

BS23MN1MB1

B.Sc Semester One [Minor] Basic Microbiology (Credit 2)

Objective: The students would understand the relevance of microbiology and microorganisms. They would know the basic types of microbes, their cultivation and control the growth of microbes

Outcome:

The students will gain the knowledge of the scope of microbiology, microbial diversity, tools to study microbes and the importance of microbes.

Unit 1

10 lectures

1. The Scope And Relevance Of Microbiology
2. Whittaker's Five Kingdom Classification, Carl Woese's Three Kingdom Classification, Comparison And Difference Of Eucaryotes and Procaryotes
3. Prokaryotic Microbes: Bacteria And Archaea
 - a. General Characters
 - b. Outline Of Cell Structural Components (Only Labelled Diagram)
 - c. Distribution And Types Of Habitats
 - d. Medical, Environmental And Agricultural Significance
4. **Eucaryotes General Characters and Significance**
 - a) Fungi
 - b) Algae
 - c) Protozoa
5. **Acellular Microbes General Characters and Significance**
 - a) Virus, Viroids, Virusoids, Prions

Unit 2

10 lectures

- a) Principle Of Light Microscope: Magnification And Resolution Power
- b) The Bright-Field Microscope , Dark field microscope and fluorescence microscope
- c) The Transmission Electron Microscope
- d) The Scanning Electron Microscope
- e) Types Of Stain Used For Light Microscopy(Acidic, Basic, Romanaski, Leuco) And Electron Microscope
- f) Positive And Negative Staining In Light And Electron Microscope
- g) Smear, Types Of Mordant, Types Of Fixation: Physical And Chemical, Staining Intensifier.

Unit 3

10 lectures

- a) Developments in Diseases and aseptic surgery: Agostino Bassi, Ignaz Semmelweis, Joseph Lister , And Robert Koch
- b) Developments in Pure Culture Techniques, Antibiotics, Immunology And Prophylaxis
- c) The Development Of Virology
- d) The Developments In Microbial Ecology : Sergei Winogradsky, Martinus Beijerinck
- e) The Developments In Genetics : Gregor Mendel, Erwin Chargaff , Rosalind Franklin , Maurice Wilkins , James Watson, Francis Crick
- f) Developments In Industrial microbiology, Biotechnology, Bioinformatics And Nanobiotechnology: Louis Pasteur (Wine/Alcohol fermentation), Werner Arber And Hamilton Smith, Howard Temin And David Baltimore, David Jackson, Robert Symons, And Paul Berg, Margaret Dayhoff, Richard Feynman.

LAB. COURSE (Credit 2)

1. Microbiology Good Laboratory Practices and Bio-safety.

2. To study the principle and applications of important instruments :biological safety cabinets, autoclave, incubator, BOD incubator, hot air oven, light microscope, pH meter, autoclave, hot air oven, incubator, membrane filtration and laminar airflow.
 - a. used in the microbiology laboratory.
3. Demonstration of the presence of microflora in the environment by exposing nutrient agar plates to air.
4. Simple Staining: Positive Monochrome
5. Negative Staining
6. Gram Staining Of Bacteria
7. Gram Staining Of Yeast
8. Acid Fast Staining
9. Spirochete Staining
10. Mounting Of Mold :*Mucor, Rhizopus, Aspergillus*
1. Permanent Slide/Photographs Of: *Bacillus, Staphylococcus, Yeast, Rhizopus, Aspergillus, Penicillium, Gram Negative Short Rods, Paramecium, Spirogyra, Euglena, Tape Worm*

List Of Microbiology Books Authored By:

- 1) Principles Of Microbiology , Atlas R.M.
 - 2) Microbiology Marjorie Kelly Cowan
 - 3) Microbiology Gerard J. Tortora
 - 4) Microbe Hunters: The Classic Book On The Major Discoveries Of The Microscopic World Paul De Kruif
 - 5) Foundations In Microbiology Kathleen Park Talaro
 - 6) General Microbiology Roger Y. Stanier Macmillan, 1987
 - 7) Michael J. Pelczar Jr. Chan Ecs And Krieg Nr (2004) Microbiology , 5th Edition. Tata Mcgraw Hill.
 - 8) Instructor's Manual To Accompany Elements Of Microbiology By Michael J. Pelczar
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