


BMS COLLEGE OF ENGINEERING, BENGALURU-19
 Autonomous Institute, Affiliated to VTU

INSTITUTIONAL ELECTIVE OFFERED BY THE DEPARTMENT OF CHEMISTRY

Course Name	Environmental Pollution and Control	Course Code	17CY7IEEPC
Credits	03	L-T-P-S	3- 0 -0-0
Contact hours	38	Faculty Handling	Dr.Kirti Agarwal

Course objective:

This course deals with the main sources of pollutants in three main environment constituents air, water and soil and their impact on the environmental ecosystem. It covers water and air pollution, its measurement, pollution abatement systems for wastewater, particulate matter and gaseous constituents. It also deals with the pollution remediation strategies for soil pollution and solid waste management. It will provide students the ability to analyse different industrial pollution control strategies and skills of remediation in combating pollution and providing solutions to societal problems.

Course outcomes:

After completion of course students will have:

CO 1	An ability to identify the components of environmental ecosystems and effect of water, air, soil pollutant on them
CO 2	An ability to apply pollution control measures on air, water and soil pollutants
CO 3	An ability to recognize and control environmental issues in various industries and comprehend engineering solutions.

Unit I. Introduction:

Biodiversity with an Introduction to Ecology & Environment. Environmental pollution an overview ambient air and water quality criteria, Standards and Acts – WHO, EPA & Indian. Effects and control of thermal, and radioactive pollution arising due to interaction of humans with environment.

6rs

Unit II. Water Pollution:

Water a valuable resource, water quality standards, types of pollutant in water and their effect. Physical and chemical characteristics of Waste water, Biochemical oxygen demand (BOD), chemical oxygen demand (COD) and their determination. Methods of sampling, preservation of samples and analysis. Method for the treatment of liquid wastes to control pollution. Physical, chemical and biological methods with role of micro organism. Sludge treatment & Disposal. Numerical problems. Selection of equipment like hydro cyclone, settling tanks, filters, ion- exchange. **8hrs**

Unit III. Air Pollution:

Pollutant Types – Natural and manmade air pollutants, classification into primary and secondary pollutants. **Primary**-particulate matter (both PM 2.5 and 10) Inorganic gases SO₂, nitric oxide,

VOC, lead. **Secondary** pollutants- Peroxy acyl nitrate, ozone, SO_3 , NO_2 . Effect of air pollutants, air pollution laws and standard. Air sampling procedures, control of air pollutants. Sampling and measurement of gaseous and particulate pollutants in ambient air and industrial waste gases. Control of gaseous pollutants-VOCS SO_x , NO_x , H_2S , from auto exhaust. Remedial measures by using equipment's like, cyclones, electrostatic precipitators fabric bag filters and wet scrubbers.
8hrs

Unit IV. SOIL POLLUTION AND SOLID WASTE MANAGEMENT:

Soil contamination by chemical pollutants: sources and fate. Remediation by plants, biomagnifications and bioremediation by microorganisms; contamination by inorganic (including heavy metals) and organic pollutants.

Solid waste-Definition, characteristics and perspectives, Problems of collection and handling, Types of solid wastes, Sources of solid waste, Properties of solid waste –solid waste management such as compaction, incineration, composting, landfills and biological processing. Material flow in society, reduction in raw material usage, solid waste generation, and reuse with materials, energy recovery.
8 hrs

Unit V. INDUSTRIAL POLLUTION CONTROL:

Pollution control in important chemical industries like Tannery, Pulp and Paper, fertiliser, food processing, Pharmaceuticals, Sugar, Distillery, petrochemicals and electroplating. **8 hrs**

Text Books:

1. Rao C.S Environmental Pollution Control Engineering, Wiley Eastern Ltd. New Delhi 2015.
2. Mahajan S.P., Pollution Control in Process Industries, Tata McGraw Hill

Reference Books:

1. Howard S. Peavy, D. R. Rowe & C. Tchobanoglous "Environmental Engineering", McGraw Hill (1984).
2. Werner Strauss, 'Air Pollution Control: Measuring and monitoring air pollutant' Wiley (1978).
3. Metcalf & Eddy, "Waste Water Engineering Treatment, Disposal & Reuse", Tata McGraw Hill (2003).