**Subject Code : N2P5**

## ENVIRONMENTAL MICROBIOLOGY

### Unit – I

Introduction : Organization of the biosphere and components of ecosystem, Natural habitats of microorganisms, Microbial communities in aquatic and terrestrial habitats, Microorganisms as components of ecosystem – as producers and decomposers.

### Unit – II

Microbial life in extreme environments : Effects of temperature, pH, Pressure, Salt and heavy metals such as As, Sb, Hg, Pb and Cd, Microbial life in conditions of high irradiation, Radiosensitivity; mechanism of damage and recovery, Growth in nutrient limited environment – mechanism of adaptations, Microbes in space.

### Unit – III

Microbes in aquatic environments: The nature of aquatic habitats, methods used in the study of aquatic (fresh and marine water) microbial community, Pollution of aquatic habitats, Water quality criteria, Water-borne diseases, Microbiological analysis of water purity, Indicator organisms, Ground water quality and home treatment system.

### Unit – IV

Microbes in air: Atmosphere as an environment, Atmospheric layers; Air sampling techniques – advantages and limitations, Identification of air-borne bioparticles: Airspora of enclosed spaces; Microbial indicators of air pollution; Microbial scavenging of air pollutants; Aerobiology and human health.

### Unit – V

Environmental application: Waste – types; Treatment of solid wastes – composting, Vermiform, composting, Silage, Pyrolysis and scarification; Treatment of liquid wastes, degradation of liquid industrial wastes; Degradation of pesticides and detergents; Degradation of lignin; Synthetic polymers; Xenobiotic compounds; Alkyl benzyl sulphonates; Petroleum and hydrocarbon degradation Biotechnological uses of microorganisms : Microbes in Oil extraction; Treatment of wastes; mineral leaching; Microbes in mining; Wastes and SCP production.

## PRACTICALS.

1. – 2 . Isolation and identification of air-borne bio-particles using Andersen sampler.
3. Effects of high salt concentration on microbial growth.
4. Oligodynamic action of heavy metals on bacteria.
5. Microbial flora of polluted water/soil.

6. Microbial flora of sewage.
7. Algae as indicators of water pollution.
8. Determination of BOD of polluted/pond water.
9. Determination of COD of polluted / pond water.
10. Microbial degradation of cellulose (Cotton) by Chaetomium glososum / any microbe.

**References:**


1. Microbial Sociology, Fundamentals and Applications, R.M. Atias and R.Sartha Addison, Wesley Publications.
2. Environmental Microbiology W.D.Grant and P.E.Long.
3. Microbiology of Extreme Environments.C.Edwards, Open University Press.
4. Algae as Ecological Indicators.L.Shubert.
5. Biological Waste Treatment – Advances in Biotechnological Process. Vol.12, A. Mizrani, Alan, R.Liss.Inc.
6. Waste Water Treatment for Pollution control S.J.Aroeivala, Tata McGraw Hill.
7. Industrial Effluent Treatment Vol.I Water Solid Wastes, J.R.Walters A.Went, Applied Science Publishers.