BSH403 BASIC MICROBIOLOGY

Course Outcomes:

Upon successful completion of the course, students will be able to:

CO 1. Understand basic concepts, historical perspectives and contributions in Microbiology.
CO 2. Understand evolution of prokaryotic and eukaryotic metabolism
CO 3. Learn about microbial nutrition and culture of microbes in the laboratory.
CO 4. Discern various factors affecting growth and death of microorganisms.
CO 5. Explain the microbial metabolic pathways with their applications.

UNIT I (13 hrs)

Introduction to microbiology, historical perspectives, contributions of early microbiologists, Koch Postulates. Branches and scope of microbiology. Origin and evolution of microorganisms, discovery of anaerobic life, evolutionary chronology, trends in evolution of archaebacteria, eubacteria and eukaryotes. Evolution of prokaryotic and eukaryotic metabolism. Modern methods of tracing and analysis of evolution.

UNIT II (13 hrs)

Microbial diversity, habitats, life cycles, structure and classification of bacteria, cyanobacteria, actinomycetes, fungi and viruses. Pathogenic microorganisms: bacteria, mycoplasmas, rickettsias, chlamydias and protozoa.

Microbial nutrition and cultivation: Nutritional categories of microorganisms, role of microbial nutrients; cultivation of aerobes, anaerobes and facultatives, obligate pathogens and viruses. Selective media, selective isolation and methods of preservation of microbes.

UNIT III (13 hrs)

Microbial growth, population and growth curves, generation time, batch and continuous cultures (e.g. chemostat, turbidostat), measurement of growth, microbiological assays (e.g. antibiotics, amino acids and vitamins).

Factors affecting growth and death of microorganisms: temperature, pH, water activity, O-R potential, salinity, hydrostatic pressure, disinfectants, antiseptics and chemotherapeutic agents. Methods of sterilization.

UNIT IV (13 hrs)

Microbial metabolism: Energy sources and classification; metabolism in autotrophs, heterotrophs; hexose and pentose phosphate pathways; synthesis of peptidoglycan, intermediary metabolism and secondary metabolites. Aerobic and anaerobic respiration, fermentation, electron transport system and substrate phosphorylation.

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