Ref No:

SRI KRISHNA INSTITUTE OF TECHNOLOGY , BANGALORE-90

COURSE PLAN

Academic Year 2019-20

Program:	B E – Civil Engineering
Semester :	5
Course Code:	17CV551
Course Title:	Air pollution and control
Credit / L-T-P:	3/3-0-0
Total Contact Hours:	40
Course Plan Author:	Yashaswini R V

Academic Evaluation and Monitoring Cell

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Table of Contents

Note : Remove “Table of Content” before including in CP Book
Each Course Plan shall be printed and made into a book with cover page
Blooms Level in all sections match with A.2, only if you plan to teach / learn at higher levels

A. COURSE INFORMATION

1. Course Overview

Degree:	BE	Program:	CIVIL
Year / Semester :	5	Academic Year:	2019-20
Course Title:	Air pollution and control	Course Code:	17CV551
Credit / L-T-P:	3/3-0-0	Duration of SEE:	180minutes
Total Contact Hours:	40 hours	SEE Marks:	80
CIA Marks:	40	Assignment	1/Module
Course Plan Author:	Yashaswini R V	Sign	Dt:03/07/2019
Checked By:	Shiva Prasad D G	Sign	Dt:
CO Targets	CIA Target : 88 %	SEE Target:	72 %

Note: Define CIA and SEE % targets based on previous performance.

2. Course Content

Content / Syllabus of the course as prescribed by University or designed by institute. Identify 2 concepts per module as in G.

Module	Content	Teaching Hours	Identified Module Concepts	Blooms Learning Levels
1	Definition, Sources, classification and characterization of air pollutants. Effects of air pollution on health, vegetation & materials. Types of inversion, photo chemical smog	8	Air pollutants Formation of Smog	L2
2	Temperature lapse rate & stability, wind velocity & turbulence, plume behavior, measurement of meteorological variables, wind rose diagrams, Plume Rise, Estimation of effective stack height and mixing depths. Development of air quality models-Gaussian dispersion model .	8	Meteorological Characteristics Behavior of Plume	L3
3	Sampling of particulate and gaseous pollutants (Stack, Ambient & indoor air pollution), Monitoring and analysis of air pollutants (PM2.5, PM10, SOX, NOX, CO, NH3)	8	Sampling of particulate matter and gaseous pollutants, Analysis of air pollutants	L4
4	Particulate matter and gaseous pollutants- settling chambers, Cyclone separators, scrubbers, filters & ESP.	8	Particulate matter control techniques,Gaseous pollutant control techniques	L4
5	Air pollution due to automobiles, standards and control methods. Noise pollution causes, effects and control, noise standards. Environmental issues, global episodes, laws, acts, protocols	8	Global environmental issues	L4
-	**Total**	**50**	-	-

3. Course Material

Books & other material as recommended by university (A, B) and additional resources used by course teacher (C).

1. Understanding: Concept simulation / video ; one per concept ; to understand the concepts ; 15 – 30 minutes
2. Design: Simulation and design tools used – software tools used ; Free / open source
3. Research: Recent developments on the concepts – publications in journals; conferences etc.

Modules	Details	Chapters in book	Availability

1	Text books		-
	"Air pollution" by M N Rao and H V N Rao,	In Lib	In Lib / In Dept
	"Air pollution and control" by H C Perkins	In dept	Not Available
2	Reference books		
	"Air pollution and control" by Anjaneyalu Y	In dept	-
	"Air pollution and control engineering" by Waveland Pr Inc.	In Lib	In Lib / In Dept
1, 2	" Contracts and their Management" B.S. Ramaswamy ,3ed , Lexis Nexis (a division of Reed Elsevier India Pvt Ltd)	4.5	In Lib / In Dept
C	**Concept Videos or Simulation for Understanding**	**-**	**-**
D	**Software Tools for Design**	**-**	**-**
E	**Recent Developments for Research**	**-**	**-**
F	**Others (Web, Video, Simulation, Notes etc.)**	**-**	**-**
1			
?			

4. Course Prerequisites

Refer to GL01. If prerequisites are not taught earlier, GAP in curriculum needs to be addressed. Include in Remarks and implement in B.5.
Students must have learnt the following Courses / Topics with described Content . . .

Modules	Course Code	Course Name	Topic / Description	Sem	Remarks	Blooms Level
1	17CV551	Air pollution and control	-	5		-
	-	-	-	-	Plan Gap Course	-

5. Content for Placement, Profession, HE and GATE

The content is not included in this course, but required to meet industry & profession requirements and help students for Placement, GATE, Higher Education, Entrepreneurship, etc. Identifying Area / Content requires experts consultation in the area.
Topics included are like, a. Advanced Topics, b. Recent Developments, c. Certificate Courses, d. Course Projects, e. New Software Tools, f. GATE Topics, g. NPTEL Videos, h. Swayam videos etc.

Modules	Topic / Description	Area	Remarks	Blooms Level
1				
2				
3				
4				
5				
-				

B. OBE PARAMETERS

1. Course Outcomes

Expected learning outcomes of the course, which will be mapped to POs. Identify a max of 2 Concepts per Module. Write 1 CO per Concept.

