

BIOPHYSICAL SCIENCES

UNIT I

Laws of physics and chemistry - Thermodynamics – Entropy – Enthalpy – Free energy of a system – Chemical potential – Oxidation-reduction potential; Physico-Chemical Techniques to study Biomolecules– Hydration of macromolecules – Role of friction – Diffusion – Sedimentation – Rotational diffusion – Light scattering – Small angle X-ray Scattering.

UNIT II

Macromolecular structure: Nucleic acid structure: The chemical structure – Conformational possibilities – Double helical structure - Polymorphism – DNA super coiling and unusual DNA structures - structure of tRNA - Protein structure: Amino acids and Peptide bond – Primary, secondary, Tertiary, Super secondary, domain and Quaternary structure – Virus structure.

UNIT III

Energy pathways in Biology: – Free energy – Coupled reactions – Group transfer potential – Role of pyrimidine Nucleotides – Photosynthesis – Energy conversion pathways – Membrane transport.

UNIT IV

Biomechanics: Striated muscles – Mechanical properties of muscles – Biomechanics of the cardiovascular system.

UNIT V

Neurobiophysics : The Nervous system – Physics of membrane potentials – Sensory mechanisms : Physical aspects of Vision and Hearing – Signal transduction.

Textbook:

Vasantha pattabhi and N. Gautham, *Biophysics*, Narosa publishing house, 2002. (For all units)

Reference book:

1. Rodney Cotterill, *Biophysics An Introduction*, John Wiley & Sons, Ltd., 2002.
2. Daniel M., *Basic Biophysics for Biologists*. Wiley International, New Delhi, 1992.
3. Ackerman E., *Biophysical science*, Prentice Hall, New Delhi, 1962.
4. Das D., *Biophysics and Biological chemistry*, Academic Publishers, Calcutta, 1996