

## **Course File**

**Air & Noise Pollution And Control (5CE5-11)**

**Semester: V, Year: III (2023-24)**

**Name of faculty: Nishit Jain**

**Email ID: [nishit.jain@technonjr.org](mailto:nishit.jain@technonjr.org)**

**Total Number of Lectures: 28**

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# Techno India NJR Institute of Technology

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## VISSION & MISSION OF INSTITUTE

### Vision

Empowering student with recent and emerging technologies to create innovative technical leaders capable of contributing to industrial and societal needs for betterment of mankind across the globe.

### Mission

**M1:** To provide dynamic learning environment to students by providing constant exposure to latest technologies by linking closely with the industries.

**M2:** To establish effective interface with industry to obtain live problems to enhance critical thinking and problem solving skills among students and consultancy projects for faculty.

**M3:** To provide avenues and opportunities to faculty for domain specific trainings and qualification upgradation.

**M4:** To develop ethical leaders with strong communication skills.

## **VISION & MISSION OF DEPARTMENT**

### **Department Vision**

To increase students learning of fundamentals for designing and planning of buildings and latest technologies through industry-aligned project-based learning which will help in transforming students to be good civil engineering professionals leading to innovation and incubation of new ideas.

### **Department Mission**

- M1: To create experimental learning through solving problems of Government, Society, Smart Cities, Industry and other entities.
- M2: To teach the latest technologies to the students as beyond the syllabus activity so that they are updated and industry ready.
- M3: To enable engineering students understand industry-aligned technologies and learn to find solutions from their early engineering days and this is the only way to produce globally relevant engineers solving real-life problems applying current technologies.
- M4: To enable students to generate projects through problem faced by and requirement of Smart cities, industry, Government and other entities whereby those outlined problem statements are to be studied deeply by a group of faculty members to convert them into real-time project format.

## **PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)**

- PEOs 1: To provide an in-depth understanding of the fundamentals of Civil Engineering and create a foundation for lifelong learning to facilitate a progressive career in the construction Industry, as an entrepreneur and in pursuit of higher studies.
- PEOs 2: To equip the students with technical and analytical skills to develop innovative solutions to complex real-life problems using existing and novel technologies. To equip the students with good communication and interpersonal skills, inter-disciplinary teamwork and leadership skills to enable them to fulfill professional responsibilities.

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PEOs 3: To expose them to various contemporary issues which will enable them to become ethical and responsible towards themselves, co-workers, Society and the Nation.

PEOs 4: To make the student's industry ready by imparting education related to the latest technologies so that they can grab future industry jobs.

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## **PROGRAM SPECIFIC OUTCOMES (PSO's)**

- PSO1: To be aware of and initiate some-work on future technologies and new developments which may impact the future Industry 4.0.
- PSO2: Hands on training on upcoming technologies and project-based learning.
- PSO3: Get exposure to BIM (Building Information Modeling).

## **PROGRAMME OUTCOMES (POs)**

### **A student will develop:**

- PO01. ENGINEERING KNOWLEDGE: An ability to apply knowledge of Mathematics, Science and Engineering Fundamentals in Electronics and Communication Engineering.
- PO02. PROBLEM ANALYSIS: Ability to analyze and interpret data by designing and conducting experiments. Develop the knowledge of developing algorithms, designing, implementation and testing applications in electronics and communication related areas.
- PO03. DESIGN/ DEVELOPMENT OF SOLUTION: An ability to Design a system Component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
- PO04. CONDUCTION OF INVESTIGATION OF COMPLEX PROBLEMS: Ability to Identify, formulate and solve engineering problems.
- PO05. MODERN TOOL USAGE: An ability to use the techniques, skills and modern engineering tools necessary for engineering practice.
- PO06. THE ENGINEERING AND SOCIETY: Broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context.
- PO07. ENVIRONMENT & SUSTAINABILITY: Understand the impact of professional engineering solution in societal and environmental contexts, and demonstrate the knowledge of, and need of sustainable development.
- PO08. ETHICS: An ability to understand the professional, social and ethical responsibility.
- PO09. INDIVIDUAL AND TEAM WORK: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

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PO10. COMMUNICATION: An ability to Communicate effectively in order to succeed in their profession such as, being able to write effective reports and design documentation, make effective presentations.

PO11. PROJECT MANAGEMENT & FINANCE: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in team, to manage projects and in multidisciplinary environment.

PO12. LIFE-LONG LEARNING: Recognize the need and an ability to engage in life-long learning.

