Subject Code : CCBI310

CC – X BIOPHYSICS AND STEREOCHEMISTRY

UNIT – I

Levels of structures in biological macromolecules – Central quaetions in biophysics – basic strategies in biophysics

UNIT – II

Conformational Analysis – Forces that determine protein and nucleic acid structure, polypeptide chain geometries – Ramachandran Map – potential energy calculations – observed values for rotation angles – hydrogen bonding – hydrophobic interactions and water structure – ionic interactions – disulphide bonds – prediction of protein structure

UNIT – III

Nucleic acids – general characteristics of nucleic acid structure – geometries, glycosidic bond – rotational isomers and ribose puckering - forces stabilizing ordered forms – base pairing – base stacking – tertiary structure of nucleic acids

UNIT – IV

Stereochemistry : Principles – Chirality, Symmetry in organic compounds, Molecular isomerism : Time scales and energy criteria, conformational principles, conformational space, Types of movements – vibrational, Rotational, torsion angles, Conformational analysis, calculation of surface areas, Volumes and radius of biomolecules.

UNIT – V

Application of sterochemical principles : Conformation of open chain compounds, Chiral compounds, Macromolecular stereochemistry, Determination of relative and absolute configuration.

Reference Books

1. C.R.Cantor & P.R.Schimmel, Biophysical Chemistry Part - I, W.H. Freeman & Co., in San Fransisco, 1980.
2. C. Branden and J. Tooze, Introduction to Protein Structure, Garland Publishing Inc., New York., 1991.
3. R. Glaser, Biophysics, Springer, 2000.
4. Sterochemistry of Organic Compounds by Ernest. L.Eliel etal., John Wiley & Sons, 1994.
5. Sterochemistry – Conformation & Mechanism by P.S.Kalsi, New Age International Ltd., 1990.