Year & Sem: E1S1	Course Code: ME1102	Course Name: **Thermodynamics**	No. of Credits: 4	L	T&PS	P
				2	2	0

UNIT-I: Introduction Fundamental Concepts: definitions of system and surrounding,concept of control volume, thermodynamic state, concepts of simple compressible substances, pure substance and phase, thermodynamic processes and thermodynamic equilibrium; Temperature and Zeroth law; Thermodynamic properties and use of tables of thermodynamic properties; Idea of a generalized chart and the law of corresponding states; Concept of ideal gases and their equations of state; Thermodynamic concept of energy; Modes of work and heat transfer.

UNIT-II: First Law of Thermodynamics The first law referred to cyclic and non-cyclic processes, concept of internal energy of a system, conservation of energy for simple compressible closed systems; Definitions of enthalpy and specific heats;Conservation of energy for an open system or control volume, steady & transient processes.

UNIT-III: Second Law of Thermodynamics The directional constraints on natural processes; Formal statements; Concept of reversibility; Carnot principle; Absolute thermodynamic temperature scale; Clausius Inequality, entropy, change in entropy in various thermodynamic processes, Tds relations, entropy balance for closed and open systems, Principle of increase-in-Entropy, entropy generation.

UNIT-IV: Exergy: Concept of reversible work & irreversibility; Second law efficiency;

UNIT-V: Thermodynamic Property Relations Maxwell relations; Clausius-Clapeyronequation; Difference in heat capacities; Ratio of heat capacities; Joule-Thompson coefficient.

UNIT-VI: Introduction to Properties of Mixtures and Phases Amagat's and Dalton's model, Equation of state and properties of ideal gas mixtures, Change in entropy on mixing; introduction to real-gas mixtures; Gibbs phase rule;

Reference Books:

1. Johnes, James B and George A Hawkins, *Engineering Thermodynamics.*
2. J Van Wylen and Sonntag, *Fundamentals of Classical Thermodynamics.*
3. G F C Rogers and Y R Mayhew, *Engineering Thermodynamics Work and Heat Transfer*.

Lecture Plan: Unit-I & -II syllabus for MID-I, Unit-III & -IV syllabus for MID-II and Unit-V & -VI syllabus for MID-III examinations.