4. A Guide Book to Mechanisum in Organic Chemistry: Peter Sykes.
5. Principles of Organic Synthesis: R. O. C. Norman
6. Stereochemistry of Organic Compounds: D. Nasipuri
7. Organic Chemistry: Clayden and Greeves
8. Mechanism and Structure in Organic Chemistry: E. S. Gould

SEMISTER –I		
Code: 102103	**Title : Physical Chemistry**	**Credits : 4**

Objectives:-
1. Explain the basic concept of thermodynamics and its effects on the ionic strengths.
2. Determine thermodynamic efficiency of various energy related processes.
3. Estimate thermodynamic properties of substances in solid, gas and liquid states.
4. To explain concept of quantum chemistry, operators, oscillators and numerical.
5. Explain the phenomenon of surface chemistry, various theories of surface chemistry

Paper -I		60 Hours
Unit I	**Chemical Thermodynamics :-** Nernst heat theorem, the third law of thermodynamics, determination of absolute entropies of solids, liquids and gases. Partial molar properties : Partial molar free energy, chemical potential, partial molar volume and partial molar heat content and their significance, determination of these quantities, concept of fugacity and determination of fugacity .	15 Lectures
Unit II	**Quantum Chemistry:-** Rigid rotor, spherical coordinates Schrödinger wave equation in spherical coordinates, separation of the variables, the phi equation, wavefunction, quantum number, the theta equation, wave function, quantization of rotational energy, spherical harmonics. 2.2. Hydrogen atom, the two particle problem, separation of the energy as translational and potential, separation of variables, the R the θ * and the ϕ equations, solution of the requation, introduction of the four quantum numbers and their interdependence on the basis of the solutions of the three equations, total wave function, expression for the energy, probability density function, distances and energies in atomic units, radial and angular plots., points of maximum probability, expressions for the total wave function for 1s,2s, 2p and 3d orbitals of hydrogen. 2.3. Application of the Schrödinger equation to two electron system, limitations of the equation, need for the approximate solutions, methods of obtaining the approximate solution of the Schrödinger wave equation. 2.4. Hückel Molecular Orbitals theory for ethylene , 1,3-butadiene and benzene. (Derivation expected)	15 Lectures
Unit III	**Classical Thermodynamics :-** Collision theory, modified collision theory, weakness of the collision theory, Theory of absolute reaction rates, equilibrium hypothesis, Derivation of the rate equation, statistical mechanical derivation and thermodynamic formulation. Isotope effect on reaction rate. Primary salt effect, secondary salt effect. Dynamics of uni-molecular reactions,	15 Lectures

	Lindmann and Hinshelwood theory Kinetics of fast reactions, study of fast reactions by flow method, relaxation method, flash photolysis and NMR method. Reactions in solution: Reaction between ions, influence of solvent-double sphere model, single sphere model, influence of ionic strength, numericals.	
Unit IV	**Surface Chemistry: -** Surface tension, capillary action, pressure difference across curved surface (Laplace equation) vapour pressure of droplets (Kelvin equation) Gibbs adsorption isotherm, estimation of surface area (BET equation), surface films on liquids (Electro kinetic phenomenon), catalytic activity at surfaces, numericals. Colloidal electrolytes, Types of micelles in colloidal electrolytes, Micellization, Thermodynamics of micellization, Mechanism of Micellization, critical micellar concentration, Determinations of critical micellar concentration, Surface active agents, Classifications of surface active agents, Reverse micelles, Solubilization	15 Lectures

Reference Books :

1. Chemical Kinetics - Laidler (McGraw-Hill)

2. Kinetic and Mechanism of Chemical Transformations - J. Rajaram and J.C. CURIACOSE (Macmillan India Ltd.)

3. Physical Chemistry - Atkins (Oxford)

4. Thermodynamics for Chemists - S. Glasstone (EWP, New Delhi)

5. Physical Chemistry - G. M. Barrow

6. Advanced Physical Chemistry - Gurdeep-Raj (Pelenum)

7. Micelles : Theoretical and Applied Aspects - V. Moroi (Plenum)

8. Text Book of Physical Chemistry - S.Glasstone (McMillan)

9. An Introduction to Electrochemistry - S. Glasstone (EWP, New Delhi)

10. Physical chemistry – Robert A .Alberty ., Robert J .Silbey 11. Statistical Thermodynamic – M. C. Gupta.