Jordan University of Science and Technology

Faculty of Engineering

Mechanical Engineering Department

ME321 Thermodynamic (1) - JNQF Level: 6

First Semester 2023-2024

Course Catalog
3 Credit Hours. Thermodynamics concepts and definitions, states, properties, systems, control volume, processes, cycles, units, tables of properties, work and heat, first law, internal energy and enthalpy, conservation of mass, steady? state and uniform state processes, second law, heat engines and refrigerators, reversible processes, entropy, principle of the increase of entropy, efficiencies, irreversibility and availability.

Text Book	
Title	Thermodynamics, an Engineering Approach
Author(s)	Yunus A. Cengel, and Michael A. Boles
Edition	10th Edition
Short Name	Ref # 1
Other Information	

Instructor	
Name	**Prof. Mohammad Alkam**
Office Location	-
Office Hours	Sun : 10:00 - 11:00 Mon : 10:00 - 12:00 Tue : 11:30 - 13:30 Wed : 10:00 - 11:00
Email	alkam@just.edu.jo

Class Schedule & Room

Section 1:
Lecture Time: Mon : 08:30 - 10:00
Room: M5125

Section 2:
Lecture Time: Wed : 08:30 - 10:00
Room: M5125

Prerequisites		
Line Number	**Course Name**	**Prerequisite Type**
921010	PHY101 General Physics (1)	Prerequisite / Study
902030	MATH203 Ordinary Differential Equations	Prerequisite / Study
911020	CHEM102 General Chemistry (2)	Prerequisite / Study

Tentative List of Topics Covered		
Weeks	**Topic**	**References**
Weeks 1, 2	Introduction and Basic Concepts	
Weeks 3, 4	Energy, Energy Transfer, and General Energy Analysis	
Weeks 5, 6	Properties of Pure Substances	
Weeks 7, 8	Energy Analysis of Closed Systems	
Weeks 9, 10	Mass and Energy Analysis of Control Volumes	
Weeks 11, 12	The Second Law of Thermodynamics	
Weeks 13, 14, 15, 16	Entropy	

Mapping of Course Outcomes to Program Outcomes and NQF Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
Obtain thermodynamics properties using tables, charts and equations. [SO1] [1SO1] [1L6K1, 2L6K2]	20%	First exam, Final exam
Quantify forms of energy including heat and work that are involved in energy balance of a thermodynamic system. [SO1] [1SO1] [1L6K1, 1L6K2]	20%	First exam, Final exam
Apply the first law of thermodynamics on closed and open systems to model a thermodynamic system. [SO1] [1SO1] [1L6K1, 1L6K2]	20%	Second exam, Final exam
Apply the second law of thermodynamics to model heat engines, heat pumps and refrigeration cycles. [SO1] [1SO1] [1L6K1, 1L6K2]	20%	Final exam

Apply entropy analysis to balance entropy of thermodynamics systems. [SO1] [1SO1] [1L6K1, 1L6K2]	20%	Final exam

Relationship to Program Student Outcomes (Out of 100%)						
SO1	SO2	SO3	SO4	SO5	SO6	SO7
100						

Relationship to NQF Outcomes (Out of 100%)	
L6K1	L6K2
46.67	53.33

Evaluation	
Assessment Tool	**Weight**
First exam	30%
Second exam	30%
Final exam	40%

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