

Course	Generic Elective
Semester	I
Paper Number	HBTGE1012T & HBTGE1012P
Paper Title	CELL BIOLOGY
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"> 1. impart a basic understanding of biomolecules, cell biology and genetics with special emphasis on biological organisms. 2. to impart a fundamental understanding of metabolism and various macromolecular components of cells and their functions. 3. give an overview of various perspectives of cell biology. 4. emphasize on the basic principles of genetics and DNA replication. 5. provide students with an integrated knowledge and understanding of dynamics of cell, including the dynamics of membrane-bound organelles in eukaryotic cells. 6. provide a basic understanding of microscopy, micrometry, cytology and biochemistry experiments in the practical module.
Syllabus	<p>Theory</p> <p>Module A: (25 marks)</p> <p>UNIT I: Origin of life: Chemogeny; RNA world; biogeny; semiautonomous organelles and endosymbiosis; origin of photosynthesis; evolution of eukaryotes.</p> <p>UNIT II: Genetics: 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>UNIT III: Replication of DNA: General principles of replication (bidirectional, semi conservative and semi discontinuous); mechanism (outline); enzymes involved in replication.</p> <p>UNIT IV: Genetic code and central dogma: Genetic code (salient features); central dogma and reverse transcriptase; types of RNA, principles of transcriptional and translational regulation</p> <p>No. of Classes: 2 Classes per week</p> <p>Module B: (25 marks)</p> <p>UNIT V: Introduction to biological macromolecules and metabolism: 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>UNIT VI: Introduction to basic cell biology and histology: Importance of compartmentalization of cells, cell membrane and permeability, functional roles of sub-cellular organelles, cytoskeleton and extracellular matrix.</p> <p>UNIT VII: Introduction to chromosomes: Organization of</p>

	<p>chromosomes; nucleosome concept; chromosomal aberrations; significance of cell cycle; basic experimental models in biology.</p> <p>No. of Classes: 2 Classes per week</p> <p>Practical</p> <ol style="list-style-type: none"> 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 and observation of yeast cells under oil emersion objective. 6. Study of different stages mitosis from permanent slides. 7. Study of different stages of meiosis from permanent slides. 8. Determination of cell size by micrometry
Readings	<ol style="list-style-type: none"> 1. Genetics – P.K. Gupta (Rastogi Publications) 2. Cell Biology – C.B. Powar (Himalaya Publishing House) 3. Biochemistry – A.L. Lehninger (Kalyani Publishers) 4. Cytogenetics, Evolution and Plant Breeding – R.S. Shukla, P. Chandel (S. Chand & Co) 5. Harper’s Illustrated Biochemistry. R.K. Murray, D.K. Granner, V.W. Rodwell, (29th ed.). 6. Biochemistry- J.M. Berg, J.L. Tymoczko, L. Stryer (7th Ed) 7. Lehninger Principles of Biochemistry. M.M. Cox, D.L. Nelson (5th Ed.) 8. Molecular Biology of the Cell .Bruce Alberts et. al (5th edition) 9. A.J.F. Griffiths, S.R. Wessler, R.C. Lewontin, S.B. Carroll. An Introduction to Genetic Analysis (9th ed.). 10. The Cell – A Molecular Approach – G.M. Cooper, R.E. Hausman 11. Genetics - M.W. Strickberger (3rd ed.)
Evaluation	<p>Theory: Continuous Internal Assessment: 10 marks End-Semester Theory Examination: 50 marks</p> <p>Practical: Continuous Internal Assessment: 10 marks End-Semester Examination: 30 marks</p>
Paper Structure for End Sem Theory	<p>Module A (25 Marks) 5 questions, 1 mark each; i.e. 1x5=5 marks Two questions, 10 marks each, i.e. 10x2=20 marks</p> <p>Module B (25 Marks) 10 questions, 1 mark each; i.e. 1x10=10 marks 3 questions, each 5 marks; i.e. 3x5=15 marks</p>