Modules	Course Code.#	Course Outcome **At the end of the course, student**	Teach. Hours	Concept	Instr Method	Assessment	Blooms' Level

		should be able to . . .				Method	
1	17CV551 CO1	**Students should be able to.....** Identify the major source of generation of air pollutants & understand their effects on health & environment	08	Air pollutants	Lecture	CIA	L2 Understand
1	CO2	Evaluate the dispersion of air pollutants under different environmental conditions in the atmosphere & to develop air quality models	04	Meteorological Characteristics	Lecture	CIA	L3,apply
2	CO3	Understand the variation of Plume under environmental conditions	04	Behavior of plume	Lecture	CIA	L4 Analyze
2	CO4	Evaluate sampling techniques for atmospheric & stack pollutants	04	Sampling of particulate matter and gaseous pollutants	Lecture / PPT	CIA	L3 Apply
3	CO5	Monitoring and Analysis of gaseous air pollutants	04	Analysis of air pollutants	Lecture	CIA	L4 Analyze
3	CO6	Choose & design control techniques for particulate & gaseous emissions	08	Pollutants control techniques	Lecture and Tutorial	CIA	L3 Apply
4	CO7	Identify the sources of noise & understand their effects ,control & compare with Noise standard	04	Noise pollution control techniques	Lecture	CIA	L2 Understand
4	CO8	To measure & discuss effects of global environmental issues	04	Global environmental issues	Lecture	CIA	L2 understand
-	**-**	**Total**	**50**	**-**	**-**	**-**	**L2-L4**

2. Course Applications

Write 1 or 2 applications per CO.
Students should be able to employ / apply the course learnings to . . .

Modules	Application Area Compiled from Module Applications.	CO	Level
	Major source of generation of air pollutants in the polluted area & understand their effects on health & environment	CO1	L2
	Dispersion of air pollutants in the atmosphere & to develop air quality models	CO2	L3
	variation of Plume in the atmosphere	CO3	L4
	sampling techniques for atmospheric & stack pollutants	CO4	L3
	Monitoring and Analysis of gaseous air pollutants from the souses	CO5	L4
	Design control techniques for particulate & gaseous emissions	CO6	L3
	sources of noise & understand their effects ,control & compare with Noise standard	CO7	L2
	Effects of global environmental issues from different Global episodes	CO8	L2

3. Mapping And Justification

CO – PO Mapping with mapping Level along with justification for each CO-PO pair.
To attain competency required (as defined in POs) in a specified area and the knowledge & ability required to accomplish it.

Modules	Mapping		Mapping Level	Justification for each CO-PO pair	Level
-	**CO**	**PO**	**-**	**'Area': 'Competency' and 'Knowledge' for specified 'Accomplishment'**	**-**
1	CO1	PO1	L2	The students will be able to apply the knowledge of science, and to	L2

				know about air pollutants from different sources to solve air pollution problems	
1	CO1	PO2	L2	The students will be able to identify, formulate, research literature, and analyze engineering problems of air pollution and to provide a solution to control	L2
1	CO1	PO3	L2	The students will be able to identify different types of pollutants and provide a solution by their environmental application to meet the specifications with consideration for the public health and safety, and the cultural, societal, and environmental considerations	L2
1	CO2	PO1	L2	The students will be able to apply the knowledge of science, and to know about pollutants characteristic from different sources to solve air pollution problems near the stack	L2
1	CO2	PO2	L2	The students will be able to apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to find the solution for air pollutant problems	L2
1	CO3	PO1	L2	The students will be able to apply the knowledge of mathematics, science, engineering fundamentals for effluent behavior under different environmental conditions	L2
1	CO3	PO2	L2	The students will be able to analyze plume behavior near the stack to get concentration levels	L2
1	CO4	PO3	L2	The students will be able to analyse the sampling techniques and develop strategies for improving them in concern with the public health/ environmental concerns	L2
2	CO4	PO4	L4	The students will be able to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide stalk design.	L4
2	CO5	PO3	L4	The students will be able to analyse the air quality and develop strategies for improving them in concern with the public health/ environmental concerns	L4
2	CO5	PO4	L4	The students will be able to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid treatment methods to complex pollution scenarios	L4
2	CO6	PO3	L2	The students will be able to develop controlling equipment for controlling air pollutants to improve quality of air	L2
2	CO6	PO4	L2	The students will be able to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide suitable control devices	L2
2	CO7	PO1	L2	The students will be able to apply the knowledge of science, and to know about different sources of noise and effects of noise	L2
3	CO7	PO2	L2	The students will be able to identify, formulate, research literature, and analyze engineering problems of air pollution and to provide a solution to control Noise generated from different source	L2
3	CO7	PO3	L2	The students will be able to identify different types of noise pollutants and provide a solution by their environmental application to meet the noise specifications with consideration for the public health and safety, and the cultural, societal, and environmental considerations	L2
3	CO8	PO1	L2	The students will be able to apply the knowledge of science, and to know about global environmental issues and effects	L2
3	CO8	PO2	L2	The students will be able to identify, formulate, research literature, and analyze engineering problems of global environmental pollution and to provide a solution to control	L2
3	CO8	PO3		The students will be able to identify different types of global issues and provide a solution by their environmental application consideration for the public health and safety, and the cultural, societal, and environmental considerations	

4. Articulation Matrix

CO – PO Mapping with mapping level for each CO-PO pair, with course average attainment.

-	-	Course Outcomes	Program Outcomes															-
Modules	CO.#	**At the end of the course student should be able to . . .**	PO1	PO2	PO3	PO4	PO5	PO6	PO8	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	Level
1	17CV551	**Students should be able to……** Identify the major source of generation of air pollutants & understand their effects on health & environment	3	2	1	-	-	-	-	-	-	-	-	-	L2			L5
1	17CV551	Evaluate the dispersion of air pollutants under different environmental conditions in the atmosphere & to develop air quality models	2	1	-	-	-	-	-	-	-	-	-	-	L3			L5
2	17CV551	Understand the variation of Plume under environmental conditions	1	2	-	-	-	-	-	-	-	-	-	-	L4			L5
2	17CV551	Evaluate sampling techniques for atmospheric & stack pollutants	-	-	3	-	2	-	-	-	-	-	-	-	L4			L5
3	17CV551	Ability to justify the use of pollution control equipment and design	-	-	3	-	2	-	-	-	-	-	-	-	L4			L2
3	17CV551	Choose & design control techniques for particulate & gaseous emissions	-	-	3	-	2	-	-	-	-	-	-	-	L3			L5
4	17CV551	Identify the sources of noise & understand their effects ,control & compare with Noise standard	3	2	1	-	-	-	-	-	-	-	-	-	L2			L2
4	17CV551	To measure & discuss effects of global environmental issues	3	2	1	-	-	-	-	-	-	-	-	-	L2			L2
-	**15CV81PC**	**Average attainment (1, 2, or 3)**	**2.0**	**2.3**	**2.4**	-	**2**	**-**	-	-	-	-	**-**	-				**-**
-	*PO, PSO*	*1.Engineering Knowledge; 2.Problem Analysis; 3.Design / Development of Solutions; 4.Conduct Investigations of Complex Problems; 5.Modern Tool Usage; 6.The Engineer and Society; 8.Environment and Sustainability; 8.Ethics; 9.Individual and Teamwork; 10.Communication; 11.Project Management and Finance; 12.Life-long Learning; S1.Software Engineering; S2.Data Base Management; S3.Web Design*																

5. Curricular Gap and Content

Topics & contents not covered (from A.4), but essential for the course to address POs and PSOs.

