

Revised Syllabus For the Session 2020-21

BIOTECHNOLOGY

Class XI

Course Structure

Units Topics	Marks
Unit -I Biotechnology An overview	10
Unit - II Molecules of Life	20
Unit - III Genes & Genomes	20
Unit - IV Cells and Organisms	20
Practical	30

Unit-I: Biotechnology: An overview **8 period**

Chapter 1: Introduction to Biotechnology

Historical Perspectives; Production Strategies in Biotechnology; Safety; Good Manufacturing Practices; Good Laboratory Practices; Biotechnology in India and Global Trends.

Unit-II: Molecules of Life **16 period**

Chapter 1: Biomolecules: Building Blocks

Building Blocks of Carbohydrates - Sugars and Their Derivatives; Building Blocks of Proteins -Amino Acids; Building Blocks of Lipids - Simple Fatty Acids, Sphingosine, Glycerol and Cholesterol;

Building Blocks' of Nucleic Acids -Nucleotides;

Chapter 2: Macromolecules: Structure & Function

Carbohydrates - The Energy Givers; Proteins - The Performers; Enzymes - The Catalysts; Lipids and Biomembranes - The Barriers; Nucleic Acids - The Managers

Unit III: Genes & Genomes **16 Period**

Chapter 1: Gene Structure and Function

Cell Structure and Components; Discovery of DNA as Genetic Material

Chapter 2: Genomes Organization & Function

Cell Division; Cell Cycle; Cell Communication; Reproduction; In vitro Fertilization; Immune Response in Animals; Programmed Cell Death;

Unit IV: Cells and Organisms **16 Period**

Chapter 1: Cells: The Basic Unit of Life

Linkage and Crossing Over; Genetic Mapping; Gene Interaction; Sex-Linked. Inheritance; Mutations; DNA Repair; Genetic Disorders

Chapter 2: Organisms: Structure & Dynamics

Genome Organization; DNA Replication; Fine Structure of Genes; From Gene to Protein; Transcription' - The Basic Process; Genetic Code; Translation; Regulation of Gene Expression

PRACTICALS

1. Preparation of buffers and pH determination
2. Sterilization techniques
3. Preparation of bacterial growth medium
4. Isolation of bacteria from curd and staining of bacteria
5. Determination of bacterial growth curve
6. Study of various stages of mitosis and calculation of mitotic index

7. Preparation of karyotyping
8. Cell counting
9. Isolation of genomic DNA

BIOTECHNOLOGY

Class XII

Unit V: Protein and Gene Manipulation (28 Periods)

Chapter-1: Recombinant DNA Technology

Introduction; Tool of rDNA Technology; Introduction of Recombinant DNA into Host Cells; Identification of Recombinants; DNA Probes; Hybridization Techniques; Polymerase Chain Reaction (PCR); DNA Sequencing; Site-directed Mutagenesis

Chapter-2: Protein Structure and Engineering

Introduction to the World of Proteins; 3-D Shape of Proteins; Structure-Function Relationship

Protein Purification of Proteins; Characterization of Proteins;

Chapter-3: Genomics and Bioinformatics

Introduction; Genome Sequencing Projects; Gene Prediction and Counting; Genome Similarity, SNP and Comparative Genomics; Functional Genomics; Proteomics; Sequence and Nomenclature;

Unit VI: Cell Culture and Genetic Manipulation (28 Periods)

Chapter-1: Microbial Culture and Applications

Introduction, Microbial culture techniques, Isolation of microbial products, Strain isolation and improvement, Applications of microbial culture technology,

Chapter-2: Plant Cell Culture and Applications

Introduction; Cell and Tissue Culture Techniques; Applications of Cell and Tissue Culture; Gene Transfer Methods in Plants; Transgenic Plants with Beneficial Traits;

Chapter-3: Animal Cell Culture and Applications

Introduction, Animal cell culture techniques, Scale-up of animal culture process, Stem cell technology,

Books Recommended:

1. Bureau's Higher Secondary (+2) Biotechnology, Part-I &II, Published