UCH 303 CHEMICAL ENGINEERING THERMODYNAMICS

	L	T	P	Cr
	3	1	0	3.5

Course Objective:
To understand the theory and applications of classical thermodynamics, thermodynamic properties, equations of state, methods used to describe and predict phase equilibria.

Introduction: Laws of thermodynamics and their applications to real processes, Heat capacities, Heat effects during: Phase change, formation, combustion and mixing, Enthalpy-concentration diagram, Thermodynamic analysis of flowing fluids.

Thermodynamic Properties of Fluids and Equations of State: Relationships among thermodynamic properties, Behavior of gases in multi-component systems, Thermodynamic properties of gases and their mixtures, Thermodynamic diagrams, Equations of state and generalized property correlations for gases.

Vapour-Liquid Equilibria and Solution Thermodynamics: Criteria for equilibrium, Fugacity of gases and liquids, Composition of phases in equilibrium, Generalized correlations for the fugacity coefficients, Models for the excess Gibbs energy, Effect of pressure and temperature on phase behavior, Chemical reaction equilibria.

Refrigeration and Liquefaction: Refrigeration cycle, Vapor compression cycle, Eco-friendly refrigerants, Absorption and adsorption refrigeration, Liquefaction processes.

Course Learning Outcomes (CLO)
   The students will be able to:

1. apply fundamental concepts of thermodynamics to engineering applications.
2. estimate thermodynamic properties of substances in gas and liquid states.
3. determine thermodynamic efficiency of various energy related processes.

Text Books:
1. *Smith J. M. and Van Ness H. C., Chemical Engineering Thermodynamics, Tata McGraw-Hill (2007).*
2. *Rao, Y. V. C., Chemical Engineering Thermodynamics, University Press (1997).*

Reference Books:
1. *Weber, H. C. and Meissner, H. P., Thermodynamics for Chemical Engineers, John Wiley, (1970).*
2. *Hougen, O.A., Watson, K.M. and Ragatz, R.A., Chemical Processes Principles (Thermodynamics), Part 2, C.B.S. Publications (2006).*

Evaluation Scheme:

S. No.	Evaluation Elements	Weightage (%)
1	MST	30
2	EST	45
3	Sessional	25