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## Course Overview:

This course aims to provide a comprehensive understanding of air and noise pollution, their sources, effects, and control methods. Students will explore various types of air pollutants, including their impact on human health, the environment, and materials. The course also covers the principles of pollution measurement, ambient air quality standards, and current environmental legislation. Additionally, it introduces techniques for controlling both gaseous and particulate pollutants and explores advanced noise pollution control methods. By the end of the course, students will gain knowledge of sustainable pollution management practices and innovative technologies for improving air quality.

## Course Outcome:

5CE5-11	Cognitive Level	
5CE511.1	Understanding	Understand key concepts of air and noise pollution (pollutants, sources, effects).
5CE511.2	Understanding	Understand the sources, classifications, and effects of air pollutants..
5CE511.3	Applying	Apply air sampling methods and air quality standards to real-world cases.
5CE511.4	Analyzing	Analyze air pollution control techniques and their effectiveness..
5CE511.5	Analyzing	Analyze noise pollution levels and propose appropriate control strategies.

Prerequisites:

- Knowledge of pollution and environmental issues.
- Understanding of gases and chemical reactions.
- Basic concepts of acoustics and sound propagation.
- Ability to handle quantitative data and calculations.

## Mapping COs, POs and PSOs:

AIR & NOISE POLLUTION AND CONTROL															
Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO35511.1	0	0	0	1	0	0	1	1	0	2	0	0	0	0	0
CO35511.2	0	0	0	1	0	0	2	0	0	2	0	0	0	0	0
CO35511.3	0	0	0	0	0	0	2	2	0	2	0	0	0	0	0
CO35511.4	0	0	0	0	0	0	2	2	0	2	0	0	0	0	0



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CO35511.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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## UNIVERSITY ACADEMIC CALENDAR

Academic Calendar for Even Semester for Session

RAJASTHAN TECHNICAL UNIVERSITY KOTA				
Course: Bachelor of Technology (B.TECH.) for Odd Semester				
Semester	I	III	V	VII
Induction Program	17.08.2023			
Commencement of Classes	11.09.2023	24.08.2023	04.09.2023	04.09.2023
Commencement of First Mid Term	02.11.2023	03.10.2023	05.10.2023	05.10.2023
Commencement of Second Mid Term	07.12.2023	16.11.2023	20.11.2023	20.11.2023
Last Working Day	23.12.2023	02.12.2023	02.12.2023	30.11.2023
Commencement of Practical Exams	02.01.2024	04.12.2023	23.12.2023	14.12.2023
Commencement of Theory Exams	18.01.2024	14.12.2023	08.12.2023	07.12.2023
Winter Break				

## Academic Calendar

Academic Calendar for Odd Semester for Session 2023-24 (Odd Semester)

Course: Bachelor of Technology (B.TECH.)				
Semester	I	III	V	VII
<b>Induction Program</b>	10-08-2023			
<b>Commencement of Classes</b>	20-08-2023	11-09-2023	30-08-2023	22-08-2023
<b>Commencement of First Mid Term</b>	04-11.2023	02-11.2023	02-11.2023	27-09-2023
<b>Commencement of Second Mid Term</b>	15-01-2024	27-12-2023	27-12-2023	05-12-2023
<b>Last Working Day</b>	20-01-2024	12-01-2024	12-01-2024	20-12-2023
<b>Commencement of Practical Exams</b>	29-01-2024	15-01-2024	15-01-2024	31-12-2023
<b>Commencement of Theory Exams</b>	15-02-2024	30-01-2024	29-01-2024	27-12-2023

## Evaluation Scheme

### FACULTY DETAILS:

Name of the Faculty : Mr. Nishit Jain  
Designation : Assistant Professor  
Department : Civil Engineering

### 1. TARGET

- a) Percentage Pass : 100 %
- b) Percentage I class: 70 %

### 2. METHOD OF EVALUATION

- 2.1. Continuous Assessment Examinations (Mid-Term 1 & 2)
- 2.2. Assignments / Seminars
- 2.3. Mini Projects
- 2.4. Quiz
- 2.5. Semester Examination
- Others \_\_\_\_\_

3. List out any new topic(s) or any innovation you would like to introduce in teaching the subject in this Semester.

1. Take the help of creative tools to stimulate creativity. Include slide presentations, demonstration or forms of visual exercises that will excite the young minds and capture their interest.

