DHANALAKSHMI SRINIVASAN ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE & Affiliated to Anna University, Chennai)
Re-Accredited by NAAC with 'A' Grade
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PERAMBALUR-621212, TAMILNADU, INDIA.
Website: www.dsengg.ac.in

COURSE PLAN

Name of the Faculty				
Designation/Department	**Assistant Professor/ Civil Engineering**			
Course Code/Name	**U20OCE72 /Air Pollution and Control**			
Year/Section/Department	**IV/-/Agricultural Engineering**			
Credits Details	**L:3**	**T: 0**	**P: 0**	**C:3**
Total Contact Hours Required	**45 Hours**			

Syllabus:

UNIT I/ INTRODUCTION	**No. of Periods: 07**
Structure and composition of Atmosphere – Definition, Scope and Scales of Air Pollution – Sources and classification of air pollutants and their effect on human health, vegetation, animals, property, aesthetic value and visibility- Ambient Air Quality and Emission standards.	
UNIT II/ METEOROLOGY	**No. of Periods:06**
Effects of meteorology on Air Pollution - Fundamentals, Atmospheric stability, Inversion, Wind profiles and stack plume patterns- Atmospheric Diffusion Theories – Dispersion models, Plume rise. Emerging trends in air pollution treatment, control and management.	
UNIT III/ CONTROL OF PARTICULATE CONTAMINANTS	**No. of Periods:11**
Factors affecting Selection of Control Equipment – Gas Particle Interaction – Working principle - Gravity Separators, Centrifugal separators Fabric filters, Particulate Scrubbers, Electrostatic Precipitators.	
UNIT IV/ CONTROL OF GASEOUS CONTAMINANTS	**No. of Periods:11**
Factors affecting Selection of Control Equipment – Working principle - absorption, Adsorption, condensation, Incineration, Bio filters – Process control and Monitoring.	
UNIT V/ INDOOR AIR QUALITY MANAGEMENT	**No. of Periods:10**
Sources, types and control of indoor air pollutants, sick building syndrome and Building related illness- Sources and Effects of Noise Pollution – Measurement – Standards –Control and Preventive measures.	

Objectives:

- To impart knowledge on the principle and design of control of Indoor/ particulate/ gaseous air pollutant and its emerging trends.
- To introduce students to basic concepts of pollution.
- The contents involved the knowledge of causes of air pollution.
- The contents involved the knowledge of health related to air pollution.
- To develop skills relevant to control of air pollution.

Text Books:

T1: M.N Rao and HVN Rao, "Air Pollution", Tata Mc Graw Hill Publishing Company limited, 2007.

T2: Santosh Kumar Garg, "Sewage Disposal and Air pollution Engineering", Khanna Publishers, 2022.

Reference Books:

R1: Lawrence K. Wang, Norman C. Pareira, Yung Tse Hung, "Air Pollution Control Engineering", Tokyo, springer science media LLC,2004.

R2: David H.F. Liu, Bela G. Liptak, "Air Pollution", Lweis Publishers, 2000.

R3: Wayne T.Davis, "Air Pollution Engineering Manual", John Wiley & Sons, Inc, 2000.

R4: Noel de Nevers, "Air Pollution Control Engineering", Waveland press,Inc 2017.

R5: C.S.Rao, "Environmental Pollution Control Engineering", New Age International (P) Limited Publishers, 2006.

