

SEMESTER II
LSM3243 MOLECULAR BIOPHYSICS

Prerequisite: LSM1106

Workload: 26 lecture hours + 24 tutorial hours

Course description:

This module provides physical bases of macromolecular conformations and conformational stabilities under various conditions. This module also introduces basic principles and applications of a number of biophysical techniques that are commonly used for the studies of structure, dynamics and interactions of biomolecules. Specific topics include conformation of biological macromolecules, intra- and inter-molecular interactions (forces), protein folding, protein-ligand interaction, biological membrane, and biophysical techniques.

S/N	Topics	Lecture hours
1.	Conformational Analysis and Forces that determine structures of protein and nucleic acid Potential energy, hydrogen bonding, hydrophobic , ion-ion , ion-dipole and dipole-dipole interactions, disulfide bonds Base pairing, base stacking Protein and DNA conformations	Yang D W 6
2.	Protein folding & Protein interaction Conformational transitions in proteins and nucleic acids Protein-protein and protein-ligand interactions Kinetics of ligand interactions	Mok Y K 6
3.	Biological membranes Lipids, micelles and bilayers, membrane, membrane protein, lipid-protein interactions Transport of small molecules across cell membrane	Yang D W 6
4.	Biophysical techniques for studies of structure, dynamics and interactions of proteins, nucleic acids and membranes Circular dichroism, Fluorescence spectroscopy, Nuclear magnetic resonance	Yang D W 8
		Total Lectures: 26h Tutorials : 20h Practicals: 2x2 h
		Total hours: 50h

TEXT BOOK (Reference books):

Principles of Biophysical Chemistry, Kensal E.Van Holde, W.Curtis Johnson and P.Shing Ho, Prentice-Hall International, Inc, 1998.

MODE OF ASSESSMENT: Exam (65%) + CA (35%)

MODULE CO-ORDINATOR:

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