Signature of Faculty:

Signature of HOD

## UNIVERSITY SYLLABUS



### RAJASTHAN TECHNICAL UNIVERSITY, KOTA Syllabus

**3<sup>rd</sup> Year - V Semester: B.Tech. (Civil Engineering)**

#### SCE5-11: AIR & NOISE POLLUTION AND CONTROL

**Credit: 2**

**Max. Marks: 100(IA:30, ETE:70)**

**2L+0T+0P**

**End Term Exam: 3 Hours**

SN	Contents	Hours
<b>1</b>	Introduction: Objective, scope and outcome of the course.	<b>1</b>
<b>2</b>	<i>Air Pollution:</i> Air pollutants, Sources, classification, Combustion Processes and pollutant emission, Effects on Health, vegetation, materials and atmosphere, Reactions of pollutants in the atmosphere and their effects-Smoke, smog and ozone layer disturbance, Greenhouse effect.	<b>7</b>
	Air sampling and pollution measurement methods, principles and instruments, Ambient air quality and emission standards, Air pollution indices, Air Act, legislation and regulations, control principles,	<b>6</b>
	Removal of gaseous pollutants by adsorption, absorption, reaction and other methods. Particulate emission control, settling chambers, cyclone separation, Wet collectors, fabric filters, electrostatic precipitators and other removal methods like absorption, adsorption, precipitation etc. Biological air pollution control technologies, Indoor air quality.	<b>7</b>
<b>3</b>	<i>Noise pollution:</i> Basics of acoustics and specification of sound; sound power, sound intensity and sound pressure levels; plane, point and line sources, multiple sources; outdoor and indoor noise propagation; psychoacoustics and noise criteria,	<b>4</b>
	Effects of noise on health, annoyance rating schemes; special noise environments: Infrasound, ultrasound, impulsive sound and sonic boom; noise standards and limit values; noise instrumentation and monitoring procedure. Noise indices. Noise control methods.	<b>3</b>
	<b>TOTAL</b>	<b>28</b>

Office of Dean Academic Affairs  
Rajasthan Technical University, Kota

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## TEXT/REFERENCEBOOKS

- "Air Pollution Control Engineering" by Noel de Nevers.
- "Noise Pollution and Control Strategy" by S. P. Singal.
- "Air Quality Management" by G. Baumbach.
- "Environmental Noise Control" by Carl E. Hanson.

## WEEKLY TIME TABLE OF THE TEACHER

Day	1	2	3	4	5	6	7
Monday							
Tuesday							ANPC
Wednesday							
Thursday							ANPC
Friday							
Saturday							ANPC

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## COURSE-PLAN

Lecture No	Unit	Topic	Teaching Methods/ Teaching Aids
1	1	Introduction: Objective, scope and outcome of the course.\	White Board
2	2	Air Pollution: Air pollutants, Sources, classification	White Board
3	2	Combustion Processes and pollutant emission,	White Board
4	2	Effects on Health vegetation materials and atmosphere	White Board
5	2	Reactions of pollutants in the atmosphere and their effects-Smoke	White Board
6	2	smog and ozone layer disturbance	White Board
7	2	Greenhouse effect	White Board
8	2	Air sampling and pollution measurement methods	White Board
9	2	principles and instruments	White Board
10	2	Ambient air quality and emission standards	White Board
11	2	Air pollution indices	White Board
12	2	Air Act	White Board
13	2	legislation and regulations, control principles	White Board
14	2	Removal of gaseous pollutants by adsorption absorption, reaction and other method	White Board
15	2	Particulate emission control	White Board
16	2	settling chambers cyclone separation	White Board
17	2	Wet collectors, fabric filters	White Board
18	2	electrostatic precipitators and other removal methods like absorption, adsorption, precipitation etc	White Board
19	2	Biological air pollution control technologies	White Board
20	2	Indoor air quality.	White Board

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21	3	Noise pollution: Basics of acoustics and specification of sound	White Board
22	3	sound power, sound intensity and sound pressure levels;	White Board
23	3	plane, point and line sources, multiple sources; outdoor and indoor noise propagation	White Board
24	3	psychoacoustics and noise criteria	White Board
25	3	Effects of noise on health, annoyance rating schemes special noise environments: Infrasound, ultrasound, impulsive sound and sonic boom	White Board
26	3	noise standards and limit values; noise instrumentation and monitoring procedure	White Board
27	3	Noise indices.	White Board
28	3	Noise control methods.	White Board

**Signature of Faculty:**

**Signature of HOD**

## **Assignment Sheet**

### **ASSIGNMENT NO. 1**

1. Explain the classification of air pollutants and discuss the major sources of each type.
2. Analyze the health effects of air pollution on vulnerable populations such as children and the elderly. Provide case studies where applicable.
3. Discuss the role of combustion processes in air pollution and suggest methods to reduce emissions from these processes.
4. Compare the mechanisms of smog and greenhouse effect and explain how they impact the atmosphere differently.
5. Describe the various methods of air sampling and pollution measurement, explaining the principles behind each technique.

