

BIOTECHNOLOGY

Course Structure

Units	Topics	Marks
I	Biotechnology: An Overview	5
II	Molecules of Life	20
III	Genes & Genomes	20
IV	Cells & Organism	25
Practical	Human Physiology: Section A & Section B	30
Total		100

Course Syllabus

Unit 1: 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
 - 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: Genes & Genomes

Chapter 1: Gene Structure and Function

- Cell Structure and Components
- Tissues and Organs
- Stem cells
- Biodiversity

- Organization of Life

Chapter 2: Genomes Organization & Function

- Cell Division
- Cell Cycle
- Cell Communication
- Movement
- Nutrition
- Gaseous Exchanges
- 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

Unit IV: Cells and Organisms

Chapter 1: Cells: The Basic Unit of Life

- Historical Perspective
- Multiple Alleles
- Linkage and Crossing Over
- Genetic Mapping
- Gene Interaction
- Sex-Linked Inheritance
- Extra nuclear Inheritance
- Quantitative Inheritance
- Genes at Population Level
- Discovery of DNA as Genetic Material

- 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

Practical Syllabus

- Preparation of buffers and pH determination
- Sterilization techniques
- Preparation of bacterial growth medium
- Isolation of bacteria from curd and staining of bacteria
- Determination of bacterial growth curve
- Study of various stages of mitosis and calculation of mitotic index
- Preparation of karyotyping
- Cell counting
- Isolation of genomic DNA
- Detection of DNA by gel electrophoresis
- Isolation of milk protein (Casein)
- Estimation of protein by biuret method
- Assaying the enzyme acid phosphate