The University of Jordan /
School of Engineering

Department	Course Name	Course Number	Semester
Mechanical Engineering	Turbomachinery	0904466	Summer, 2022/2023

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 Tu, Wed	Lecture Time Su, Mon Tu, Wed, Th
Dr. Rafiq Manna'	r.manna@ju.edu.jo	1	09:30 - 10:30	08:30 - 09:30

Textbooks

	Textbook 1	Textbook 2
Title	Fluid Mechanics and Thermodynamics of Turbomachinery	
Author(s)	S. L. Dixon and C. A. Hall	
Publisher, Year, Edition	Elsevier Inc. 2014, 7th edition	

References

Books	1. E. Logan, "Turbomachinery basic theory and application". Marcel Dekker Inc. 2. O. Balje, "Turbomachinery, a guide to design, selection and theory". John Wiley and Sons. 3. D. Shepherd," Principle of turbomachinery" Macmillan Publishing Co.
Journals	
Internet links	

Prerequisites

Prerequisites by topic	1. Differentiation and integration. 2. Concepts of thermodynamics. 3. Concepts of fluid mechanics. 4. Types of compressors, pumps and turbines.
Prerequisites by course	1. Fluid Mechanics I 0904361 2. Thermodynamics II 0904342
Co-requisites by course	-
Prerequisite for	-

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
Mid-Term Exam	01/08/2023	50 %
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)

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