

**The University of Jordan  
School of Engineering**



Department	Course Name	Course Number	Semester
Mechanical Engineering	Refrigeration systems	0904453	

**2019 Course Catalog Description**

Basic definitions and concepts, review of vapor compression and absorption cycles, compressors, condensers, evaporators, expansion devices, refrigerants, cooling towers, components of an absorption cycles, controls.

**Instructors**

Name	E-mail	Sec	Office Hours		Lecture Time	

**Text Books**

	Text book 1	Text book 2
<b>Title</b>	Refrigeration systems and Application	
<b>Author(s)</b>	Dincer Ibrahim	
<b>Publisher, Year, Edition</b>	Wiley, 2017, 3 <sup>rd</sup> Edition	

**References**

<b>Books</b>	ASHRAE Handbook (Fundamentals volume)
<b>Journals</b>	
<b>Internet links</b>	<a href="https://www.ashrae.org/">https://www.ashrae.org/</a>

**Prerequisites**

<b>Prerequisites by topic</b>	<ol style="list-style-type: none"> <li>1. First and second law of thermodynamics</li> <li>2. Thermodynamics of mixtures</li> <li>3. Basics of fluid mechanics</li> <li>4. Basics of convection, conduction and radiation heat transfer</li> <li>5. Heat exchangers</li> </ol>
<b>Prerequisites by course</b>	Thermodynamics (2) - 0904342 + Heat Transfer (1) 0904441
<b>Co-requisites by course</b>	-
<b>Prerequisite for</b>	-

**Topics Covered**

Week	Topics	Chapter in Text	Sections
1-2	Introduction and applications of refrigeration and air conditioning	1	1-2
3	The vapor-compression cycle	10	3
4	Compressors	11	4
5	Condensers and evaporator	12	5
6	Expansion devices	13	6
7	Vapor-compression system analysis	14	7
8	Refrigerants: ozone depletion and new refrigerants	15 & outlines	8
9	Multi-pressure systems.	16	9
11-15	Absorption Refrigeration Systems: Lithium Bromide and Aqua-Ammonia	17	11-15

**Mapping of Course Outcomes to ABET Student Outcomes**

<b>SOs</b>	<b>Course Outcomes</b>
4	1.Evaluate the refrigeration loads of cold stores, and design a suitable refrigeration system that satisfies the loads. 2.Understand the end user requirement for a refrigeration plant and design an appropriate refrigeration system. 3.Analyze the performance of the vapor compression and absorption cycles. 4.Study the basic principles of the operation of compressors and their types 5.Size and select the proper compressors and refrigeration plant components. 6.Understand the effect of the selection of refrigeration systems components materials on their performance and the environment.
7	7.Explain the vital rule of refrigeration systems on the life quality of humankind in residential and commercial buildings.

### **Evaluation**

<b>Assessment Tools</b>	<b>Expected Due Date</b>	<b>Weight</b>
<b>Presentation</b>		10 %
<b>Midterm Exam</b>		30 %
<b>Project</b>		10 %
<b>Final Exam</b>		50 %

### **Contribution of Course to Meet the Professional Components**

The course contributes to building the knowledge and skills required for the sizing and design of refrigeration systems.

### **Relationship to Student Outcomes**

<b>SOs</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
<b>Availability</b>				X			X

### **Relationship to Mechanical Engineering Program Objectives (MEPOs)**

<b>MEPO1</b>	<b>MEPO2</b>	<b>MEPO3</b>	<b>MEPO4</b>	<b>MEPO5</b>

### **ABET Student Outcomes (SOs)**

<b>1</b>	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
<b>2</b>	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
<b>3</b>	An ability to communicate effectively with a range of audiences
<b>4</b>	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
<b>5</b>	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
<b>6</b>	An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
<b>7</b>	An ability to acquire and apply new knowledge as needed, using appropriate learning strategies

**Updated by ABET Committee, 2021**