CHN-604 (C) Biophysical Chemistry

CH-502 (c) Biophysical Chemistry **30 Hrs (1 Hr/week)**

I Biological Cell and its Constituents — 2 Hrs

Biological cell, structure and functions of proteins, enzymes, DNA and RNA in living systems. Helix coil transition.

II Bioenergetics — 3 Hrs

Standard free energy change in biochemical reactions, exergonic, endergonic. Hydrolysis of ATP, synthesis of ATP from ADP.

III Statistical Mechanics in Biopolymers — 5 Hrs

Chain configuration of macromolecules, statistical distribution end to end dimensions, calculation of average dimensions for various chain structures. Polypeptide and protein structures, introduction to protein folding problem.

IV Biopolymer Interactions — 5 Hrs

Forces involved in biopolymer interactions. Electrostatic charges and molecular expansion, hydrophobic forces, dispersion force interactions. Multiple equilibria and various types of binding processes in biological systems. Hydrogen ion titration curves.

V Thermodynamics of Biopolymer Solutions — 4 Hrs

Thermodynamics of biopolymer solutions, osmotic pressure, membrane equilibrium, muscular contraction and energy generation in mechanochemical system.

VI Cell Membrane and Transport of Ions — 3 Hrs

Structure and functions of cell membrane, ion transport through cell membrane, irreversible thermodynamic treatment of membrane transport. Nerve conduction.

VII Biopolymers and their Molecular Weights — 5 Hrs

Evaluation of size, shape, molecular weight and extent of hydration of biopolymers by various experimental techniques. Sedimentation equilibrium, hydrodynamic methods, diffusion, sedimentation velocity, viscosity, electrophoresis and rotational motions.

VIII Diffraction Methods — 3 Hrs

Light scattering, low angle X-ray scattering, X-ray diffraction and photo correlation spectroscopy. ORD.

Books Suggested

1. Principles of Biochemistry, A. L. Lehninger, Worth Publishers.
2. Biochemistry, L.Stryer, W.H.Freeman.
3. Biochemistry, J. David Rawn, Neil Patterson.
4. Biochemistry, Voet and Voet, John Wiley.
5. Outlines of Biochemistry, E. E. Conn and P. K. Stumpf, John Wiley.
6. Bioorganic Chemistry: A Chemical Approach to Enzyme Action, H. Dugas and C. Penny, Springer-Verlag.
7 Macromolecules: Structure and Function, F. Wold, Prentice Hall.