

MB3PG10 - ENVIRONMENTAL AND AGRICULTURAL MICROBIOLOGY

Number of Hours / Week: 4

Credits: 4

UNIT I

Aerobiology- -Microbial contamination of air – Sources of contamination- Microbial indicators of air pollution. Enumeration of bacteria in air, Air sampling devices. Air sanitation.Effect of Air Pollution on plants and Human.

UNIT II

Aquatic microbiology: Microbiology of water – Water pollution and water borne pathogens – Bacteriological examination of water – Indicator organisms. Purification and disinfection of water Microbiology of sewage – Waste water treatment – BOD, COD. Role of microbes in marine fouling

UNIT III

Microbial flora of soil and factors affecting them, Bio geochemical cycling – Nitrogen, Carbon, Phosphorus, Sulphur cycles and its importance.

UNIT IV

Microbial interaction – Plant-microbe, microbe-microbe interactions. Mycorrhizae, Biological Nitrogen fixers-Symbiotic and free living nitrogen fixers- physiology and genetics of nitrogen fixers, Phosphate solubilizers, Phytopathogens – Bacterial , fungal, Viral diseases. (Wilt, Blight, Canker, Mosaic etc.) – Control measures. Biofertilizers, Microbial control of pests and diseases. Integrated pest management. GM crops and its importance.

UNIT V

Recycling of liquid and solid wastes – Composting – Biogas – Biodegradation. Bioremediation, Bioleaching, Xenobiotic degradation. Microbial corrosion- Biofilms degradation of petroleum products. Microbes in mineral leaching and metal concentration, Microbial enhanced oil recovery

References:

1. Mitchell R (1974) *Introduction to environmental microbiology* (Prentice-Hall, Englewood Cliffs, N.J.,)
2. Atlas RM & Bartha R (1998) *Microbial ecology : fundamentals and applications* (Benjamin/Cummings, Menlo Park, Calif. ; Harlow) 4th ed.
3. Campbell RE (1983) *Microbial ecology* (Blackwell Scientific Publications, Oxford ; Boston) 2nd ed
4. Rheinheimer G (1991) *Aquatic microbiology* (John Wiley and Sons) 4th ed

5. Dart RK (1980) *Microbiological aspects of pollution control* (Elsevier Scientific, Amsterdam) 2nd ed.
6. Alexander M (1977) *Introduction to soil microbiology* (Wiley, New York ; London) 2nd ed.
7. Rao NSS (1995) *Soil microorganisms and plant growth* (Science Publishers, Inc.; New Hampshire, U.S.A) 3rd ed.