

Semester- III
Course MI-201
Microbial Physiology

Unit I. Microbial Nutrition and Factors Affecting

1. Culture media: Types of culture media: Routine and specialized media; selective media, differential media, enriched media, enrichment media, enumeration media, assay media and maintenance media (4 hr)
2. Modes of nutritional uptake (3 hr)
 - A. Entry of nutrition in the cell, passive diffusion, facilitated diffusion and active transport,
 - B. Utilization of nutrients that cannot enter the cell
3. Classification of bacteria on the basis of growth supporting environmental factors such as oxygen, temperature, pH, osmotic pressure, salt and hydrostatic pressure. (3 hr)

Unit II. Enzymes

1. General introduction (4 hr)
 - A. Physical and chemical properties
 - B. Structure of enzymes: Prosthetic group, apoenzyme, coenzymes, cofactors
 - C. Localization of enzymes: Extra cellular and intra cellular
 - D. Nomenclature and classification of enzymes, IUB system of enzyme classification
2. Enzyme action (6 hr)
 - A. Active sites of enzymes
 - B. Mechanism of enzyme action
 - C. Factors affecting enzyme activity
 - D. Inhibition of enzyme activity: Competitive and noncompetitive

Unit III. Microbial growth

1. Methods of reproduction in bacteria and new cell formation (2 hr)
2. Growth (5 hr)
 - A. Introduction to growth rate, generation time
 - B. Criteria for growth measurement: Cell mass and cell number, methods of their measurement
 - C. Normal growth curve of bacteria
 - D. Continuous growth and synchronous growth
3. Chemotherapeutic agents as growth inhibitors (3 hr)
 - A. Principles of chemotherapy

- B. General mode of action of various chemotherapeutic agents:
Sulfonamides, antibiotics (penicillin, streptomycin, Polymixin)

Unit IV. Biomolecules and metabolism

1. Biomolecules: Chemical structure, properties, classification and biological significance of carbohydrates, proteins, lipids and nucleic acids (7 hr)
2. Introduction to metabolism (3 hr)
 - A. Anabolism, catabolism, primary and secondary metabolism
 - B. Role of reducing power, precursor metabolites and energy rich compounds in cell metabolism

Text Books:

1. Pelczar Jr, M J, Chan E C S., Krieg N R, (1986) *Microbiology*, 5th edn, McGraw-Hill Book Company, NY
2. Ingraham J L, and Ingraham, C L, (2000) *Introduction to Microbiology*, 2nd edn, Brooks/Cole, Singapore
3. Black J G, (2002) *Microbiology: Principles and Explorations*, 5th edn, John Wiley and Sons, Inc. NY

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