

SEMESTER II
LSM3243 MOLECULAR BIOPHYSICS

Prerequisite: LSM1101

Workload: 26 lecture hours + 24 tutorial hours

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, interactions (forces) that determine biomolecular structures, 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):

Biophysical Chemistry, Charles R.Cantor and Paul R.Schimmel, W.H.Freeman and Company, New York, 1980.

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:

Prof Yang Daiwen (Tel: 6516-1014, E-mail: dbsydw@nus.edu.sg)

LECTURERS:

A/P Mok Yu-Keung, Henry (Tel: 6516-2967, E-mail: dbsmokh@nus.edu.sg)

Prof Yang Daiwen (Tel: 6516-1014, E-mail: dbsydw@nus.edu.sg)