



#### **b.Intellectual Skills: :**

1 -	Deduce the equations of the first, second laws of thermodynamics.
2 -	Solve different engineering problems related to thermodynamics.
3 -	Analyse different engineering systems using thermodynamics principles.
4 -	Calculate the energy efficiency ratio for different engineering systems.
5 -	Relate the energy efficiency ratio of a given system to Carnot efficiency.

#### **c.Professional and Practical Skills: :**

1 -	Practice basic experiments related to thermodynamics.
2 -	Follow up safety requirements at experimental work and observe the appropriate steps to manage risks.
3 -	Analyse experimental results.
4 -	Write a technical report on a project or an assignment.

#### **d.General and Transferable Skills: :**

1 -	Collaborate effectively within multidisciplinary team in preparing researches in heat transfer.
2 -	Refer to relevant literatures.

#### **Course Topic And Contents :**

Topic	No. of hours	Lecture	Tutorial / Practical
Basic concepts and definitions; system types.	6	3	3
Property and state, processes and cycles.	6	3	3
Definition of work and heat transfer.	9	6	3
Ideal gases; state equation; specific heat at constant pressure and volume.	9	3	6
Pure substances and phase equilibrium.	6	3	3
Tables of thermodynamic properties.	6	3	3
First law of thermodynamics; closed and open systems.	6	3	3
Applications of first law of thermodynamics.	9	3	6
Transient system analysis.	9	6	3
Second law of thermodynamics.	12	6	6
Entropy.	12	6	6

#### **Teaching And Learning Methodologies :**

Interactive lecture
Discussion
Problem-based learning
Laboratory experiments

Research activity

**Course Assessment :**

Methods of assessment	Relative weight %	Week No	Assess What
Assignments	5.00		
Final Exam	40.00		
Lab. Exper.	5.00		
Mid- Exam I	15.00		
Mid- Exam II	15.00		
Oral Exam	5.00		
Participation	10.00		
Quizzes	5.00		

**Recommended books :**

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