

**B.Sc MICROBIOLOGY (CBCS) SYLLABUS  
THIRD YEAR – SEMESTER- V**

**MBT- 501 ENVIRONMENTAL & AGRICULTURAL MICROBIOLOGY**

**TOTAL HOURS: 36**

**CREDITS: 3**

**UNIT - I**

**No. of hours: 8**

Terrestrial Environment: Soil profile and soil microflora

Aquatic Environment: Microflora of fresh water and marine habitats  
Atmosphere: Aeromicroflora and dispersal of microbes

Extreme Habitats: Extremophiles: Microbes thriving at high & low temperatures, pH, high hydrostatic & osmotic pressures, salinity, & low nutrient levels.

**UNIT – II**

**No. of hours: 8**

Role of microorganisms in nutrient cycling (Carbon, nitrogen, phosphorus).

Treatment and safety of drinking (potable) water, methods to detect potability of water samples: (a) standard qualitative procedure: presumptive test/MPN test, confirmed and completed tests for faecal coliforms (b) Membrane filter technique. Microbial interactions – mutualism, commensalism, antagonism, competition, parasitism, predation.

**UNIT – III**

**No. of hours: 6**

Outlines of Solid Waste management: Sources and types of solid waste, Methods of solid waste disposal (composting and sanitary landfill).

Liquid waste management: Composition and strength of sewage (BOD and COD), Primary, secondary (oxidation ponds, trickling filter, activated sludge process and septic tank) and tertiary sewage treatment.

Xenobiotics – their recalcitrance and effects on microflora.

**UNIT = IV**

**No. of hours: 7**

Plant Growth Promoting Microorganisms - Mycorrhizae, Rhizobia, *Azospirillum*, *Azotobacter*, *Frankia*, phosphate-solubilizers fluorescent Pseudomonads.

Outlines of biological nitrogen fixation (symbiotic, non-symbiotic).

Biofertilizers - *Rhizobium*, *Cyanobacteria*.

**UNIT – V**

**No. of hours: 7**

Concept of disease in plants. Symptoms of plant diseases caused by fungi, bacteria, and viruses. Plant diseases - groundnut rust, Citrus canker and tomato leaf curl.

Principles of plant disease control.

## **MBP- 501 ENVIRONMENTAL & AGRICULTURAL MICROBIOLOGY**

**TOTAL HOURS: 36**

**CREDITS: 2**

1. Analysis of soil – pH, Moisture content and water holding capacity.
2. Isolation of microbes (bacteria and fungi) from soil.
3. Study of air flora by petriplate exposure method.
4. Analysis of potable water: SPC, and MPN method.
5. Determination of Chemical Oxygen Demand (COD) of waste water samples.
6. Isolation of *Rhizobium* from root nodules.
7. Staining and observation of Vesicular Arbuscular Mycorrhizal (VAM) fungi.
8. Observation of plant diseases of local importance - Citrus canker, Tikka disease of Groundnut, Bhendi yellow vein mosaic, Rusts, Smuts, Powdery mildews, Tomato leaf curl.

### **SUGGESTED READINGS**

Atlas RM and Bartha R. (2000). **Microbial Ecology: Fundamentals & Applications**. 4<sup>th</sup> edition. Benjamin/Cummings Science Publishing, USA

Barton LL & Northup DE (2011). **Microbial Ecology**. 1st edition, Wiley Blackwell, USA

Campbell RE. (1983). **Microbial Ecology**. Blackwell Scientific Publication, Oxford, England.

Lynch JM & Hobbie JE. (1988). **Microorganisms in Action: Concepts & Application in Microbial Ecology**. Blackwell Scientific Publication, U.K.

Madigan MT, Martinko JM and Parker J. (2014). **Brock Biology of Microorganisms**. 14<sup>th</sup> edition. Pearson/Benjamin Cummings

Maier RM, Pepper IL and Gerba CP. (2009). **Environmental Microbiology**. 2<sup>nd</sup> edition, Academic Press

Martin A. (1977). **An Introduction to Soil Microbiology**. 2<sup>nd</sup> edition. John Wiley & Sons Inc. New York & London.

M. N. Reddy, V. Uma Maheswara Rao, P. Nagapadma, M. Raghuram and M. Charitha Devi (2012). Applied Microbiology B.Sc Third Year Paper-IV, Telugu Akademi, Hyderabad.

P.D. Sharma (2005) Environmental Microbiology. Alpha Science International New Delhi.

P.D. Sharma (2005) Microbiology – Rastogi Publication, India.

Subba Rao NS. (1999). **Soil Microbiology**. 4<sup>th</sup> edition. Oxford & IBH Publishing Co. New Delhi.

Willey JM, Sherwood LM, and Woolverton CJ. (2013). **Prescott's Microbiology**. 9<sup>th</sup> edition. McGraw Hill Higher Education.