



SEMESTER - V

BRANCH	Subject	Subject Code
B.Sc. (Microbiology)	Environmental Microbiology (Theory)	MBMDSE1-151

Course Objective:- The objective of the course is to make students gain knowledge about the diverse life forms, life cycles, morphology and importance of microorganisms Microbial Genetics and Molecular Biology

Course learning outcomes (CLO):-

On useful completion of this course, the student will be able to:

1. Have knowledge on interrelationship of microbes and environment.
2. Get an idea on role of microbes in bioremediation,
3. Have knowledge of applications of microbes in solving environmental pollution related issues and quality control of water
4. Acquire knowledge on, vital role of microbes in environmental management through production of sustainable energy and bio fuels from waste materials.
5. Get an idea on working of pollution sensing devices based on biosensors

Unit – I

- 1.1 Introduction to Environment and its components: Soil, air and water.
- 1.2 Meanods of Solid and Liquid waste management: Sewage treatment (primary, secondary, tertiary). Biological Oxygen Demand (BOD) and Chemical Oxygen Demand (COD).
- 1.3 Microbial assessment of Potable water quality: Test for coliforms (presumptive test, confirmed test and complete test), Most probable Number (MPN) of coli forms.

Unit – II

- 2.1 Bioremediation: Bioremediation Technology for Petroleum, Hydrocarbons, Poly Aromatic Hydrocarbons (PAHs).
- 2.2 Organic pollutants and Xenobloties: General description
- 2.3 Microbial Interactions of Bio-pulping, bio-bleaching and deinking of waste paper.



Unit – III

3.1 Sustainable energy sources from Microbes: Mechanism of Bioenergy Production: Bioenergy from lignocellulosic wastes and pollutants,

3.2 Biogas generation, Biohydrogen generation Microalgae as Biofuels

3.3 Bioleaching techniques: Recovery of minerals from low grade ores

Unit – IV

4.1 E-wastes and sewage sludge for land treatment.

4.2 Biosensors: Mechanism of working of biosensors and their types.

4.3 Applications of Biosensors: Applications in environment pollution monitoring based on Aptamer sensors, Genosensors, immune-sensors and enzymatic sensors.

Practical's

1. Study of the methods of solid waste disposal and management.
2. Study of the methods of Liquid Waste Disposal and management
3. Practical related to BOD measurement in given samples.
4. Practical related to COD measurement in given samples.
5. Bacteriological water analysis through direct plate count method
6. Study of plants which are used to clean contamination
7. Study related to Microorganism in metal absorption
8. Study related to plant-microbial interaction
9. Flow chart of Bio-pulping.
10. Flow chart of Bio-bleaching,
11. Flow chart of Mechanism of Bioenergy Production from lignocellulosic wastes and pollution
12. Flow chart of Recovery of minerals from low grade ores
13. Flow chart of process of work of Biosensors
14. Basic information related to Immune-sensors and enzymatic-sensors
15. Study related to E Waste and its disposal.