ANCILLARY COURSES OFFERED TO OTHER DEPARTMENTS

19IMBA15: MICROBIOLOGY - I

Learning Objectives (LO):

To learn about the Introduction, Historical development, Staining reactions and Media preparation for the cultivation of microorganisms.

Unit – 1: History Of Microbiology

History and scope of Microbiology. Recent developments - Spontaneous generation - Biogenesis. Contributions of Leeuwenhoek, Louis Pasteur, Robert Koch, Elie Metchnikoff, Edward Jenner, Lister and Fleming.

Unit – 2: Microscopy

Microscopy: Principles and applications of Simple, Compound, Bright field, Dark field, Phase contrast, Fluorescent and Electron microscope [SEM & TEM].

Unit – 3: Bacterial Structure And Staining

Structure and organization of bacterial cell, Gram positive and Gram negative bacterial cell wall. Principles of staining: Nature of dyes, Types of staining – Simple, Differential, Negative and Spore staining.

Unit – 4: Sterilization Methods

Sterilization methods – Physical (Moist heat, Dry heat, Filtration, Pasteurization, Tyndalization, Radiations) and Chemical methods (Alcohols, Aldehydes, Phenols, Halogens and Hypochlorite).

Unit – 5: Cultivation And Preservation Of Bacteria

Culture and Media preparation – Solid and liquid – types of media -.Semi synthetic, Synthetic, Enriched, Enrichment, Selective and Differential media. Pure culture techniques - Tube dilution - Pour, Spread, Streak plate. Anaerobic culture techniques.

Text Books:

1. Dubey, R.C. and Maheswari, D.K. (2013). A Textbook of Microbiology 3/e, S. Chand and Company Ltd., New Delhi.
2. Ananthanarayan. R. and Paniker C.K.J Text Book of Microbiology, 9th Edition Orient Longman, (2013).

Supplementary Books:

3. Pelczar, Chan & Kreig (2012). Microbiology 5th edition. Tata McGraw Hill, New Delhi.
4. Willey, Joanne M. Prescott's Microbiology. 9th Edition: McGraw - Hill Education 10/e - Europe, 2017.
5. Geeta Sumbali and Mehrotra RS (2009). Principles of Microbiology. First edition, Tata McGraw Hill P. Ltd., New Delhi.

19IMBA26: MICROBIOLOGY- II

Learning Objectives (LO):

To acquire fundamental knowledge about the Classification of microorganisms, Structure, differences and antimicrobial chemotherapy.

Unit – 1: Classification Of Microorganisms

Difference between prokaryotic and eukaryotic microorganisms. Classification of microorganisms - General principles and nomenclature - Haeckel's three kingdom concept, Whittaker's five kingdom concept.

Unit – 2: Ultrastructure Of Bacteria

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

Unit – 3: General Characteristics Of Microorganisms

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

Unit – 4: Isolation Of Microorganisms

Isolation of different types of Bacteria - Fungi - Actinomycetes - Cyanobacteria - Protozoa. Preservation methods of microbes. Type culture collections

Unit – 5: Antimicrobial Chemotherapy

Antimicrobial Chemotherapy – Antibiotics – Mode of action antimicrobial resistance, Tests for sensitivity to antimicrobial agents.

Text Books:

1. Pelczar, Chan & Kreig (2012). Microbiology 5th edition. Tata McGraw Hill, New Delhi.
2. Dubey, R.C. and Maheswari, D.K. (2013). A Textbook of Microbiology 3/e, S. Chand and Company Ltd., New Delhi.
3. Ananthanarayan. R. and Paniker C.K.J Text Book of Microbiology, 9th Edition Orient Longman, 2013.

Supplementary Books:

1. Willey, Joanne M. Prescott's Microbiology. 9th Edition: McGraw-Hill Education 10/e - Europe, 2017.
2. Meenakumari. S (2006) Microbial Physiology. 1st Edition, MJP Publishers, A unit of Tamil Nadu Book House, Chennai.

Web References:

1.https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1254764/
2.http://microbialcell.com/
3.http://www.biologydiscussion.com/microbiology-2/antimicrobial-drugs-features-and-mechanisms-microbiology/66222

19IMBP27: ANCILLARY PRACTICAL – I - MICROBIOLOGY

Learning Objectives (LO):

To acquire basic laboratory skills like pure culture techniques, Staining techniques and Media preparation.

Practicals:

1. Different methods of sterilization.
2. Preparation of Media:
   i. Nutrient broth ii. Nutrient agar iii. Plates iv. Slants v. Soft agar vi. Blood agar vii. Selective Media.
3. Determination of growth - Growth curve.
4. Pure culture technique:
   i. Streak plate ii. Spread plate iii. Pour plate methods.
5. Measurement of microbes - Micrometry.
6. Enumeration of bacterial / yeast cells- Viable count (Plate count), Total count (Haemocytometer count).
7. Motility determination
   i. Hanging drop method.
8. Staining methods:
   i. Simple staining ii. Gram's staining iii. Negative staining iv. Spore staining
   v. Metachromatic granular staining vi. Lacto phenol cotton blue staining
   vii. Fungal slide culture.

Reference Books:

1. Sundararajan, T. Microbiology laboratory manual. 2nd edition (2007).
2. Kannan, N. Laboratory manual in General Microbiology (2002).