

# Middle Technical University

## الجامعة التقنية الوسطى



### *First Cycle – Bachelor's Degree (B.Sc.) - Air Conditioning and Refrigeration*

بكالوريوس – هندسة تقنيات التكييف والتبريد (الدورة الأولى)



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### 1. **Mission & Vision Statement**

#### *Vision Statement*

The Air Conditioning (AC) Engineering academic staff of the Technical Engineering Collage-Baghdad at Middle Technical University believe that Providing high-quality technical education that makes the targeted return from the education process more efficient and distinguished by developing technical capabilities, critical thinking skills, social and personal skills, and work values in an ever-changing environment in the mechanical engineering, and AC engineering. Small class sizes within the AC engineering a close working relationship between academic staff and students in an informal and nurturing atmosphere that be a technical leader and innovator in providing high-quality educational programs and services, in a highly competitive global high-tech environment.

#### *Mission Statement*

The AC engineering staff pursues a multifaceted charge at Middle Technical University. AC engineering provides the education in AC field, envisaging various employment capabilities and careers. To prepare students with particular interest in specialized areas of AC systems like: mechanical maintenance of AC systems, AC electricity, Design of AC parts, diagnosis of AC systems and also on for general mechanical engineering.

## 2. Program Specification

<b>Programme code:</b>	BSc-MPAC	<b>ECTS</b>	240
<b>Duration:</b>	4 levels, 8 Semesters	<b>Method of Attendance:</b>	Full Time

AC engineering program is designed to provide students with the skills to improve themselves by preparing them for a career in AC engineering. Students will learn how to manage of AC workshops and make all necessary service and maintenance. The curriculum consists of an AC maintenance and service with modern methods. Students will have the opportunity to know the principles of AC engineering and they will be prepared for careers in companies and programming teams dealing with the design, implementation and operation of information systems. Moreover, the students will be provided with the knowledge of electrical and computer control for AC systems.

Level 1 exposes students to the fundamentals of general mechanical engineering, suitable for progression to all programs within the mechanical power. Level 2 preparing student subject specialist modules at Levels 3 and 4. AC engineering graduate is therefore trained to appreciate how research informs teaching, according to the university and school mission statements.

## 3. Program Goal

To form leading AC engineers in the areas of AC design and maintenance with the ability to diagnose, optimize, construct, and implement a solution to the problems related to the fields of AC design, installation, and maintenance; with quality and respect for the environment, in an ethical and humanistic framework.

## 4. Student Learning Outcomes

- To maintain the electrical, electronic and mechanical systems that are part of the AC systems
- To determine mechanical failures in AC systems, in accordance with the principles of thermodynamic operation using electronic diagnostic equipment.
- To optimize the mechanisms for energy consumption in the AC systems and the air quality, in response to the national and international environment quality standards.
- To participate in production systems in the AC industry seeking the optimization of resources in the manufacturing processes.
- To AC manufacturing processes through the use of current technology for the manufacture of AC parts.
- To develop AC system design projects, using different thermal load estimation software.
- To implement quality and environmental standards in AC refrigerants processes, under national and international control schemes.
- Implement software embedded in engineering drawings and AC ducts and systems drawings.
- To develop the use of renewable energy in AC systems.

- Interpret and communicate adequately technical texts in the native language and in the English language for their use in the field of AC Engineering.

### **Outcome 1**

#### ***Understanding of allied knowledge***

Graduates will be able to maintain the electrical, electronic, and mechanical systems that are part of the AC systems.

### **Outcome 2**

#### ***Oral and Written Communication***

Graduates will be able to formally communicate the results of AC investigations using both oral and written communication skills.

### **Outcome 3**

#### ***Technical and cognitive skills***

Graduates will be able to collect, analyze, process, summarize data and deal with various AC engineering skills like (testing, debugging, word processing, data visualization, ..)

### **Outcome 4**

#### ***Critical thinking and analytical skills***

Graduates will be able to identify engineering problems and try to solve them with approaches based on logical and critical thinking using modeling, designing and simulation methods.

### **Outcome 5**

#### ***Appropriate research tools and techniques***

Graduates will be able to design install, and maintain related AC systems depending on programming software, AC standards, and taking into account the weather and environmental conditions

### **Outcome 6**

#### ***Communication and IT skills***

Graduates will be able to use engineering drawing software (like AutoCAD), AC software for thermal load estimation, and other mechanical design desktop software.

