

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. Overview

This catalogue is about the courses (modules) given by the program of Air Conditioning and Refrigeration Engineering to gain the Bachelor degree. The program delivers (49) Modules with (7200) total student workload hours and 240 total ECTS. The module delivery is based on the Bologna Process.

نظرة عامة

يتناول هذا الدليل المواد الدراسية التي يقدمها برنامج هندسة تقنيات التبريد والتكييف للحصول على درجة البكالوريوس. يقدم البرنامج (49) مادة دراسية، مع (7200) إجمالي ساعات حمل الطالب و240 إجمالي وحدات أوروبية. يعتمد تقديم المواد الدراسية على عملية بولونيا.

2. Undergraduate Courses 2023-2024

Module 1

Code	Course/Module Title	ECTS	Semester
MPAC100	Mathematics	8	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
6		87	153
Description			
Teaching the student the basic and advanced principles of calculus and its applications to develop the students mental abilities to solve problems and make use of available information in the other scientific materials.			

Module 2

Code	Course/Module Title	ECTS	Semester
MPAC101	Engineering Drawing	6	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
6		88	92

Description
Studying the engineering drawing and its importance as related to other engineering materials and developing the student mental and manual abilities to draw simple and complex engineering objects.

Module 3

Code	Course/Module Title	ECTS	Semester
MPAC102	Workshops	8	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
	10	116	124
Description			
The main object of this unit is to identify the students on the gain of the manual skills by preceding the operations and manufacturing processes, and doing the maintenance by using different manual tools and measuring instruments.			

Module 4

Code	Course/Module Title	ECTS	Semester
MPAC103	Engineering Materials	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4		60	90
Description			
Teaching the student, the most important materials (metals and non-metals) used in the manufacturing of air conditioning and refrigeration devices, and studying their crystalline structure and mechanical properties.			

Module 5

Code	Course/Module Title	ECTS	Semester
MPAC104	English	3	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4		59	31
Description			
This course gives the student reading skills, listening skills, speaking skills, and writing Skills			

Module 6

Code	Course/Module Title	ECTS	Semester
MPAC105	Matlab	4	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	4	88	32
Description			
<p>MATLAB is one of the languages used by engineers and scientists to create programs for engineering and scientific calculations. MATLAB allows large amounts of data to be analyzed very efficiently. It is explained how to benefit from the MATLAB language so that the student has the ability to deal comfortably with programming using the language. The curriculum contains: dealing with variables, dealing with matrices operations, making functions, making graphs building interactive programs, and dealing with different toolboxes.</p>			

Module 8

Code	Course/Module Title	ECTS	Semester
MPAC107	Electrical Engineering	7	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	4	116	94
Description			
<p>Teaching the student, the basic principles of electrical technology and applications.</p>			

Module 9

Code	Course/Module Title	ECTS	Semester
MPAC108	Engineering Mechanics	7	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
6		87	123
Description			
<p>The main purpose of this semester is to provide the student with a clear and thorough presentation of the theory and application of engineering mechanics. In a general sense, first to a particle, then to a rigid body subjected to a coplanar system of two- dimensions forces, and finally to three-dimensional force systems acting on a rigid body. This theory is then applied to the equilibrium of both concentrated and distributed force systems and the methods used to simplify them. The principles of rigid-body equilibrium and then applied to specific problems</p>			

involving the equilibrium of trusses, frames, and machines, and to the analysis of internal forces in beams and cables. Applications to problems involving frictional forces are discussed, and topics related to the center of gravity and centroid are treated. Most of these topics are included area and mass moments of inertia and virtual work and potential energy.

Module 10

Code	Course/Module Title	ECTS	Semester
MPAC109	Thermodynamics 1	8	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
6	4	144	96
Description			
Studying the principles of thermodynamics including thermal systems according to energy interactions with their direct surroundings, the differences in the properties of both the system and the surrounding with their engineering applications			

Module 11

Code	Course/Module Title	ECTS	Semester
MPAC110	Humans Rights and Democracy	2	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		30	30
Description			
This course defining the principles of human rights, their historical development, identifying non-governmental and international organizations, international agreements and the concept of administrative corruption, as well as introducing the student to the principles of human rights, conventions and international declarations of human rights.			

Module 12

Code	Course/Module Title	ECTS	Semester
MPAC111	Arabic	2	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		30	30
Description			
The course addresses basic knowledge of the Arabic language which can be used in the academic environment.			

