

Course: BOT(N) 301

CELL BIOLOGY, MOLECULAR BIOLOGY AND BIOTECHNOLOGY

Objective: To provide knowledge about the intricacies of life processes at the molecular and cellular level, describe the cell structure, function, morphology and study the biotechnological techniques and tools of genetic engineering

Syllabus:

- The Cell: Historical background, cell theory, cell size and structure, comparative account of prokaryotic and eukaryotic cell
- Structures and Functions of Cell Organelles: Nucleus, ribosomes, nucleoplasm, mitochondria and chloroplast, plastids, golgi complex, endoplasmic reticulum, lysosomes, peroxisomes
- Structure and types of chromosomes
- Cell division: Mitosis, meiosis and their significance
- Structure and composition of DNA: DNA the genetic material, DNA structure, replication, DNA- protein interaction
- Structure, types and composition of RNA
- Modern concept of Gene and Genetic code: Operon concept
- Protein synthesis and Gene regulation of protein synthesis: Protein synthesis, structure and properties of polysaccharides
- Recombinant DNA
- Genetic Engineering: Tools and techniques in Genetic Engineering
- Biotechnology and its applications: Biotechnology and its applications in health, agriculture and industries
- Plant Tissue Culture: Methods of gene transfer, Transgenic plants, Gene bank, Nif gene, Nod gene and Mycoprotein

Unit Schedule:

BLOCK-1: CELL BIOLOGY

- Unit-01 : The Cell
Unit-02 : Structure and functions of cell organelles
Unit-03 : Structure and types of chromosomes
Unit-04 : Cell division

BLOCK-2: MOLECULAR BIOLOGY

Unit -05 : Structure and composition of DNA

Unit-06 : Structure and composition of RNA

Unit-07 : Modern concept of gene and genetic code

Unit-08 : Protein synthesis and gene regulation of protein synthesis

BLOCK-3: BIOTECHNOLOGY

Unit-09 : Recombinant DNA

Unit-10 : Genetic engineering

Unit-11 : Biotechnology and its applications

Unit-12 : Plant tissue culture

Course: BOT(N) 301L

CELL BIOLOGY, MOLECULAR BIOLOGY AND BIOTECHNOLOGY (LABORATORY)

Objective: To study the cell, cell-organelles, cell division, their chemical composition, various genetical aspects, the economic uses of plants and experiments to demonstrate various physiological activities of plants

Syllabus:

- Cell biology, molecular biology and biotechnology: To study cell structure from *Allium cepa*/ *Tradescantia* leaf peels and Demonstration of staining and mounting methods, estimation and relationship between nucleus and cell volume at shoot/ root apices by camera lucida/micrometer method, chromosome study during cell division. DNA isolation: CTAB method, biotechnology Unit, tissue culture technique: sterilisation, media preparation, inoculation, incubation and transplantation; PCR: initiation, elongation and termination

Unit Schedule:

Unit-01:	To study the cell structure from <i>Allium cepa</i> / <i>Tradescantia</i> leaf peels; and demonstration of staining and mounting methods
Unit-02:	Estimation and relationship between nucleus and cell volume at shoot/ root apices by camera lucida/micrometer method
Unit-03:	To study the chromosome during cell division
Unit-04:	To demonstrate the process of DNA isolation
Unit-05:	To study tissue culture techniques

Practical:

Distribution of marks- 50 Marks

Lab Practical	30 Marks
Records	10 Marks
Viva voce.....	10 Marks

