

(BM-100) - Introduction to Biology For Pre-Engineering

Course Outline:

Theory:

1. Cell Structure and Function

1. Techniques used in Cell Biology
2. Cell Wall and Plasma Membrane – The Boundary Wall
3. Cytoplasm and Organelles
4. Prokaryotic and Eukaryotic Cells

2. Biological Molecules

1. Biological Molecules in Protoplasm
2. Importance of Water (Importance in Protoplasm and in Environment)
3. Carbohydrates
4. Proteins
5. Lipids
6. Nucleic Acids
7. Conjugated Molecules (Glycolipids, Glycoproteins, Lipoproteins and Nucleoproteins)

3. Enzymes

1. Structure of Enzymes
2. Mechanism of Enzyme Action
3. Factors affecting the Rate of Enzymatic Action (Temperature, pH, Enzyme Concentration and Substrate Concentration)
4. Enzyme Inhibition (Competitive and Noncompetitive Inhibitors)
5. Classification of Enzymes

4. Bioenergetics

1. Aerobic and Anaerobic respiration
2. Mechanism of Respiration
3. Synthesis of ATP – Chemiosmosis and Substrate-level Phosphorylation

5. Biodiversity

1. Acellular life
2. Prokaryotes
3. Diversity among animals
4. Digestion
5. Circulation
6. Immunity
7. Respiration
8. Homeostasis
9. Support and movement
10. Nervous coordination
11. Chemical coordination

6. Continuity in Life

1. Reproduction
2. Development and aging
3. Inheritance
4. Chromosome and DNA
5. Evolution

7. Application of Biology

1. Gene Cloning (Recombinant DNA Technology and Polymerase Chain Reaction)
2. DNA Sequencing
3. DNA Analysis
4. Genome Maps
5. Tissue culture
6. Transgenic bacteria, plants and animals

7. Biotechnology and healthcare
8. Scope and importance of biotechnology
9. Vaccination and integrated disease management
10. Animal husbandry
11. Latest techniques applied to enhance crop and fruit yields
12. Home gardening
13. Role of microbes in human welfare

Suggested Teaching Methodology:

- Lecturing
- Written Assignments Report Writing

Suggested Assessment:

Theory (100%)

- Sessional (20%)
- Quiz (12%)
- Assignment (8%)
- Midterm (30%)
- Final Term (50%)

Recommended and Text Books:

1. AS/A level Biology, Mary Jones, Contributors: Richard Fosbery, Jennifer Gregory, Dennis Taylor
Edition 2, Cambridge University Press, 2007, ISBN 0521703069, 9780521703062
 2. National Curriculum 2006, HEC Pakistan
 3. AQA A-Level Biology, Pauline Lowrie, Mark Smith
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