to be a globally recognized leader in chemical and petroleum engineering, known for excellence in education, cutting-edge research, and industry partnerships. We envision a future where our graduates are at the forefront of technological innovation, driving advancements inchemical and petroleum processes that enhance efficiency, safety, and environmental sustainability. Through interdisciplinary collaboration and a commitment to lifelong learning, we aim to shape the next generation of engineers who will transform the chemical and petroleum industries, shaping a brighter and more sustainable future for all.

Mission Statement

1: Conduct innovative research: We strive to push the boundaries of knowledge in chemical and petroleum engineering through rigorous and forward-thinking research initiatives.

2: Foster education and skill development: We are committed to providing high-quality education that equips students with the necessary technical expertise, critical thinking abilities, and ethical values required for success in the chemical and petroleum industries.

3: Promote industry collaboration: We actively engage with industry partners to foster collaborative relationships, exchange knowledge, and address real-world challenges in the chemical and petroleum sectors.

4: Drive sustainable development: We are dedicated to advancing sustainable practices in the chemical and petroleum industries, seeking innovative solutions that minimize environmental impact and contribute to a greener and more sustainable future.

5: Optimize processes and technologies: We strive to optimize chemical and petroleum processes by leveraging cutting-edge technologies, automation, and data-driven approaches, enhancing efficiency, safety, and productivity.

6: Make a positive societal impact: We aim to make significant contributions to society by developing engineers who are capable of addressing societal needs, promoting social responsibility, and utilizing chemical and petroleum engineering to improve the well-being of individuals and communities.

2. Program Specification

Program code:	**BSc-Technological Engineering for Chemical and Oil Industries**	**ECTS**	**240**
Duration:	**4 levels, 8 Semesters**	**Method of Attendance:**	**Full Time**

Level 1: Program Overview

Introduction to the program and its purpose in the Department of Chemical and Petroleum Industries Technologies Engineering.

High-level objectives of the program, including project management, resource allocation, data analysis, collaboration, and documentation.

Level 2: Functional Requirements

Detailed functional requirements for each key aspect of the program:

Project management: Project creation, task management, Gantt charts, resource allocation, and budget management.

Data analysis: Data collection and storage, data visualization, statistical analysis, and reporting.

Collaboration and communication: Document sharing, communication tools, and calendar integration.

Documentation and reporting: Document management, report generation, and version control.

Level 3: Non-functional Requirements

Non-functional requirements that govern the design and implementation of the program:

Security: Measures to protect data and ensure access control.

Scalability: Ability to handle a growing number of projects, users, and data.

Usability: User-friendly interface and efficient navigation.

Integration: Compatibility and integration with existing systems and tools.

Performance: Efficient performance, response times, and handling of concurrent users and data.

Compatibility: Support for common operating systems, web browsers, and devices.

Level 4: Implementation Considerations

Detailed considerations for implementing the program:

Technology Stack: Programming languages, frameworks, and databases to be used.

Development Methodology: Approach to development, such as Agile.

Testing and Quality Assurance: Procedures for testing and ensuring program reliability.

Deployment and Maintenance: Plan for deployment, hosting, updates, and ongoing maintenance

3. Program Objectives

Objective 1: Project Management Efficiency

Streamline project planning, execution, and monitoring.

Facilitate task management, progress tracking, and timeline adherence.

Improve resource allocation and utilization for projects.

Objective 2: Resource Optimization

Optimize allocation of personnel, equipment, and materials for projects.

Consider availability, expertise, and project requirements when assigning resources.

Enhance visibility into resource utilization and availability.

Objective 3: Data Analysis and Insights

Enable efficient data collection, storage, and organization.

Provide tools for data visualization and analysis.

Incorporate statistical functions to identify patterns, trends, and anomalies.

Generate comprehensive reports summarizing data analysis results.

Objective 4: Collaboration and Communication

Foster effective communication and collaboration among team members and stakeholders.

Facilitate document sharing, version control, and collaborative editing.

Offer messaging, notifications, and discussion forums for real-time communication.

Integrate with calendars to schedule meetings and synchronize project events.

Objective 5: Documentation Management

Simplify the creation, management, and organization of project documentation.

Provide templates and tools for generating professional reports.

Ensure version control for documents to track changes and revisions.

Objective 6: Quality and Compliance

Support adherence to quality standards and compliance requirements.

Implement checks and workflows to ensure regulatory compliance.

Facilitate documentation of procedures, specifications, and guidelines.

Objective 7: Continuous Improvement and Knowledge Management

Promote a culture of continuous improvement and knowledge sharing.

Capture lessons learned and best practices for future reference.

Provide mechanisms for sharing expertise and fostering innovation.

Objective 8: Security and Data Protection

Implement robust security measures to protect sensitive data.

Enforce access controls and user authentication.

Comply with data privacy regulations and industry standards.

These objectives aim to enhance the efficiency, effectiveness, collaboration, documentation, quality, knowledge management, and security within the Department of Chemical and Petroleum Industries Technologies Engineering. The program will enable better project management, resource allocation, data analysis, collaboration, documentation, compliance, and knowledge sharing to support the department's activities

4. Student Learning Outcomes

Learning Outcomes from The Department of Chemical and Petroleum Industries Technologies Engineering

Learning Outcome 1: Fundamental Knowledge

Acquire a strong foundation in the principles and theories of chemical and petroleum industries technologies engineering.

Demonstrate understanding of key concepts related to chemical processes, petroleum refining, and industrial applications.

Learning Outcome 2: Technical Skills

Develop proficiency in using industry-standard software and tools for process simulation, data analysis, and project management.

Gain hands-on experience in operating and maintaining equipment used in chemical and petroleum industries.