### **ASSIGNMENT NO. 2**

1. Examine the Air (Prevention and Control of Pollution) Act in India, and discuss how it has impacted air quality management.
2. Evaluate the effectiveness of particulate control devices, such as electrostatic precipitators and fabric filters, in industrial applications.
3. Describe the biological methods of air pollution control and assess their feasibility in urban settings.
4. Explain the effects of noise pollution on human health, focusing on physical, psychological, and social impacts.
5. Propose noise control strategies for urban areas with high levels of traffic and industrial noise, and justify your solutions with technical reasoning.

**SAMPLE QUIZ QUESTIONS**

1. What is the primary objective of studying air and noise pollution?
- a) To understand pollution sources
  - b) To identify control methods
  - c) To mitigate health and environmental impacts
  - d) All of the above

Answer: d) All of the above

2. Which of the following is not a common outcome of air pollution?
- a) Ozone layer disturbance
  - b) Soil erosion
  - c) Greenhouse effect
  - d) Smog formation

Answer: b) Soil erosion

3. Which of the following is a primary air pollutant?
- a) Ozone
  - b) Carbon monoxide
  - c) Nitric acid
  - d) Peroxyacetyl nitrate

Answer: b) Carbon monoxide

4. What is the major source of sulfur dioxide (SO<sub>2</sub>) in the atmosphere?
- a) Industrial emissions
  - b) Automobile exhaust
  - c) Natural gas combustion
  - d) Household waste

Answer: a) Industrial emissions

5. The term “smog” refers to a mixture of:
- a) Smoke and fog
  - b) Carbon monoxide and sulfur dioxide
  - c) Nitrogen dioxide and ozone
  - d) Hydrocarbons and lead

Answer: a) Smoke and fog

6. The depletion of the ozone layer is mainly caused by:
- a) Carbon monoxide
  - b) Chlorofluorocarbons (CFCs)
  - c) Methane
  - d) Lead



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Answer: b) Chlorofluorocarbons (CFCs)

7. Which gas contributes the most to the greenhouse effect?

- a) Oxygen
- b) Nitrogen
- c) Carbon dioxide
- d) Neon

Answer: c) Carbon dioxide

8. What is the role of adsorption in air pollution control?

- a) To absorb gases into a liquid
- b) To settle particulate matter
- c) To capture gaseous pollutants on solid surfaces
- d) To neutralize gases with chemicals

Answer: c) To capture gaseous pollutants on solid surfaces

9. Cyclone separators are primarily used for the removal of:

- a) Gaseous pollutants
- b) Particulate matter
- c) VOCs (Volatile Organic Compounds)
- d) Ozone

Answer: b) Particulate matter

10. The Air (Prevention and Control of Pollution) Act was enacted in India in:

- a) 1974
- b) 1981
- c) 1986
- d) 1994

Answer: b) 1981

11. Which of the following is a biological air pollution control method?

- a) Biofilters
- b) Electrostatic precipitators
- c) Fabric filters
- d) Wet collectors

Answer: a) Biofilters

12. The "Air Quality Index (AQI)" is used to measure:

- a) Noise levels
- b) Concentration of water pollutants
- c) Concentration of air pollutants
- d) Soil quality

Answer: c) Concentration of air pollutants

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13. Which of the following represents sound intensity?

- a) Decibels (dB)
- b) Newtons (N)
- c) Joules (J)
- d) Pascals (Pa)

Answer: a) Decibels (dB)

14. Which is a typical point source of noise pollution?

- a) An aircraft flying overhead
- b) A factory machine
- c) Traffic on a highway
- d) Wind blowing through trees

Answer: b) A factory machine

15. Outdoor noise propagation depends on:

- a) Temperature
- b) Humidity
- c) Wind speed
- d) All of the above

Answer: d) All of the above

16. What type of sound is described as "infrasound"?

- a) Sound below 20 Hz
- b) Sound between 20 Hz and 20,000 Hz
- c) Sound above 20,000 Hz
- d) None of the above

Answer: a) Sound below 20 Hz

17. The main health impact of prolonged exposure to high levels of noise is:

- a) Eye strain
- b) Lung disease
- c) Hearing loss
- d) Skin irritation

Answer: c) Hearing loss

18. The noise created by a sonic boom falls under the category of:

- a) Continuous noise
- b) Impulsive noise
- c) Periodic noise
- d) White noise

Answer: b) Impulsive noise

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19. What is the purpose of a noise barrier?

