FACULTY OF LIFE SCIENCES

SYLLABUS

For

Bachelor of Science (Honours) Biotechnology
Semester II
(Under Credit Based Continuous Evaluation Grading System)

Session: 2026-27

The Heritage Institution

KANYA MAHA VIDYALAYA
JALANDHAR
(Autonomous)

KANYA MAHAVIDYALAYA, JALANDHAR (AUTONOMOUS)

SCHEME AND CURRICULUM OF EXAMINATION OF FOUR YEAR UNDER GRADUATE DEGREE PROGRAMME

Session-2026-27

Bachelor of Science (Honours) Biotechnology Semester -II									
Course Code	**Course Title**	**Course Type**	**Paper Credits L-T-P**	**Hours per week L-T-P**	**Total Marks**	**Marks**			**Exam Time in Hrs**
						L	**P**	**CA**	
BBTM-2483	Cell Biology	DSC	3-0-1	3-0-2	100	50	20	30	3+3

Bachelor of Science (Honours) Bio-Technology Semester-II

Session: 2026-27

Course Code: BBTM-2483

Course Title: Cell Biology

(Theory)

COURSE OUTCOMES:

After passing this course the student will be able to:

- **CO1**: Understanding the basic unit of life – cell and broad classification of cell types.
- **CO2**: Understanding the structure and functions of cell organelles.
- **CO3**: Understand Cell Division and Cell Cycle.
- **CO4:** Understanding the biological membranes along with membrane transport mechanism.

Bachelor of Science (Honours) Bio-Technology Semester-II

Session: 2026-27

Course Code: BBTM- 2483

Course Title: Cell Biology

(Theory)

Time: 3 Hrs. **Max. Marks: 100**

L-T-P: 3-0-1 **Theory: 50**

Practical: 20

CA: 30

Instructions for the Paper Setter

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit-I

Cell as a basic unit of living systems. The cell theory Broad Classification of Cell Types: PPLO's, bacteria, eukaryotic microbes, plant and animal cells. A detailed classification of cell types within an organism. Cell, tissue, organ and organism as different levels of organizations of otherwise genetically similar cells.

Unit-II

Structure and function of cell organelles, ultrastructure of cell membrane, cytosol, Golgi bodies, endoplasmic reticulum (rough and smooth), ribosomes, cytoskeletal structures (actin, microtubules etc.), Mitochondria, chloroplasts, lysosomes, peroxysomes, nucleus (nuclear membrane, nucleoplasm, nucleolus, chromatin).

Unit-III

Cell Division and Cell Cycle: mitosis, meiosis, stages of cell cycle, binary fission, amitosis and its regulation. Cell-cell interaction, Cell locomotion (amoeboid, flagellar and ciliar).

Unit-IV

Biological Membranes: Supramolecular architecture of membranes; Solute transport across membranes; Model membranes and Liposomes.

Books Recommended:

1. De-Robertis, F.D.P. and De-Robertis Jr. E.M.F. (2017) Cell and Molecular Biology, Saunders, Philadelphia.
2. Lodish, Berk, Kaiser, Krieger, Scott, Bretscher, Ploegh and Matsudaira (2007) Molecular Cell Biology 6th Edition, W.H.Freemen& Co Ltd.
3. Geoffrey, M. Cooper & Robert E. Hausman (2013) The Cell: A molecular approach 6th Edition, Sinauer Associates.
4. Alberts, Johnson, Lewis, Raff, Roberts and Walter (2008) Molecular Biology of the Cell, 5th Edition, Garland Science.

Bachelor of Science (Honours) Bio-Technology Semester-II

Session: 2026-27

Course Code: BBTM-2483 (P)

Course Title: Practical (Cell Biology)

(Practical)

COURSE OUTCOMES:

After passing this course the student will be able to:

- **CO1:** Perform a variety of molecular and cellular biology techniques.
- **CO2**: Describe cellular membrane structure and function, fine structure and function of cell organelles.
- **CO3**: Understand Microtomy, staining and histology of different tissues.
- **CO4**: Study about electron micrographs of different organelles

Bachelor of Science (Honours) Bio-Technology Semester-II

Session: 2026-27

Course Code: BBTM-2483

Course Title: Practical (Cell Biology)

(Practical)

Time: 2 Hrs. **Practical: 20**

Credit: 0-0-1

Instructions for the practical Examiner: Question paper is to be set on the spot jointly by the internal and external examiners. Two copies of the same may be submitted for the record to COE Office, Kanya Maha Vidyalaya, Jalandhar.

1. Study of Cells:

(a) Prokaryotic cells: Lactobacillus, E. coli. Blue green algae.

(b) Eukaryotic cells: Testicular material (for studies of spermatogenesis)

2. Study of electron micrographs of various cell organelles-plasma membrane, Mitochondria, Golgi complex, Lysosomes, Endoplasmic Reticulum (smooth and granular), Cilia, Centrioles, inclusions like glycogen, lipids, etc.
3. Preparation of Permanent Slides: Principles and procedures- Section cutting of tissues and staining of tissues with Haematoxylin/eosin method.
4. Study of permanent slides of various tissues (gut region, liver, lung, spleen, kidney, pancreas, testis, ovary, tongue, skin etc.).
5. Preparation of Buccal Smear for microscopic examination.
6. Barr body observation in human squamous epithelial cells.
7. Microtomy of Plant Tissue specimens (Stem & Root)

Books Recommended:

1. Shah, V.C., Bhatavdekar, J., Chinoy, N.J. and Murthy, S.K. (1988). Essential techniques in Cell Biology.Anand Book Depot, Ahemadabad.
2. Celis, J.E. (1998) Cell Biology: A Laboratory handbook. Vol. 1-3. Academic Press, UK.