Course Overview

Introduction to Microbiology

course title: Principles of Microbiology (Theory):

UNIT	CONTENTS	HOURS
1	The Microbial World and You - Microbes in our lives. - A brief history of microbiology. - Classification of microorganisms. - Microbes and human diseases.	2
2	Observing Microorganisms Through a Microscope - Units of measurements. - Microscopy (light, dark field, fluorescence, and electron microscopy). - Preparation of specimens for light microscopy.	4
3	Structure of Bacterial Cells - Size, shape, and arrangement of bacterial cells. - Structures external to the cell wall (glcocalyx, flagella, axial filaments, and pili). - The cell wall. - Structures internal to the cell wall (cytoplasm, nuclear area, ribosomes, inclusions, and endospores).	4
4	Microbial Metabolism - Catabolic and anabolic reactions. - Enzymes. - Energy production methods. - Biochemical pathways of energy production. - Biochemical pathways of energy utilization.	6
5	Microbial Growth - Requirements for growth. - Culture media. - Preserving bacterial cultures and growth.	4

6	Control of Microbial Growth - Conditions influencing microbial control. - Action of microbial control agents. - Rate of microbial death. - Physical methods of microbial control. - Chemical methods of microbial control.	4
7	Microbial Genetics - Structure and function of the genetic material. - Mutation: change in the genetic material. - Genetic transfer (transformation, conjugation, transduction, and recombination). - Genetic engineering	6

course title: Principles of Microbiology (Practical)

UNIT	CONTENTS	HOURS
1	Preparation and Storage of Media, Sterilization and Disinfection. - Media. - Sterilization. - Disinfection. - Culture tubes and Petri dishes. - Transfer instruments. - Media storage.	4
2	Basic Laboratory Techniques for Isolation, Cultivation, and Cultural Characterization of Microorganisms. - Culture transfer techgniques. - Isolation of discrete colonies from a mixed culture. - Isolation of pure cultures from a spread-plate or streak plate preparation. - Cultural and morphological characteristics of microorganisms.	8
3	Microscopy. - Microscopic examination of stained cell and living bacterial preparation. - The microscopic measurements of microorganisms.	4

4	Bacterial Staining. - Simple staining. - Negative staining. - Gram stain. - Acid-fast stain (Ziehl-Neelsen method). - Spore stain (Schaeffer-Fulton method). - Capsule stain	16
5	Nutritional and Physical Requirements, and Enumeration of Microbial Populations. - Nutritional requirements: media for routine cultivation of bacteris. - Use of differential and selective media. - Physical factors: temperature, pH, and oxygen. - Techniques for the cultivation of anaerobic microorganisms. - Serial dilution-agar plate procedure to quantitate viable cells. - The bacterial growth curve.	28