

Course Title: Physical Chemistry

Instructor: Dr. Premkumar Senguttuvan

Course No: JNC 207 (Aug) 3:0

Thermodynamics, specific heats, enthalpy, entropy, free energies, laws, standard energies.

Reaction equilibria, equilibrium constant, le Chatelier principle.

Phase equilibrium, phase rule, phase diagrams, Clausius-Calpeyron equation, phase transitions, landau theory, equations of state.

Solution equilibrium, properties of ideal and non-ideal systems, excess functions, determination of partial molar volume and enthalpy, activity, fugacity, partial quantities, chemical potential, Gibbs-Duhem equation.

Intermolecular forces, van der Waals, hydrogen bonding, electrostatic interactions.

Statistical mechanics of gases and liquids, theory of ensembles, entropy, partition function, configuration integral, thermodynamic limit, relationship to thermodynamics, molecular partition function.

Electrolytes, Debye-Huckel theory, ion-ion and ion-solvent interactions.

Electrochemistry, Faraday laws, standard electrode potential, electrochemical double layer and theories, Galvanic and Daniell cells

Quantum theory for He atom, H_2^+ ion H_2 molecules.

Reference Books:

1. Physical Chemistry by Atkins & Paula
2. Physical Chemistry: A molecular Approach, McQuarria D.A. and Simon J.D.
3. Physical Chemistry by I. N. Levine
4. Statistical Mechanics by D. A. McQuarrie
5. Quantum Chemistry by I. N. Levine