

# 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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# 1. Mission & Vision Statement

## *Vision Statement*

The Department of Power Mechanic Technical Engineering is one of the nine scientific departments of the Technical College of Engineering at the Northern Technical University in Mosul. The department had been established in 1998. The department awards a bachelor's degree in the field of mechanical engineering technology in two branches, namely (Renewable Energy Branch, Refrigeration and Air Conditioning Branch)

## *Mission Statement*

The department aims to prepare technical engineers specialized in the field of the two mentioned branches and have scientific and practical skills in diagnosing and repairing faults that occur during the work of the two mentioned branches. As well as the creation of competent engineers with the ability to keep pace with the rapid development in the competence of the two mentioned branches and acquire the necessary skills to develop and modernize the two mentioned branches devices. In addition to providing the graduates with the skill to install and operate various modern the two mentioned branches systems.

As well as this department is creating a distinguished theoretical and practical study environment for students by delivering valuable scientific lectures in the specialty, conducting laboratory experiments and creative scientific research, and interacting with the local and global environment in the field of working on equipment in the department's laboratories.

# 2. Program Specification

<b>Program code:</b>	PM-RAC	<b>ECTS</b>	240
<b>Duration:</b>	4 levels, 8 Semesters	<b>Method of Attendance:</b>	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

The department aims to provide high-quality technical education, by keeping pace with the rapid technological developments in the world, and respond to the necessities of change in the curriculum to lay the foundations of human development so that graduates acquire skills and expertise to meet the needs of the market by adopting quality assurance and assurance. Therefore, the department aspires to graduate applied engineers familiar with the applications and modern devices in the field of the three mentioned branches and be able to:

1. Installation and operation of all types of devices deals with the specialties in this department.
2. Contributing and supervising the maintenance of different appliances deal with the specialties in this department.
3. Design and implementation of sketches for the installation and operation of modern units.
4. Research, develop and find replacement parts for the unemployed units.

### 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 be 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:

$$CGPA = [ (1st^{th} module score \times ECTS) + (2nd^{th} module score \times ECTS) + ..... ] / 240$$

## 7. Curriculum/Modules

**Semester 1 | 30 ECTS | 1 ECTS = 25 hr.**

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
NTU100	English Language Principles	32	18	2.00	S	
PM 100	Engineering Mechanics / Static	93	107	8.00	C	
TEMO 100	Mathematics Principles	78	122	8.00	B	
TEMO 101	Electrical Technology	78	72	6.00	B	
TEMO 102	Workshop	93	57	6.00	C	

**Semester 2 | 30 ECTS | 1 ECTS = 25 hr.**

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
PM 102	Thermodynamics Principles	108	92	8.00	C	
NTU 101	Computer Principles	63	87	6.00	B	
NTU 102	Human Rights & Democracy	32	18	2.00	S	
PM 101	Engineering Mechanics/ Dynamics	93	107	8.00	C	
TEMO 103	Engineering Drawing	63	87	6.00	C	

**Semester 3 | 30 ECTS | 1 ECTS = 25 hr.**

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
PM 200	Fluid Mechanics	108	92	8.00	C	
PM 201	Thermodynamics	123	77	8.00	C	
TEMO 200	Mathematics	63	87	6.00	B	
NTU 200	Professional Ethics	32	18	2.00	S	
PM 202	Mechanical Drawing	63	87	6.00	C	

**Semester 4 | 30 ECTS | 1 ECTS = 25 hr.**

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	Refrigeration & Air Conditioning Principles	108	92	8.00	C	
NTU 201	Arabic Language	32	18	2.00	S	
PM 206	Occupational Safety	32	68	4.00	B	

**Semester 5 | 30 ECTS | 1 ECTS = 25 hr.**

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
RAC 300	Heat Transfer	93	107	8.00	C	
PM 300	Engineering Analysis	63	87	6.00	B	
RAC 301	Refrigeration & Air Conditioning	108	92	8.00	C	
RAC 302	Drawing of Refrigeration & Air Conditioning Systems	48	152	8.00	C	

**Semester 6 | 30 ECTS | 1 ECTS = 25 hr.**

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
PM 301	Machine Design	78	72	6.00	S	
RAC 303	Maintenance of Refrigeration & Air Conditioning Systems	78	122	8.00	C	
PM 303	Electrical & Electronic Engineering	78	72	6.00	B	
PM 302	Computer Applications	63	37	4.00	B	
PM 304	Numerical Analysis	63	87	6.00	C	

**Semester 7 | 30 ECTS | 1 ECTS = 25 hr.**

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
PM 400	Thermal Power Plants	78	97	7.00	C	
RAC 401	Refrigeration Systems	93	82	7.00	C	
RAC 402	Introduction to Renewable Energy	63	87	6.00	C	
NTU 400	Methodology of Scientific Research	32	68	4.00	B	
RAC 403	Principles of Air Conditioning Systems Design	78	72	6.00	C	

**Semester 8 | 30 ECTS | 1 ECTS = 25 hr.**

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
PM 401	Computer Aided Design	63	87	6.00	C	
RAC 404	Design of Air Conditioning Systems	78	72	6.00	C	
PM 402	Control Systems	78	72	6.00	C	
TEMO 400	Engineering and Industrial Management	48	102	6.00	S	
TEMO 401	Project	62	88	6.00	C	



## 8. Contact

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