### **Outcome 7**

#### ***Group/team leadership***

Graduates will be able self-motivated, Cooperates effectively with other professionals in different disciplines, backgrounds, and interests to solve problems, works lucidly in confusing situations under pressure, and demonstrates knowledge of and commitment to following safety procedure for self and others.

### **Outcome 8**

#### ***Own professional development***

Graduates will be able to take his own decisions, planning and problem solving, and stay updated professionally.

## 5. Academic Staff

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## 6. Credits, Grading and GPA

### *Credits*

Middle 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 30 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
<b>Success Group</b> (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
<b>Fail Group</b> (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:

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



## 7. Curriculum/Modules

### Semester 1 | 30 ECTS | 1 ECTS = 30 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MPAC100	Mathematics	87	153	240	8.00	
MPAC101	Engineering Drawing	88	92	180	6.00	
MPAC102	Workshops	116	124	240	8.00	
MPAC103	Engineering Materials	60	90	150	5.00	
MPAC104	English	59	31	90	3.00	

### Semester 2 | 30 ECTS | 1 ECTS = 30 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MPAC107	Electrical Engineering	116	94	210	7.00	
MPAC108	Engineering Mechanics	87	123	210	7.00	MPAC100
MPAC109	Thermodynamics 1	144	96	240	8.00	
MPAC110	Humans Rights and Democracy	30	30	60	2.00	
MPAC111	Arabic	30	30	60	2.00	
MPAC112	Computer principles	88	32	120	4.00	
MPAC105	Matlab					

### Semester 3 | 30 ECTS | 1 ECTS = 30 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MPAC200	Advanced Mathematics	102	78	180	6.00	MPAC100
MPAC201	Mechanical Drawing	116	64	180	6.00	MPAC101
MPAC202	Fluid Mechanics	144	96	240	8.00	
MPAC203	Thermodynamics 2	158	142	300	10.00	MPAC109

**Semester 4 | 30 ECTS | 1 ECTS = 30 hrs**

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MPAC205	Fundamentals of Air Conditioning and Refrigeration	144	156	300	10.00	MPAC109
MPAC206	Strength of Materials	116	124	240	8.00	MPAC108
MPAC207	Computer Applications 1	88	92	180	6.00	
MPAC208	English 2	86	94	180	6.00	MPAC104
MPAC209	Summer Training 1	144	156	300	10.00	MPAC109

**Semester 5 | 30 ECTS | 1 ECTS = 30 hrs**

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MPAC300	Engineering and Numerical Analysis	87	33	120	4.00	MPAC200
MPAC301	Computer Applications 2	88	32	120	4.00	MPAC207
MPAC302	Theory of Machine and Vibrations	116	4	120	4.00	MPAC108, MPAC206
MPAC303	Heat Transfer	144	96	240	8.00	MPAC203, MPAC202
MPAC304	Air Conditioning and Refrigeration systems	144	156	300	10.00	MPAC205

**Semester 6 | 30 ECTS | 1 ECTS = 30 hrs**

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MPAC305	Mechanical Design	88	62	150	5.00	MPAC206
MPAC307	Maintenance of Air Conditioning systems	144	156	300	10.00	MPAC205
MPAC308	English 3	44	46	90	3.00	MPAC208
MPAC309	Air Conditioning systems Drawing	116	94	210	7.00	MPAC 201, MPAC205
MPAC311	Electrical and Electronic Engineering	88	62	150	5.00	MPAC107
MPAC310	Summer Training 2	88	62	150	5.00	MPAC206

**Semester 7 | 30 ECTS | 1 ECTS = 30 hrs**

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MPAC400	Project	129	51	180	6.00	MPAC205
MPAC401	Air Conditioning System Design	144	156	300	10.00	MPAC205
MPAC402	Power Plants	144	36	180	6.00	MPAC109
MPAC404	Computer Applications 3	88	62	150	5.00	
MPAC405	Industrial Engineering Management	45	45	90	3.00	

**Semester 8 | 30 ECTS | 1 ECTS = 30 hrs**

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MPAC406	Refrigeration Systems	158	142	300	10.00	MPAC205
MPAC407	Renewable Energy	158	142	300	10.00	MPAC203
MPAC408	Professional Ethics	30	30	60	2.00	
MPAC409	English 4	30	30	60	2.00	MPAC308
MPAC410	Control and Measurements	116	64	180	6.00	MPAC304

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