Learning Outcome 3: Problem Solving

Apply critical thinking and problem-solving skills to analyze and solve complex engineering problems in the chemical and petroleum industries.

Utilize mathematical and scientific principles to develop innovative solutions.

Learning Outcome 4: Laboratory Techniques

Demonstrate proficiency in conducting experiments, collecting data, and analyzing results in a laboratory setting.

Apply safety protocols and quality assurance measures during laboratory work.

Learning Outcome 5: Design and Optimization

Apply engineering principles to design and optimize chemical processes and petroleum refining operations.

Consider factors such as efficiency, sustainability, and cost-effectiveness in the design process.

Learning Outcome 6: Communication Skills

Communicate effectively, both orally and in writing, to convey technical information to diverse audiences.

Prepare technical reports, project proposals, and presentations.

Learning Outcome 7: Teamwork and Collaboration

Work effectively in multidisciplinary teams to solve complex engineering problems.

Collaborate with colleagues from different backgrounds and contribute to team projects.

Learning Outcome 8: Ethical and Professional Conduct

Demonstrate ethical behavior and professional responsibility in all aspects of chemical and petroleum engineering practice.

Understand and adhere to professional codes of conduct and industry standards.

Learning Outcome 9: Lifelong Learning

Recognize the importance of continuous learning and professional development in the rapidly evolving field of chemical and petroleum industries technologies engineering.

Seek opportunities for further education, skill enhancement, and staying updated with industry trends.

Learning Outcome 10: Societal and Environmental Impact

Understand the societal and environmental implications of chemical and petroleum industries technologies and engineering. Consider sustainability, environmental regulations, and social responsibility in engineering decisions and practices. These learning outcomes aim to equip students with the necessary knowledge, skills, and attributes to succeed in the field of Chemical and Petroleum Industries Technologies Engineering. The program focuses on developing a strong technical foundation, problem-solving abilities, laboratory proficiency, effective communication and teamwork skills, ethical conduct, and a broader understanding of societal and environmental impact

1. Academic Staff

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2. Credits, Grading and GPA

Credits

(Northern Technical University) University is following the Bologna Process with the European Credit Transfer System (ECTS) credit system. The total degree program number of ECTS is 240, 30 ECTS per semester. 1 ECTS is equivalent to 25 hrs student workload, including structured and unstructured workload.

Grading

Before the evaluation, the results divided into two subgroups: pass and fail. Therefore, the results are independent of the students who failed a course. The grading system defined as follows:

GRADING SCHEME مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب - قيد المعالجة	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note:				
Number Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Calculation of the Cumulative Grade Point Average (CGPA)

1. The CGPA is calculated by the summation of each module score multiplied by its ECTS, all are divided by the program total ECTS.

   CGPA of a 4-year B.Sc. degree:

   CGPA = [(1st module score x ECTS) + (2nd module score x ECTS) + ……] / 240

3. Curriculum/Module

Semester 1 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
NTU100	Human Rights and Democracy	32	43	2	B	
NTU101	English Language	32	43	2	B	
TEMO100	Mathematics	62	138	8	S	
TEMO101	Engineering Drawing	78	122	8	S	
ETCP100	Principles of Chemical Engineering	92	158	10	C	
		281	419	30		

Semester 2 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
NTU102	Computer Principles	63	12	3	B	
NTU103	Arabic Language	32	18	2	B	
TEMO102	Electrical Principles	78	72	6	S	
TEMO103	Workshop	63	62	5	S	
ETCP101	General Chemistry	123	77	8	C	
TEMO104	Engineering Mechanics &Strengthof Materials	93	57	6	S	
		452	298	30		

Semester 3 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
NTU200	Crimes of the Ba'ath Regime in Iraq	32	18	2	S	
ETCP200	Petroleum Chemistry	108	92	8	C	
ETCP201	Engineering Mathematics	62	88	6	S	Mathematics
ETCP202	Physical Chemistry	108	92	8	C	
ETCP203	Engineering materials	78	72	6	C	
		356	362	30		

Semester 4 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
NTU201	Professional ethics	32	18	2	B	
ETCP204	Fluid flow	108	42	6	C	
ETCP205	Computer Applications	93	7	4	S	
ETCP206	Kinetics	138	12	6	C	
ETCP207	Energy balance	92	58	6	C	
ETCP208	Petroleum fluid properties	93	57	6	C	
		556	194	30		

Semester 5 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
TEMO300	Engineering Analysis	63	87	6	S	Engineering Mathematics
ETCP300	Mass Transfer	108	92	8	C	
ETCP301	Heat Transfer	108	92	8	C	
ETCP302	Industrial Safety	47	53	4	C	
ETCP303	Engineering Economics	32	68	4.00	S	
		358	392	30		

Semester 6 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
ETCP304	Chemical Engineering Thermodynamics	123	77	8	C	
ETCP305	Reactor Design	77	62	6	C	Kinetics
ETCP306	Process Simulation	63	37	4	C	
ETCP307	Unit Operation	108	42	6	C	Mass Transfer
ETCP308	Instrumental of Chemical Analysis	108	42	6	S	
		479	260	30		

Semester 7 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
NTU400	Research Methodology	45	55	4	B	
ETCP400	Petroleum Refinery	77	73	6	C	
ETCP401	Equipment Design	62	88	6	C	
ETCP402	Process Control	108	42	6	C	
ETCP403	Chemical Industries	123	77	8	c	
		415	335	30		

Semester 8 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
TEMO400	Graduation Project	75	125	8	C	
ETCP404	Petrochemical	123	77	8	C	
ETCP405	Corrosion Engineering	62	88	6	S	
ETCP406	Environmental pollution	47	53	4	S	
ETCP407	Natural gas Engineering	47	53	4	C	
		354	396	30		

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