

## Industrial Pollution and Control

- 1.1 Course Number: CH402
- 1.2 Contact Hours: 2-0-2 Credits: 8
- 1.3 Semester-offered: 4<sup>th</sup> Year-even
- 1.4 Prerequisite: NA
- 1.5 Syllabus Committee Member: Dr Deepak Dwivedi, Dr Shweta, Dr G.K. Agrahari
2. **Objective:** To understand the important issues and their abatement principles of industrial pollution
3. **Course Content:**

### Unit-wise distribution of content and number of lectures

Unit	Topics	Sub-topic	Lectures
1	Industrial pollutions and regulations	Different types of wastes generated in an industry, Different water pollutants, Air pollutants and solid wastes from industry. Their effects on living and non-living things. Environmental regulatory legislations and standards, Importance of industrial pollution abatement	4
3	Air Pollution	Sources; Types of air pollutants; Classification of industries and area. Atmospheric dispersion: Micrometeorology; Lapse rate; Atmospheric classes; Plume and type of plume; Dispersion models; Ground and elevated sources with and without reflection; Calculation for plume rise and stack gas flow rates. Odor Pollution: Causes, effects and control methods.	6
4	Gaseous pollutants	Sources; Emission factors and control technology. Particulate pollutants: Major sources; Effects; Emission factor and emission limits; Combustion generated pollutants and control; Particulate emission control equipment- Design and efficiency of centrifugal collectors, electrostatic precipitators, bag filters and scrubbers; Vehicular emission control.	4
5	Water Pollution	Sources; Water quality modeling for streams; Characterization and classification of effluents; Effluent standards; Pretreatment and primary treatment methods; Physico-chemical methods of water pollution control; Design of a settling tank, Neutralization and flocculation Biological wastewater treatment processes; Concept of aerobic digestion, Design of activated sludge process, Concept of anaerobic digestion, Biogas plant layout; Advanced treatment methods; Disinfections; Typical industrial and municipal applications.	9

6	Solid waste	Collection, treatment and disposal.	2
7	Noise Pollution	Measurements; Effects; Control	2
8	Case studies	Waste recovery system, Pollution prevention	1
9	Laboratory Classes	There will be 8-10 experiment designed based on the theory covered in the lectures.	2 hours/ week
		<b>Total</b>	<b>Lecture: 28</b>

#### 4. Readings

##### 4.1 Textbook:

1. Peavy, H.S., Rowe, D.R., and Tchobanoglous, G. Environmental Engineering, McGraw Hill International (1985).
2. Metcalf & Eddy, Wastewater Engineering, Tata McGraw-Hill Education Private Limited (2009).

##### 4.2 Reference books:

1. Masters, G.M., Introduction to Environmental Engineering and Science, Prentice Hall off India, (2008).
2. Rao, C.S., Environmental Pollution Control Engineering, Wiley Eastern (2010).
3. De Nevers, N., Air Pollution Control Engineering, McGraw-Hill (2000).

#### 5 Outcome of the Course:

The students will be able to:

- Quantify and analyze the pollution load.
- Analyze/design of suitable treatment for wastewater
- Model the atmospheric dispersion of air pollutants.
- Selection and design of air pollution control devices.
- Analyze the characteristics of solid waste and its handling & management.
- Understand the pollution load of Oil and Gas industry and will be equipped to control it