

Programme: M. Sc. (Zoology)

Course Code: ZOC-104

Title of the Course: Cell and Molecular Biology

Number of Credits: 3

Effective from AY: 2018-19

<u>Prerequisites for the course:</u>	Basic understanding of different components and functions of the cell.	
<u>Objective:</u>	This course develops concepts in molecular understanding of structural and functional properties of cells and various processes associated which have potential applications in molecular and biochemical and biomedical research	
<u>Content:</u>	Module 1. Introduction to the cell: Prokaryotic and Eukaryotic systems; DNA, chromosomes and genomes: Replication, Transcription, Translation; Regulation of gene expression: Operon concept, <i>lac</i> and <i>trp</i> operons; regulation at the transcriptional and translational level in eukaryotes, Viruses: Structure and classification of animal viruses - reverse transcription; Bacterial viruses: structure, lysogenic and lytic life cycle.	12 hours
	Module 2. Internal organization of the cell: Plasma membrane structure and function; Cell organelles: Intracellular compartments and protein sorting; nucleus, ribosomes, endoplasmic reticulum, peroxisomes; Intracellular membrane traffic: golgi apparatus, endocytosis, exocytosis, lysosomes; mitochondria and energy conversion.	12 hours
	Module 3. Cell communication: Cell signalling and communication, Cell junctions and Extra Cellular Matrix (ECM); Cytoskeletal structure and functions; Cell cycle and cell division: Phases of cell cycle, Cyclins and Cyclin dependant kinases, Apoptosis, Cellular aspects of cancer.	12 hours
<u>Pedagogy:</u>	Lectures/ Tutorials/Assignments/Self-study.	
<u>References/Readings</u>	<ol style="list-style-type: none">1. Alberts B, Johnson A, Lewis J, et al. Molecular Biology of the Cell, Taylor & Francis Group, New York, USA.2. Lodish H, Berk A, Lawrence S, et al., Molecular Cell Biology, Freeman WH & Co. New York.3. Watson JD, Beyker, Bell JD, et al., Molecular Biology of the Gene, Pearson Education, Delhi4. Bray BAD, Lewis J, Raff M, Roberts K and Watson JD, Molecular Biology of the Cell, Garland Publishing Co. Ltd. New York.5. De Robertis EDP and De Robertis EMF, Cell and Molecular Biology Saunders College, Philadelphia Dowben RM, Cell Biology, Harper and Row Publ. London.	

	6. Hartl DL and Jones EW, Genetics: Analysis of Genes and Genomes, Jones & Bartlett Publishers, Boston.	
<u>Learning Outcomes</u>	<ol style="list-style-type: none"> 1. Understand and apply the principles and techniques of molecular biology which prepares students for further education and/or employment in teaching, basic research, or the health professions. 2. Understand the functions of the cell at the molecular level. 3. Gain insight into the most significant molecular and cell-based methods used today to expand our understanding of biology. 	