

i) Immunity:

Students should be able to:

- I. Define immune system and describe its components:
 - Antigen.
 - Antibody (structure of antibody).
 - Lymphocytes (B and T cells).
- II. Describe cell mediated response and humoral immune response.
- III. Discuss the types of immunity:
 - Active immunity.
 - Passive immunity.
- IV. Explain vaccination.

6. BIOENERGETICS:

Content

Photosynthesis and cellular respiration

Learning outcomes:

Students should be able to:

- a) Describe photosynthetic pigments (chlorophyll and carotenoids).
- b) Understand the concept of absorption and action spectra.
- c) Discuss light dependent stage (cyclic and non-cyclic phosphorylation).
- d) Discuss light independent stage (Calvin cycle).
- e) Describe the respiration at cellular level including:
 - Glycolysis (with preparatory and oxidative phase), Krebs's cycle (with reference to production of NADH, FADH and ATP), Electron Transport Chain with its carriers.
 - Anaerobic Respiration and its types (alcoholic and lactic acid fermentation).

7. BIOTECHNOLOGY:

Content

DNA technology
Gene therapy
Tissue culture
Cloning

Learning outcomes:

Students should be able to:

- a) Describe Recombinant DNA Technology and its application (e.g. Insulin production).
- b) Describe the principle and steps of Polymerase Chain Reaction (PCR).
- c) Understand the following terms:
 - DNA Analysis (Finger Printing, Gene Sequencing).
- d) Explain Gene therapy with reference to how genetic diseases (i.e. cystic fibrosis, severe combined immunodeficiency syndrome, hypercholesterolemia) can be treated with gene therapy.
- e) Describe the detail of Transgenic Organisms (Bacteria, Plants and Animals), Tissue Culture, Cloning and their applications.

8. ECOSYSTEM:

Content

Biological succession
Impacts of Human activity on ecosystem
Energy flow in ecosystem

Explain learning outcomes:

Students should be able to:

- a) Define succession and describe various stages of xerosere.
- b) Describe the significance of human activity on ecosystem such as Population, Deforestation, Ozone Depletion, Greenhouse Effect, Acid rain, Eutrophication and Pesticides.
- c) Describe Nitrogen cycle (ammonification, nitrification, assimilation, depletion).

- d) Define and explain Energy Flow, Trophic Levels (producers, consumers, decomposers), Productivity, Food chain, Food web.

9. EVOLUTION:

Content

Darwin's theory
Lamarck's theory
Evidences of evolution

Learning outcomes:

Students should be able to:

- a) Compare the theory of Darwin and Lamarck.
- b) Discuss evidences of evolution from Paleontology, Comparative anatomy, Molecular biology and Biogeography.
- c) Explain Hardy-Weinberg Theorem and factors affecting gene / allele frequency

10. Genetics

Content

Mendelian Inheritance
Genetic linkage
Gene control & expression
Sex Determination
Cell Division
Genetic disorders

Learning outcomes:

Students should be able to:

- a) Explain the terms: Gene, locus, allele, dominant, recessive, co-dominant, linkage, F1 and F2, phenotype, genotype, homozygous, heterozygous, mutation, epistasis, multiple allele, Rh factor, dominance relations, polygenic inheritance.
- b) Explain law of segregation and law of independent assortment through Punnet square, solve problems related to monohybrid, dihybrid crosses and testcross.

- c) Discuss gene linkage and sex linkage in human (haemophilia and colour blindness).
- d) Discuss hypothesis about DNA Replication, Meselson and Stahl experiment and mechanism of replication.
- e) Explain mechanism of gene expression: Transcription and Translation.
- f) Describe Genetic code and its properties.
- g) Explain sex chromosomes and discuss different systems of sex determination (XO-XX, XY-XX, ZZ-ZW).
- h) Know cell cycle and its phases.
- i) Describe events of mitosis and meiosis along with their significance.
- j) Discuss meiotic errors (Down's syndrome, Klinefelter's syndrome, Turner's syndrome).

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(For F.Sc. and Non-F.Sc.)

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CHEMISTRY

STRUCTURE OF THE SYLLABUS (2018)

For F.Sc. and Non-F.Sc.

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5. Chemical Energetics
6. Electrochemistry
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B. Inorganic Chemistry

1. Periods
2. Groups
3. Transition elements
4. Compounds of Nitrogen and Sulphur

C. Organic Chemistry

1. Fundamental Principles
2. Hydrocarbon
3. Alkyl Halides
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5. Aldehydes and Ketones
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9. Environmental Chemistry