



## ChE 242: Engineering Thermodynamics

3 credit hour, 3 contact hour lecture, 3 credit hour Eng.

### Instructor

Instructor: Dr. Munther Kandah

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### Textbooks & References

#### A. Textbook

	<b>Textbook 1</b>
<b>Title</b>	Thermodynamics an Engineering Approach
<b>Author(s)</b>	Gengel, A.Y., and Boles, A.M
<b>Publisher</b>	McGraw-Hill
<b>Year</b>	2011
<b>Edition</b>	7 <sup>th</sup> Edition

#### B. References

1. Fundamentals of Engineering Thermodynamics, Michael J. Moran , Howard N. Shapiro, Daisie D. Boettner, Margaret B. Bailey, 8<sup>th</sup> edition, 2014.
2. Fundamentals of Thermodynamics, Claus Borgnakke , Richard E. Sonntag, 8<sup>th</sup> edition, 2012.

### Specific Course Information

#### A. Course Catalog:

Forms of energy. Open and closed systems. Work and Heat. P-V-T properties of pure fluids and steam tables. First laws of thermodynamics. Second law of thermodynamics. Introduction to cycles. Entropy concept (open and closed systems). Basic ideals of heat engines and refrigerators.

#### B. Prerequisites or co-requisites

Prerequisite: ChE 203

#### C. Required/Elective or Selected Elective

Required

### Objectives and Outcomes\*

1. To introduce the students to scope and domain of thermodynamics and where it can be applied [1,6,3].
2. To understand the 1st and 2nd law of thermodynamics [1,6]

\* Number in brackets refer to the Program outcomes

3. To provide the students the knowledge of PVT relationship and thermodynamics properties [1,6,3]
4. To be familiar with the calculations of work, heat, and changes in the energy of the system for a given process [1]
5. To introduce the basic ideas behind heat engines and refrigerators [1,6].

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**Contribution of Course to Meeting the Professional Component**

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**Relationship to Student Outcomes (%)**

1	2	3	4	5	6	7
65		7			28	

**Relationship to Chemical Engineering Program Objectives**

PEO1	PEO2	PEO3	PEO4	PEO5	PEO6
y	-	-	-	y	-

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**Topics Covered**

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<b>Topic</b>
Introduction and basic concepts
Energy, energy transfer and general energy analysis
Properties of pure substance
Energy analysis of closed systems
Mass and energy analysis of control volumes
The second law of thermodynamics