- a) To amplify sound
- b) To direct sound
- c) To block or reduce noise
- d) To enhance indoor acoustics

Answer: c) To block or reduce noise

20. Which of the following is used to measure sound pressure levels?

- a) Anemometer
- b) Hygrometer
- c) Sound level meter
- d) Barometer

Answer: c) Sound level meter

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## MID-TERM PAPERS

**TECHNO INDIA NJR INSTITUTE OF TECHNOLOGY, UDAIPUR**

**B. TECH III YEAR (V SEM.) – MT-I**

**AIR & NOISE POLLUTION AND CONTROL (Subject Code: 5CE5-11)**

**Time: 2 Hr**

**Max. Marks: 70**

**Note:**

- 1) The paper is divided into 2 parts: Part-A and, Part-B.
- 2) Part-A contains 10 questions and carries 2 mark each.
- 3) Part-B contains 5 questions. Each question is having two options and carries 10 marks each

PART A: 20 MARKS (WORD LIMIT 25 WORDS)		
A	Define air pollutants and provide examples of both natural and anthropogenic sources.	CO1
B	What are the main types of pollutants emitted during combustion processes, and how do they contribute to air pollution?	CO1
C	Briefly explain two health effects associated with exposure to air pollution.	CO1
D	How does air pollution affect vegetation, and can you give an example of a pollutant that harms plant life?	CO1
E	What is wet precipitation?	CO2
F	What is dry deposition?	CO2
G	Differentiate between smoke and smog.	CO2
H	Explain the ozone layer disturbance.	CO2
I	what are the main greenhouse gases responsible for this phenomenon?	CO3
J	Name one strategy to mitigate air pollution and briefly describe how it works to improve air quality.	CO3
PART B: 50 MARKS		
1	What are the primary sources of air pollutants, and how are they classified based on their origin?	CO1
	OR	
	Explain the role of combustion processes in emitting pollutants into the air.	
2	How does air pollution affect human health, and what are some common health problems associated with exposure to air pollutants?	CO1
	OR	
	Describe the impact of air pollution on vegetation and its role in environmental degradation.	
3	Write a note on classification of Particulate Matter	CO2
	OR	
	Write a note on classification of SO <sub>x</sub> & NO <sub>x</sub>	
4	Write a note on Green House effect & its role in Ozone depletion.	CO2
	OR	
	Write a note on fate of air pollution	
5	What is ambient air sampling?	CO3
	OR	
	What is Stack Sampling method?	

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**Marks and Gap Analysis of Mid-Term 1**

S.No	University Roll No.	Name of Student	Mid-Term 1 MM-70	Remark ( Remedial Class need or not – Y/N )
1.	21ETCCE001	Dev vaishnav	45	N
0.	21ETCCE002	Hitesh Sutradhar	45	N
0.	21ETCCE004	Naved khan	50	N
0.	21ETCCE006	Pushpendra gehlot	52	N
0.	21ETCCE007	Shalin Dak	47	N
0.	21ETCCE009	Tamanna kumawat	67	N
0.	21ETCCE300	Muniraj Sharma	61	N
0.	22ETCCE200	Moiz Udaipurwala	52	N
0.	22ETCCE201	Vikas Suthar	61	N

\*(Y, if obtained marks are <50%)

**Signature of Faculty:**

**Signature of HOD**

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## Remedial Action Taken to Remove the Gaps (After Mid- Term 1)

S.no.	University Roll no.	Name of Student	Topics to be discussed in Remedial Class	Schedule Date of Remedial Class	Outcome Achieved
1.	NIL				
2.					

**Signature of Faculty:**

**Signature of HOD**

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**TECHNO INDIA NJR INSTITUTE OF TECHNOLOGY, UDAIPUR**  
 DEPARTMENT OF CIVIL ENGINEERING  
 II MIDTERM- 2023-24

**SUB: AIR & NOISE POLLUTION & CONTROL (SCE5-11)**

TIME: 2 Hrs

MM:70

Note:

- 1) The paper is divided into 3 parts: Part-A, Part-B and Part-C.
- 2) Part-A contains 10 questions and carries 2 mark each.
- 3) Part-B contains 7 questions carries 4 marks each. Attempt any 5 Questions.
- 4) Part-C contains 5 questions carries 10 marks each. Attempt any 3 Questions.

PART A		
1	Define Air pollution.	CO1
2	Define smoke.	CO1
3	Define Smog.	CO2
4	What is Ozone depletion?	CO2
5	What is the greenhouse effect?	CO3
6	What is AQI?	CO3
7	What is noise?	CO4
8	What is sound intensity?	CO4
9	What is the 'point source' of noise pollution?	CO5
10	What do you understand by psychoacoustics?	CO5
PART B		
1	Define ambient air quality	CO1
2	Discuss harmful effects of ozone depletion.	CO2
3	Define Air act.	CO3
4	Define absorption .	CO4
5	Define adsorption.	CO4
6	Explain various measures to control noise pollution.	CO5
7	What is ambient noise level monitoring?	CO5
PART C		
1	What are methods of removal of gaseous pollutants?	CO1
2	What are the key regulations of the air act?	CO2
3	What is particulate emission control and what are its methods?	CO3
4	What are the effects of noise on human health?	CO4
5	What is noise control?	CO5

