

GUJARAT UNIVERSITY
Syllabus for First Year B. Sc. Semester I,
Microbiology (Multidisciplinary Course)
Effective from June-2023
Course MDC- MIC-114T
Paper name: Introduction to Microbial World
Credit:02 [02 hrs/week, Total 30 hrs]

Unit 1 The Microbial World

- 1.1. Introduction: Microbes in our lives (02 h)
- 1.2. Classification of Microorganisms (06 h)
 - a) Binomial system of nomenclature
 - b) Difference between prokaryotic and eukaryotic microorganisms
 - c) Whittaker's five kingdom concept of classification
 - d) Carl Woese's three kingdom classification system
- 1.3. Major Groups of Microorganism (06 h)
 - a) Prokaryotic microbes: Eubacteria and Archaeobacteria
 - b) Eukaryotic microbes: Fungi (Yeasts & Molds), Protozoa, Algae
 - c) Acellular microbes: Viruses
- 1.4. Distribution of Microorganisms in Nature (01 h)

Unit 2 The Microscopic Examination of Microorganisms

- 2.1 Light Microscopy (06 h)
 - a) Principle of bright-field microscopy: resolving power, numerical aperture, limit of resolution and magnification
 - b) Component parts of the compound light microscope
 - c) Principle and applications of dark-field, fluorescence and phase-contrast microscopy
- 2.2 Preparation of Specimens for Light Microscopy (06 h)
 - a) The wet-mount and hanging-drop techniques
 - b) Microbiological stains: acidic, basic and neutral dyes
 - c) Smear preparation, fixation, use of mordents, intensifiers, decolorizers
 - d) Simple staining of the smear: Positive and negative staining
- 2.3 Electron Microscopy (03 h)
 - a) Principle and applications of transmission & scanning electron microscopy

Reference Books:

1. **Microbiology: An Introduction** G. J. Tortora, B. R. Funke, C. L. Case, 11th Edition (Indian Edition) (2016). Pearson India Education Services Pvt. Ltd., Noida (UP), India.
2. **Microbiology**, Pelczar JR., Chan ECS, Krieg NR, 5th Edition (1993), McGraw-Hill Book Company, NY.
3. **Microbiology: An Application Based Approach**, Pelczar JR., Chan ECS, Krieg NR, 3rd Reprint (2011), Tata McGraw Hill Education Private Limited, New Delhi, India
4. **Principles of Microbiology**, R. M. Atlas, 2nd Edition (Indian Edition) (2015) McGraw Hill Education (India) Private Limited, New Delhi, India

Course MDC- MIC-114P

Paper name: Microbiology Practicals

Credit:02 [04 hrs/week, Total 60 hrs]

9. Study of curd sample by wet mount (temporary mount)
10. Study of hay infusion by hanging drop method
11. Simple staining of bacteria: positive staining & negative staining
12. Study of permanent slides/photomicrographs of different groups of microorganisms
 - a) Prokaryotic microbes: Bacteria (*Staphylococci*, *Bacilli*, *Spirochetes*, *Actinomycetes*)
 - b) Eukaryotic microbes:
 1. Fungi: *Yeast*, *Mucor*, *Penicillium*
 2. Algae: *Diatoms*, *Spirogyra*, *Chlamydomonas*
 3. Protozoa: *Amoeba*, *Paramecium*, *Euglena*
 - c) Acellular microbes (viruses): Photomicrographs of HIV, TMV, Bacteriophage T2

Scheme of Practical Examination

No.	Title of The Exercise	Marks
Ex-1	(a) Microscopic study of the given sample by wet-mount OR hanging drop method (b) Positive OR negative staining of the given bacterial culture	10
Ex-2	Spotting	10
Ex-3	Viva-voce	10
Ex-4	Journal and slides	05
Total Marks		35