

**Educational Objectives:**

1. This course is designed to help students understand workings of the cell structure and function at cellular and molecular level. In this course molecular basis of cell structure and function is discussed which will provide students a detailed account of functional physiology of the cells.

2. **Course Outcomes:**

- a. Student must be empowered to think in a holistic manner when manipulating genes and other macromolecules of a cell.
- b. Appreciate the fact that macromolecular manipulations can have global effects in a cell and hence an organism.
- c. This course will not only equip the students to relate biochemistry with molecular biology and genetic engineering but it will allow them to think “outside the box” and learn the eventualities of dealing with cellular manipulations.

3. **Course Contents:**

- a. Introduction
- b. Cell Organization
- c. Cell Architecture
- d. Membrane Structure and Function
- e. Bio Transport
- f. Vesicular Transport
- g. Transport Signals
- h. Nuclear Transport
- i. Bio Energetic

- j. Mitochondrial Energy Conversion
- k. Chloroplast Energy Conversion
- l. Cytoskeleton
- m. Cell Shape
- n. Cell Contractility
- o.** Cell to cell Communication
- p. Electrochemical Signaling
- q. Synaptic and Sensory Transduction
- r. Biochemical Signaling
- s. Receptor Ligand Interactions
- t. Second Messengers
- u. Signaling Cascades
- v. Cell Cycle and Apoptosis
- w. Phases of Cell Cycle and Cell Division
- x. Regulation of Cell Growth and Death
- y. Specialized Cell Systems

### **Recommended Books:**

1. **Gene VIII** By Lewin Benjamin Eds 2004. Oxford University press, Inc, New York.
2. **Molecular Biology of the Gene** by Watson, J. D., T. A. Baker, S. P. Bell, A. Gann, M. Levine, and R. Losick, 5th Ed. 2003. New York, Benjamin Cummings ISBN 0-8053-4635-X
3. **The Cell** by Bruce Albert and Dennis Bray, 3<sup>rd</sup> Ed. Garland Publishing Inc, New York and London.
4. **Biochemistry** by [Victor L. Davidson](#), [Donald B. Sittman](#). 3<sup>rd</sup> Ed. 1993, Harwal Pub Co.

5. **Cell and Molecular Biology** by Gerald Karp. 1996, John Willey and Sons, Inc.  
London