Northern technical university
الجامعة التقنية الشمالية

First Cycle – Bachelor's Degree (B.Sc.) – Power Mechanics
Northern Technical University
Eng. Technical College/ Mosul
Department of Power Mechanics Engineering Technologies
Refrigeration and Air-conditioning

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Program Catalogue Form

University Name: .Northern Technical University.....

Faculty/Institute: .Technical Engineering College Mosul.....

Scientific Department: Power Mechanics Engineering Technology

Academic or Professional Program Name: Bachelor of Power Mechanics Engineering Technology

Final Certificate Name: Bachelor of Power Mechanics Engineering Technology

Academic System: Bologna Process.....

Description Preparation Date: 2/9/2025

File Completion Date: 2/9/2025

Signature:

Head of Department Name:

Dr. Ammar Hassan Suhail

Date: 2/9/2025

Signature:

Scientific Associate Name:

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Date: 25/9/2025

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance

Department: Assist. Lect. Warqaa Hashim Mahmood

Date:

Signature:

A.T

Approval of the Dean

1. Mission & Vision Statement

Vision Statement

The Department of Mechanical Power Engineering Technologies aims to be a national leader in engineering education and applied research. It strives to produce skilled, practice-oriented engineers in renewable energy, refrigeration and air conditioning, production and automation at the preliminary study and postgraduate studies. The department is committed to enhancing innovation, promoting sustainability, and aligning its academic programs with global standards. It aspires to contribute to national development by preparing graduates with the competencies needed to advance Iraq's technological progress and meet the evolving demands of society and the labor market.

Mission Statement

Creating a distinguished theoretical and practical learning environment for students by delivering high quality scientific lectures in specialized fields, providing modern laboratories, workshops, and hands on training to enhance technical proficiency, and continuously updating curricula and programs to keep pace with technological development.

2. Program Specification

Programe code:	**PM-RAC**	**ECTS**	**240**
Duration:	**4 levels, 8 Semesters**	**Method of Attendance:**	**Full Time**

Mechanical engineering is a wide-ranging subject and is different special branches. The emphasis of the program is the materials and their behavior as well as their physical properties to which everything is related, be it the materials formed a separate system or it is a part of the system. The degree is popular–or some it's' the breadth of the subject that appeals, for others it's a path to specialization. All students have the opportunity to transfer onto our specialist degrees in mechanical, renewable energy, heating, ventilating and air conditioning at the end of the second year.

Level 1 exposes students to the fundamentals of mechanics, suitable for progression to all program within the mechanical engineering program group. Program-specific core topics are covered at Level 2 preparing for research-led subject specialist modules at Levels 3 and 4. The University mechanical engineering graduate is therefore trained to appreciate how research informs teaching, according to the University and School Mission statements.

At Levels 3 and 4 students are free to choose more than half of their module credits with the proviso a range of modules are selected that reflect the complexity of the different directions of the specializations in the mechanical engineering, through modern modules, to ensure the breadth of knowledge expected of a graduate with an engineering degree. This allows students to develop their own wide-ranging interests in mechanical and thermal energy engineering. Decisions on what to study are made with input from personal tutors.

The research ethos is developed and fostered from the start via practical, which are either embedded in lecture modules or taught in dedicated practical modules, research seminars and tutorials. There is a compulsory field course in Level 2 and 3, which students must pass in order to progress into Level 3 and 4. At Level 4 all students carry out an independent research project, which may be a data analysis project, or practical project

3. Program Objectives

This branch aims to:

1- Graduate engineers capable of performing thermal load calculations and system testing, qualifying them to work on engineering systems and conduct feasibility studies for various specialized projects.

2- Diagnose and repair a wide range of thermal systems—including small, combined, separate, and central units, as well as refrigerated and freezing storage systems and steam systems—serving both industrial and service sectors.
3- Develop refrigeration and freezing systems that are adapted to the country's climatic and environmental conditions, while keeping pace with technological advancements in the field.
4- Install, operate, and manage maintenance and repair facilities related to the branch's specialization.
5- Conduct research and investigations, promote energy rationalization, and explore alternative solutions within the field.

