

**B.Tech. Biotechnology: Semester-VII**  
**BBT 701: STRUCTURAL BIOLOGY**

Teaching Scheme	Examination Scheme
Lectures: 3 hrs/Week	Class Test -12 Marks
Tutorials: 1 hr/Week	Teachers Assessment – 6 Marks
Credits: 4	Attendance – 12 Marks
	End Semester Exam – 70 marks

### Course Objective

The course aims to provide the students with a detailed understanding of the behavior of proteins in solution and how their properties may be altered by changing the physical surroundings. To provide an understanding of the theory and practical techniques involved in developing a purification process.

### Course Learning Outcomes

After completing the course, the student shall be able to:

CO1: At the end of this course, students will be able to understand methods to determine, study protein structures and structural knowledge on proteins.

CO2: Understand energetics and kinetics of proteins.

#### Unit 1: Chemistry of amino acids and peptides

Side chain structure and function in protein folding and functionality: Secondary structure of proteins -helices, sheets, loops and turns; Structural and functional proteins. Tertiary structure of proteins, homo and hetero-dimers, trimers and tetramers; forces governing protein-protein interactions; open tertiary structure; Classification of proteins; structure of hemoglobin

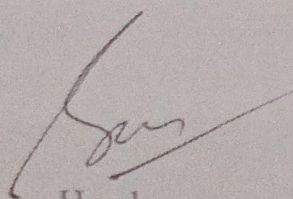
#### Unit 2: Protein-ligand interactions:

Lock and key versus handshake mechanism of substrate recognition; structural basis of recognition; reaction mechanisms of enzymes, G-Protein coupled receptors.

**Protein solubility, protein stability and stabilization** Salting in and salting out, Parameters affecting; enthalpic and entropic stabilization, mutations increasing stability, helix capping; Native, partially denatured and denatured proteins; Protein denaturation, Physical and chemical denaturants

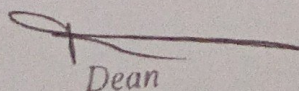
#### Unit 3: DNA structure:

Covalent structure of DNA, base pairing, hydrogen bonding, DNA melting and annealing, difference between AT and GC pairing, Watson Crick model; Crystal structure of B-DNA, major and minor grooves, dyad symmetry, base pair stacking, propeller twist, A and Z- DNA, triple stranded DNA, telomeric sequences and structure, G-quartets, palindromic and tandem sequences, Base pair flipping and DNA bulges, DNA methylation; Protein-DNA interactions; drug-DNA interactions; Databases of sequences and structure for protein and DNA, public domain softwares for visualizing and modeling biomolecules -Rasmol, Deepview, Whatif



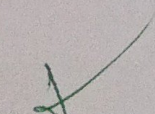
Head

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