Paper Code: ETEN 203 **L T C**

Paper: Environmental Chemistry and Microbiology **3 1 4**

INSTRUCTIONS TO PAPER SETTERS:	**MAXIMUM MARKS: 75**
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks. 2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only one question from each unit.	

UNIT – I

Fundamentals of chemical kinetics, Acid-base chemistry of natural waters, Acid deposition, Trace metals in water. Fundamentals of free radical chemistry, Smog and aerosols. Stratospheric ozone depletion, Health aspects of ozone depletion.

[No. of Hours:10]

UNIT – II

Monitoring techniques and toxic effects of organic compounds such as Phenols, Pesticides, Surfactants, Tannin, Lignin and Hydrocarbons.

Environmental toxicity and analysis: Principles of toxicity and standards, Analysis of Chromium, Uranium, Cobalt, Manganese, Nickel, Copper, Zinc, Cadmium, Mercury, Arsenic & Organo-metallic compounds. Chemical speciation of (Cu, Pb, As, Hg, Cr).

[No. of Hours 11]

UNIT – III

Microorganisms in water & wastewater engineering: Microbial examination of water and wastewater, Taste & odours, coliform, bacteria tests, Heterotrophic Plate Count (HPC). Bacterial growth, Kinetics of bacterial growth, Emerging biotechnical processes in wastewater treatment, Acclimatization of waste and microbial inhibition.

Microbial leaching and precipitation of heavy metals, biologically degradable Plastics & surface active substances. Microorganism in air pollution control (Bio filters and bio scrubbers).

[No. of Hours 11]

UNIT – IV

Bioremediation and Biorestoration: Use of microbes for improving soil fertility, Restoration of soils contaminated with heavy metals/pesticides and other toxic organic chemicals.

Biochemistry and Microbiology of Landfills & Composting, Recycling and processing of organic residues, Xenobiotics.

[No. of Hours: 9]

Text and Reference Books:

1. Pelczar Jr, M.J. Chan, E.C.S. Krieg, R. Noel, and Pelczar Merna Foss, “Microbiology”, Tata McGraw Hill Publishing Company Limited.
2. A.K. De, “Environmental Chemistry ", New Age International Ltd., New Delhi, 1995.
3. A.K. Datta, “Introduction to Environmental Science & Engineering”, Oxford & IBH, New Delhi.
4. S.M. Khopkar, “Environmental Pollution Monitoring and Control”, New Age International Publishers.
5. Purohit & Purohit, “Textbook of Microbiology”, Agro Publication.
6. C.S. Rao, “Environmental Pollution and Control Engineering”, New Age International Publishers.
7. S.C. Bhatia, “Environmental Chemistry”, CBS Publication.
8. S.S. Dara, “A Textbook of Environmental Chemistry and Pollution Control”, S. Chand & Company Ltd.