The University of Jordan
School of Engineering

Department	Course Name	Course Number	Semester
Mechanical Engineering	Thermodynamics II	0904342	

2019 Course Catalog Description

Review of basic laws and principles. Irreversibility and availability, Vapour and air power and refrigeration cycles. Mixtures of real gases and vapours. Psychrometry. Combustion. Elementary chemical kinetics, Principles of Flow through a Nozzle.

Instructors

Name	E-mail	Sec	Office Hours		Lecture Time	

Text Books

	Text book 1	Text book 2
Title	Thermodynamics / An Engineering Approach	
Author(s)	Y. Cengel and M. Boles	
Publisher, Year, Edition	McGraw Hill, 2011, 7th SI	

References

Books	1. Fundamentals of Thermodynamics, R. Sonntag, C. Borgnakke, and G. Van Wylen, sixth edition, 2003, John Wiley and Sons, Inc. USA. 2. Fundamentals of Engineering Thermodynamics, H. Shapiro and M. Moran, Fifth edition, 2004, John Wiley and Sons, Inc. USA.
Journals	Journal of Thermodynamics
Internet links	http://www.hindawi.com/journals/jther/

Prerequisites

Prerequisites by topic	Steam properties, first and second law, ideal gas laws and entropy
Prerequisites by course	Thermodynamics I 0904341
Co-requisites by course	-
Prerequisite for	Internal Combustion Engines ; Power plant ; Air conditioning and Energy Conversion

Topics Covered

Week	Topics	Chapter in Text	Sections
1	1. Refrigeration cycles with exergy application 2. Gas mixtures 3. Chemical reactions 4. Compressible fluid flow (If time permits)	12 14 16	
2	5. Gas-Vapor Mixtures and Psychrometry	15	
2-3	6. Air standard power cycles with exergy application	9-11	
4	7. Vapor power cycles with exergy application	10	

Mapping of Course Outcomes to ABET Student Outcomes

SOs	Course Outcomes
1	1. Understand how to calculate the properties of ideal/non-ideal gas mixtures and apply this to calculate the properties of air-water vapor mixtures, and chemical thermodynamics processes. 2. Calculate stagnation properties of high-speed flows and apply these properties for one-dimensional, compressible flow to isentropic flow though nozzles and to the process occurring across a normal shock wave. 3. Understand how thermodynamics cycles work and apply first and second law concepts to thermodynamic cycles to calculate their performance parameters and methods for their improvement

Evaluation

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

Contribution of Course to Meet the Professional Components

The course contributes to building the skills of design and selection of basic gas and vapor power cycles, refrigeration, and air conditioning systems plants, and calculation of heat transfer from combustion.

Relationship to Student Outcomes

SOs	1	2	3	4	5	6	7
Availability	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