Biotechnology Class 11 Syllabus

Exam Structure

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| **Units** | **Topics** | **Marks** |
| Unit - I | Biotechnology: An overview | 5 |
| Unit - II | Molecules of Life | 20 |
| Unit - III | Genetics and Molecular Biology | 20 |
| Unit - IV | Cells and Organisms | 25 |
| Practicals |  | 30 |
|  | **Total** | **100** |

Unit-I: Biotechnology: An overview

**Chapter 1: Introduction to Biotechnology**

Historical Perspectives; Production Strategies in Biotechnology; Quality Control; Product Safety; Good Manufacturing Practices; Good Laboratory Practices; Intellectual Property; Public Perception; Global market; Biotechnology in India and Global Trends

Unit-II: Molecules of Life

**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; Biochemical Transformations

**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: Genetics and Molecular Biology

**Chapter-1: Concepts of Genetics**

Historical Perspective, Multiple Alleles, Linkage and Crossing Over, Genetic Mapping, Gene Interaction, Sex-Linked Inheritance, Extranuclear Inheritance, Qauntitative Inheritance, Genes at the Population Level

**Chapter-2: Genes and Genomes: Structure and Function**

Discovery of DNA as Genetic Material, DNA Replication, Fine Structure of Genes, From Gene to Protein, Transcription – The Basic Process, Genetic Code, Translation, Regulation of Gene Expression, Mutations, DNA Repair, Human Genetic Disorders, Genome Organization

Unit IV: Cells and Organisms

**Chapter 1: The Basic Unit of Life**

Cell Structure and Components, Tissues and Organs, Stem Cells, Biodiversity, Organization of Life.

**Chapter 2: Cell Growth and Development**

Cell Division, Cell Cycle, Cell Communication, Nutrition, Gaseous Exchange, Internal Transport, Maintaining the Internal Environment, Reproduction, In Vitro Fertilization, Animal and Plant Development, Immune Response in Animals, Programmed Cell Death, Defense Mechanisms in Plants.

Practicals

1. Recording Practical results & safety rules in the laboratory
2. Preparation of buffers and pH determination
3. Sterilization techniques
4. Preparation of bacterial growth medium
5. Determination of bacterial growth curve
6. Cell counting
7. Isolation of milk protein (casein)
8. Estimation of whey protein by biuret method
9. Assaying the enzyme acid phosphate
10. Estimation of blood glucose by enzymatic & glucometer method (GOD/POD)
11. Study of various stages of mitosis and calculation of mitotic index
12. Preparation of karyotype