

Department of Microbiology
Discipline Specific Minor Course
(Semester-II)

Year	Semester	Course Type	Course Code	Course Title	Theory/ Practical	Credits	No. of Lectures/ Practical to be conducted	Page No.
1 st	II	DSC (Minor)	MB-MN-126T	Introduction to Microbial World	Theory	2	30L	2-4

**DISCIPLINE SPECIFIC MINOR COURSE (MB-MN-126T): Introduction To
Microbial World**

Course Code & Title	Credits	Credit Distribution of the Course	
		Theory	Practical
MB-MN-126T - Introduction to Microbial World	2	2	--

LEARNING OBJECTIVES:

The Learning Objectives of this course are as follows:

- To provide thorough knowledge about Development of Microbiology.
- To highlight the potential of these studies to become an entrepreneur.
- To equipped the students with skills related to laboratory as well as field-based studies.
- To make the students aware about different diseases caused by microorganisms.
- To create foundation for further studies in Microbiology
- To address the socio-economic challenges related to Microbial world.
- To facilitate students for taking up and shaping a successful career in Microbiology.
- To inculcate sense of scientific responsibilities and social and environment awareness.

COURSE OUTCOMES:

After completion of this course student will able to;

CO-1: The students will develop understanding about the diversity, identification, classification of microorganisms.

CO-2: Understand the abiogenesis and biogenesis.

CO-3: Study the different branches of Microbiology.

CO-4: Study bacterial nomenclature and classification.

CO-5: Study the difference between prokaryotic and eukaryotic microorganisms and their cell structures.

CO-6: Understand the scope of Microbiology.

CO-7: Study the microorganisms used in biopesticide, biofertilizer, fermented food products etc.

CO-8: The role of Microorganisms in functioning of global ecosystem.

SYLLABUS of MB-MN-126T:**(30 Hours)****Unit-I: Amazing World of Microbiology****[15 Hours]**

Development of microbiology as a discipline

- i. Micrographia of Anton von Leeuwenhoek and Robert Hooke.
- ii. Abiogenesis v/s biogenesis (Aristotle's notion about spontaneous generation)
- iii. Francesco Redi's experiment, Louis Pasteur's & Tyndall's experiments
- iv. Contributions of - **Louis Pasteur** (Fermentation, Rabies, Pasteurization and Cholera vaccine-fowl cholera experiment) **Robert Koch** (Koch's Postulates, Germ theory of disease. Tuberculosis and Cholera-isolation and staining techniques of causative agent) **Ferdinand Cohn** (Endospore discovery)
- v. Discovery of viruses (TMV and Bacteriophages).
- vi. River's Postulates.
- vii. Contribution of –
 - a. Joseph Lister.
 - b. Paul Ehrlich.
 - c. Elie Metchnikoff.
 - d. Edward Jenner
 - e. Alexander Fleming
 - f. of Martinus W. Beijerinck
 - g. N. Winogradsky
- viii. **Modern Era of Microbiology**
 - a. Carl Woese classification based on 16S rRNA Signification and Application.
 - b. Nano-biotechnology and Space Microbiology.
 - c. Discovery of double helix structure of DNA, Discovery of recombinant DNA technology.

Unit-II: Types of Microorganism and their differentiating characters [15 Hours]

- Prokaryotes, Eukaryotes, three domain and five domain system of classification
- Bacteria (Eubacteria and Archaeobacteria).
- Protozoa.
- Algae.
- Viruses, Viroids and Prions.
- Actinomycetes.

Beneficial and Harmful effects of microorganisms

- a. Medical Microbiology (Enlist diseases caused by various microorganisms, Types of vaccine).
- b. Environmental Microbiology (Eutrophication, red tide, Sewage treatment, bioremediation).
- c. Food and Dairy Microbiology (Food spoilage, food borne diseases, Probiotics and fermented food).
- d. Agriculture Microbiology (Plant diseases and Biofertilizers and Bio-control agents)

- e. Industrial Microbiology (Vaccine preventable Bacterial and Viral diseases , enzymes, solvents).
- f. Immunology (Normal flora of various systems of human being , Three lines of defence mechanisms).

ESSENTIAL/RECOMMENDED READINGS:

1. Michael J. Pelczar, Jr. E.C.S. Chan, Noel R. Krieg, Microbiology (McGraw Hills Publication, 1986) 5th edition. Unit I -IV
2. A. J. Salle, Fundamental Principles of Bacteriology (McGraw-Hill Book Co. New York and London 1973) 7th Edition (UNIT - I to IV)
3. C. P. Baveja, Microbiology (Arya publications, 6th Edition, 2019) UNIT I to IV
4. R. Y. Stanier, J. L. Ingraham, M. L. Wheelis and P. R. Painter, General Microbiology (Macmillan Education Ltd., London, 2001) 5th edition. (UNIT I to IV)
5. Dr. C.B. Powar, Dr. H.F. Daginawala, General Microbiology (Himalaya Publications, 2010) (UNIT I to IV)

