

**The University of Jordan
School of Engineering**



Department	Course Name	Course Number	Semester
Mechanical Engineering	Energy Conversion	0904459	

2019 Course Catalog Description

Energy classification, sources and utilization, Energy growth and economics, Fossil Fuel Systems and combustion in steam power plants. Steam generators. Boiler rating and performance. Environmental aspects of thermal power plants. Overview on renewable energy sources with emphasis on solar and wind energy systems. Introduction to direct energy conversion systems, Thermoelectric, photovoltaic and thermionic converters. Energy Storage.

Instructors

Name	E-mail	Sec	Office Hours	Lecture Time

Text Books

	Text book 1	Handout by the Instructor
Title	Principles of Energy Conversion	
Author(s)	Archie W. Culp	
Publisher, Year, Edition	McGraw-Hill, 1991, 2 nd Edition	

References

Books	Solar Engineering of Thermal Processes, by John Duffie and William Beckman, John Wiley, 2014, 4 th edition
Journals	
Internet links	www.memr.gov.jo ; www.ica.org/statist/index.htm www.inerdata.fr ; www.eia.doe.gov/emeu/cabs/east-med/background www.worldbank.org

Prerequisites

Prerequisites by topic	1. Basic thermodynamic concepts such as systems and properties; energy, work and heat. 2. Thermal power cycles. 3. Vapor and gas mixtures. 4. Chemical reactions of combustion. 5. Basics of fluid mechanics and heat transfer.
Prerequisites by course	Thermodynamics (2) 0904342
Co-requisites by course	-
Prerequisite for	-

Topics Covered

Week	Topics	Chapter in Text	Sections
1, 2	1. Energy classification, resources and utilization.	Chapter 1	1.1, 1.4, 1.5, 1.7
3, 4	2. Principal fuels for energy conversion.	Chapter 2	
5,6,7	3. Production of thermal energy.	Chapter 3	
8,9,10	4. Fossil fuel systems.	Chapter 4	
11,12	5. Environmental impact of power plant operation.	Chapter 6	
13	6. Production of electrical energy (by direct energy conversion).	Chapter 8	
14	7. Wind energy.	Chapter 7	7.3.3
15	8. Solar energy.	Chapter 2 & 8	2.5, 8.4
16	9. Geothermal energy.	Handout Chapter 9	

	10. Energy storage and conservation.		
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Mapping of Course Outcomes to ABET Student Outcomes

SOs	Course Outcomes
4	1.The ability to deal with engineering standards and most of the following constraints in engineering design: economic, health and safety, environmental, ethical, social, political, manufacturability, sustainability.
7	2.An ability to find, evaluate and use resources to learn independently.

Evaluation

Assessment Tools	Expected Due Date	Weight
First Exam		20%
Second Exam		20%
Project		10%
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

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