Subject Code : P8MB6

Core Course VI (CC) – Environmental and Agricultural Microbiology

Unit I : Biogeochemical cycles & Air microbiology

Roles of microbes in biogeochemical cycles – carbon, nitrogen, phosphorus, sulphur. Soil microbes and fertility of soil. Air microbiology: a brief account.

Unit II : Aquatic microbiology and bioremediation

Microbes in marine and fresh water environment – eutrophication – Biodegradation and bioaccumulation – bioremediation concepts, microbial and phytoremediation – composting – solid waste treatment – saccarification and pyrolisis.

Unit III : Liquid waste and treatment

Water pollution – sources and nature of pollutants in water – sewage – treatment of liquid waste – primary, secondary and tertiary treatment – water born diseases – Assessment of water quality – BOD and COD determinations.

Unit IV : Soil Microbiology

Microbial association – beneficial – nitrogen fixing organism – symbiosis, asymbiosis, associate symbiosis – bacteria, actinomycetes, cyanobacteria – mycorrhiza – ecto and endo mycorrhiza – phosphate solubilizers – application of biofertilizers in agriculture. Biology of nitrogen fixation – genes and regulations in *Rhizobium* – *Agrobacterium* and plant tumours.

Unit V : Plant diseases and its control

Plant pathogens – bacterial – viral – fungal pathogens. Morphological, physiological changes with reference to disease establishment in plants – plant protection – phenolics – phytoalexins and related compounds. Bioinsecticides – viral, bacterial and fungal – a brief note.

References:

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Dirk, J. Elasas, V., Trevors, J.T., Wellington, E.M.H. (1997). Modern Soil Microbiology, Marcel Dekker INC, New York, HongKong.

Ec Eldowney S, Hardman DJ, Waite DJ, Waite S. (1993). Pollution: Ecology and Biotreatment – Longman Scientific Technical.

Mitchel, R. (1992). Environmental Microbiology. Wiley – John Wiley and Sons. New York.

Clescri, L.S., Greenberg, A.E. and Eaton, A.D. (1998). Standard Methods for Examination of Water and Waste Water, 20th Edition, American Public Health Association.

Gerhardt, P., Murray, R.G., Wood, W.A. and Kreig, N.R. (1994). Methods for General and Molecular Bacteriology, ASM Publications, Washington D.C.

Patricia Cunning (1995). Official Methods of Analysis, Vol. I and II, 16th Edition, Arlington, Virginia, USA.

Richard G. Burus and Howard Slater (1982). Experimental Microbial Ecology, Blackwell Scientific Publishers.