Module 13

Code	Course/Module Title	ECTS	Semester
MPAC112	Computer principles	4	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	4	88	32
Description			
Providing the student with the skills of dealing with basic office applications, creating office files and documents, using operating systems, as well as the basics of working with the digital environment.			

Module 14

Code	Course/Module Title	ECTS	Semester
MPAC200	Advanced Mathematics	6	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
6	1	102	78
Description			
To introduce students to the mathematical concepts and techniques that They will encounter in the various engineering. To develop an awareness of the role of mathematics in the solution of Engineering problems			

Module 14

Code	Course/Module Title	ECTS	Semester
MPAC201	Mechanical Drawing	6	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	6	116	64
Description			
Teaching the student, the basic skill of reading engineering drawing along with their simples and terms as well as the standards. knowledge of assembly drawings and how to use ACD in mechanical drawing			

Module 15

Code	Course/Module Title	ECTS	Semester
MPAC202	Fluid Mechanics	8	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
6	5	158	142

Description
Gain knowledge of the basic fluid behavior and how it could be calculated, handled and controlled.

Module 16

Code	Course/Module Title	ECTS	Semester
MPAC203	Thermodynamics 2	10	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
6	4	158	142
Description			
To study the principles of applied thermodynamics, as the basis of refrigeration and air conditioning engineering and power plant subjects			

Module 17

Code	Course/Module Title	ECTS	Semester
DS2318	Electrical Engineering2	4	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	5	101	120
Description			
To study the principles of electrical machines that are necessary for refrigeration and air conditioning engineers.			

Module 18

Code	Course/Module Title	ECTS	Semester
MPAC208	English 2	6	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2	86	94
Description			
New headway plus pre-intermediate			

Module 19

Code	Course/Module Title	ECTS	Semester
MPAC205	Fundamentals of Air Conditioning and Refrigeration	10	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
6	4	144	156
Description			
<p>This topic aims to enable and qualify the student to the basic processes of refrigeration and conditioning, identifying the properties of air and the processes that take place on the moisture content of air, and learn about the different cooling media and how to use their tables and curves. In addition, the student will learn about the refrigeration compression system and its accessories.</p>			

Module 20

Code	Course/Module Title	ECTS	Semester
ME207	Computer Applications	6	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	4	88	92
Description			
<p>To make the student able to process, program, and solve arithmetic and engineering problems using Matlab</p>			

Module 21

Code	Course/Module Title	ECTS	Semester
MPAC300	Engineering and Numerical Analysis	4	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
6		87	33
Description			
<p>This course aims to provide a good knowledge to the students about the Engineering and numerical analysis with understand the basis of solutions and their application in different branches of engineering / mechanical, material, Civil and power.</p>			

Module 22

Code	Course/Module Title	ECTS	Semester
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MPAC301	Computer Applications 2	4	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	5	101	19
Description			
<p>The student will be able to draw and design various mechanical parts most commonly used in the mechanical industries. The student should be able to use software to characterize mechanical parts, move from lengthy paper calculations to fast computer operations, compare results in terms of accuracy and speed, and perform calculations of the moment of inertia and bending of certain mechanical parts. The student understands and applies simulations to calculate and solve various problems of simple and compound types of beams and under different loads, point, diffuse, or twisting moment.</p>			

Module 23

Code	Course/Module Title	ECTS	Semester
MPAC302	Theory of Machine and Vibrations	4	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	4	116	4
Description			
<p>To develop students' fundamental knowledge and insight into the theory of machines , balancing of rotating masses, theory of gears, governors, cams, belts, free vibrations and damped vibration to be used in machines design</p>			

Module 24

Code	Course/Module Title	ECTS	Semester
MPAC303	Heat Transfer	8	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
6	4	144	96
Description			
<p>To develop students' fundamental knowledge and insight into the physical principles and evolving technical capabilities of heat transfer principles including conduction, convection and radiation modes, finned surfaces, heat exchangers, and the applications in the Air conditioning , Refrigeration, and Automotive engineering.</p>			

Module 25

Code	Course/Module Title	ECTS	Semester
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MPAC304	Air Conditioning and Refrigeration systems	10	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
6	4	144	156
Description			
To develop students' fundamental knowledge and insight into the physical principles and evolving technical capabilities of heat transfer principles including conduction, convection and radiation modes, finned surfaces, heat exchangers, and the applications in the Air conditioning, Refrigeration, and Automotive engineering.			