Modules	Gap Topic	Actions Planned	Schedule Planned	Resources Person	PO Mapping
1					
2					
3					
4					
5					

6. Content Beyond Syllabus

Topics & contents required (from A.5) not addressed, but help students for Placement, GATE, Higher Education, Entrepreneurship, etc.

Modules	Gap Topic	Area	Actions Planned	Schedule Planned	Resources Person	PO Mapping
1						
1						
2						
2						

3						
3						
4						
4						
5						
5						

C. COURSE ASSESSMENT

1. Course Coverage

Assessment of learning outcomes for Internal and end semester evaluation. Distinct assignment for each student. 1 Assignment per chapter per student. 1 seminar per test per student.

Modules	Title	Teach. Hours	No. of question in Exam						CO	Levels
			CIA-1	CIA-2	CIA-3	Asg	Extra Asg	SEE		
1	Introduction	8	2	-	-	1	1	2	CO1	L2
2	Meteorology	**8**	2	-	-	1	1	2	CO2, CO3	L3
3	sampling	**8**	-	2	-	1	1	2	CO4, CO5	L4
4	Control techniques	**8**	-	2	-	1	1	2	CO6	L2
5	Air pollution due to automobiles	**8**	-	-	4	1	1	2	CO7, CO8	L4
-	**Total**	**40**	**4**	**4**	**4**	**5**	**5**	**10**	**-**	**-**

2. Continuous Internal Assessment (CIA)

Assessment of learning outcomes for Internal exams. Blooms Level in last column shall match with A.2.

Modules	Evaluation	Weightage in Marks	CO	Levels
1, 2	CIA Exam – 1	30	CO1, CO2, CO3	L2, l3, l4
3, 4	CIA Exam – 2	30	CO4, CO5, CO6	L4, L2
5	CIA Exam – 3	30	CO7, CO8	L4
1, 2	Assignment - 1	05	CO1, CO2, CO3	L2, l3, l4
3, 4	Assignment - 2	05	CO4, CO5, CO6	L4, L2
5	Assignment - 3	05	CO7, CO8	L4
1, 2	Seminar - 1	05	CO1, CO2, CO3	L2, l3, l4
3, 4	Seminar - 2	05	CO4, CO5, CO6	L4, L2
5	Seminar - 3	05	CO7, CO8	L4
	Other Activities – define – Slip test		CO1 to Co9	L2, L3, L4 . ..
	Final CIA Marks	**40**	**-**	**-**

D1. TEACHING PLAN - 1

Module - 1

Title:	Quantity Estimation for Building	Appr Time:	16 Hrs
a	***Course Outcomes***	-	**Blooms**
-	The student should be able to:	-	**Level**
1	Identify the major source of generation of air pollutants & understand their effects on health & environment	CO1	L2
b	***Course Schedule***	-	-
Class No	**Module Content Covered**	**CO**	**Level**
1	Definition, Sources of air pollutants	C01	L2
2	classification of air pollutants.	C01	L2
3	characterization of air pollutants.	C01	L2

4	Effects of air pollution on health	CO1	L2
5	Effects of air pollution on vegetation	CO1	L2
6	Effects of air pollution on materials.	CO1	L2
7	Types of inversion.	CO1	L2
8	photo chemical smog	CO1	L2
c	**Application Areas**	**CO**	**Level**
1	Major source of generation of air pollutants in the polluted area & understand their effects on health & environment	CO1	L2
d	**Review Questions**	-	-
1	Define air pollution. Identify various sources of generation of pollution	CO1	L2
2	Classify the air pollutants in to different categories, indicating their sources	CO1	L2
3	Distinguish between a) primary air pollutant & secondary air pollutant b) stationary and mobile sources of air pollutants	CO1	L2
4	Distinguish between stationary and mobile sources of air pollutants	CO1	L2
5	Explain the following terms with respect to air pollutants a)point sources b)area sources c)line sources	CO1	L2
6	Explain effects of air pollutants on human health, vegetation and materials	CO1	L2
7	Explain different types of inversion	CO1	L2
8	Explain about formation of Photo chemical smog	CO1	L2
9	Define inversion and explain types of inversion	CO1	L2
10	Discuss in briefly the following air pollutants i)natural contaminants ii)Aerosols iii)dust iv)smoke	CO1	L2
11	Explain the basic theory of formation of photo chemical smog with necessary chemical reactions	CO1	L2
12	Explain briefly coal induced smog	CO1	L2
e	**Experiences**	-	-
1		CO1	L2
2			
3			
4		CO3	L3
5			

