

B.E. Semester: VIII
Department of Civil Engineering

Subject Name: Air Pollution and Control (CV804-N-C)

Course Category: Program Course Elective– V (PCE)

A. Objectives of the Course:

- This subject is intended to make students aware about the noise and air pollution, various sources which contribute in degradation of air quality, assessing the air quality through air quality index, and various air pollution control methods and equipment used by industries
- To provide a coherent development to the students for the courses in sector of engineering like Air quality and air pollution.
- To analyse the air ambient characteristics
- To give an experience in the implementation of engineering concepts which are applied in field of air quality
- To present the foundations of many basic Engineering tools and concepts related Environmental Engineering

B. Teaching & Evaluation Scheme:

Teaching Scheme				Credit	Evaluation Scheme					Total Marks
L hrs	T hrs	P hrs	Total Hrs		Theory		IE	CIA	Pra/Viva	
					Hrs	Marks	Marks	Marks	Marks	
3	0	0	3	3	3	70	30	20	00	120

C. Detailed Syllabus:

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. Air Pollutants from Various Industrial Sectors, Impact of Air Pollution on Human Health and Vegetation

2. **Pollutant Dispersion:** Concept of atmospheric stability. Adiabatic and Environmental Lapse Rate, Plume Behavior, Effect of Topography, Terrain and Structure on Pollutant Dispersion, Effect of Wind on Pollutant Dispersion. Concept of Maximum Mixing Depth and Ventilation Coefficient, Plumerise and Effective Stack Height
3. **Air Quality:** Introduction to Air Quality Index and Comprehensive Environmental Pollution Index etc., and its Application, Sampling and Measurement of Air Pollutants, Introduction to National Ambient Air Quality Standards
4. **Dispersion Modeling:** Introduction to Dispersion Modeling, Applications and Limitations, Introduction to Gaussian Plume Model and GLC Determination
5. **Impacts of Air Pollution:** Extreme air Pollution scenarios: Acid Rain, Global Warming, Smog, Ozone Layer Depletion etc. Various Treaties and Protocols: Kyoto Protocol and Montreal Protocol etc.
6. **Control methods and equipment:** Introduction to Control Methods and Equipment for Particulate Matter and Gases, Design and Working of Scrubbers, Electrostatic Precipitator, Gravity Settlers, Cyclone Separator, Filter Bags etc., Other Mechanisms of Air Pollution Control such as Biochemical Processes, Catalytic Processes etc.

D. Lesson Planning:

Unit No	Title of the Unit	Minimum Hours	Weightage (%)
1	Introduction to Air Pollution	04	10
2	Pollutant Dispersion	10	20
3	Air Quality	06	20
4	Dispersion Modeling	05	10
5	Impacts of Air Pollution	10	20
6	Control methods and equipment	10	20
Total:		45	100

E. Assignments:

- Presentation on Air pollution
- Presentation on Air pollution effect
- Presentation on Air pollution impact
- Case study of Air pollution
- Presentation on control method and equipment

F. Instructional Method and Pedagogy (Continuous Internal Assessment Scheme CIA):

- At the start of course, the course delivery pattern, prerequisite of the subject will be discussed.
- Lecture may be conducted with the aid of multi-media projector, black board, OHP etc.
- Attendance is compulsory in lectures, practical and Tutorial which carries 05 Marks.
- At regular intervals assignments is given. In all, a student should submit all assignments of 05 marks each.
- Classroom participation and involvement in solving the problems in Tutorial rooms carries 05 Marks.
- Viva Voce will be conducted at the end of the semester of 05 Marks.
- One internal exam of 30 marks is conducted as a part of Mid Semester evaluation.

G. Students Learning Outcomes:

On the successful completion of this course

- The students will be able to understand the fundamentals of pollution aspect.
- The students will gain an experience in the implementation of Air pollution Engineering on engineering concepts which are applied in field Environmental Engineering
- The students will get a diverse knowledge of Environmental engineering practices applied to real life problems.
- The students will learn to understand the theoretical and practical aspects of Environmental engineering along with the design and management applications.

H. Recommended Study Materials:

a. Text book & Reference Books:

1. Environmental Pollution Control and Engineering, Rao C.S., New Age International (P) Limited, 1st Ed., 1991
2. Air Pollution, Perkin, H.G. McGraw Hill 1974
3. Air Pollution. Physical and Chemical Fundamentals, Sainfeld, J.H. McGraw Hill, N.Y. 1975
4. Air Pollution: Measurement, Modeling and Mitigation, A Tiwari and J Colls, Taylor & Francis, 2010
5. Sources and Control of Air Pollution, R J Heinsohn and R L Kabel, Prentice Hall, 1999
6. Air Pollution Control Equipment Calculations, L Theodore, John Wiley and Sons, 2008
7. Catalytic Air Pollution Control, Hack, Furraoto and Gulati, John Wiley and Sons, 2009

b. Web Materials:

1. <http://www.epa.gov>
2. <http://www.indiaenvironmentportal.org.in>
3. <http://nptel.iitm.ac.in>
4. <http://www.filtersource.com>
5. <https://dgserver.dgsnd.gov.in>

c. Indian Codes of Practice:

1. IS 5182-23 (2006) Methods to measure Air pollution AIR POLLUTION ACT, 1981