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## Marks and Gap Analysis of Mid-Term II

S.No	University Roll No.	Name of Student	Mid-Term 1 MM-70	Remark ( Remedial Class need or not – Y/N )
2.	21ETCCE001	Dev vaishnav	43	N
1.	21ETCCE002	Hitesh Sutradhar	43	N
1.	21ETCCE004	Naved khan	47	N
1.	21ETCCE006	Pushpendra gehlot	53	N
1.	21ETCCE007	Shalin Dak	45	N
1.	21ETCCE009	Tamanna kumawat	66	N
1.	21ETCCE300	Muniraj Sharma	61	N
1.	22ETCCE200	Moiz Udaipurwala	51	N
1.	22ETCCE201	Vikas Suthar	61	N

\*(Y, if obtained marks are <50%)

**Signature of Faculty:**

**Signature of HOD**



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## Remedial Action Taken to Remove the Gaps (After Mid- Term II)

Sr. No.	University Roll no.	Name of Student	Topics to be discussed in Remedial Class	Schedule Date of Remedial Class	Course Outcome
<b>1.</b>	NIL				

Signature of Faculty:

Signature of HOD

**PREVIOUS YEAR PAPERS**

<b>5E1745</b>	<b>5E1745</b> <b>B. Tech. V - Sem. (Main) Exam., February - 2023</b> <b>Civil Engineering</b> <b>5CE5 – II Air &amp; Noise Pollution and Control (Elective-I)</b>	<b>Roll No.</b> _____ <b>Total No. of Pages:</b> <span style="border: 1px solid black; padding: 2px;">2</span>
<b>Time: 3 Hours</b>		<b>Maximum Marks: 70</b>

*Instructions to Candidates:*

*Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five from Part C.*

*Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.*

*Use of following supporting material is permitted during examination. (Mentioned in form No. 205)*

1. NIL \_\_\_\_\_

2. NIL \_\_\_\_\_

**PART – A**

**(Answer should be given up to 25 words only)**

**[10×2=20]**

**All questions are compulsory**

- Q.1 What are the sources of air pollution?
- Q.2 Explain Greenhouse effect.
- Q.3 What do you mean by indoor air pollution?
- Q.4 Explain the phenomenon of self-cleansing of atmosphere.
- Q.5 What is meant by "Smog"? State the harmful effects of smog.
- Q.6 What are the indices of air pollution?
- Q.7 What is meant by Acoustic reflex?
- Q.8 Differentiate between Air-borne noise and Structure-borne noise.
- Q.9 Differentiate between sound intensity and sound pressure levels.
- Q.10 What are the harmful effects of noise on human health?

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**PART – B**

**(Analytical/Problem solving questions)**

**[5×4=20]**

**Attempt any five questions**

- Q.1 Describe the primary and secondary meteorological parameters that influence air pollution.
- Q.2 Describe the working and advantages of cyclone separator as an equipment for control of air pollution.
- Q.3 Explain the natural and un-natural sources of air pollution.
- Q.4 What do you understand by biological air pollution control strategies?
- Q.5 What is Noise Pollution? What are the harmful effects of noise pollution?
- Q.6 Define dBA. What are the various standards of noise?
- Q.7 Differentiate between continuous, intermittent and impulsive noise.

**PART – C**

**(Descriptive/Analytical/Problem Solving/Design Questions)**      **[3×10=30]**

**Attempt any three questions**

- Q.1 What are the different methods for control of gaseous pollutants? Describe any one method in detail.
  - Q.2 What do you understand by the terms RSPM, SPM and PM10? Explain the working of Electrostatic Precipitator alongwith its working principle.
  - Q.3 Discuss the impact of atmospheric pressure and moisture on dispersion of air pollutants.
  - Q.4 What is annoyance by noise? Explain Sonic booms in detail.
  - Q.5 Distinguish between Temporary Threshold Shift (TTS), Permanent Threshold Shift (PTS) with respect to cause of hearing loss, duration of exposure and potential for recovery.
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<b>5E1346</b>	<b>Roll No.</b> _____	<b>Total No. of Pages:</b> <span style="border: 1px solid black; padding: 2px;">2</span>
<b>5E1346</b>		
<b>B. Tech. V - Sem. (Main / Back) Exam., January - 2022</b>		
<b>PCC / PEC Civil Engineering</b>		
<b>5CE5 – 11 Air &amp; Noise Pollution and Control</b>		

