

COURSE TITLE	INDUSTRIAL POLLUTION CONTROL
COURSE CODE	01CH0711
COURSE CREDITS	3

Objective:

- 1 To impart knowledge on industrial emissions, and pollution abatement strategies

Course Outcomes: After completion of this course, student will be able to:

- 1 Gain in-depth knowledge of environmental pollutants generated by industries
- 2 Examine the role of air pollution control equipment in process industries
- 3 Apply the science and engineering knowledge for water pollution control in industries
- 4 Explore various pollution prevention and control technologies and techniques applicable to different industrial sectors

Pre-requisite of course:Basics of Environmental Studies

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
3	0	0	50	30	20	0	0

Contents : Unit	Topics	Contact Hours
1	Overview of Industrial Emissions Types of emissions from Chemical industries and Effects of environment, Environment legislation, Type of pollution and their sources, Processes and Waste Characteristics, Pollution Control in Process and Waste Management according to the industry specific standards	8
2	Pollution control strategies Pollution Prevention: Process modification, Alternative raw material, Recovery of by product from industrial emission/effluents, Recycle and reuse of waste, Energy recovery and waste utilization, Material and energy balance for pollution minimization, Water minimization, Fugitive emission/effluents and leakages and their control-housekeeping and maintenance.	8
3	Water pollution and control Waste water characteristics, Primary, Secondary and Tertiary treatments for wastewater, Design of conventional and advanced systems; sludge handling systems, Water pollution control for petroleum refineries, fertilizer industry, pulp and paper industry. Reuse of treated water, Zero liquid discharge	12

Contents : Unit	Topics	Contact Hours
4	Air Pollution and control Air dispersion models, Air pollution control methods and Equipment: Source collection methods: raw material changes, process changes, and equipment modification, Cleaning of gaseous Equipment particulate emission control: Collection efficiency, Control equipment like gravitational settling chambers, Cyclone separators, Fabric filters, ESP, Scrubbers. CO ₂ sequestration and its utilization	12
Total Hours		40

Textbook :

- 1 Pollution control in process industries, Mahajan S. P, McGraw Hill Education, 2017
- 2 Handbook of Industrial Pollution and Control, Bhatia S. C., CBS Publishers and Distributors, 2002

References:

- 1 Waste Management Practices: Municipal, Hazardous and Industrial, Waste Management Practices: Municipal, Hazardous and Industrial, Pichtel J., CRC Press, 2005
- 2 Wastewater Engineering – Treatment and Reuse, Wastewater Engineering – Treatment and Reuse, Metcalf & Eddy, Inc. George Tchobanoglous, Franklin Burton , H. David Stensel, McGraw Hill Education, 2017

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery					
Remember / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking / Creative
10.00	20.00	25.00	25.00	10.00	10.00

Instructional Method:

- 1 The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.
- 2 The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.
- 3 Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory
- 4 Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory

Supplementary Resources:

- 1 https://onlinecourses.nptel.ac.in/noc23_ch72/preview
- 2 <https://elearn.cseindia.org/course/index.php?categoryid=3>