



MANGALORE UNIVERSITY

Department of Microbiology

M.Sc. Microbiology

MBS- 456: Environmental Microbiology

40h

OBJECTIVES

1. To learn Microbiology of air and isolation of microbes from air.
2. Types of air pollutants and transmission of air borne microbes.
3. Causes of allergy and its detection methods.
4. Study of microbes in various soil and water ecosystem.

COURSE OUTCOME

- CO1: Understanding microbial contamination of water and its management.
- CO2: Implementation of Waste water and solid waste treatment technologies.
- CO3: Detailed study of microbes in the degradation of various chemicals.
- CO4: Establishment of bioleaching of different metals.
- CO5: Air pollutions, types and control

UNIT I

Air Microflora in different layers of atmosphere, Bioaerosol, Assessment of air quality using principles of sedimentation, impaction, impingement, suction and filtration. Air pollutions - types of pollutants, Brief account of transmission of airborne microbes; Microbiology of indoor and outdoor. Allergy: Causes and tests for detection of allergy.

UNIT II

Distribution of microorganisms in the aquatic environment. Fresh and Marine ecosystems (estuaries, mangroves, deep sea, hydrothermal vents, salt pans, coral reefs). Zonation of water ecosystem. Upwelling, Eutrophication, Food chain in aquatic ecosystems. Potability of water. Microbial assessment of water. Ground water contamination. Biofilm.

Unit III 14 h

Biotic and abiotic interactions. Microbial communities; nature, structure and attributes, levels of species diversity, succession and stability, Biodiversity management and conservation. Role of microbes in organic solid waste treatment. Subterranean microbes. Biogeochemical cycles of Carbon, Nitrogen, Phosphorous and Sulphur. Waste treatment: sewage and effluent treatment; primary, secondary and tertiary treatment, Solid waste treatment. Solid wastes as sources of energy and food.

Unit IV 14 h

Role of microbes in degradation, Biodegradation of Xenobiotics, hydrocarbons, pesticides and plastics. Biodeterioration of wood, pulp and paper. Biosorption/ bioaccumulation of heavy metals. Bioremediation, advantages and disadvantages. Bioleaching of iron, copper, gold and uranium. Diversity in anoxic ecosystem. Methanogenesis. **Note: Each unit is for 10h**