

UNIT I

Introduction and historical development, Microscopic and macroscopic views of matter, Thermodynamic systems, properties, processes, cycles, thermal equilibrium, Zeroth law of thermodynamics, temperature, thermodynamic equilibrium, Energy and the first law, Mechanical concept of energy, internal energy, conservation of energy, energy transfer as work, various modes, energy transfer as heat, First law for closed system, The state postulate, pure substance, simple compressible substances, specific heat, isothermal, isobaric, isentropic compressibility.

UNIT II

First law for open systems , enthalpy, first law for cyclic processes, applications, Second law of Thermodynamics, Entropy and second law, Thermodynamic reservoirs, various statements and their equivalence, reversible cycle, Carnot cycle, efficiencies of reversible cycle, Carnot's theorem, Thermodynamic temperature scale, Clasius's theorem, entropy concept, inequality of Clasius's principle's of increase of entropy and its applications, Second law for closed system , Second law for open system.

UNIT III

Energy, Gibb's function, Helmholtz function, Relationship between specific heats, Clapeyron equations, thermodynamic relations for ideal gases (computation of entropy and internal energy from measurable quantities, Process with ideal gases and vapours, Calculations involving heat transfer, work transfer and change in thermodynamic properties with various processes, Ideal gas mixture, various definitions, Dalton's law, Gibb's – Dalton's law, Amagat - Leduc law, internal energy, enthalpy, specific heat and entropy of an ideal gas mixture, air water vapour mixture, Complete and incomplete combustion analysis, heating value of fuels, analysis of products of combustion, Orsat apparatus.

Text Books:

1. Moran, M.J., Shapiro, "Fundamentals of Engineering Thermodynamics", *John Wiley, 2005.*
2. Wark, K., "Thermodynamics", *Mc-Graw Hill, 2001.*

Reference Books:

1. Cengal, Y., Boles, "Thermodynamics", *Mc-Graw Hill, 2001.*
2. Van-Wylen, G.J., "Fundamentals of Classical Thermodynamics", *John Wiley, 2001.*