

GUJARAT TECHNOLOGICAL UNIVERSITY

B.E. SEMESTER : VIII

BIOTECHNOLOGY

Subject Name: **ENVIRONMENTAL MANAGEMENT**

Sr. No.	Course Contents	Total Hrs
1.	Environmental issues : Acid rain, Greenhouse effect, Global warming, Climate change, Ozone depletion and CFC, Environmental degradation, Environmental health, Genetic pollution & Genetically modified food controversies, soil contamination & soil salination, Bioaccumulation & Biomagnification, Nanotoxicology & Nanopollution, Basics of Environmental Impact Assessment (EIA) and Environmental Audit, Carbon Credit and its significance.	8
2.	Water and waste water management: Domestic and industrial wastewater, types, sources and effects of water pollutants, Waste water characteristics–DO, BOD, COD, TOC, total suspended solids, colour and odour, bacteriological quality, oxygen deficit, determination of BOD constants, heavy metals, Water quality standards: ICMR, WHO, MPCB and CPCB, Principles of primary treatment and secondary treatment, process design and basic operating principles of activated sludge (suspended growth) process, sludge treatment and disposal.	12
3.	Industrial waste waters: Introduction, Pollution Control: Governing bodies, Policies and Amendments, disposal standards; Treatment of industrial effluents: neutralization, proportioning, effluent sampling and characterization, treatment strategies and disposal standards for different industries: paper and pulp, sugar, distillery, textile, tannery.	6
4.	Air Pollution- Sources, Effects and Measurement: Definition, sources of air pollutants, Effects of air pollutants on human health, plants, animals, materials, Sampling and measurement of air pollutants, Air pollution control standards: WHO, MPCB, CPCB, Air Pollution Control Methods and Equipment, Particulate pollution: cleaning methods, collection efficiency, particulate collection systems, Basic design and operating principles of settling chamber, cyclone separator, fabric filter, electrostatic precipitator, Operating principles of spray tower, centrifugal scrubber, venturi scrubber, Selection of particulate collector, Gaseous pollution: Principles of control by absorption, adsorption, combustion or catalytic oxidation, removal of SO _x , NO _x . CO ₂ sequestration by algae	12
5.	Hazardous and Solid Waste Management: Xenobiotic compounds, recalcitrance; Hazardous Waste Management, Sources & Classification, physicochemical properties, Hazardous Waste Control & Treatment; Concept of Waste minimization: benefits and technologies to hazardous waste reduction; Hazardous Waste Management & Handling rules, Hospital Waste Management, Solid Waste Management Plan: Sanitary land filling, Recycling, Composting, Incineration, Biotechnology application to hazardous waste management - Biodegradation and Biological detoxification; examples of cyanide and phenols.	10

Practical:

1. To study the various methods of collection and storage of water samples
2. To study the microbial flora of waste water
3. To determine the potability of water by MPN Test
4. To characterize the coli-forms
5. To study the quality of air of the given place
6. To study the quality of given water sample

7. To measure the conductivity of the given water sample
8. To study the effect of treatment method on coli-form / microbial content
9. To determine the level of noise pollution at a given place
10. To study the use of any software related to pollution analysis

Text books:

1. Metcalf and Eddy, "Wastewater Engineering: Treatment and Disposal", Second edition, Tata McGraw-Hill publishing Company, New Delhi, 1987
2. Metcalf and Eddy, "Wastewater Engineering: Treatment and Disposal", Fourth edition, Tata McGraw-Hill Companies, 2002
3. Peavy, R., "Environmental engineering", Mc Graw Hill Publications

Reference books:

1. Arciwala, S. J., "Waste water treatment for pollution control" , Tata McGraw-Hill Publications, New Delhi
2. Manual Sewerage and Sewage Treatment – Public Health Department, Govt. of India.
3. Dr. Modi, "Sewage disposal and treatment", Standard Publications, New Delhi
4. Rao, M. N. and Dutta, A. K., "Wastewater Treatment", Oxford and IBH Publishing Co Pvt Ltd, New Delhi, 1987
5. Rao, C. S., "Environmental Pollution Control Engineering", New Age International (P) Ltd., 1991
6. Punmia, B. C. and Jain, A. K., "Wastewater Engineering", Second edition, Laxmi Publications (P) Ltd, New Delhi, India, 1998
7. Arora, S., "Fundamentals of Environmental biology", Kalyani Publishers, New Delhi, 2008