

<b>Course</b>	<b>Generic Elective</b>
Semester	I
Paper Number	<b>HBTGE1012T &amp; HBTGE1012P</b>
Paper Title	<b>Cellular Biochemistry</b>
No. of Credits	6
Theory/Composite	Composite
No. of periods assigned	4 Theory + 2 Practical
Course description/objective	<p>The course aims to</p> <ol style="list-style-type: none"> <li>1. impart a basic understanding of biomolecules, cell biology and genetics with special emphasis on biological organisms.</li> <li>2. to impart a fundamental understanding of metabolism and various macromolecular components of cells and their functions.</li> <li>3. give an overview of various perspectives of cell biology.</li> <li>4. emphasize on the basic principles of genetics and DNA replication.</li> <li>5. provide students with an integrated knowledge and understanding of dynamics of cell, including the dynamics of membrane-bound organelles in eukaryotic cells.</li> <li>6. provide a basic understanding of microscopy, micrometry, cytology and biochemistry experiments in the practical module.</li> </ol>
Syllabus	<p><b>Theory</b></p> <p><b>Module A: (25 marks)</b></p> <p><b>UNIT I: Origin of life:</b> Chemogeny; RNA world; biogeny; semiautonomous organelles and endosymbiosis; origin of photosynthesis; evolution of eukaryotes.</p> <p><b>UNIT II: Genetics:</b> DNA as carrier of genetic information; chromosome theory of inheritance; Mendel's work on transmission of traits; Mendelian laws; monohybrid and dihybrid cross; deviations from Mendelian laws; gene mutations.</p> <p><b>UNIT III: Replication of DNA:</b> General principles of replication (bidirectional, semi conservative and semi discontinuous); mechanism (outline); enzymes involved in replication.</p> <p><b>UNIT IV: Genetic code and central dogma:</b> Genetic code (salient features); central dogma and reverse transcriptase; types of RNA, principles of transcriptional and translational regulation</p> <p><b>No. of Classes:</b> 2 Classes per week</p> <p><b>Module B: (25 marks)</b></p> <p><b>UNIT V: Introduction to biological macromolecules and metabolism:</b> Historical perspectives; functional significance of biological macromolecules and their relevance in various human diseases; functional significance of biological micronutrients; outline of basic metabolic processes.</p> <p><b>UNIT VI: Introduction to basic cell biology and histology:</b> Importance of compartmentalization of cells, cell membrane and permeability, functional roles of sub-cellular organelles, cytoskeleton and extracellular matrix.</p> <p><b>UNIT VII: Introduction to chromosomes:</b> Organization of</p>

**chromosomes; nucleosome concept;  
chromosomal aberrations; significance of cell  
cycle; basic experimental models in biology.**

**No. of Classes: 2 Classes per week**

**Practicals**

- 1. Preparation of buffer.**
- 2. Determination of pKa values of glycine.**
- 3. Estimation of protein concentration by Modified Lowry method.**
- 4. Estimation of protein concentration by taking absorbance at 280 nm.**
- 5. Microscopy**
- 6. Observation of yeast cells by fungus staining.**
- 7. Determination of bacterial cell size by micrometry.**

Readings	<ol style="list-style-type: none"> <li>1. Genetics – P.K. Gupta (Rastogi Publications)</li> <li>2. Cell Biology – C.B. Powar (Himalaya Publishing House)</li> <li>3. Biochemistry – A.L. Lehninger (Kalyani Publishers)</li> <li>4. Cytogenetics, Evolution and Plant Breeding – R.S. Shukla, P. Chandel (S. Chand &amp; Co)</li> <li>5. Harper’s Illustrated Biochemistry. R.K. Murray, D.K. Granner, V.W. Rodwell, (29th ed.).</li> <li>6. Biochemistry- J.M. Berg, J.L. Tymoczko, L. Stryer (7th Ed)</li> <li>7. Lehninger Principles of Biochemistry. M.M. Cox, D.L. Nelson (5th Ed.)</li> <li>8. Molecular Biology of the Cell .Bruce Alberts et. al (5th edition)</li> <li>9. A.J.F. Griffiths, S.R. Wessler, R.C. Lewontin, S.B. Carroll. An Introduction to Genetic Analysis (9th ed.).</li> <li>10. The Cell – A Molecular Approach – G.M. Cooper, R.E. Hausman</li> <li>11. Genetics - M.W. Strickberger (3rd ed.)</li> </ol>
Evaluation	<p><b>Theory: Continuous Internal Assessment: 10 marks End-Semester Theory Examination: 50 marks</b></p> <p><b>Practical: Continuous Internal Assessment: 10 marks End-Semester Examination: 30 marks</b></p>
Paper Structure for End Sem Theory	<p><b>Module A (25 Marks)</b>  5 questions, 1 mark each; i.e. 1x5=5 marks  Two questions, 10 marks each, i.e. 10x2=20 marks</p> <p><b>Module B (25 Marks)</b>  10 questions, 1 mark each; i.e. 1x10=10 marks 3 questions, each 5 marks; i.e. 3x5=15 marks</p>