GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering
Subject Code: 3153512
Semester – V
Subject Name: Air Pollution Control – I

Type of course: Professional Core Course

Prerequisite: Understanding of air pollution and its control, along with some basic information of pollutant dispersion.

Rationale: This subject is intended to make students aware about the noise and air pollution, degradation of air quality through various sources of air pollution, assessment of air quality through air quality index, and various air pollution control methods and equipment.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE (E)	PA (M)	ESE (V)	PA (I)	
4	0	2	5	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs
1	Introduction to Air Pollution: Air and its composition, Air Pollution, Sources of air pollution and its classification, Major air Pollutants and their characteristics, Specific group pollutants such as CFC, GHG etc. Effects of air pollution on human health and vegetation, animals and materials.	10
2	Meteorology and Air Pollution: Temperature lapse rate and stability, wind velocity and turbulence, plume behavior, dispersion of air pollutants, maximum mixing depth, heat island effect, Effective stack height, Indoor air pollution, Odors and their controls. Various types of Fuels and pollution issues	14
3	Air Pollution Sampling and Measurement: Ambient Air Sampling and Analysis of air pollutants: SO_2, NO_x CO, O_3, HC, particulate matter, Stack Sampling, Air pollution due to Automobiles: types of emission and their controls. CEMS for various process industries as per CPCB guidelines Control methods and equipment: Introduction to control methods and equipment for Particulate matter and gases. Construction and working of scrubbers, Electrostatic Precipitator, Gravity settlers, Cyclone separator, Filter bags etc. Greenbelt requirement and the role of trees in air pollution control	14
4	Air Quality and Emission Standards: NAAQS, Air Quality index, CEPI, Salient features of Air pollution Control Act and rules. Salient features of ODS Rules	10

	Introduction to noise: Difference between sound and noise, Pitch and Frequency, Sound Pressure, Sound Pressure level (Decibel), Leq, and sources of noise and harmful effects of noise, noise measurement and noise control measures.	

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
20	**15**	**10**	**10**	**10**	**5**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

1. Environmental Pollution Control and Engineering, Rao C.S., New Age International (P) Limited, 2nd Ed., 2006.
2. Air Pollution, Perkin, H.G. McGraw Hill 1974.
3. Air Pollution – by Wark & Warner
4. Air Pollution. Physical and Chemical Fundamentals, Sainfeld, J.H. McGraw Hill, N.Y. 1975.
5. Air Pollution: Measurement, Modeling and Mitigation, A Tiwari and J Colls, Taylor & Francis, 2010
6. Sources and Control of Air Pollution, R J Heinsohn and R L Kabel, Prentice Hall, 1999
7. Air Pollution Control Equipment Calulations, L Theodore, John Wiley and Sons, 2008
8. Catalytic Air Pollution Control, Hack, Furraoto and Gulati,John Wiley and Sons, 2009

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Course Outcomes:

Sr. No.	CO statement
CO-1	Recall the concept of air pollution including its sources and effects
CO-2	Interpret the impact of various meteorological parameters on air pollutants.
CO-3	Experiment sampling and analysis of various air pollutants.
CO-4	Compare and contrast various air pollution control methods and equipment.
CO-5	Explain air quality standards.
CO-6	Revise the concept of noise pollution.

List of Experiments:

1. Sampling of Suspended Particulate Matter in ambient air.
2. Sampling of Respirable Suspended Particulate Matter PM10 in ambient air.
3. Sampling and analysis of sulphur dioxide in ambient air.
4. Measurement of Noise using Sound Level Meter.
5. Demo of Stack monitoring kit.