4. Student Learning Outcomes

Mechanical engineering is the study of objects and systems in motion. As such, the field of mechanical engineering touches virtually every aspect of modern life, including the human body, a highly complex machine. Graduates obtain information on the historical, technical and social aspects of mechanical and thermal engineering and utilize basic knowledge toward realizing broader concepts. The Department offers a Bachelor of Engineering in Mechanics and thermal energy with a concentration in General mechanics; renewable energy / thermal energy. Additionally, the Department offers courses to a large number of students from other departments and supports pre-professional programs. The mechanical engineering curriculum and experiences are designed to prepare students, in part, for entry into professional engineering programs, graduate studies, technical careers and education

Outcome 1
Identification of Complex thermodynamic processes
Graduates will be able to illustrate the thermodynamic processes in different thermal systems and they will able to make the heat and mass balance for the complex systems

Outcome 2
Oral and Written Communication
Graduates will be able to formally communicate the results of their research investigations using both oral and written communication skills.

Outcome 3
Laboratory and Field Studies
Graduates will be able to perform laboratory experiments and field studies, by using scientific equipment and computer technology while observing appropriate safety protocols.

Outcome 4
Scientific Knowledge
Graduates will be able to demonstrate a balanced concept of how scientific knowledge develops, including the historical development of foundational theories and laws and the nature of science.

Outcome 5
Data Analysis
Graduates will be able to demonstrate scientific quantitative skills, such as the ability to conduct simple data analysis

Outcome 6
Critical Thinking
Graduates will be able to use critical-thinking and problem-solving skills to develop a research project or paper

5. Academic Staff

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6. Credits, Grading and GPA

Credits

(Northern technical) 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 are divided into two subgroups: pass and fail. Therefore, the results are independent of the students who failed a course. The grading system is 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)

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

7. Curriculum/Modules

Semester 1 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
NTU101	English Language Principles	33	17	2.00	S	
PM 100	Engineering Mechanics / Static	78	122	8.00	C	
TEMO 100	Mathematics Principles	93	57	6.00	B	
PM 101	Electrical Technology	63	87	6.00	B	
PM 102	Workshop	93	57	6.00	C	
NTU 100	Human Rights & Democracy	33	17	2.00	S	

Semester 2 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
PM 103	Thermodynamics Principles	93	107	8.00	C	
NTU 102	Computer Principles	63	12	3.00	S	
NTU 103	Arabic Language	33	17	2.00	S	
PM 104	Engineering Mechanics/ Dynamics	78	122	8.00	C	
TEMO 105	Engineering Drawing	63	112	7.00	B	
PM 106	Occupational Safety	32	18	2.00	S	

Semester 3 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
PM 201	Fluid Mechanics	108	92	8.00	C	
NTU 201	English Language	32	18	2.00	S	
TECO 200	Mathematics	63	87	6.00	B	
PM 200	Refrigeration & Air Conditioning Principles	108	92	8.00	C	
PM 202	Mechanical Drawing	63	87	6.00	C	
NTU 200	Crimes of the Baath Party in Iraq	33	17	2.00	B	

Semester 4 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
PM 203	Strength of Materials	108	92	8.00	C	
PM 204	Engineering Materials	93	107	8.00	C	
PM 205	Thermodynamics	123	52	7.00	C	
NTU 203	Arabic Language	32	18	2.00	S	
NTU 202	Computer	63	12	3.00	B	
PM 206	Electrical Machines	63	87	5.00	B	

Semester 5 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	**Pre-request**
PM 300	Machine Design	63	87	6.00	C	
PM 301	Engineering Analysis	63	87	6.00	B	
RAC 300	Refrigeration & Air Conditioning	123	77	8.00	C	
RAC 301	Drawing of Refrigeration & Air Conditioning Systems	63	37	4.00	C	
RAC 302	Theory of Machines	63	87	6.00	C	

Semester 6 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
PM 302	Heat Transfer	123	77	8.00	c	
RAC 303	Maintenance of Refrigeration & Air Conditioning Systems	63	87	6.00	c	
PM 304	Engineering Computer Applications	63	37	4.00	B	
RAC 304	Vibration	63	87	6.00	B	
PM 304	Numerical analysis	63	87	6.00	C	

Semester 7 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
PM 400	Thermal Power Plants	123	77	8.00	C	
RAC 400	Refrigeration Systems	123	77	8.00	C	
PM 401	Engineering and Industrial Management	33	67	4.00	B	
PM 402	Engineering Measurement systems	63	87	6.00	B	
PM 403	Methodology of Scientific Research	32	68	4.00	S	

Semester 8 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
RAC 401	Renewable Energy	63	87	8.00	C	
RAC 402	Design of Air Conditioning Systems	123	77	6.00	C	
PM 404	Automatic Control systems	63	87	6.00	B	
PM 405	Computer Aided Design	63	37	4.00	B	
PM 406	Project	62	88	6.00	C	

8. Contact

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