Websites:

W1: Air pollution introduction lecture , https://nptel.ac.in/courses/105/107/105107213/

W2: Meteorology lecture, https://nptel.ac.in/courses/105107213

W3: Air Quality and Emission standards, https://nptel.ac.in/courses/105/102/105102089/

W4: Control of contaminants, https://nptel.ac.in/courses/105/104/105104099/

Online Mode of Study (if Any):

- https://archive.nptel.ac.in/courses/112/104/112104227/
- https://byjus.com/free-ias-prep/sick-building-syndrome/

Course Plan:

Topic Number	Topic	Reference Detail	Page Number	Mode of teaching	Number of Periods Required	Cumulative Period
UNIT I- INTRODUCTION						
1.	Structure and composition of Atmosphere	T2	710-716	BB	1	1
2.	Definition, Scope and Scales of Air Pollution	T2,W1	1-4	BB	1	2
3.	Sources and Classification of air pollutants	T1, T2	4-12, 646-656	BB	1	3
4.	The effect on human health, vegetation.	T1, T2	43-69, 656-660	BB	1	4
5.	The effect on animal, property, aesthetic value and visibility	T1, T2	70-80, 660-661	BB	1	5
6.	Ambient Air Quality standards	T1,W3	255-260	BB	1	6
7.	Emission standards	T1,W3	261-268	BB	1	7
Outcome of Unit I: **CO1:** At the end of unit, students should be able to understanding of the nature and characteristics of air pollutants, noise pollution and basic concepts of air quality management						
UNIT II- METEOROLOGY						
8.	Effects of Meteorology on Air Pollution	T1	14-15	BB	1	8
9.	Fundamentals, Atmospheric stability, Inversion	T1	15-16	BB	1	9
10.	Wind profiles and stack plume patterns	T1	22-23	BB,PPT	1	10
11.	Atmospheric Diffusion Theories	T1	27-32	BB	1	11

12.	Dispersion models, Plume rise	T1	32-35	BB	1	12
13.	Emerging trends in air pollution treatment, control and management.	T2,W2	686-700	BB	1	13

Outcome of Unit II:

CO2: At the end of unit, students should be able to ability to identify, formulate and solve air and noise pollution problems and Understand the Fundamentals, Atmospheric stability, Inversion, Wind profiles and plume patterns.

UNIT III- CONTROL OF PARTICULATE CONTAMINANTS

14.	Factors affecting Selection of Control Equipment	T1	152-154	BB	1	14
15.	Gas Particle Interaction	T1	154-156	BB	1	15
16.	Gravity Separators	T1	154-156	BB	1	16
17.	Gravity Separators	T1	154-156	BB	1	17
18.	Centrifugal separators	T1	159-167	BB,PPT	1	18
19.	Centrifugal separators	T1	159-167	BB,PPT	1	19
20.	Fabric filters	T1	167-175	BB,PPT	1	20
21.	Particulate Scrubbers	T1	184-190	BB	1	21
22.	Particulate Scrubbers	T1	184-190	BB	1	22
23.	Electrostatic Precipitators	T1	176-184	BB,PPT	1	23
24.	Electrostatic Precipitators	T1	176-184	BB,PPT	1	24

Outcome of Unit III:

CO3: At the end of unit, students should be able to ability to design stacks and particulate air pollution control devices to meet applicable Standards.

UNIT IV- CONTROL OF GASEOUS CONTAMINANTS

25.	Factors affecting Selection of Control Equipment	T1	152-153	BB	1	25
26.	Absorption working principles	T1, T2	203-204, 698	BB	1	26

27.	Absorption working principles	T1, T2	203-204, 698	BB	1	27
28.	Adsorption working principles	T1, T2	204-206, 698-699	BB	1	28
29.	Adsorption working principles	T1, T2	204-206, 698-699	BB	1	29
30.	Condensation	T2	699	BB	1	30
31.	Condensation	T2	699	BB	1	31
32.	Incineration	T2	699	BB	1	32
33.	Incineration	T2	699	BB	1	33
34.	Bio filters -Process control and Monitoring	T1,W4	167-175	BB,PPT	1	34
35.	Bio filters -Process control and Monitoring	T1,W4	167-175	BB,PPT	1	35
Outcome of Unit IV: **CO4:** At the end of unit, students should be able to Select control equipments.						
UNIT V- INDOOR AIR QUALITY MANAGEMENT						
36.	Sources of indoor air pollutants	T2	607-608	BB	1	36
37.	Types of indoor air pollutants	T2	608-610	BB	1	37
38.	Control of indoor air pollutants	T2	612	BB	1	38
39.	Sick building syndrome	R5,Online	124-125	BB	1	39
40.	Building related illness	R5	125	BB	1	40
41.	Sources and Effects of Noise Pollution	T2	747-750	BB	1	41
42.	Sources and Effects of Noise Pollution	T2	747-750	BB	1	42
43.	Measurement	T2	729-736	BB,PPT	1	43
44.	Standards	T2	743-747	BB	1	44
45.	Control and Preventive measures	T2,Online	748750	BB	1	45

