

SEMESTER I
LSM3231 PROTEIN STRUCTURE AND FUNCTION

Prerequisite: LSM2101

Workload: 26 lecture hours + 6 tutorial hours + 18 laboratory hours

The main objective is to provide a strong foundation in the study of protein structure and function. The following topics will be covered: Structures and structural complexity of proteins and methods used to determine their primary, secondary and tertiary structures; Biological functions of proteins in terms of their regulatory, structural, protective and transport roles; The catalytic action of enzymes, their mechanism of action and regulation; Various approaches used in studying the structure-function relationship of proteins.

S/N	Topics	Lecture hours
1.	Introduction Protein structures Overview of protein structure Structural patterns in protein Varieties of protein structures Protein function Structural diversity reflects functional diversity in globular proteins Structure-function relationships in selected protein families Protein folding and molecular chaperones	Maxey Chung 6h
2.	Advanced enzymology Enzymes, enzyme reaction kinetics, mechanism of action, and allosteric control of enzyme activity Probing structure –function relationships Chemical modification Epitope mapping, Site-directed mutagenesis	Theresa Tan 6h
3.	Methods for determination of protein structures Primary structure by Edman degradation and mass spectrometry Solid phase peptide synthesis and applications of synthetic peptides Secondary structure by circular dichroism and theoretical methods Tertiary structure by X-ray diffraction and NMR Prediction, engineering and design of protein structure	Maxey Chung 4h Henry Mok 6h
		Total Lectures: 22h Tutorials: 4h Practicals 6X3: 18h
		Total hours: 44h

REFERENCE BOOKS:

Introduction to Protein Structure (2nd Edition) by Carl Branden and John Tooze;
 Introduction to Protein Architecture by Arthur M. Lesk , and
 Introduction to Protein Science by Arthur M. Lesk.

MODE OF ASSESSMENT:

CA, 40% (short answer questions); semestral examination, 60% (short answer and long answer questions)

MODULE CO-ORDINATOR :

A/P Maxey Chung (Tel: 6516-3252, E-mail: bchcm@nus.edu.sg)

LECTURERS:

A/P Maxey Chung
 A/P Theresa Tan
 A/P Henry Mok