BTS510:MICROBIOLOGY

L:2 T:0 P:0 Credits:2

Course Outcomes: Through this course students should be able to

CO1 :: understand microbial evolution, classification, interactions, and environmental significance in microbiology

CO2 :: compare characteristics and classification of bacteria, viruses, fungi, protists

CO3 :: summarize techniques for culturing microbes and analyze their structural components

CO4 :: determine the effectiveness of antimicrobial agents and mechanisms of microbial resistance

CO5 :: classify the various microbial diseases, host interactions, and clinical diagnostic methods

CO6 :: classify applications of microbes in healthcare, industry, and environmental sustainability

Unit I

Introduction to microbiology and microbial evolution : historical roots of microbiology, microbial diversity and rise of general microbiology, modern era of microbiology, antiquity and extent of microbial life, microbial diversity, microbial classification and taxonomy, accessing microbial phylogeny, microbial interaction

Unit II

Microbial diversity : overview of bacterial diversity (Eubacteria and Archaea), bacteria basic classification and characteristics, virus basic classification and characteristics, fungi basic classification and characteristics, protists basic classification and characteristics

Unit III

Cell Structure, function, microbial growth and nutrition : overview of prokaryotic cell structure, components external to the cell wall, culture media and isolation techniques, cell membranes and cytoplasmic matrix, plasmids and nucleoid, archaeal and bacterial cell wall, common nutritional requirements and nutritional types of microorganisms, culture media, Preservation and Maintenance of microbial cultures routine methods and liquid nitrogen preservation, freeze-drying (lyophilization)

Unit IV

Control of microorganisms : basics of microbial control, conditions influencing the effectiveness of antimicrobial agents, characteristics of ideal antimicrobial agents, physical and chemical agents for controlling microorganisms, antibiotics and therapeutic agents: historical highlights, characteristics of antimicrobial drugs and mechanism, antibiotics and therapeutic agents: development of resistance

Unit V

Microbe-host interactions : overview of host-microbe interaction, harmful microbial interaction with humans

Microbial diseases : bacterial- representative example, viral- representative example, fungal- representative example, protozoal- representative example

Clinical microbiology : identification of microorganisms from specimens, rapid methods of identification, molecular methods and analysis of metabolic products

Unit VI

Applied microbiology : industrial microorganisms and product formation, industrial microorganism for health industry, vitamins, steroids, food industry, biotransformation, enzymes, amino acids, microbial fermentations, biohydrogen

Text Books:

1. MICROBIOLOGY by PELCZAR M J, CHAN E C S AND KREIG N R,, MCGRAW HILL EDUCATION

References:

1. PRESCOTT'S MICROBIOLOGY by JOANNE WILLEY AND KATHLEEN SANDMAN AND DOROTHY WOOD, MCGRAW HILL EDUCATION