

B.Sc., MICORBIOLOGY (CBCS) SYLLABUS (W.E,F'2020-2021)

FIRST YEAR- Semester 1

MBT-101 <u>Introductory Microbiology, Microbial Techniques and Biology of Microorganisms</u> TOTAL HOURS 60 CREDITS-4

Course Learning Outcomes- At the conclusion of this course the students-

- CO 1- Have developed a good knowledge of the development of the discipline of Microbiology and the contributions made by prominent scientists in this field.
- CO 2 -Have developed a very good understanding of the characteristics of different types of microorganisms and their Classification.
- CO 3 Have developed a good understanding about different methods of sterilization, isolation and preservations of microorganisms.
- CO4 Have developed a good understanding about different methods of identification of micro organisms by staining methods.
- CO 5- Are able to explain the useful and harmful activities of the microorganisms.
- CO 6 -Are able to perform basic experiments to grow and study microorganisms in the laboratory.

Unit-I

History and Milestones in Microbiology - Meaning, definition and history of Microbiology.

Contributions of Antony von Leeuwenhoek, Edward Jenner, Louis Pasteur, Robert Koch, Iwanowsky, Beijerinck, Winogradsky and Alexander Fleming.

Importance and applications of Microbiology.

Classification of microorganisms -Hackel's three-kingdom concept - Whittaker's five-kingdom concept and three domain concept of Carl Woese.

Unit-II

General characters of Fungi (Molds, Yeasts, Candida) General characters of Algae (Cyanobacteria, Chlorella),

General characters of Protozoa (Entameoba, Leishmania, Plasmodium).

General characteristics and classification of viruses- animal, plant and microbial.

Unit-III

Sterilization and disinfection techniques Principles and methods of sterilization. Physical methods -autoclave, hot-air oven, laminar air flow, filter sterilization. Radiation methods - UV rays, gamma rays. Chemical methods - Use of alcohols, aldehydes, fumigants, phenols, halogens and hypochlorite. Phenol coefficient. Identification of Microorganisms- Principles and types of stains (Simple, differential and

iost: Degree College (Mea,

negative stains), structural stains - spore, capsule, flagella. Hanging-drop method. Types, principles and applications of various techniques: Microscopy- Bright field, Dark field, Fluorescent, Phase Contrast microscopy, TEM and SEM.

Unit-IV

Nutritional groups of microorganisms - autotrophs, heterotrophs, mixotrophs, methylotrophs.

Growth media - synthetic, nonsynthetic, selective, enrichment and differential media. Isolation of pure culture techniques - Enrichment culturing, dilution-plating, streak-plate, spread-plate and micromanipulator. Preservation of microbial cultures - sub culturing, overlaying cultures with mineral oils, lyophilization, sand cultures, storage at low temperature (ultra low temperature).

Unit-V

General characteristics of bacteria, archaebacteria, actinomycetes.

General characteristics, rickettsia, mycoplasmas.

Morphology, structure and replication of TMV, HIV and lambda bacteriophage.

Ultra structure of a bacterial cell: Invariant components - cell wall, cell membrane, ribosomes, nucleoid. Variant components- Capsule, flagella, fimbriae, endospore and storage granules.

PRACTICALS CREDITS -1

MBP-101 Introductory Microbiology, Microbial Techniques and Biology of Microorganisms

- 1. Precautions to work in Microbiology laboratory.
- 2. Preparation of culture media: Solid / Liquid.
- 3. Isolation of single colonies on solid media.
- 4. Enumeration of bacterial numbers by serial dilution and plating- spread and streak.
- 5 I jobt and sammannd mismassans and its handling