INDUSTRIAL POLLUTION AND CONTROL

COURSE CODE:15CH1121

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COURSE OUTCOMES:

At the end of the course the student shall be able to

CO 1 Recognize and explain different types of pollution and the methods to regulate pollution.

CO 2 Select the correct air and water pollutant sampling collection method and their measurement technique.

CO 3 Describe the working principle of air and water pollution control equipment.

CO 4 Select the appropriate process required for reducing air, water and soil pollution.

CO 5 Explain different techniques for municipal solid waste and hazardous waste management.

UNIT-I (6 LECTURES)

Types of pollution, types of emissions from chemical industries and effects of environment, environment legislation, Effluent guidelines and standards.

UNIT-II (14 LECTURES)

POLLUTANT SAMPLING AND MEASUREMENT:

Ambient air sampling: collection of gaseous air pollutants, collection of particulate air pollutants. Stack sampling:

Sampling system, particulate sampling, and gaseous sampling.

Analysis of air pollutants: Sulphur dioxide, nitrogen oxides, carbon monoxide, oxidants and Ozones, hydrocarbons, particulate matter.

Sources and characteristics of pollutants in fertilizer, paper and pulp industry, petroleum and petroleum industry. Treatment of liquid and

gaseous effluent in fertilizer industry.

UNIT-III (14 LECTURES)

AIR POLLUTION CONTROL METHODS AND EQUIPMENTS:

Source collection methods: raw material changes, process changes, and equipment modification. Cleaning of gaseous effluents particulate emission control: collection efficiency, particulate control equipment like gravitational settling chambers, Cyclone separators, fabric filters, ESP and their constructional details and design aspects. Scrubbers: wet scrubbers, spray towers, centrifugal scrubbers, packed beds and plate columns, venturi scrubbers, their design aspects. Control of gaseous emissions: absorption by liquids, absorption equipments, adsorption by solids, equipment and the design aspects.

UNIT-IV (10 LECTURES)

Characterization of effluent streams, oxygen demands and their determination (BOD, COD, and TOC), Oxygen sag curve, BOD curve mathematical, controlling of BOD curve, self purification of running streams, sources of wastewater. Introduction to waste water treatment, Methods of primary treatments: screening, sedimentation, flotation, neutralization. Biological treatment of wastewater, bacterial and bacterial growth curve, aerobic processes, suspended growth processes, activated aerated lagoons and stabilization ponds, Attached growth processes, trickling filters, rotary drum filters, anaerobic processes. Methods of tertiary treatment. A brief study of carbon absorption, ion exchange, reverse osmosis, ultra filtration, chlorination, ozonation, treatment and disposal.

UNIT-V (6 LECTURES)

MUNICIPAL SOLID WASTE SOURCES, AND CONTROL METHODS HAZARDOUS WASTE MANAGEMENT:

Nuclear wastes: health and environment effects, sources and disposal methods. Chemical wastes: health and environmental effects, treatment and disposal: treatment and disposal by industry, off site treatment and disposal, treatment practices in various countries. Biomedical wastes: types of wastes and their control.

TEXT BOOKS:

1 Rao. C.S., "Environmental Pollution and Control Engineering", 2nd Edition, Revised, Wiley

2. Mahajan. S.P., "Pollution Control in Process Industries", Tata-McGraw Hill, New Delhi, 1985.

REFERENCES:

1. Narayana Rao, M. and Datta, A.K., "Waste Water Treatment", 2nd Edition, Oxford and IBH Publications, New Delhi, 2005.

2. Swamy, A.V.N., "Industrial Pollution Control and Engineering", Galgotia Publications, Hyderabad, 2005.