# Philadelphia University

Faculty of Engineering - Department of Mechanical Engineering

2019-2020

## Course Information

**Title:** Thermodynamics I (620323) & (620313) for electrical engineering)

**Prerequisite:** Calculus II & Chemistry

**Credit Hours:** 3 credit hours (16 weeks per semester, approximately 44 contact hours)

**Textbook:** **Text Books (title , author (s), publisher, year of publication)**
Thermodynamics, an Engineering approach. By Y.Cengel, 8th edition

**References:** Fundamentals of Engineering thermodynamics, Moran and Shapiro 1998.

**Description:** Thermodynamics 1 is a fundamental basic course, without it all thermal science cannot be comprehended so it is anticipated that after completion of this course students should have starting point to heat transfer, thermodynamics 2, power plants, Ac and all other related subjects. Students should be able to use the property tables and apply the first law of thermodynamics for different mechanical systems.

**Instructor:** **Eng. Nadia Badarneh**
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**Office**: Mechanical Engineering building, room E61308 , ext. : 2125
**Office hours**: Sun, Tue &Thu: 11:10-12:00

## Course Topics:

| Week | Topic |
|---|---|
| **1** | Introduction and Basic Concepts of Thermodynamics<br>Chapter 1 |
| **2** | Energy, energy transfer and general analysis.<br>Chapter 2 |
| **3,4,5** | Properties of pure substances<br>Chapter 3 |
| **6,7,8** | Energy analysis of closed system, Chapter 4 |
| **9,10,11** | Energy analysis of open system, Chapter 5 |
| **12,13,14** | The second law of thermodynamics, Chapter 6 |
| **15** | Entropy, chapter 7 |
| **16** | Review, and final exam |

## Course Learning Outcomes and Relation to ABET Student Outcomes:

Upon successful completion of this course, a student should be able to:

| | | |
|---|---|---|
| 1. | Basic Understanding of Basic Concepts of Thermodynamics | [1, 5, 7] |
| 2. | Understand the definition of Pure substance phase change materials as working Fluid (Vaporization and Condensation and fusion), as well as ideal gases. | [1, 5, 7] |
| 3. | Solving problems for different thermodynamics systems. | [1 , 5, 7] |
| 4. | Basic understanding of thermal cycle's concepts i.e. heat engines | [1 , 5, 7] |
| | Knowledge of practical Carnot cycle, heat addition and rejection | [1 , 5, 7] |
| 5. | Ability to understand the Entropy laws | [1 , 5, 7] |

## Assessment Instruments:

Evaluation of students' performance (final grade) will be based on the following categories:

**Exams:** Two written exams will be given. Each will cover about 3-weeks of lectures

**Quizzes**: 10-minute quizzes will be given to the students during the semester. These quizzes will cover material discussed during the previous lecture(s).

**Homework**: Problem sets will be given to students. Homework should be solved individually and submitted before the due date.

Copying homework is forbidden, any student caught copying the homework or any part of the homework will receive zero mark for that homework

**Participation:** Questions will be asked during lecture and the student is assessed based on his/her response

**Final Exam:** The final exam will cover all the class material.

## Grading policy:

| | |
|---|---|
| First Exam | 20% |
| Second Exam | 20% |
| Home works, Quizzes and participation | 20% |
| Final Exam | 40% |
| Total: | 100% |

## Attendance policy:

Absence from classes and/or tutorials shall not exceed 15%. Students who exceed the 15% limit without a medical or emergency excuse, acceptable to and approved by the Dean of the relevant college/faculty, shall not be allowed to take the final examination and shall receive a mark of zero for the course. If the excuse is approved by the Dean, the student shall be considered to have withdrawn from the course.