

COURSE CODE: ENE-416
COURSE NAME: Introduction to Air and Noise Pollution
CREDIT HOURS: Theory = 3 Practical = 1 Total = 4
CONTACT HOURS: Theory = 48 Practical = 48 Total = 96
PREREQUISITE: None
MODE OF TEACHING: Three hours of lecture per week,
Three hours of lab per week

COURSE DESCRIPTION:

The main objective of this course is to provide a comprehensive package of knowledge related to major domains of the Air and noise pollution.

RELEVANT PROGRAM LEARNING OUTCOMES (PLOs):

The course is designed so that students will achieve the PLOs:

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|------------------------------------|-------------------------------------|-----------------------------------|-------------------------------------|
| 1 Engineering Knowledge: | <input checked="" type="checkbox"/> | 7 Environment and Sustainability: | <input checked="" type="checkbox"/> |
| 2 Problem Analysis: | <input type="checkbox"/> | 8 Ethics: | <input type="checkbox"/> |
| 3 Design/Development of Solutions: | <input checked="" type="checkbox"/> | 9 Individual and Teamwork: | <input type="checkbox"/> |
| 4 Investigation: | <input type="checkbox"/> | 10 Communication: | <input type="checkbox"/> |
| 5 Modern Tool Usage: | <input type="checkbox"/> | 11 Project Management: | <input checked="" type="checkbox"/> |
| 6 The Engineer and Society: | <input type="checkbox"/> | 12 Lifelong Learning: | <input type="checkbox"/> |

COURSE LEARNING OUTCOMES:

Upon successful completion of the course, the student will demonstrate competency by being able to:

Sr. No.	CLO	Domain	Taxonomy Level	PLO
1	EXPLAIN the fundamentals of air and noise pollution	Cognitive	2	1
2	INTERPRET the relationship between meteorology and air pollution	Cognitive	3	7
3	MONITOR air quality parameters	Psychomotor	4	3
4	MAINTAIN ethical conduct in lab and adhere to lab safety procedures while contributing effectively towards individual and/ or group	Affective	5	9

goals.			
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Open Ended Lab

5	MEASURE the indoor air quality and efficiency ventilation systems of buildings with different types of heating, ventilation, and air conditioning systems.	Psychomotor	4	6
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TOPICS COVERED:

Week	Topic Covered	Reading Assignment/ Homework	CLO #
1	Introduction to air pollutants: Classification of Air Pollutants	Chapter 1	1
2	Introduction to air pollutants: Sources of Air Pollutants, Health and Environmental Effects of Air Pollutants	Chapter 2 Assignment 1	1
3	Air pollution related global and regional issues: Ozone Layer Depletion, Greenhouse Effect, and Climate Change	Chapter 3 Quiz 1	1
4	Air pollution related global and regional issues: Photochemical Smog, Acid Rain, and Dust Storms	Chapter 4	1
5	Air Quality Management: Design of Air Pollution Monitoring Program, Source Monitoring and Emission Inventory	Chapter 5	1
6	Air Quality Management: Sampling and Analytical Techniques for air pollutants, Air Quality Index	Chapter 5 Assignment 2	1
7	Meteorology and Air Pollution: Atmosphere, Motion in the Atmosphere, Atmospheric Stability, and Atm. turbulence	Chapter 6 Quiz 2	7
8	Mid Semester Exam		
9	Introduction to Ambient Air Quality Modelling: Ambient air concentration modelling such as Gaussian Dispersion Models, Plume Dispersion Parameters	Chapter 7	7
10	Introduction to Indoor air pollution: Indoor sources of air pollution, Indoor air quality,	Chapter 8 Quiz 3	1

	ventilation, and energy nexus		
11	Introduction to Noise Pollution: Sources of noise pollution, Scientific basis for noise quantification	Chapter 9 Assignment 3	1
12	Health effects of noise pollution	Chapter 9	1
13	Noise mapping: principles and processes	Chapter 9 Quiz 4	1
14	Characteristics of noise: Industrial noise, Transportation noise, Urban noise	Chapter 10	1
15	Noise Measurement: Frequency sensitivity and equal loudness characteristics	Chapter 11 Assignment 4	1
16	Revision		1
17	Revision		
18	End Semester Exam		

LIST OF PRACTICALS:

No.	Laboratory
1	Monitoring of Total Suspended Particles (TSP) in ambient air using High-Volume Air Sampler
2	Monitoring of PM10 & PM2.5 in ambient air using High-Volume Air Sampler
3	Monitoring of PM10 & PM2.5 in ambient air using Low-Volume Air Sampler
4	Monitoring of PM10 and PM2.5 using optical sensor-based Air Quality Analyzers
5-6	Personal Exposure Monitoring of Particulate matter by using Personal Air Sampler
7	Monitoring Indoor Air Quality using CO2 analyzers
8	Vehicular emissions measurement using Gastec Pump and Gas Detector Tubes
9	Noise Monitoring of Mobile and Stationary Sources
10	Monitoring of trace ambient gases using Ambient Air Quality Analyzers
11	Monitoring of trace ambient gases using Max-DOAS Instrument

TEXT AND MATERIAL:

Textbook (s)

Harrison, R. M. (Ed.). (2012). *Handbook of air pollution analysis*. Springer Science & Business Media.

References Material:

Boubel, R. W., Vallero, D., Fox, D. L., Turner, B., & Stern, A. C. (2013). *Fundamentals of air pollution*. Elsevier.

Tripathy, D. P. (2008). *Noise pollution*. APH Publishing.

ASSESSMENT SYSTEM:

Theoretical/Instruction

Assignments 10%

Quizzes 15%

Mid Semester Exam 25%

End Semester Exam 50%

Practical Work

Laboratory Work 70%

Laboratory Report 30%

Rubrics 30%

Laboratory Quiz 10%

Viva 30%
