

MB - 102 Diversity of Life forms and Applied Microbiology

Section - I

Unit - 1 Concept of Biodiversity

15 hours

- 1.1. Biodiversity Basics; Biodiversity: Origin, speciation and extinction and ecological role of biodiversity; Types of biodiversity: alpha, beta, and gamma diversity
- 1.2. Techniques for molecular identification: Morphological methods, Biochemical, serological, Molecular methods, Fatty acid profiling, metabolic fingerprinting (Biolog), DGGE and TGGE
- 1.3. Taxonomy methods: Taxonomy and classification: Taxonomic Hierarchies; Classical approach to classification; Numerical taxonomy; Molecular taxonomy; modern methods of taxonomy and systematic.
- 1.4. Overview of plant and Animal biodiversity: Taxonomic criteria of classification; Classification system; Distinguishing and significant characteristics of representative group

Unit - 2 Eukaryotic Microorganism and Archaeobacteria

15 hours

- 2.1. Mycology : Taxonomic criteria of fungal classification; Distinguishing and significant characteristics of Mastigomycotina, Ascomycotina, Basidiomycotina, Zygomycotina and Deuteromycotina; Fungal growth and differentiation;
- 2.2. Protozoa: Structure, classification, reproductive strategies and economic importance; Algae : structure, classification, reproductive strategies and economic importance; algal ecology ; lichens
- 2.3. Archaeobacteria : Phenotypes of Archea : Methanogenic bacteria, extremophiles : thermophilic, halophilic bacteria; Cell structure & composition; Eco-physiology; Taxonomy & nomenclature; Salient features of representative group
- 2.4. Virology : Structure, classification, cultivation and economic importance of plant viruses and animal viruses; Structure, classification, cultivation and economic importance of Bacteriophage; Viroids; Prions

Section – II

Unit - 3 Prokaryotic Microorganisms and Viruses

15 hours

- 3.1. Microbial taxonomy : Microbial evolution and diversity, Taxonomic ranks, Classification system, Major characteristics used in taxonomy, Assessing Microbial Phylogeny, The Major Divisions of Life, Bergey's Manual of Systematic Bacteriology, A Survey of Prokaryotic Phylogeny and Diversity
- 3.2. Overview of the Deinococci and Nonproteobacteria Gram Negatives
- 3.3. Overview Proteobacteria
- 3.4. Overview of The Low G+C and High G+C Gram Positives bacteria

Unit - 4 Applied Microbiology

15 hours

- 4.1. Application of Microbiology and Role of Microbiologist in Dairy and Food industry
- 4.2. Application of Microbiology and Role of Microbiologist in Clinical and Diagnostic field
- 4.3. Application of Microbiology and Role of Microbiologist in Agriculture
- 4.4. Application of Microbiology and Role of Microbiologist in Environment science

List of Experiments

1. Isolation and identification of bacteria belonging to Enterobacteriaceae, Bacillaceae, Pseudomonadaceae, Azotobacteraceae family
2. Isolation and identification of industrially important molds and fungi.
3. Isolation of actinomycetes
4. Isolation of bacteriophage
5. Screening of Extremophiles (Acidophiles / Alkaliphiles / Halophiles/ Psychrophiles / Thermophiles)
6. Study of Protozoan and algal permanent slide
7. Growth curve of E. coli and determination of growth rate and generation time, Effect of pH, temperature, salt and glucose on growth
8. Identification of Microorganism with 16S rRNA homology technique
9. Microbiological analysis of clinical sample

10. Identification of bacteria by rapid kit
11. Microbiological examination of food
12. Microbiological examination of water
13. Microbiological analysis of Air
14. Microbiological analysis of Milk

List of Reference Books

1. Pollard, Cell Biology.
2. Alberts, Molecular Biology of Cell.
3. Cooper, The cell.
4. Prescott, Microbiology.
5. Lodish, Molecular Cell Biology.
6. Griffith, An Introduction to Genetic analysis.
7. Moat, Microbial Physiology.
8. David White, The Physiology and Biochemistry of Prokaryotes
9. Pierce Genetics A Conceptual Approach.
10. Benjamin, Gene VIII.
11. Syndeer and Champness. Molecular genetics of bacteria
12. Nancy, Fundamental Bacterial Genetics
13. Tamarin, Principles of Genetics.
14. J. D. Watson, Molecular Biology of the Genes.
15. Prescott, Microbiology
16. Griffith, Genetic Analysis