

BS23MJ1MB1:
Bachelor of Sciences : Microbiology
Learning Outcomes & Contents of the Courses
Semester one

Major 1: Principles of Microbiology

Course learning outcomes: At the conclusion of this course the students -

Outcome 1. Have developed a good knowledge of the development of the discipline of Microbiology and the contributions made by prominent scientists in this field.

Outcome 2. Have developed a very good understanding of the characteristics of different types of microorganisms, methods to organize/classify these into and basic tools to study these in the laboratory.

Outcome 3. Are able to explain the useful and harmful activities of the microorganisms.

Outcome 4. Are able to perform basic experiments to grow and study microorganisms in the laboratory.

Unit – 1:

15 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. The Discovery Of Microorganisms : Antony Van Leeuwenhoek
4. Developments in Germ theory of disease
5. Developments in Pure Culture Techniques
6. Developments in Chemotherapy
7. Developments in Immunology And Prophylaxis
8. Developments in Soil and microbial ecology
9. Developments in virology
10. Contribution of India in the field of microbiology: Kiran Mazumdar-Shaw, Cyrus Poonawala, Ananda Mohan Chakrabarty, Mankombu Sambasivan Swaminathan.

Unit – 2:

15 Lectures

Introduction to Distribution, morphology, reproduction and importance of:

1. Viruses (acellular microbes)
2. Procaryotic cell
3. Fungi (eukaryotic cell)
4. Protozoa
5. Helminths

Unit – 3:

15 Lectures

1. Principle Of Light Microscope: Magnification And Resolution Power
2. The Bright-Field Microscope
3. The Dark-Field Microscope
4. The Phase-Contrast Microscope
5. The Fluorescence Microscope
6. The Transmission Electron Microscope
7. The Scanning Electron Microscope

Unit – 4:

15 Lectures

1. Types Of Stain Used For Light Microscopy(Acidic, Basic, Romanaski, Leuco) And Electron Microscope
2. Staining techniques: Smear preparation, simple staining, Gram staining, negative staining and acid-fast staining.
3. Types Of Mordant, Types Of Fixation: Physical And Chemical, Staining Intensifier.
4. Types Of Stain Used For Electron Microscope
5. Staining techniques for electron microscope: Negative staining, shadowing, freeze etching
6. Difference of light and electron microscope

Reference Books

11. Prescott, M.J., Harley, J.P. and Klein, D.A. Microbiology. 5th Edition WCB Mc Graw Hill, New York, (2002).

1. Tortora, G.J., Funke, B.R. and Case, C.L. Microbiology: An Introduction. Pearson Education, Singapore, (2004).
2. Alcomo, I.E. Fundamentals of Microbiology. VI Edition, Jones and Bartlett Publishers. Sudbury. Massachusetts, (2001).
3. Black J.G. Microbiology-Principles and Explorations. John Wiley & Sons Inc. New York, (2002).
4. Pelczar, MJ Chan ECS and Krieg NR, Microbiology McGraw-Hill.
5. Willey, Sherwood, Woolverton. Prescott, Harley, and Klein's Microbiology McGraw-Hill publication
6. Tortora, Funke, Case. Microbiology. Pearson Benjamin Cummings.
7. JACQUELYN G. BLACK. Microbiology Principles and explorations. JOHN WILEY & SONS, INC.
8. Madigan, Martinko, Bender, Buckley, Stahl. Brock Biology of Microorganisms. Pearson
9. Tom Besty, D.C Jim Koegh. Microbiology Demystified McGRAW-HILL.