Time: 2 Hours

Maximum Marks: 80  
Min. Passing Marks: 28

*Instructions to Candidates:*

*Attempt all five questions from Part A, four questions out of six questions from Part B and two questions out of three from Part C.*

*Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.*

*Use of following supporting material is permitted during examination. (Mentioned in form No. 205)*

1. NIL

2. NIL

**PART – A**

**(Answer should be given up to 25 words only)**

[5×2=10]

**All questions are compulsory**

- Q.1 Mention the sources of pollutant PM<sub>2.5</sub> & PM<sub>10</sub>. [2]
- Q.2 Write the formula for finding average sound power level. [2]
- Q.3 How many pollutants are covered in NAAQS? [2]
- Q.4 Mention the instruments used in the measurement of air pollution. [2]
- Q.5 What is the unit of measurement of sound? [2]

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**PART – B**

**(Analytical/Problem solving questions)**

[4×10=40]

**Attempt any four questions**

- Q.1 Discuss the NAQI (National Air Quality Index) with six different pollution levels, colors & effects. [10]
- Q.2 Mention the list of pollutants covered in the NAMP, NAAQS & NAQI. [10]
- Q.3 What are the sources of noise pollution? Also mention the sound level/limit of the sources. [10]
- Q.4 Discuss the various controlling measures of noise pollution. [10]
- Q.5 Explain the cyclonic scrubber & spray scrubber. [5+5=10]
- Q.6 Discuss the biological air pollution control technologies. [10]

**PART – C**

**(Descriptive/Analytical/Problem Solving/Design Questions)**

[2×15=30]

**Attempt any two questions**

- Q.1 What is the air pollution? Also discuss the effects of air pollution on plant health, human health, animal health & environment. [3+3+3+3=15]
- Q.2 What is the noise pollution? Also discuss the effects of noise pollution on plant health, human health, animal health & environment. [3+3+3+3=15]
- Q.3 Write short notes on the following - [5+5+5=15]
- (1) Acid rain and its effects
  - (2) High Volume Air Sampler (HVAS)
  - (3) Remedial measures for ozone layer depletion
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<b>5E1346</b>	Roll No	<b>5E1346</b>	Total No of Pages: <b>3</b>
<b>B. Tech. V - Sem. (Main / Back) Exam., Feb.-March - 2021</b>			
<b>PCC/PEC Civil Engineering</b>			
<b>SCE5 - 11 Air &amp; Noise Pollution and Control</b>			

Time: 2 Hours

[To be converted as per scheme]

Max. Marks: 65

Min. Marks: 23

*Instructions to Candidates:*

*Attempt all five questions from Part A, four questions out of six questions from Part B and one questions out of three from Part C.*

*Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.*

*Use of following supporting material is permitted during examination. (Mentioned in form No. 205)*

1. NIL

2. NIL

**PART - A**

**(Answer should be given up to 25 words only)**

[5×2=10]

**All questions are compulsory**

- Q.1 Define greenhouse effect and mention gases responsible for it.
- Q.2 What are the characteristics of smog and smoke?
- Q.3 Mention gases measured in air pollution indices and their emission standards.
- Q.4 Enumerate the unnatural sources of air pollution.
- Q.5 Suggest the acceptable noise levels for residential, industrial and institutional buildings.

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<https://www.rtuonline.com>

**PART - B**

**(Analytical/Problem solving questions)**

**[4×10=40]**

**Attempt any four questions**

- Q.1 What do you understand by ozone layer disturbance? Mention gases responsible for it.
- Q.2 What is ambient air quality standard? Describe in brief instruments involved for measuring air quality.
- Q.3 Give sketches of the following -
- (1) Typical bag house filter unit
  - (2) Typical collector unit
  - (3) Cyclonic scrubber
  - (4) Spray scrubber
  - (5) Venturi scrubber
- Q.4 Define sound power, sound intensity and sound pressure levels. What are the effects of noise on health? <https://www.rtuonline.com>
- Q.5 What is Noise indices? What are the instruments used and how noise monitoring is done?
- Q.6 What do you understand by Indoor Air quality? Give necessity for ventilation.

**PART - C**

**(Descriptive/Analytical/Problem Solving/Design Questions)** [1×15=15]

**Attempt any one questions**

- Q.1 What is an acid rain? Explain its harmful effects and suggest some remedial measures to avoid it.
- Q.2 What are the advantages and disadvantages of the electrostatic precipitator and wet scrubbers?