Module – 2

Title:	Quantity Estimation for Roads	Appr Time:	10 Hrs
a	***Course Outcomes***	-	**Blooms**
-	The student should be able to:	-	**Level**
1	Evaluate the dispersion of air pollutants under different environmental conditions in the atmosphere & to develop air quality models	CO2	L3
2	Understand the variation of Plume under environmental conditions	CO3	L3
b	***Course Schedule***	-	-
Class No	**Module Content Covered**	**CO**	**Level**
17	Temperature lapse rate & stability,	CO2	L3
18	wind velocity & turbulence,	CO2	L3
19	plume behavior	CO2	L3
20	measurement of meteorological variables	CO2	L3
21	wind rose diagrams	CO3	L3
22	Plume Rise,	CO3	L3
23	Estimation of effective stack height and mixing depths	CO3	L3
24	Development of air quality models-Gaussian dispersion model	CO3	L3

c	Application Areas	CO	Level
1	Dispersion of air pollutants in the atmosphere & to develop air quality models	CO3	L3
2	variation of Plume in the atmosphere	CO3	L3
d	**Review Questions**	-	-
12	Explain the role of meteorological factors influencing air pollution in the atmosphere	CO2	L3
13	Explain stable and unstable atmosphere and inversion of the atmosphere	CO2	L3
14	Explain the following atmospheric conditions a)super-adiabatic b)sub-adiabatic c)Neutral d)Inversion	CO3	L3
15	Define wind rose. Explain the importance of wind roses in air pollution studies	CO3	L3
16	Describe with neat sketches, how different atmospheric conditions give rise to different kinds of plumes	CO3	L3
17	Estimate effective height of the stack	CO3	L3
18	Briefly explain air quality model- Gaussian plume model	CO3	L3
19	Explain the role of meteorological factors influencing air pollution in the atmosphere	CO3	L3
20	Explain stable and unstable atmosphere and inversion of the atmosphere	CO3	L3
21	Briefly explain behavior of plume at different environmental conditions	CO3	L3
22	Define I) environmental lapse rate ii) adiabatic lase rate	CO3	L3
23	Write a short note on i) Acid rain ii) Green house effect	CO3	L3
e	**Experiences**	-	-
1		CO1	L2
2			
3			
4		CO3	L3
5			

E1. CIA EXAM – 1

a. Model Question Paper - 1

Crs Code:	17CV551	Sem:	5	Marks:	30	Time:	75 minutes
Course:	Design and Analysis of Algorithms						

-	-	**Note: Answer any 3 questions, each carry equal marks.**	**Marks**	**CO**	**Level**
1	a	Define air pollution. Explain primary and secondary air pollutants with examples	8M	CO1	L1
	b	Classify the different sources of air pollution indicating typical pollutants .Explain them briefly.	7M	CO1	L2
		OR			
2	a	Briefly explain the effects of air pollution on, i)Human health ii)plants iii)Animals iv)Materials	8M	CO1	L1
	b	Write a short note on i) Acid rain ii) Green house effect	7M	CO1	L2
3	a	Explain the role of meteorological factors influencing air pollution in the atmosphere	8M	CO2	L3
	b	Explain stable and unstable atmosphere and inversion of the atmosphere	7M	CO2	L3
		OR			
4	a	Briefly explain behavior of plume at different environmental conditions	8M	CO3	L3
	b	Define I) environmental lapse rate ii) adiabatic lase rate	7M	CO3	L3

b. Assignment -1

Note: A distinct assignment to be assigned to each student.

Model Assignment Questions							
Crs Code:	17CV551	Sem:	5	Marks:	5 / 10	Time:	90 – 120 minutes

Course:	Air pollution and control		

Note: Each student to answer 2-3 assignments. Each assignment carries equal mark.

SNo	USN	Assignment Description	Marks	CO	Level
1		Define air pollution. Identify various sources of generation of pollution	5	CO1	L2
2		Classify the air pollutants in to different categories, indicating their sources	5	CO2	L2
3		Distinguish between a) primary air pollutant & secondary air pollutant b) stationary and mobile sources of air pollutants	5	CO2	L2
4		Explain the following terms with respect to air pollutants a)point sources b)area sources c)line sources	5	CO1	L2
5		Explain effects of air pollutants on human health, vegetation and materials	5	CO1	L2
6		Define inversion and explain types of inversion	5	CO1	L2
7		Discuss in briefly the following air pollutants i)natural contaminants ii)Aerosols iii)dust iv)smoke	5	CO1	L2
8		Explain the basic theory of formation of photochemical smog with necessary chemical reactions	5	CO1	L2
9		Explain briefly coal induced smog	5	CO1	L2
10		Explain about formation of Photochemical smog	5		L2
11		Explain the role of meteorological factors influencing air pollution in the atmosphere	5	CO1	L3
12		Explain stable and unstable atmosphere and inversion of the atmosphere	5	CO2	L3
13		Explain the following atmospheric conditions a)super-adiabatic b)sub-adiabatic c)Neutral d)Inversion	5	CO2	L3
9		Define wind rose. Explain the importance of wind roses in air pollution studies	5	CO2	L3
10		Describe with neat sketches, how different atmospheric conditions give rise to different kinds of plumes	5	CO2	L3
11		Explain different types of inversion	5	CO2	L3
12		Estimate effective height of the stack	5	CO2	L3
13		Briefly explain air quality model- Gaussian plume model	5	CO2	L3
14		Write a short note on i) Acid rain ii) Green house effect	5	CO2	L3
15		Define air pollution. Explain primary and secondary air pollutants with examples	5	CO2	L3
16		Classify the different sources of air pollution indicating typical pollutants .Explain them briefly.	5	CO2	L3
17		Briefly explain the effects of air pollution on, i)Human health ii)plants iii)Animals iv)Materials	5	CO2	L3
18		Write a short note on i) Acid rain ii) Green house effect	5	CO2	L3
19		Explain the role of meteorological factors influencing air pollution in the atmosphere	5	CO2	L3
20		Explain stable and unstable atmosphere and inversion of the atmosphere	5	CO2	L3
21		Briefly explain behavior of plume at different environmental conditions	5	CO2	L3
22		Explain the following terms with respect to air pollutants a)point sources b)area sources c)line sources	5	CO2	L3
23		Explain effects of air pollutants on human health, vegetation and materials	5	CO2	L3
24		Define inversion and explain types of inversion	5	CO2	L3
25		Discuss in briefly the following air pollutants i)natural contaminants ii)Aerosols iii)dust iv)smoke	5	CO2	L3
26		Explain the basic theory of formation of photochemical smog with necessary chemical reactions	5	CO2	L3
27		Explain briefly coal induced smog	5	CO2	L3
28		Explain about formation of Photochemical smog	5	CO2	L3

