

**The University of Jordan
School of Engineering**



Department	Course Name	Course Number	Semester
Mechanical Engineering	Air Conditioning (1)	0934445	

2019 Course Catalog Description

This course is designed to introduce students to basics of heating, ventilation, and air conditioning (HVAC) for residential buildings. The following topics will be discussed: Review of psychrometry. Air conditioning processes. Thermal comfort. Inside and outside design conditions. Heat transfer in building envelope. Ventilation and infiltration. Heating load calculations. Hot water heating systems layout and design. Under floor heating system. Solar radiation. Cooling load calculations. Air systems design.

Instructors

Name	E-mail	Sec	Office Hours		Lecture Time	

Text Books

Title	Heating and air conditioning for residential buildings
Author(s)	Alsaad M. & Hammad M.
Publisher, Year, Edition	Ajjal press, 2016, 6 th edition

References

Books	National Building Code of Jordan. (1990) Jordanian code for central heating .
Journals	
Internet links	https://www.ashrae.org/

Prerequisites

Prerequisites by topic	1. Basic heat transfer concepts, such as conduction, convection and radiation 2. Basic thermodynamic concepts such as energy, work and heat, Psychrometrics. 3. Basics of fluid mechanics, with concentration on pressure drop in pipes Basics of heat transfer, with concentration on conduction, fins, convection and radiation.
Prerequisites by course	Thermodynamics II 0904342 + Heat Transfer (1) 0904441
Co-requisites by course	-
Prerequisite for	Air conditioning (2)

Topics Covered

Week	Topics	Chapter in Text	Sections
1	Introduction to HVAC	Chapter 1	
2	Fundamental properties of air and water vapor mixtures.	Chapter 2	
3	Introduction to the psychrometry of air conditioning process.	Chapter 3	
4-5	Human Comfort, inside and outside design conditions.	Chapter 4	
5-6	Heat Transfer in buildings	Chapter 5	
6-7	Heating load calculation.	Chapter 6	
8-9	Design of heating systems.	Chapters 7 + 8 + catalogues	
10-12	Cooling load calculation.	Chapter 9	
13-14	Design of cooling systems.	Chapter 9 + catalogues	

Mapping of Course Outcomes to ABET Student Outcomes

SOs	Course Outcomes
2	1. Evaluate the heating and cooling loads of a building and design a suitable air conditioning system.

4	2. Ensure comfort for occupants with low energy consumption and environmental impact through the air conditioning system design.
5	3. Apply the Jordanian local codes and the ASHRAE codes in the procedure of selecting design parameters.

Evaluation

Assessment Tools	Expected Due Date	Weight
Midterm Exam		30 %
Project		20 %
Final Exam		50 %

Contribution of Course to Meet the Professional Components

The course contributes to building the knowledge and skills required for the design of air conditioning systems for residential and commercial buildings based on the local.

Relationship to Student Outcomes

SOs	1	2	3	4	5	6	7
Availability		X		X	X		

Relationship to Mechanical Engineering Program Objectives (MEPOs)

MEPO1	MEPO2	MEPO3	MEPO4	MEPO5

ABET Student Outcomes (SOs)

1	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2	An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3	An ability to communicate effectively with a range of audiences
4	An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5	An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6	An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7	An ability to acquire and apply new knowledge as needed, using appropriate learning strategies

Updated by ABET Committee, 2021