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Q.3 Give reasons for the following -

- (a) The effects of air pollution have no national boundaries.
  - (b) The small changes in the ozone concentrations could have dramatic effects on the life on earth.
  - (c) The urban areas are the victims to the ever increasing air pollution.
  - (d) The wet scrubbers may exhibit plume in the sky.
  - (e) It will be necessary to have international co - operation for attempting the reduction of green - house effect.
  - (f) The range of audible sound to painful sound is covered on the logarithmic scale.
  - (g) It is necessary to design carefully the doors and windows of the room.
  - (h) It is desirable to make massive base for a vibrating machine.
  - (i) A **practical and efficient** method of reducing noise in a system is to provide enclosures, shields and barriers.
  - (j) Machines are enclosed in a box - like structure with sound absorbing materials on its surface.
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**STUDENT PERFORMANCE REPORT**

Roll No.	Name of Student	I Mid-Term	II Mid-Term	Average
21ETCCE00 1	Dev vaishnav	45	43	44
21ETCCE00 2	Hitesh Sutradhar	45	43	44
21ETCCE00 4	Naved khan	50	47	48.5
21ETCCE00 6	Pushpendra gehlot	52	53	52.5
21ETCCE00 7	Shalin Dak	47	45	46
21ETCCE00 9	Tamanna kumawat	67	66	66.5
21ETCCE30 0	Muniraj Sharma	61	61	61
22ETCCE20 0	Moiz Udaipurwala	52	51	51.5
22ETCCE20 1	Vikas Suthar	61	61	61

**Signature of Faculty:**

**Signature of HOD**

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## RESULT ANALYSIS

S.N O.	RTU ROLL NUMBER	NAME OF STUDENT	END TERM MARK S	SESSIONA L MARKS	TOTA L
		MAX MARKS	70	30	100
1.	21ETCCE001	Dev vaishnav	46	20	66
2.	21ETCCE002	Hitesh Sutradhar	39	20	59
3.	21ETCCE004	Naved khan	39	22	61
4.	21ETCCE006	Pushpendra gehlot	40	23	63
5.	21ETCCE007	Shalin Dak	21	21	42
6.	21ETCCE009	Tamanna kumawat	43	30	73
7.	21ETCCE300	Muniraj Sharma	59	27	86
8.	22ETCCE200	Moiz Udaipurwala	23	23	46
9.	22ETCCE201	Vikas Suthar	53	27	80

TOTAL	PASS	FAIL	ABSENT	PASS %
9	9	0	0	100

# **Techno India NJR Institute of Technology**

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## **Indirect Assessment:**

**Overall Teacher Self-Assessment (at the completion of course) in terms of course objective and outcomes**

## **Course Objectives:**

This course aims to provide a comprehensive understanding of air and noise pollution, their sources, effects, and control methods. Students will explore various types of air pollutants, including their impact on human health, the environment, and materials. The course also covers the principles of pollution measurement, ambient air quality standards, and current environmental legislation. Additionally, it introduces techniques for controlling both gaseous and particulate pollutants and explores advanced noise pollution control methods. By the end of the course, students will gain knowledge of sustainable pollution management practices and innovative technologies for improving air quality.

## **Course Outcomes:**

CO1 Understand key concepts of air and noise pollution (pollutants, sources, effects).

CO2 Understand the sources, classifications, and effects of air pollutants..

CO3 Apply air sampling methods and air quality standards to real-world cases.

CO4 Analyze air pollution control techniques and their effectiveness

CO5 Analyze noise pollution levels and propose appropriate control strategies.

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## Methodology to identify bright student

Considered a range of criteria, including academic performance, creativity, critical thinking, problem-solving skills, and enthusiasm for learning. Bright students often excel in multiple areas. Observed how students perform in the classroom. In terms of active participation, engagement in discussions, leadership, and the ability to grasp complex concepts.

## Efforts to keep students engaged

1. Active Learning:
  - Incorporate active learning strategies, such as group discussions, problem-solving activities, and hands-on projects. Active participation keeps students engaged and encourages critical thinking.
2. Varied Teaching Methods:
  - Use a variety of teaching methods, including lectures, group work, multimedia presentations, and interactive activities to cater to different learning preferences.
3. Technology Integration:
  - Leverage technology, such as online platforms, educational apps, and interactive software, to make lessons more engaging and interactive.

## Methodology to identify weak student

Considered a range of criteria, including classroom observation, formative assessment, summative assessment, assignment review e.t.c. Weak students are struggling students with sensitivity and a desire to support their learning. Some measures, such as additional tutoring, personalized assignments, or alternative assessment methods, to help students succeed.

## Targeted interventions for weak student

### 1. Additional Resources

Offer supplementary learning materials, such as textbooks, online resources, or multimedia content, to provide alternative explanations and reinforce key concepts.

### 2. Remedial classes

Establish a tutoring program where students can receive extra help from teachers.

### 3. Flipped classroom

Students are assigned pre-class learning materials, often in the form of videos, readings, or online modules, to cover the foundational concepts before coming to class.