M.Sc (Final) Environmental Sciences
Semester IV

Paper IV A

ENVIRONMENTAL MICROBIOLOGY AND BIOTECHNOLOGY

Unit-I

Classification, characteristics, occurrence, distribution and ecological importance of microorganisms; Photoautorophs, chemolithotrophs, organotrophs, parasites and their environmental importance; Soil microorganisms and their interactions relative to soil fertility; Detection of microbial toxins.

Unit-II

Fermentation technology; wastes as a source of microorganism; compost and processes of composting; factors effecting the process of composting; microbes in biogas production, microbes in hydrogen and hydrocarbon production; application of immunofilteration; immunoprecipitation and DNA probing methods for detection of microbial pathogens in aquatic environment.

Unit III

Environmental biotechnology- scope and application, scope of cleaner technology, tools and techniques of biotechnology; Application of plants tissues culture technology for micropropogatiom of stress tolerant plants.

Unit IV

Microbes and their genetic engineering for degradation of pollutants; Application of microbes as biofertilizers and biopesticides; Microbes in biomining, biohydrometallurgy and biomineralization; Application of recombinant DNA technology for improvement of bacterial strains; Microbial degradation of Xenobiotics, Microorganism in abatement of heavy metal pollution; Bioremediation

Unit V

Principle and application of biosensors for detection of pollutants; Risk assessment for recombinant biosensors; Anaerobic biotechnology for sustainable waste treatment; oil spills-causes and recovery; Biodegradation of petroleum (hydrocarbon); use of super bugs for removal of oil spills; Aero microbiology, Aeroallergens and microbial pathology in human health.