29		Explain the role of meteorological factors influencing air pollution in the atmosphere	5	CO2	L3
30		Explain stable and unstable atmosphere and inversion of the atmosphere	5	CO2	L3
31		Explain the following atmospheric conditions a)super-adiabatic b)sub-adiabatic c)Neutral d)Inversion	5	CO2	L3
32		Define wind rose. Explain the importance of wind roses in air pollution studies	5	CO2	L3
33		Describe with neat sketches, how different atmospheric conditions give rise to different kinds of plumes	5	CO2	L3
34		Explain different types of inversion	5	CO2	L3
35		Estimate effective height of the stack	5	CO4	L3
36		Briefly explain air quality model- Gaussian plume model	5	CO2	L3
37		Explain the basic theory of formation of photochemical smog with necessary chemical reactions	5	CO2	L4
38		Explain briefly coal induced smog	5	CO2	L3
39		Explain about formation of Photochemical smog	5	CO2	L3
40		Explain the role of meteorological factors influencing air pollution in the atmosphere	5	CO5	L3
41		Explain stable and unstable atmosphere and inversion of the atmosphere	5	CO2	L3
42		Explain the following atmospheric conditions a)super-adiabatic b)sub-adiabatic c)Neutral d)Inversion	5	CO5	L3
43		Define wind rose. Explain the importance of wind roses in air pollution studies	5	CO2	L4
44		Describe with neat sketches, how different atmospheric conditions give rise to different kinds of plumes	5	CO3	L3
45		Explain different types of inversion	5	CO2	L3
46		Estimate effective height of the stack	5	CO2	L3
47		Briefly explain air quality model- Gaussian plume model	5	CO2	L3
48		Write a short note on i) Acid rain ii) Green house effect	5	CO2	L3
49		Define air pollution. Explain primary and secondary air pollutants with examples	5	CO2	L5
50		Classify the different sources of air pollution indicating typical pollutants .Explain them briefly.	5	CO2	L3
51		Briefly explain the effects of air pollution on, i)Human health ii)plants iii)Animals iv)Materials	5	CO4	L3
52		Write a short note on i) Acid rain ii) Green house effect	5	CO2	L3
53		Explain the role of meteorological factors influencing air pollution in the atmosphere	5	CO2	L3
54		Explain stable and unstable atmosphere and inversion of the atmosphere	5	CO2	L3
55		Briefly explain behavior of plume at different environmental conditions	5	CO2	L3
56		Explain the following terms with respect to air pollutants a)point sources b)area sources c)line sources	5	CO2	L3
57		Explain effects of air pollutants on human health, vegetation and materials	5	CO2	L3
58		Define inversion and explain types of inversion	5	CO2	L3
59		Discuss in briefly the following air pollutants i)natural contaminants ii)Aerosols iii)dust iv)smoke	5	CO5	L3
60		Explain the basic theory of formation of photochemical smog with necessary chemical reactions	5	CO2	L4
61		Explain different types of inversion	5	CO5	L3
62		Estimate effective height of the stack	5	CO2	L3
63		Briefly explain air quality model- Gaussian plume model	5	CO2	L3
64		Write a short note on i) Acid rain ii) Green house effect	5	CO2	L3
65		Define air pollution. Explain primary and secondary air pollutants with examples	5	CO2	L3

66		Classify the different sources of air pollution indicating typical pollutants .Explain them briefly.	5	CO2	L3
67		Briefly explain the effects of air pollution on, i)Human health ii)plants iii)Animals iv)Materials	5	CO5	L3
68		Write a short note on i) Acid rain ii) Green house effect	5	CO4	L3
69		Explain the role of meteorological factors influencing air pollution in the atmosphere	5	CO4	L3
70		Explain stable and unstable atmosphere and inversion of the atmosphere	5	CO2	L3
71		Briefly explain behavior of plume at different environmental conditions	5	CO2	L3
72		Explain the following terms with respect to air pollutants a)point sources b)area sources c)line sources	5	CO2	L5
73		Explain effects of air pollutants on human health, vegetation and materials	5	CO2	L3
74		Define inversion and explain types of inversion	5	CO2	L5
75		Discuss in briefly the following air pollutants i)natural contaminants ii)Aerosols iii)dust iv)smoke	5	CO4	L3
76		Explain the basic theory of formation of photochemical smog with necessary chemical reactions	5	CO4	L3
77		Explain stable and unstable atmosphere and inversion of the atmosphere	5	CO2	L3
78		Briefly explain behavior of plume at different environmental conditions	5	CO2	L3
79		Explain the following terms with respect to air pollutants a)point sources b)area sources c)line sources	5	CO2	L3
80		Explain effects of air pollutants on human health, vegetation and materials	5	CO3	L3

D2. TEACHING PLAN - 2

Module – 3

Title:	Specification for Civil Engineering Works	Appr Time:	10 Hrs
a	***Course Outcomes***	-	**Blooms**
-	The student should be able to:	-	**Level**
1	Evaluate sampling techniques for atmospheric & stack pollutants	CO4	L4
2	Monitoring and Analysis of gaseous air pollutants	CO5	L4
b	***Course Schedule***		
Class No	**Module Content Covered**	**CO**	**Level**
1	Sampling of particulate and gaseous pollutants Stack	C4	L2
2	Sampling of particulate and gaseous pollutants Ambient	C4	L2
3	Sampling of particulate and gaseous pollutants indoor air pollution	C4	L2
4	Monitoring and analysis of air pollutants PM2.5,	C5	L3
5	Monitoring and analysis of air pollutants PM10	C5	L3
6	Monitoring and analysis of air pollutants SOX,	C5	L3
7	Monitoring and analysis of air pollutants NOX,	C5	L3
8	Monitoring and analysis of air pollutants CO,	C5	L3
9	Monitoring and analysis of air pollutants NH3,	C5	L3
c	**Application Areas**	**CO**	**Level**
1	sampling techniques for atmospheric & stack pollutants	CO4	L3
2	Monitoring and Analysis of gaseous air pollutants from the souses	CO5	L4
d	**Review Questions**	-	-
1	Define Sampling. Explain preliminary consideration and stages of Sampling	CO3	L2
2	Write a note on Stack sampling.	CO3	L2
3	Explain procedure to measurement of suspended particulate matter in	CO3	L2

