

# The University of Jordan School of Engineering



Department	Course Name	Course Number	Semester
Mechanical Engineering	Turbomachinery	0904466	

## 2019 Course Catalog Description

Review of basic thermodynamics and fluid mechanics, types of turbomachines, 2-D cascades, Fans Laws, Principles of operation of compressors and pumps, centrifugal pumps, axial-flow pumps, axial-flow turbines, radial-flow turbines and different types of turbines.

## Instructors

Name	E-mail	Sec	Office Hours	Lecture Time
				Mon, Wed

## Text Books

	Text book 1	Text book 2
<b>Title</b>	Fluid Mechanics and Thermodynamics of Turbomachinery	
<b>Author(s)</b>	S. L. Dixon and C. A. Hall	
<b>Publisher, Year, Edition</b>	Elsevier Inc. 2014, 7 <sup>th</sup> edition	

## References

<b>Books</b>	<ol style="list-style-type: none"> <li>1. E. Logan, "Turbomachinery: Basic Theory and Applications", CRC Press, 2<sup>nd</sup> edition, 1993</li> <li>2. O. E. Balje, "Turbomachinery, a guide to design, selection and theory", John Wiley and Sons, 1981</li> <li>3. D. G. Shepherd, "Principles of Turbomachinery", Macmillan Publishing Co., 1956</li> <li>4. H.I.H. Saravanamuttoo, G.F.C. Rogers, Paul Straznicky, H. Cohen, and A.C.Nix, "Gas Turbine Theory", Pearson, 7<sup>th</sup> edition, 2017</li> </ol>
<b>Journals</b>	
<b>Internet links</b>	

## Prerequisites

<b>Prerequisites by topic</b>	
<b>Prerequisites by course</b>	Fluid Mechanics I 0904361 + Thermodynamics II 0904342
<b>Co-requisites by course</b>	-
<b>Prerequisite for</b>	-

## Topics Covered

Week	Topics	Chapter in Text	Sections
1-2	Basic concepts, pumps and turbines		
3-4	Centrifugal and axial flow pumps curves		
5-7	Hydraulic, Impulse and reaction turbines		
8-10	Pelton, Francis and Kaplan turbines		
11-12	Centrifugal and axial-flow compressors		
13	Compressible fluid flow		
14	Steam and Gas turbines		

## Mapping of Course Outcomes to ABET Student Outcomes

SOs	Course Outcomes
1	1. Ability to be acquainted with the different types of pumps, compressors and turbines. 2. Ability to understand the operation principles of pumps, compressors and turbines.
2	3. Ability to apply basic principles and to select the appropriate turbomachine for certain applications
7	4. Recognizing the state of art technology in the area of Turbomachinery.

## Evaluation

Assessment Tools	Expected Due Date	Weight
Homework and Quizzes		20 %
Midterm Exam		30 %
Final Exam		50 %

### Contribution of Course to Meet the Professional Components

The course contributes to building the fundamental basic concepts of fluid statics and motion analysis and basic fluid mechanical piping systems design.

### 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)

<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, 2024**