

Course Objectives:

The objectives of the course are:-

1. To provide first-hand knowledge to students in the fundamental aspects of basic microbiology
2. To impart the practical know-how about the morphology and microbial activities
3. To acquaint the students with basic techniques of sterilization, culturing and isolation of microorganisms

Course Learning Outcomes:

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

1. **ATTAIN** the basic knowledge of microorganisms
2. **FAMILIARIZE** with the concepts of basic microbiological techniques
3. **ELUCIDATE** the role of microbes with reference to food, health and environment in general
4. **EXPLORE** the plant-microbial interaction

5. **INVESTIGATE** the potential of pathogenic microorganisms

6. **APPLY** the appropriate microbiological techniques, methodologies and equipment in accordance with Lab safety protocol

Course Contents:

Viruses: Bacteriophages; Replication of bacteriophages. Viruses of animals and plants; History, structure and composition; classification and cultivation of animal viruses. Effects of virus infection on cells. Cancer and viruses.

Microbial Diversity: Prokaryotic diversity Bacteria: Purple and green bacteria; cyanobacteria, prochlorophytes, chemolithotrophs, methanotrophs and methylotrophs, sulfate and sulfur-reducing bacteria, homoacetogenic bacteria, Budding and appendaged bacteria, spirilla, spirochetes, Gliding bacteria, Sheathed bacteria, Pseudomonads, Free living aerobic nitrogen fixing bacteria, Acetic acid bacteria, Zymomonas and chromobacterium, Vibrio, Facultatively aerobic Gram-negative rods, Neisseria and other Gram-negative cocci, Rickettsias, Chlamydias, Gram-positive cocci, Lactic acid bacteria, Endospore forming Gram-positive rods and cocci, Mycoplasmas, High GC Gram-positive bacteria; Actinomycetes, Coryneform bacteria, propionic acid bacteria, Mycobacterium, Filamentous Actinomycetes.

Eukaryotic Microorganisms: Algae: Biological and economic importance of algae; Characteristics of algae; Lichens. Fungi: Importance of fungi; Morphology; Physiology and reproduction, Cultivation of fungi. Protozoa: Ecology and importance of protozoa. Classification of protozoa.

Microbial Ecology: Microorganisms in nature, Microbial activity measurements, Aquatic habitats, Deep-sea microbiology, Terrestrial environments, Hydrothermal vents, Rumen microbial ecosystem, Microbial leaching, Biogeochemical cycles; Trace metals and mercury, Biodegradation of Xenobiotics.

Teaching-Learning Strategies

Teaching will be a combination of class lectures, class discussions, and group work. Short videos /films will be shown on occasion.

Assignments

The sessional work will be a combination of written assignments, class quizzes, presentation, and class participation/attendance.

Assessments and Examination

Sessional Work:	25 marks
Midterm Exam:	35 marks
Final term Exam:	40 marks

Books Recommended:

1. MICROBIAL APPLICATIONS (complete version) LABORATORY MANUAL IN GENERAL MICROBIOLOGY, 1994. Benson, H.J. WMC Brown Publishers, England.
2. MICROBIOLOGY, 1986. Pelczar Jr., Chan, E.C.S. and Krieg, M.R. McGraw Hill, London.
3. BROCK'S BIOLOGY OF MICROORGANISMS, 1997. Madigan, M.T., Martinko, J.M. and Parker, J. Prentice-Hall, London.
4. THE MICROBIAL WORLD, 1986. Stainier, R.Y., Ingraham, J.L., Wheelis, M.L. and Painter, R.R. Prentice Hall, London.

Course Objectives:

The objectives of the course are:-

1. To provide first-hand knowledge to students in the fundamental aspects of basic microbiology
2. To impart the practical know-how about the morphology and microbial activities
3. To acquaint the students with basic techniques of sterilization, culturing and isolation of microorganisms

Course Learning Outcomes:

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

1. **ATTAIN** the basic knowledge of microorganisms
2. **FAMILIARIZE** with the concepts of basic microbiological techniques
3. **ELUCIDATE** the role of microbes with reference to food, health and environment in general
4. **EXPLORE** the plant-microbial interaction
5. **INVESTIGATE** the potential of pathogenic microorganisms
6. **APPLY** the appropriate microbiological techniques, methodologies and equipment in accordance with Lab safety protocol

Course Contents:

Study of bacteria, yeasts, molds and protozoa. Demonstration of special structures by stains: Spore stain, Flagella stain. Differential stains: Gram stain, Metachromatic Granule stain, Acid fast stain. Quantitative plating methods. The turbidimetric estimation of microbial growth. Study of bacterial viruses.

Teaching-Learning Strategies

Teaching will be a combination of class lectures, class discussions, and group work. Short videos /films will be shown on occasion.

Assignments

The sessional work will be a combination of written assignments, class quizzes, presentation, and class participation/attendance.

Assessments and Examination

Sessional Work:	25 marks
Midterm Exam:	35 marks
Final term Exam:	40 marks