	ambient air using High volume air Sampler.		
4	Describe sampling train with the help of neat diagram.	CO3	L2
5	Sketch and explain different kinds of plumes depending upon different environmental conditions	CO3	L2
6	What are the sources of air pollution in automobiles? Explain	CO3	L2
7	Explain the procedure for measurement of suspended particulate matter in ambient air using high volume air sampler with neat sketch	CO4	L4
8	Explain the procedure for measurement of NOx in ambient air.	CO4	L4
9	Explain the procedure for measurement of SOx in ambient air.	CO4	L4
10	Explain the procedure for measurement of Particulate matter in ambient air.	CO4	L4
11	Explain the procedure for measurement of CO in ambient air.	CO4	L4
e	**Experiences**	-	-
1		CO1	L2
2			
3			
4		CO3	L3
5			

Module – 4

Title:	Contract Management-Tender and its Process	Appr Time:	10 Hrs
a	***Course Outcomes***	-	**Blooms**
-	The student should be able to:	-	**Level**
1	Choose & design control techniques for particulate & gaseous emissions	CO7	L2
2	Identify the sources of noise & understand their effects ,control & compare with Noise standard	CO8	L3
b	***Course Schedule***		
Class No	**Module Content Covered**	**CO**	**Level**
1	Particulate matter and gaseous pollutants	CO6	L4
2	settling chambers	CO6	L4
3	Cyclone separators	CO6	L4
4	scrubbers	CO6	L4
5	filters	CO6	L4
6	ESP	CO6	L4
c	**Application Areas**	**CO**	**Level**
1	sources of noise & understand their effects ,control & compare with Noise standard	CO7	L2
2	Effects of global environmental issues from different Global episodes	CO8	L2
d	**Review Questions**	-	-
1	Sketch and explain different kinds of plumes depending upon different environmental conditions	CO5	L4
2	What are the sources of air pollution in automobiles? Explain	CO5	L4
3	Explain the procedure for measurement of suspended particulate matter in ambient air using high volume air sampler with neat sketch	CO5	L4
4	Explain the procedure for measurement of NOx in ambient air.	CO5	L4
5	Explain the procedure for measurement of SOx in ambient air.	CO5	L4
6	Explain the procedure for measurement of Particulate matter in ambient air.	CO5	L4
7	Explain the procedure for measurement of CO in ambient air.	CO5	L4
8	Explain procedure to measurement of suspended particulate matter in ambient air using High volume air Sampler.	CO5	L4
9	Describe sampling train with the help of neat diagram.	CO5	L4
10	Sketch and explain different kinds of plumes depending upon different environmental conditions	CO5	L4

11	What are the sources of air pollution in automobiles? Explain	CO6	L4
12	Explain with a neat sketch, the principle and construction of fabric filter, give applications	CO6	L4
14	Explain the control of air pollutants by the use of the Cyclone Separators control devices with neat sketch	CO7	L4
15	On what principle the settling chamber works. Explain with advantages & disadvantages	CO6	L4
16	Explain the collection of particulate pollutant using Dust fall Jar.	CO6	L4
17	Write about the sampling methods for collecting gaseous air pollutants.	CO6	L4
18	Write about the sampling methods for collecting particulate matters.	CO6	L4
19	Explain with sketch the following air pollution control equipment. a)Electrostatic precipitator b)Spray towers c)cyclones d)Pipe-type precipitator	CO6	L4
20	What are the advantages & disadvantages of electrostatic precipitation	CO6	L4
21	Define the term air sampling & explain the basic considerations to be made during air sampling.	CO6	L4
22	List the methods of sampling suspended particulate matter & explain anyone in detail with sketch	CO6	L4
23	Explain different environmental lapse rates & their effects on dispersion of air	CO6	L4
24	Write a note on atmospheric stability and temperature inversion.	CO6	L4
25	List the meteorological parameters that influence the dispersion of pollutants in atmosphere.	CO6	L4
e	**Experiences**	-	-
1		CO7	L2
2			
3			
4		CO8	L3
5			

E2. CIA EXAM – 2

a. Model Question Paper - 2

Crs Code:	17CV551	Sem:	5	Marks:	5 / 10	Time:	90 – 120 minutes
Course:	Air pollution and control						

-	-	**Note: Answer any 2 questions, each carry equal marks.**	**Marks**	**CO**	**Level**
1	a	Define Sampling. Explain preliminary consideration and stages of Sampling	8M	CO4	L2
	b	Write a note on Stack sampling.	7M	CO4	L2
		OR			
2	a	Explain procedure to measurement of suspended particulate matter in ambient air using High volume air Sampler.	8M	CO4	L4
	b	Describe sampling train with the help of neat diagram.	7M	CO4	L4
3	a	Explain with a neat sketch, the principle and construction of fabric filter, give applications	8M	CO4	L4
	b	Explain the control of air pollutants by the use of the Cyclone Separators control devices with neat sketch	7M	CO4	L4
		OR	8M	CO3	L3
4	a	On what principle the settling chamber works. Explain with advantages & disadvantages	7M	CO3	L3
	b	On what principle the settling chamber works. Explain with advantages & disadvantages	7M	CO3	L3

b. Assignment – 2

Note: A distinct assignment to be assigned to each student.

Model Assignment Questions

Crs Code:	17CV551	Sem:	5	Marks:	5 / 10	Time:	90 – 120 minutes
Course:	Air pollution and control						

Note: Each student to answer 2-3 assignments. Each assignment carries equal mark.

