**SEMESTER I**
**LSM3231 PROTEIN STRUCTURE AND FUNCTION**

**Prerequisite:** LSM2211 or LSM2241  
**Workload:** 26 lecture hours + 6 tutorial hours + 18 laboratory hours

**Course description:**
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.

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<th>S/N</th>
<th>Topics</th>
<th>Lecture hours</th>
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| 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:**
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**LECTURERS:**
A/P Maxey Chung  
A/P Theresa Tan  
A/P Henry Mok