25PEEM04 INDUSTRIAL POLLUTION CONTROL-TECHNOLOGY AND MANAGEMENT (3-1-0)

Module I: (15 HOURS)

Industrial Air Pollution

Overview of industrial pollution and major air pollutants; Sources and types of air pollutants from industries, Industrial emission control technologies: Mechanical (cyclones, filters), Chemical (scrubbers, absorbers), Thermal (afterburners, incinerators); Industrial air pollution disasters and key case studies, Air pollution laws and standards: The Air (Prevention an Control of Pollution) Act, 1981; CPCB guidelines

Industrial Water Pollution

Industrial water usage and characteristics of effluents; Major water pollutants, Impacts on aquatic ecosystems and public health; Effluent Treatment Plants (ETPs): Primary, secondary, tertiary treatment processes and Advanced technologies, Industry-specific case studies, Legal framework: Water (Prevention and Control of Pollution) Act, 1974; zero liquid discharge (ZLD) concept

Module II: (15 HOURS)

Industrial Solid Waste and Hazardous Waste Management

Classification of solid wastes: process wastes, hazardous wastes, biomedical, e-waste; Sources of industrial solid waste, Collection, storage, transportation, and disposal methods; Waste minimization strategies: reuse, recovery, recycling, co-processing; Treatment technologies: composting, incineration, landfilling, pyrolysis; Overview of waste-to-energy concepts; Regulatory policies: Hazardous Waste Management Rules (2016), Solid Waste Management Rules (2016), E-waste Rules (2022)

Land Degradation and Control Measures

Types of land degradation caused by industrial activities: contamination, erosion, subsidence; Reclamation of degraded lands, Principles of cleaner production and industrial ecology; Sustainable industrial practices: waste audit, green belt development, eco-industrial parks; Case studies: ash pond reclamation, mining belt restoration, National policies and programs for land rehabilitation

Module III: (10 HOURS)

Industrial Pollution Control Strategies and Legislation

Pollution control in specific sectors: cement, iron & steel, petroleum, fertilizer, tanneries; Role of Environmental Management Systems (EMS), ISO 14001; Introduction to Environment Impact Assessment (EIA) in industries; Legal provisions: Environment (Protection) Act, 1986, Public Liability Insurance Act, 1991, EIA Notification 2006, Role of CPCB, SPCBs, MoEFCC in enforcement

Books recommended:

TEXT BOOK

1. Introduction to Environmental Engineering – Gilbert and Masters v. Wastewater engineering: Metcalf & Eddy, et.al., Mcgraw Hill Pub. (T1)
2. Textbook of Environmental Sudies – by E. Bharucha. (T2)

REFERENCE BOOK

1. Handbook of Industrial pollution & Control- Vol 1 & 2, S. C. Bhatia, CBS Publishers.(R1)
2. Industrial waste treatment Handbook- Woodward and Cirran, Elsevier Pub (R2)
3. Industrial Pollution Control Handbook- Edited by Herbert, F. Lund, McGrawhill Pub (R3)