SNo	USN	Assignment Description	Marks	CO	Level
1		Define Sampling. Explain preliminary consideration and stages of Sampling	5	CO3	L2
2		Write a note on Stack sampling.	5	CO3	L2
3		Explain procedure to measurement of suspended particulate matter in ambient air using High volume air Sampler.	5	CO3	L2
4		Describe sampling train with the help of neat diagram.	5	CO3	L2
5		Sketch and explain different kinds of plumes depending upon different environmental conditions	5	CO3	L2
6		What are the sources of air pollution in automobiles? Explain	5	CO3	L2
7		Explain the procedure for measurement of suspended particulate matter in ambient air using high volume air sampler with neat sketch	5	CO4	L4
8		Explain the procedure for measurement of NOx in ambient air.	5	CO4	L4
9		Explain the procedure for measurement of SOx in ambient air.	5	CO4	L4
10		Explain the procedure for measurement of Particulate matter in ambient air.	5	CO4	L4
11		Explain the procedure for measurement of CO in ambient air.	5	CO4	L4
12		Sketch and explain different kinds of plumes depending upon different environmental conditions	5	CO5	L4
13		What are the sources of air pollution in automobiles? Explain	5	CO5	L4
9		Explain the procedure for measurement of suspended particulate matter in ambient air using high volume air sampler with neat sketch	5	CO5	L4
10		Explain the procedure for measurement of NOx in ambient air.	5	CO5	L4
11		Explain the procedure for measurement of SOx in ambient air.	5	CO5	L4
12		Explain the procedure for measurement of Particulate matter in ambient air.	5	CO5	L4
13		Explain the procedure for measurement of CO in ambient air.	5	CO5	L4
14		Explain procedure to measurement of suspended particulate matter in ambient air using High volume air Sampler.	5	CO5	L4
15		Describe sampling train with the help of neat diagram.	5	CO5	L4
16		Sketch and explain different kinds of plumes depending upon different environmental conditions	5	CO5	L4
17		What are the sources of air pollution in automobiles? Explain	5	CO6	L4
18		Explain with a neat sketch, the principle and construction of fabric filter, give applications	5	CO6	L4
19		Explain the control of air pollutants by the use of the Cyclone Separators control devices with neat sketch	5	CO7	L4
20		On what principle the settling chamber works. Explain with advantages & disadvantages	5	CO6	L4
21		Explain the collection of particulate pollutant using Dust fall Jar.	5	CO6	L4
22		Write about the sampling methods for collecting gaseous air pollutants.	5	CO6	L4
23		Write about the sampling methods for collecting particulate matters.	5	CO6	L4
24		Explain with sketch the following air pollution control equipment. a)Electrostatic precipitator b)Spray towers c)cyclones d)Pipe-type precipitator	5	CO6	L4
25		What are the advantages & disadvantages of electrostatic precipitation	5	CO6	L4
26		Define the term air sampling & explain the basic considerations to be made during air sampling.	5	CO6	L4
27		List the methods of sampling suspended particulate matter &	5	CO6	L4

		explain anyone in detail with sketch			
28		Explain different environmental lapse rates & their effects on dispersion of air	5	CO6	L4
29		Write a note on atmospheric stability and temperature inversion.	5	CO6	L4
30		List the meteorological parameters that influence the dispersion of pollutants in atmosphere.	5	CO6	L4
31		Define Sampling. Explain preliminary consideration and stages of Sampling	5	CO3	L2
32		Write a note on Stack sampling.	5	CO3	L2
33		Explain procedure to measurement of suspended particulate matter in ambient air using High volume air Sampler.	5	CO3	L2
34		Describe sampling train with the help of neat diagram.	5	CO3	L2
35		Sketch and explain different kinds of plumes depending upon different environmental conditions	5	CO3	L2
36		What are the sources of air pollution in automobiles? Explain	5	CO3	L2
37		Explain the procedure for measurement of suspended particulate matter in ambient air using high volume air sampler with neat sketch	5	CO4	L2
38		Explain the procedure for measurement of NOx in ambient air.	5	CO4	L2
39		Explain the procedure for measurement of suspended particulate matter in ambient air using high volume air sampler with neat sketch	5	CO4	L2
40		Explain the procedure for measurement of NOx in ambient air.	5	CO4	L2
41		Explain the procedure for measurement of SOx in ambient air.	5	CO4	L2
42		Explain the procedure for measurement of Particulate matter in ambient air.	5	CO4	L2
43		Explain the procedure for measurement of CO in ambient air.	5	CO4	L2
44		Sketch and explain different kinds of plumes depending upon different environmental conditions	5	CO5	L2
45		What are the sources of air pollution in automobiles? Explain	5	CO5	L2
46		Explain the procedure for measurement of suspended particulate matter in ambient air using high volume air sampler with neat sketch	5	CO5	L2
47		Explain the procedure for measurement of NOx in ambient air.	5	CO5	L2
48		Explain the procedure for measurement of SOx in ambient air.	5	CO5	L3
49		Explain the procedure for measurement of Particulate matter in ambient air.	5	CO5	L3
50		Explain the procedure for measurement of CO in ambient air.	5	CO5	L3
51		Explain procedure to measurement of suspended particulate matter in ambient air using High volume air Sampler.	5	CO5	L3
52		Describe sampling train with the help of neat diagram.	5	CO5	L3
53		Sketch and explain different kinds of plumes depending upon different environmental conditions	5	CO5	L3
54		What are the sources of air pollution in automobiles? Explain	5	CO6	L3
55		Explain with a neat sketch, the principle and construction of fabric filter, give applications	5	CO6	L3
56		Explain the control of air pollutants by the use of the Cyclone Separators control devices with neat sketch	5	CO7	L3
57		On what principle the settling chamber works. Explain with advantages & disadvantages	5	CO6	L3
58		Explain the collection of particulate pollutant using Dust fall Jar.	5	CO6	L3
59		Write about the sampling methods for collecting gaseous air pollutants.	5	CO6	L3
60		Write about the sampling methods for collecting particulate matters.	5	CO6	L3
61		Explain the procedure for measurement of suspended particulate matter in ambient air using high volume air sampler	5	CO4	L3

