**CELL BIOLOGY CREDIT HOUR 2+1**

**LEARNING OUTCOMES**:

**Students will be able to:**

1. The structures and need of basic components of Prokaryotic and Eukaryotic cells, especially macromolecules, membranes, and organelles
2. The cellular division i.e., mitosis and meiosis .
3. Students will apply their knowledge of cell biology to understand the reasons of changes in cell function.

**COURSE CONTENTS:**

Introduction to cell theory, structure, chemical constituents of cell and cell organelles and their functions, separation of cell organelles, Cell membrane, its molecular organization and functional role, The concept of the unit membrane, membrane structure, the fluid mosaic model, membrane receptors and transport mechanisms. Cell to cell communication, Endoplasmic Reticulum. Lysosome, Micro-bodies, Mitochondrial ultra-structure and function, Chloroplast ultra-structure and the mechanism of photosynthesis, Cell movements, structure and function of cytoskeleton, centriole, cilia and flagella, the mitotic apparatus, The nucleus, structure and function of chromosomes, the cell cycle, mitosis, meiosis., apoptosis , necrosis.

**PRACTICALS:**

1. Microscopy and staining techniques
2. Study of prokaryotic and eukaryotic cells
3. Study of plant and animals cells
4. Study of the cell structure in the staminal hair of *Tradescantia*
5. Study of different types of plastids
6. Mitosis: smear/squash preparation of onion roots.

**RECOMMENDED BOOKS:**

1. Alberts, B., Bray, D., Hopkin, K., Johnson, A. D., Lewis, J., Raff, M., Roberts, K. and Walter, P. 2013. Essential Cell Biology; 4th Edition, Garland Sciences, New York, USA.
2. Alberts, B., Johnson, A., Lewis, J., Morgan, D., Raff, M., Roberts, K. and Walter, P. 2014. Molecular Biology of the Cell; 6th Edition, Garland Sciences, New York, USA.
3. David L. Nelson, D. L. and Cox, M. M. 2012. Lehninger Principles of Biochemistry; 6th Edition, W.H. Freeman, New York, USA.
4. Karp, J. H. 2016. Cell and Molecular Biology. John Willey and Sons, Inc. New York. USA.
5. Lodish, H. 2012. Solutions Manual for Molecular Cell Biology; 7th Edition, W.H. Freeman, New York, USA.
6. Lodish, H., Berk, A., Kaiser, C. A., Krieger, M., Bretscher, A., Ploegh, H., Amon, A. and Scott, M. P. 2012. Molecular Cell Biology; 7th Edition. W.H. Freeman, New York, USA.
7. Nelson, D. L and Cox, M. M., Lehninger, A. 2013. Absolute Ultimate Guide for Lehninger Principles of Biochemistry; 6th Edition, W.H. Freeman, New York, USA.
8. Plopper, G. 2014. Principles of Cell Biology; 2nd Edition, Jones & Bartlett Learning, Burlington, USA.
9. Wilson, J. and Hunt, T., 2014. Molecular Biology of the Cell, The Problems Book; 6th Edition, Garland Sciences, New York, USA.