

BT 631 Protein Structure, Function and Crystallography (3-0-0-6)

Course contents:

Introduction to protein structure and function; amino acids: building blocks of proteins, peptide bonds, polypeptides and its conformation; structural elements of protein structure: primary structure, secondary structure, irregular secondary structure, super secondary structure, motifs, tertiary structure, bonds stabilizing tertiary structure and quaternary structure; relation between fold and function: protein taxonomy, divergence and convergence; protein crystallography: x-ray diffraction, Bragg's law, crystal geometry, phasing problem, protein crystallization, crystallization techniques, instrumentation for x-ray diffraction; crystal harvesting and mounting; data collection, model building, challenges of crystallography; ultra-high resolution protein structures; protein database: UniProt database, protein data bank; structure and function of keratins, collagens, ATPase, hydrolases, dehydrogenase and protease.

Texts/References:

1. C. Branden and J. Tooze, *Introduction to Protein Structure*, Garland Science, 1999.
2. D. Whitford, *Proteins: Structure and Function*, and J. Wiley, 2005.
3. A. Kessel and N. Ben-Tal, *Introduction to Proteins: Structure, Function and Motion*, 1st Edn., CRC Press, 2010.
4. B. Rupp, *Biomolecular Crystallography (Principles, Practice and application to Structural Biology)*, Garland Science, Taylor and Francis Group, 2010.
5. M. Williamson, *How proteins work?*, Garland Science, 2011.