

**Core Course I – Fundamentals of Microbiology**

**Unit – I**

Introduction – Definition, scope and history of microbiology. Difference between the prokaryotic and eukaryotic microorganisms. Classification of microorganisms – general principles and nomenclature – Haeckel's three kingdom concept, Whittaker's five kingdom concept. Classification and characterization of bacteria according to Bergey's Manual of Systematic Bacteriology (9th edition). Basic understanding of classification of viruses, algae, fungi and protozoa.

**Unit – II**

Microscopy: Principles and applications of simple, compound, bright field, dark field, phase contrast, fluorescent and electron microbiology. Principles of staining : Nature of dyes, types of staining – simple, differential, negative and spore staining, Sterilization : Principles and methods – physical (moist heat, dry heat, filtration, pasteurization, tyndallization, radiations) and chemical (alcohols, aldehydes, phenols, halogens and hypochlorites).

**Unit – III**

General characteristics and nature of Archaeobacteria, Eubacteria, Cyanobacteria, Mycoplasmas, Rickettsiae, Chlamydias, Spirochaetes, Actinomycetes, Protozoa, Algae, Fungi and Viruses.

**Unit – IV**

Microbial cell : Ultrastructure of bacteria, subcellular structures and cell envelope – slime, capsule, cell wall, pili, flagella, cell inclusions, biosynthesis of bacterial cell wall, cell membrane – Biomembrane, liposomes – membrane transport – diffusion, active and passive transport and osmoregulation.

**Unit – V**

Culture techniques: Types of media simple, defined, enriched and transport media with specific examples for each type. Methods of maintenance and preservation of microbes.

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- Elizabeth Moore-Landecker. (1996). Fundamentals of the fungi. (4th edition). Prentice Hall International, Inc, London.
- Gerhardt. P. Murray R. Ce., Wood W.A., and Kreig N.R. (edtr.) (1994). Methods for General and Molecular Bacteriology – American Society for Microbiology, Washington D.C.
- Goodfellow M., and O'Donnell A.C. (1994). Chemical Methods in Prokaryotic

Systematics – John Wiley & Sons, New York.

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James G. Cappuccino and Natalie Sheman.(1996). Microbiology-A laboratory manual. (4<sup>th</sup> edition).The Benjamin/Cummings publishing company Inc, California.

John webster.(1993). Introduction to Fungi.(2nd edition).Cambridge University Press, Cambridge.

Lansing M. Prescott., John P. Harley and Donald A.Klein.(2003). Microbiology (5<sup>th</sup> edition) McGraw Hill, New York.

Larry Mc Kane and Judy Kandel.(1996). Microbiology-Essentials and applications. (2<sup>nd</sup> edition). Mc Fraw Hill Inc, New York.

Michael T. Madigan, Jhon M. Martinko and Jack Parker. (1997). Brock Biology of Microorganisms.(8th edition).Prentice Hall International Inc, London.

Moselio Schaechter. and Joshua Leaderberg. (2004). The Desk encyclopedia of Microbiology. Elseiver Academic press, California.

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