Outcome of Unit V:

CO5: At the end of unit, students should be able to ensure quality, control and preventive measures.

Course Outcome:

At the end of course: Students should be :

CO1: An understanding of the nature and characteristics of air pollutants, noise pollution and basic concepts of air quality management

CO2: Ability to identify, formulate and solve air and noise pollution problems

CO3: Ability to design stacks and particulate air pollution control devices to meet applicable standards.

CO4: Ability to select control equipments.

CO5: Ability to ensure quality, control and preventive measures.

Course Outcome Vs Program Outcome Mapping:

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1				2		3	3					2	2	2
CO2		3	3		2	1	2		2	2		1	1	2
CO3	2		3		3		1				2		2	2
CO4	2		3		3		1				2		2	2
CO5	2	2	2	2	2	3	1	2		1	1		2	1
AVG	**2**	**3**	**3**	**2**	**3**	**3**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**

Content beyond Syllabus:

- Bio Scrubbers
- Devices or measuring the wind speed and direction

Internal Evaluation Components:

Webportal	Assignment	Components	Topic Number with Topic / Unit Details	Relevance to CO
Webportal 1	--	Assessment – I (60)	Unit I and II	CO 1 & CO2
	1	Assignment – Handwritten (20)	1. Sources and Classification of air pollutants 2. Dispersion models and their theories.	CO1 CO2
	2	Assignment – Poster Presentation / PPT (20)	1. Structure and composition of Atmosphere 2. Wind profiles and stack plume patterns	CO1 CO2
Webportal 2	--	Assessment – II (60)	Unit III and IV	CO3 & CO4
	3	Seminar (20)	1. Electrostatic Precipitators and Fabric Filters 2. Incineration and Condensation	CO3 CO4
	4	Case Study Report (20)	1. Factors affecting to Selection of Control Equipment for Particulate Pollutants 2. Factors affecting to Selection of Control Equipment for Gaseous Pollutants	CO3 CO4
Webportal 3	--	Model Exam (75)	Unit I to V	CO1 to CO6
	5	MCQ (15)	Unit I to V	CO1 to CO6
	-	Course Attendance (10)	--	--

Submission Details:

Phase 1(Before AT 1)		Phase 2 (Before AT 2)		Phase 3 (Model)
Assignment 1	**Assignment 2**	**Assignment 3**	**Assignment 4**	**Assignment 5**

Google Class Code Details:

Class Name:

PLAN OF ASSESSMENT TEST –DISTRIBUTION OF MARKS:

TEST	**CO- MARK WISE DISTRIBUTION**						**BLOOM'S LEVEL MARK WISE DISTRIBUTION**					
AT-1	**CO1**	**CO2**	**CO3**	**CO4**	**CO5**	**CO6**	**BTL1**	**BTL2**	**BTL3**	**BTL4**	**BTL5**	**BTL6**
AT-2	**CO1**	**CO2**	**CO3**	**CO4**	**CO5**	**CO6**	**BTL1**	**BTL2**	**BTL3**	**BTL4**	**BTL5**	**BTL6**
MODEL	**CO1**	**CO2**	**CO3**	**CO4**	**CO5**	**CO6**	**BTL1**	**BTL2**	**BTL3**	**BTL4**	**BTL5**	**BTL6**

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