

**Faculty of Engineering & Technology**

**Engineering Thermodynamics**

**Information :**

**Course Code :** MPR 251

**Level :** Undergraduate

**Course Hours :** 4.00- Hours

**Department :** Department of Mechanical Engineering

**Instructor Information :**

Title	Name	Office hours
Professor	Mahmoud Abdelrasheed Nosier Touny	5
Assistant Lecturer	Mostafa Sayed Abd El Wahed Hassan Madina	
Teaching Assistant	Moustafa Raafat Aziz Shousha	

**Area Of Study :**

- Understand fundamentals of thermodynamics
- Apply the fundamental principles of thermodynamics
- Explore the fundamental principles of thermodynamics through experimentation
- Develop skills for analyzing experimental data and working in teams
- Share ideas and work in a team.

**Description :**

Fundamental concepts and definitions, Thermodynamic processes, Pure substances and perfect gases, first law of thermodynamics, The second law of thermodynamics, and Carnot cycle, Thermodynamic relations, Reversibility and entropy, Introduction to heat transfer by conduction, convection, and radiation, Basic formulation and solution of steady and transient problems, Issues relevant to cooling of electrical devices, Vapor power cycles, Air standard power cycles, Reversed cycles, Irreversibility and availability, Thermodynamic relations and real gas effects , Non-reacting ideal gas mixtures.

**Course outcomes :**

**a.Knowledge and Understanding: :**

1 -	Define the basic concepts of thermodynamics
2 -	Understand the first and second law of thermodynamics
3 -	Understand the properties of pure substances
4 -	Describe power and refrigeration cycles
5 -	Define different modes of heat transfer
6 -	Understand the properties of gas mixtures

**b.Intellectual Skills: :**

1 -	Ability to define and solve problems related to principles of first law of thermodynamics.
2 -	Ability to define and solve problems related to principles of second law of thermodynamics.

3 -	Ability to define and solve problems related to principles of heat transfer
4 -	Ability to define and solve problems related to thermodynamics and heat transfer for practical thermal systems.
<b>c. Professional and Practical Skills: :</b>	
1 -	Ability to analyze performance of practical thermal system
2 -	Writing technical reports
<b>d. General and Transferable Skills: :</b>	
1 -	Ability to work in a team.
2 -	Ability to share ideas and communicate with others
3 -	Ability to deal with others according to the rules of the professional ethics

**Course Topic And Contents :**

Topic	No. of hours	Lecture	Tutorial / Practical
Property and state, processes and cycles	6	3	3
Definition of work and heat transfer	12	6	6
Ideal gases; state equation; specific heat at constant pressure and volume	6	3	3
Pure substances and phase equilibrium	6	3	3
Tables of thermodynamic properties	6	3	3
First law of thermodynamics; internal energy and enthalpy	6	3	3
First law for closed and open systems	6	3	3
Steady flow and uniform state uniform flow	12	6	6
Application of first law of thermodynamics	12	6	6
Basic concepts and definitions, system and control volume	6	3	3
Second law of thermodynamics	12	6	6

**Teaching And Learning Methodologies :**

Interactive Lecturing
Experiential learning
Problem solving

**Course Assessment :**

Methods of assessment	Relative weight %	Week No	Assess What
Final examination	40.00	16	
First Midterm examination	25.00	6	
Quizzes	10.00		
Second Midterm examination	25.00	11	

**Books :**

Book	Author	Publisher
Thermodynamics an Engineering Approach	Yunus A.Cengel	McGraw Hill

**Recommended books :**

- 1) Fundamentals of Thermodynamics, Richard E. Sonntag, Claus Borgnakke, and Gordon J. Van Wylen , John Wiley & Sons, Inc., 2003
- 2) Applied Thermodynamics for Engineering Technologists, T.D. Eastop and A.McConkey, Longman Group, Ltd. 1998