

## Course Description Form

<b>1. Course Name:</b>					
Air Conditioning System Design/ 4 <sup>th</sup>					
<b>2. Course Code:</b>					
MPAC401					
<b>3. Semester / Year:</b>					
(Annual System) (2024-2025)					
<b>4. Description Preparation Date:</b>					
23/09/2024					
<b>5. Available Attendance Forms:</b>					
Theoretical and Practical Classes					
<b>6. Number of Credit Hours (Total) / Number of Units (Total)</b>					
60 hrs. (theoretical) + 30 hrs. (practical) /6 units					
<b>7. Course administrator's name (mention all, if more than one name)</b>					
Name: Ihab Omar Email: ihab.om@uowa.edu.iq					
<b>8. Course Objectives</b>					
<b>Course Objectives</b>		<ul style="list-style-type: none"> <li>a) Helping the student understand the properties of the mixture of air and vapor.</li> <li>b) Helping the student to understand the behavior of the air and vapor mixture.</li> <li>c) Helping the student to understand and use the laws for calculating the properties of air and vapor mixtures.</li> <li>d) Helping the student understand, use and design fans.</li> <li>e) Helping the student understand, use and design water pipes</li> <li>f) Helping the student understand the parts of the air handling unit, air purification, and devices used.</li> </ul>			
<b>9. Teaching and Learning Strategies</b>					
<b>Strategy</b>		<ul style="list-style-type: none"> <li>1- Lectures and illustrations: Data Show</li> <li>2- Practical tests using laboratory equipment</li> <li>3- Multimedia using the e-learning system</li> <li>4- Giving the lecture, answering students' questions, and discussing with the students aspects that are not clear to them.</li> </ul>			
<b>10. Course Structure</b>					
<b>Week</b>	<b>Hours</b>	<b>Required Learning Outcomes</b>	<b>Unit or subject name</b>	<b>Learning method</b>	<b>Evaluation method</b>
1-2	2 theoretical + 2 practical	The student understands: 1. Air distribution 2. zoning air 3. Duct layout	Air handling and distribution systems ,zoning,  Air –conditioning layout systems ,duct sizing	A theoretical and a practical lecture	Weekly exams

3-4	2 theoretical + 2 practical	The student understands: 1. Room air distribution 2. Air distribution requirements 3. Air outlets	Room air distribution, conditioned room air distribution systems, room air distribution requirements, air outlets (types), calculation and selection, design.	A theoretical and a practical lecture	Weekly exams, pre and post questions
4-6	3 theoretical + 2 practical	The student understands: 1. Air –handling units 2. Components	Air –handling units, fan-coil units (components, calculation, design and selection) system resistance in series and parallel.	A theoretical and a practical lecture	Weekly exams, and post questions
6-7	2 theoretical + 2 practical	The student understands: 1. Fans 2. types 3. designs 4. selection	Fans ( types ,designs ,selection ,calculation and connection in series and parallel point the working point by system and characteristics curves.	A theoretical and a practical lecture	Weekly exams, and post questions
8	2 theoretical + 2 practical	The student understands: 1. Air filtration 2. types 3. function 4. selection	Air filtration (types, application, selection and relations with conditioned room function.	A theoretical and a practical lecture	Weekly exams, and post questions
9	2 theoretical + 2 practical	The student understands: 1. noise in air conditioning systems 2. Sources 3. treatments	The noise in air conditioning systems. (Sources and treatments by using ducts silencers and plenum), air outlet selection with recommended noise.	A theoretical and a practical lecture	Weekly exams, and post questions
10-12	2 theoretical + 2 practical	The student understands: 1. psychrometric charts applications	Advanced applications of psychrometric charts.	A theoretical and a practical lecture	Weekly exams, and post questions
13-14	2 theoretical + 2 practical	The student understands: 1. Piping’s systems 2. accessories 3. types 4. design	Piping’s systems and accessories (open and closed system), (two, three, four pipe system) comparative study and design and applications.	A theoretical and a practical lecture	Weekly exams, and post questions
15	2 theoretical + 2 practical	The student understands: 1. Evaporative cooling 2. application	Evaporative cooling system application and design of cooler, cooling tower, and washers), psychrometric chart.	A theoretical and a practical lecture	Weekly exams, and post questions
16	2 theoretical + 2 practical	The student understands: 1. Air conditioning systems	Air conditioning system (types and selection) and relation with occupant activities.	A theoretical and a practical lecture	Weekly exams, and post questions
17-18	2 theoretical + 2 practical	The student understands: 1. All air systems	All air systems, design, features, advantages,	A theoretical and a practical lecture	Weekly exams, and post questions

