GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering
Subject Code: 3151309
Semester – V
Subject Name: Fundamentals of Air Pollution

Type of course: professional Core Course

Prerequisite: Knowledge of subjects' Environmental studies

Rationale: To learn the principles and theories behind atmospheric phenomena and air pollution due to emission of gaseous wastes.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				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:** Air Pollution, Sources of Air Pollution, Air Pollutants and their types, Effects of air pollutants, Types of fuels and air pollution caused by each fuel	08
2	**Air quality monitoring:** Sampling and analysis of stack gases and ambient air, Procedure of Sampling and analysis of stack gases as per relevant IS codes, Units of measurement of Air Pollution.	12
3	**Meteorology:** Introduction, Atmosphere and its structure, solar radiation, wind circulation, lapse rates, stability conditions, wind velocity profile , maximum mixing depth, wind rose diagram, turbulence, general characteristics of stack plumes, heat island effect, **Dispersion Of Pollutants In The Atmosphere:** Introduction to Gaussian dispersion model, evaluation of standard deviations, maximum ground level concentration, calculations of effective stack height	20
4	**Noise Pollution and odour pollution:** **Noise Pollution:** Sound and Noise, Characteristics of sound, Noise Pollution, Noise Measurement Scale – Levels and the decibels, Sources of Noise, Effects of Noise on people, Indian Standards, noise pollution control **Odour Pollution:** Introduction, Effects of odour, sources of odour, measurement of odour, odour control technologies	10

5	**Atmospheric Photochemical reactions:** Introduction, Role of oxides of nitrogen in photo oxidation, hydro carbon in atmospheric photo chemistry, oxidants in photo chemical smog	06

Suggested Specification table with Marks (Theory): (For BE only)

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	**40**	**30**	**20**		

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. Air Pollution – by Wark & Warner
2. Air Pollution – by M. N. Rao
3. Air Pollution – by Henry Parkins
4. Air Pollution – by Stern Vol – I

Course Outcomes:

Sr. No.	CO statement	Marks % weightage
CO-1	Relate sources and types of air pollutants and their effects on environment.	15
CO-2	Demonstrate stack and ambient air quality monitoring.	20
CO-3	Relate effects of meteorological condition on categorization of atmospheric stability and calculate air pollution concentration	40
CO-4	Summarize sources, effects and control of noise and odor pollution	15
CO-5	Explain role of oxides of nitrogen in photochemical reactions.	10

List of Experiments:

1. Measurement of Ambient Air Quality Parameters using High Volume Air Samplers.
2. Measurement of Sound Pressure Levels at different locations

Assignments:

1. Air Pollution: Sources and effects on human, vegetation, animals, and materials
2. Numericals on Expression of gaseous pollutants and fuels
3. Assignments and numerical based on meteorology.
4. Assignments and numerical based on dispersion of Pollutants in the atmosphere.
5. Assignments and numerical based on Noise Pollution
6. Assignments based on odour and control
7. Assignments based on photochemical atmospheric reactions.

Major Equipment:

1. High volume air sampler.

2. PM 10 and PM 2.5 sampler.

3. Stack monitoring kit

List of Open Source Software/learning website: