

Semester	V
Course	Minor 1
Paper Title	Cell Biology and Biochemistry
Paper Code	B3BT230512T/P
No of Credits	4 (3+1)
Theory /Practical /Composite	Composite
Minimum No. of preparatory hours per week a student has to devote	4
Number of Modules	2
Syllabus	<p>MODULE A [25 Marks]</p> <p>UNIT I: Basic cellular organization: (i) Prokaryotic and eukaryotic cells, (ii) Cell membrane and membrane dynamics (iii) Cell organelles: structure and functions.</p> <p>UNIT II: Biological macromolecules and vitamins: Functional relevance in human physiology.</p> <p>UNIT III: Cellular metabolism: Overview of basic metabolic processes.</p> <p>UNIT IV: Chromosome biology: Chromosome (basic organization, mutations).</p> <p>MODULE B [20 Marks]</p> <p>UNIT I: The molecular design of life: (i) Biochemical evolution, (ii) Properties of water, Henderson Hasselbach equation, (iii) Chemical bonds in biochemistry, reversible and irreversible interaction, (iv) Entropy and laws of thermodynamics.</p> <p>Unit II: Genetic code and central dogma: (i) Genetic code (salient features), central dogma, (ii) Replication, transcription and translation.</p> <p>Unit III: Recombinant DNA Technology</p> <p>UNIT IV: Some Techniques in cell biology and biochemistry: (i) Microscopy, (ii) Isotopes in biology, (iii) Electrophoresis, (iv) Chromatography, (v) Spectroscopy (UV visible, fluorescence, NMR, IR).</p> <p>PRACTICAL [40 marks; End-Sem (8 marks) + CA (30 marks) + Attendance (2 marks)]</p> <ol style="list-style-type: none"> 1. Study of onion epidermal cells. 2. Study of histology of mammalian tissues. 3. Determination of human blood groups. 4. Determination of the pH of a given buffer solution 5. Qualitative tests for important biochemical substances. 6. Estimation of protein concentration by taking absorbance at 280 nm 7. Estimation of protein concentration by Modified Lowry Method

Learning Outcomes	<ol style="list-style-type: none"> 1. Understanding the basics of cellular organization and functionality 2. Gaining a comprehensive overview of diverse biomolecules, their properties and functional relevance 3. Acquiring a comprehensive concept of cellular metabolism 4. Identifying the biophysical and biochemical techniques required to study biomolecules 5. Understanding the basics of chromosome biology, DNA packaging, and the flow of genetic message from DNA to protein 6. Understanding the fundamental aspects of recombinant DNA technology 7. Familiarizing with laboratory techniques and equipments used in cell biology and biochemistry studies 	
Reading / Reference List	<ul style="list-style-type: none"> • Biochemistry - Voet & Voet. • Lehninger Principles of Biochemistry - Cox & Nelson • Biochemistry - Tymoczko & Stryer • The Cell – A Molecular Approach – G.M. Cooper, R.E. Hausman • Molecular Biology of the cell - Bruce Alberts • Cell and Molecular Biology: Concepts and Experiments. Karp, G. • Cell and Molecular Biology- De Robertis, E.D.P. and De Robertis, E.M.F. 	
Evaluation	Theory CIA- 10 Assignment – 02 Attendance - 03 Semester Exam- 45	Practical CA- 30 Attendance - 02 Semester Exam- 08
Paper Structure for Theory Semester Exam	<p>Module A: 25 marks 1 compulsory question of 5 marks 2 questions of 10 marks each (Any 2 out of 3 questions) [No subpart will be less than 2 marks and more than 6 marks]</p> <p>Module B: 20 marks 1 compulsory question of 5 marks 3 questions of 5 marks each out of 5 questions. [Minimum 1mark and maximum 5 marks]</p>	