

**Subject Name: Cell Biology**
**B. Sc Semester - II**

**Objective:** To provide fundamental insight of cellular architecture and functional aspects of cellular organelles.

**Credits Earned:** 5 Credits

**Course Outcomes:** After completion of this course, student will be able to

- Distinguish between Plant and Animal cells.
- Explain the function of various cellular organelles and its importance.
- Explain the organization of genetic material and cell cycle regulation.

**Pre-requisite of course:** Fundamental knowledge of prokaryotic and eukaryotic cells.

**Teaching and Examination Scheme**

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE (E)	Mid Sem (M)	Internal (I)	Viva (V)	Practical	
4	0	2	5	50	30	20	25	25	150

**Contents:**

Unit	Topics	Contact Hours
1	<b>Fundamentals of Cell Structure.</b> Structural organization of cell; difference between plant and animal cell; prokaryote and eukaryote cell; specialized plant cell types. <b>Cell wall:</b> Basic architecture of cell wall and biogenesis. Plasma membrane: Structure, models, functions; ion carriers, channels and pumps.	15
2	<b>Ultrastructure of Cell Organelles and function.</b> <b>Chloroplast:</b> Structure; biogenesis; genome organization and nucleochloroplastic interactions. <b>Mitochondria:</b> Structure; genome organization and biogenesis. <b>Plasmodesmata:</b> Structure; functions; comparison with gap junctions. <b>Plant vacuole:</b> Tonoplast membrane; vacuoles as multifunctional compartments; vacuoles as storage organelle. <b>Ribosomes:</b> Structure; functions. <b>Nucleus:</b> Structure; nuclear pore complex; nucleolus. <b>Other cellular organelles:</b> Structure and functions of Golgi apparatus; lysosomes; endoplasmic reticulum; microbodies.	20
3	<b>Cytoskeleton and Protein sorting</b> <b>The cytoskeleton:</b> organization of microtubules, microfilaments and intermediate filaments, cytoskeletal accessory proteins. <b>Protein sorting:</b> Targeting of proteins into endoplasmic reticulum and chloroplast.	15
4	<b>Cell Division</b> Regulation of cell cycle; role of cyclins and cyclin dependent proteins; Mitosis and Meiosis.	10
	<b>Total Hours</b>	<b>60</b>

**References:**

1. Basic cell biology , Abhilash Jain, Cumpus Books International
2. Cell Biology, T Devasena, Oxford University Press.
3. The Cell: A molecular approach, Cooper, G. M. and Hausman, R. E. Sinauer Associates.
4. Getzen berg, R.H.and E.E.Bittar, Cell Structure and Signalling, Elsevier Science.
5. Henderson et al., 1999 Cellular Microbiology.
6. Cossart et al., 2000 Cellular Microbiology
7. Phillip Sheeler and Donald E.Blanck Cell & Molecular Biology 3rd ED John Willey Pub.
8. Ernet, J.M. Helmreich, The Biochemistry of Cell Signalling, Oxford Press.
9. De Roberts and De Roberts, 1998 Cell and Molecular Biology. Wavely Pvt. Ltd.
10. Voet and Voet J.G .3rd Edition , Biochemistry John Wiley and sons INC
11. Zubay .G. Biochemistry- Wm.C.brown Publishers.

12. White .D. 2000 The Physiology and Biochemistry of prokaryotes-Oxford Univ. Press

**Suggested Theory distribution:**

The suggested theory distribution as per Bloom's taxonomy is as per follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyze	Evaluate	Create
20%	20%	30%	15%	15%	0%

**Instructional Method:**

- a. The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by white board may also use any of tools such as demonstration, role play, Quiz, brainstorming, etc.
- b. The internal evaluation will be done based on continuous evaluation of students in the classroom in the form of attendance, assignments, presentations, verbal interactions etc.
- c. Students will use supplementary resources such as online videos, ebooks, ppts etc.