

INSTITUTE	FACULTY OF TECHNOLOGY
PROGRAM	BACHELOR OF TECHNOLOGY (CIVIL ENGINEERING)
SEMESTER	7
COURSE TITLE	AIR POLLUTION AND CONTROL
COURSE CODE	01CI0713
COURSE CREDITS	4

Objective:

- 1 To identify and explain the causes and effects of air pollution
- 2 To evaluate air quality through pollution inventory and modeling techniques
- 3 To analyze the policy, health, and social aspects of air pollution
- 4 To assess contemporary technological innovations for air quality improvement

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

- 1 Explain the different sources of air pollution and their associated health and environmental effects.
- 2 Analyze air quality data using pollution inventory and modeling techniques.
- 3 Evaluate the social, health, and policy implications of air pollution.
- 4 Assess the effectiveness and potential of contemporary technological innovations designed to improve air quality.

Pre-requisite of course: Basics of Environmental Studies and Environmental pollution.

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
3	1	0	50	30	20	25	25

Contents : Unit	Topics	Contact Hours
1	Air Pollution Introduction to Air Pollution and Impacts of air pollution on human health, vegetation, animals, Impacts of air pollution on building materials, structures, and atmosphere, soil, and water bodies.	6

Contents : Unit	Topics	Contact Hours
2	Sources, Classification, and Formation/ Transformation of Air Pollutants: Meteorology and Atmospheric Stability Sources and Classification of Air Pollutants, Atmospheric Formation and Fate of Air Pollutants, Meteorological Parameters & Air Pollution, Atmospheric Stability and Lapse Rates, Atmospheric Stability and Plume Behavior, Boundary Layer, Mixing Height, Stack Height, and Plume rise, Status of Air Quality Monitoring in India, Air Quality Index (AQI), Introduction to Air Quality Modelling, Gaussian Dispersion Model for Point Source, Gaussian Dispersion Model for Line and Area Source	10
3	Emissions Inventory and Air Pollution Emission Standards Transport Emission Inventory, Emission Inventory for Industrial sector, Emission Inventory for Agriculture sector, Emission Inventory for Residential and Commercial sectors, Application of Remote Sensing/Satellite-Based Data in Air Quality Management, Source Apportionment, Air Quality Standards, Air Pollution Legislations and Regulations, National Policies for Managing the Ambient Air Quality (AAQ)	12
4	Indoor Air Pollution Indoor Air Quality: An Introduction, Sources and Types of Indoor Air Pollutants, Health Impacts Due to Indoor Air Pollution, Assessment of exposure to Indoor Air Pollution, Indoor Air Quality Modelling, Technologies to Mitigate Indoor Air Pollution	8
5	Air Pollution Control Devices, Equipment, and Their Design Introduction to Air Pollution Control, Settling chamber, Inertial separator, Cyclonic separator, Fabric Filters, Electrostatic Precipitators, Scrubbers, or wet collector, Adsorption, Absorption, Biofiltration, Oxidation, Condensation	6
Total Hours		42

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	Tutorial-1 Determination of Concentration of Pollutants using Gaussian Dispersion Model	2
2	Tutorial-2 Case Study Based on Emission Inventory	1
3	Tutorial-3 Case Study Based on Assessment and Evaluation of IAQ.	1
4	Tutorial-4 Examples on Particulate Emission Control Devices	2
5	Tutorial-5 Examples Gaseous Emission Control Devices	2
6	Tutorial-6 Sampling and analysis of PM10 & PM2.5 in Ambient Air	2

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
7	Tutorial-7 Sampling and analysis of SO ₂ and NO ₂ in Ambient Air.	2
8	Tutorial-8 Stack Emission Monitoring using Isokinetic Sampling.	2
Total Hours		14

Textbook :

- 1 Fundamentals of Air Pollution, Boubel, R.W., Fox, D.L., Turner, D.B., Stern, A.C, Academic Press, 2005

References:

- 1 Air Pollution: Its Origin and Control, Air Pollution: Its Origin and Control, Wark, K., Warner, C.F., and Davis, W.T, Addison-Wesley Longman., 1998

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
5.00	10.00	30.00	30.00	15.00	10.00

Instructional Method:

- 1 Prerequisite of the course and its pattern shall be discussed on the commencement of the course.
- 2 Lectures shall be conducted in the classroom using various teaching aids
- 3 Presence in all academic sessions is mandatory which shall carry 5% marks of the total internal evaluation
- 4 At the end of each unit/topic an assignment based on the course content shall be given to the students which shall carry 5% weightage for timely completion and submission of the assigned work.
- 5 The tutorials are planned in such a way that they cover the practical aspects of the course contents. These tutorials shall bring clarity of the theoretical concepts which the students have studied during the academic sessions

Supplementary Resources:

- 1 https://onlinecourses.nptel.ac.in/noc22_ce22/preview