Module 26

Code	Course/Module Title	ECTS	Semester
MPAC305	Mechanical Design	5	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2	88	62
Description			
Teaching the students, basic principles to design different machine parts and teach them varying loads and thermal stresses to design complete part for different mechanisms			

Module 29

Code	Course/Module Title	ECTS	Semester
DM3329	Maintenance of Air Conditioning systems	10	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	8	144	156
Description			
Study the maintenance of all types of refrigeration system. Introducing students to all the basic topics of this course, the theoretical side and the practical side. Introduces theories and operations of heating and air conditioning system. Includes service, testing and repair of air conditioning, ventilation, and heater and engine cooling systems			

Module 30

Code	Course/Module Title	ECTS	Semester
MPAC309	Air Conditioning systems Drawing	7	6

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	6	116	94
Description			
<p>This course aims to provide a student the ability to read and draw an architectural plan. Provide a student the basics of ducting network drawing. Explain and draw the types of piping systems. draw the installation and detail drawing for refrigeration and air conditioning devices.</p>			

Module 36

Code	Course/Module Title	ECTS	Semester
MPAC308	English language 3	3	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	1	44	46
Description			
<p>This course aims to develop students' knowledge, understanding and fluency in their use of the English language and to build their skills as effective communicators in daily activities and universal topics. Students improve their control of language by reading and viewing a range of texts, listening to various audios, practicing speaking, and discovering grammar that used in everyday activities; in addition to learning an intermediate skill of writing.</p>			

Module 37

Code	Course/Module Title	ECTS	Semester
MPAC401	Air Conditioning System Design	10	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
6	4	144	156
Description			
<p>This course focuses on the design and optimization of air conditioning systems for buildings. The course covers the principles of thermodynamics, heat transfer, and fluid mechanics as they apply to air conditioning systems. Students will learn how to design and size components such as coils, and fans. The course also covers the selection of refrigerants and the environmental impact of air conditioning systems as well as advanced psychrometric process. Students will gain hands-on experience through design projects and simulations using industry-standard software. The course will also cover energy efficiency and sustainability considerations in air conditioning system design.</p>			

Module 38

Code	Course/Module Title	ECTS	Semester
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MPAC405	Industrial Engineering Management	3	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3		45	45
Description			
<p>Providing the engineer with information related to the management of the industrial unit (productivity) and its structural composition and finding the optimal solution using known methods in operations research and other engineering mathematical methods.</p>			

Module 39

Code	Course/Module Title	ECTS	Semester
MPAC402	Power Plants	6	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
6	4	144	36
Description			
<p>Introduce the student to the basic processes of power cycles. Identifying the properties of steam from tables and the processes that take place on the steam power plants cycle. Learn about the different parts of the steam power plants and how it working. Learn about the calculation the performance of each part of the steam power plants and the accessories.</p>			

Module 40

Code	Course/Module Title	ECTS	Semester
MPAC404	Computer Applications 3	5	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	4	88	62
Description			
<p>The student will be able to draw and design various mechanical parts most commonly used in the mechanical industries. The student should be able to use software to characterize mechanical parts, move from lengthy paper calculations to fast computer operations, compare results in terms of accuracy and speed, and perform calculations of the moment of inertia and bending of certain mechanical parts. The student understands and applies simulations to calculate and solve various problems of simple and compound types of beams and under different loads, point, diffuse, or twisting moment.</p>			

Module 42

Code	Course/Module Title	ECTS	Semester
MPAC406	Refrigeration systems	10	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)

6	4	158	142
Description			
Enhance the students' knowledge of the principles of vapor compression refrigeration systems and its analysis. Provide the students the basic design of all components for vapor refrigeration system. studying types of refrigeration units and cryogenic refrigeration.			

Module 43

Code	Course/Module Title	ECTS	Semester
MPAC407	Renewable Energy	10	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
6	4	158	142
Description			
Provide the students the basic knowledge of all sources of renewable energies. Provide the students the fundamentals of the different power generations systems working based on renewable energies. Provide the students the experimental training about the different renewable energy systems.			

Module 44

Code	Course/Module Title	ECTS	Semester
MPAC410	Control and Measurement	6	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	4	116	64
Description			
Knowing the aims of the control systems and their importance in the HVAC. Providing enough details to understand each element in the HVAC control system. Providing a more in-depth understanding of troubleshooting HVAC control systems. The student will be able to follow and read wiring diagrams.			

Contact

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