

SARDAR PATEL UNIVERSITY
Programme: MSc (Microbiology)
Semester: III
Syllabus with effect from: June 2011

Paper Code: PS03CMIC02	Total Credits: 4
Title Of Paper: Environmental Microbiology and Systematics	

Unit	Description in detail	Weightage (%)
1	Global environmental problems: Global warming, Ozone depletion, Acid rain. Water pollution: Sources and types, Physical, chemical and biological pollution of water, Eutrophication and its control. Bio deterioration of wood and metals: Role of micro-organisms, mechanisms and control.	25 %
2	Biogeochemical cycles: Role of microorganisms in nitrogen, sulfur and phosphorous cycling. Detrimental effects of diverted biogeochemical cycles. Biological Nitrogen Fixation in detail: Asymbiotic, symbiotic and associative nitrogen fixation. Structure, function and genetic regulation of nitrogenases. Plant–microbe interactions: Mycorrhizae, Nitrogen fixing associations between rhizobia and legumes, cyanobacteria-plant symbiosis. Plant growth promoting rhizobacteria.	25 %
3	Microbes in extreme environments: Habitat, biodiversity, adaptive strategies and biotechnological potential of thermophiles and hyperthermophiles, psychrophiles and psychrotrophs, halophiles, acidophiles and alkalophiles. Microbial communities and ecosystems: Microbial community dynamics, structure of microbial communities, ecosystems, structure and function of some microbial communities in nature.	25 %
4	The origin of life (chemical and cellular evolution), ribosomal RNA analyses for tracing microbial evolution, genetic basis of evolution, evolution of physiological diversity. Taxonomy, binomial nomenclature, types of bacterial classification systems, new approaches to bacterial taxonomy (numerical taxonomy, ribotyping, rRNA sequencing, fatty acid profile) Bergey’s manual of systematic bacteriology. Microbial diversity- molecular chronometers, phylo genetic trees and three domain universal phylogenetic tree. Methods of studying microbial diversity (Conventional and molecular tools).	25 %

Basic Text & Reference Books:

- Environmental Microbiology. R. M. Maier, I. L. Pepper & G. P. Gerba.
- Comprehensive Biotechnology Vol-4, Murray Moo Young.
- Biotechnology- Rehm and Reid.
- Microbial Ecology: Fundamentals and Applications- Atlas & Bartha, fourth edition, Pearson Education.
- Environmental science, B. J. Nebel and R. T. Wright.
- The prokaryotes- 3 rd edition, volume 2
- Brock Biology of micro organisms by Madigan, Martinko, Dunlap, and Clark