			disadvantages, comparative study with other systems and psychometric chart.	lecture	questions
19	2 theoretical + 2 practical	The student understands: 1. Air conditioning systems	Single zone system (variable volume constant temperature and variable temperature constant volume), comparative study (cost and performance), psychometric chart.	A theoretical and a practical lecture	Weekly exams, and post questions
20	2 theoretical + 2 practical	The student understands: 1. Dual conduit systems	Dual conduit system, multi-zone system comparative study, psychometric chart.	A theoretical and a practical lecture	Weekly exams, and post questions
21	2 theoretical + 2 practical	The student understands: 1. Air-water systems	Air-water systems (types, design, features, advantages, disadvantages, comparative study with other systems, psychometric chart.	A theoretical and a practical lecture	Weekly exams, and post questions
22	2 theoretical + 2 practical	The student understands: 1. Induction unit systems	Induction unit systems (study, design, types, and controls).	A theoretical and a practical lecture	Weekly exams, and post questions
23	2 theoretical + 2 practical	The student understands: 1. All-water systems	All-water systems, comparative performance, design and applications.	A theoretical and a practical lecture	Weekly exams, and post questions
24	2 theoretical + 2 practical	The student understands: 1. Fan-coil unit	Fan-coil unit systems, a primary air and fan-coil system (comparative study, design and control)	A theoretical and a practical lecture	Weekly exams, and post questions
25	2 theoretical + 2 practical	The student understands: 1. Dx-systems 2. package system	Dx-systems, package system, control and applications.	A theoretical and a practical lecture	Weekly exams, and post questions
26	2 theoretical + 2 practical	The student understands: 1. Energy conservation	Energy conservation in conditioning systems.	A theoretical and a practical lecture	Weekly exams, and post questions
27	2 theoretical + 2 practical	The student understands: 1. Heat recovery systems	Heat recovery systems.	A theoretical and a practical lecture	Weekly exams, and post questions
28	2 theoretical + 2 practical	The student understands: 1. Heat pump system	Heat pump system for air conditioning system.	A theoretical and a practical lecture	Weekly exams, and post questions
29-30	2 theoretical + 2 practical	The student understands: 1. Evaluations air conditioning systems 2. Analysis air conditioning systems	evaluations and commercial analysis for air conditioning systems.	A theoretical and a practical lecture	Weekly exams, and post questions

## 11. Course Evaluation

1. Daily oral questions.
2. Discussion and dialogue with students

3. Attendance
4. Bi-monthly oral exams.
5. Monthly written tests.
6. Semester exam (first semester + second semester)
7. Final annual exam.

## 12. Learning and Teaching Resources

Required textbooks (curricular book any)	"ASHRAE fundamentals Handbook for air conditioning Refrigeration", SI, 2013.
Main references (sources)	Wilbert F., Stoecker and Lekold W. Jones, " Refrigeration and Air condition McGraw-Hill, 1982 .
Recommended books and references (scientific journals, reports...)	1- Dr. Abdul Hadi N. Khalifa, Refrigeration and Air conditioning Engineering Dept. Engineering Technical College 3rd year – refrigeration and Air conditioning Course,2015. 2- Nihal E Wijesundera, principles of heating ventilation and air conditioning worked examples
Electronic References, Websites	