SEMESTER I & II
LSM1106 MOLECULAR CELL BIOLOGY

Prerequisite: **GCE 'A' Level or H2 Biology or equivalent, or LSM1301 or LSM1301X**
Workload: **26 lecture hours + 12 practical hours + 4 tutorial hours**
The objective is to provide the student with a firm and rigorous foundation in current concepts of the structure and functions of biomolecules in molecular cellular biology. These fundamental concepts form the basis of almost all recent advances in biological and the biomedical sciences. The lectures will introduce various cellular organelles as models to gain insights into how structures and functions of classes of biomolecules participating in important cellular processes.

S/N	Topics	Lecture hours
I	**Dynamics of Cellular Structures & Functions** (Analysing & Visualizing Cell dynamics, Cell as a Complex System.)	1
II	**Major types of biomolecules of cellular structures** (Cellular membrane, nucleus and cytoplasm, Intra-/extracellular structures.)	1
III	**Fundamental Forces & Chemicals in cells** (Water, Acid/Bases, Buffer, Non-Covalent Forces, H-bonds, Amphiphiles.)	2
IV	**Structures & Functions of Proteins** (Amino Acid Structures & Properties, Protein Biosynthesis, Shape & Structure of Proteins, Domains & Motifs, Protein Families; Post-Translational Modifications, Folding and Dynamics of Proteins in Cellular Compartments; Forms & Functions of Enzymes, Enzymatic Kinetics, Cellular and Pharmacological Inhibitors, Enzymatic Regulation of Cellular Functions, Cellular Oxygenation.)	12
V	**Structures & Functions of Carbohydrates** (Structures of polysaccharides; Physiologically important carbohydrates; Mitochondria & Bioenergetics; Oxidative and Non-Oxidative Metabolism; Overview of a system approach to the Organization & Regulation of Metabolic Pathways.)	4
VI	**Structures & Functions of Lipids** **(Classification and functions, chemistry of lipids; Cell membrane lipids.)**	2
VII	**Structures & Functions of Nucleic Acids** (Structure & Function of nucleic acids; DNA Replication and Repair; Analysis and Manipulation of DNA.)	2
VIII	**Integration of the roles and functions of various classes of biomolecules in cellular communication** (Introduction to molecular aspects of signal transduction – from membrane to gene expression.)	2
	Total Lectures : 26 h Practicals : 12 h Tutorials : 4 h CA : 2 h Examination: 2 h	
	Total hours:	**46 h**

TEXT BOOK: Garrett & Grisham. Biochemistry; Lodish et al. Molecular Cell Biology; Alberts et al. Molecular Biology of the Cell
MODE OF ASSESSMENTS: 40% CA and 60% Final Exam

MODULE CO-ORDINATOR:
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