		with neat sketch			
62		Explain the procedure for measurement of NOx in ambient air.	5	CO4	L3
63		Explain the procedure for measurement of SOx in ambient air.	5	CO4	L4
64		Explain the procedure for measurement of Particulate matter in ambient air.	5	CO4	L4
65		Explain the procedure for measurement of CO in ambient air.	5	CO4	L4
66		Sketch and explain different kinds of plumes depending upon different environmental conditions	5	CO5	L4
67		What are the sources of air pollution in automobiles? Explain	5	CO5	L4
68		Explain the procedure for measurement of suspended particulate matter in ambient air using high volume air sampler with neat sketch	5	CO5	L4
69		Explain the procedure for measurement of NOx in ambient air.	5	CO5	L4
70		Explain the procedure for measurement of SOx in ambient air.	5	CO5	L4
71		Explain the procedure for measurement of Particulate matter in ambient air.	5	CO5	L4
72		Explain the procedure for measurement of CO in ambient air.	5	CO5	L4
73		Explain procedure to measurement of suspended particulate matter in ambient air using High volume air Sampler.	5	CO5	L4
74		Describe sampling train with the help of neat diagram.	5	CO5	L4
75		Sketch and explain different kinds of plumes depending upon different environmental conditions	5	CO5	L4
76		What are the sources of air pollution in automobiles? Explain	5	CO4	L4
77		Explain with a neat sketch, the principle and construction of fabric filter, give applications	5	CO4	L4
78		Explain the control of air pollutants by the use of the Cyclone Separators control devices with neat sketch	5	CO5	L4
79		On what principle the settling chamber works. Explain with advantages & disadvantages	5	CO5	L4
80		Explain the collection of particulate pollutant using Dust fall Jar.	5	CO5	L4

D3. TEACHING PLAN - 3

Module – 5

Title:	Contract Management-Post award	Appr Time:	10 Hrs
a	***Course Outcomes***	-	**Blooms**
-	The student should be able to:	-	**Level**
1	Identify the sources of noise & understand their effects ,control & compare with Noise standard	CO7	L3
2	To measure & discuss effects of global environmental issues	CO8	L2
b	***Course Schedule***		
Class No	**Module Content Covered**	**CO**	**Level**
1	Air pollution due to automobiles	CO7	L2
2	standards and control methods.	CO7	L2
3	Noise pollution causes	CO7	L2
4	effects and control	CO7	L2
5	noise standards	CO7	L2
6	Environmental issues,	CO8	L2
7	global episodes	CO8	L2
8	laws	CO8	L2
9	acts	CO8	L2
10	protocols	CO8	L2
c	**Application Areas**	**CO**	**Level**

1	sources of noise & understand their effects ,control & compare with Noise standard	CO7	L2
2	Effects of global environmental issues from different Global episodes	CO8	L2
d	**Review Questions**	-	-
1	Explain briefly the emission of the gasoline driven vehicles and diesel driven vehicles	CO7	L3
2	Define Noise pollution. Explain the sources and different methods to control the noise pollution	CO7	L3
3	Enumerate the following i) Acid rain and it effects ii) Bhopal gas tragedy	CO7	L3
4	b. Write short notes on (i) Air quality standards (ii) noise pollution standards (iii) Environmental policy (iv) Kyoto Protocol	CO7	L3
5	Explain the factors affecting the selection of the particulate air control devices	CO7	L3
6	Briefly explain the particulate matter removal by gravity settler with the neat sketch.	CO7	L3
7	Define noise. Explain sources of noise	CO7	L3
8	Discuss the effects of noise	CO7	L3
9	What are the important factors to be considers to minimize the exhaust from the automobiles	CO7	L3
10	Explain air pollution due to gasoline and diesel vehicles	CO7	L3
11	Explain preventive measures to control noise and vibrations	CO8	L2
12	Explain about noise abatement	CO8	L2
13	Explain about noise levels	CO8	L2
14	Write a note on global environmental issues	CO8	L2
15	Explain about acid rain and explain its effects	CO8	L2
16	Explain about green house gases and explain its effects	CO8	L2
17	Write a short note on indoor air pollution	CO8	L2
18	Explain about ozone depletion and explain its effects	CO8	L2
19			
20			
17			
e	**Experiences**	-	-
1		CO10	L2
2			
3			
4		CO9	L3
5			

E3. CIA EXAM – 3

a. Model Question Paper - 3

Crs Code:	17CV551	Sem:	5	Marks:	30	Time:	75 minutes
Course:	Air pollution and control						

-	-	**Note: Answer any 2 questions, each carry equal marks.**	**Marks**	**CO**	**Level**
1	a	Define Noise pollution. Explain the sources and different methods to control the noise pollution	8	CO7	L2
	b	Explain briefly the emission of the gasoline driven vehicles and diesel driven vehicles	7	CO7	L2
2	a	Enumerate the following i) Acid rain and it effects ii) Bhopal gas tragedy	8	CO7	L2
	b	Write a note on global environmental issues	7	CO7	L2
3	a	Write short notes on		CO8	L2

		(i) Air quality standards (ii) noise pollution standards (iii) Environmental policy (iv) Kyoto Protocol			
	b	Write a short note on indoor air pollution		CO8	L2
4	a	Explain air pollution due to gasoline and diesel vehicles		CO8	L2
	b	Explain preventive measures to control noise and vibrations		CO8	L2

b. Assignment – 3

Note: A distinct assignment to be assigned to each student.

Model Assignment Questions							
Crs Code:	17CV551	Sem:	I	Marks:	5 / 10	Time:	90 – 120 minutes
Course:	Air Pollution & Control						
Note: Each student to answer 2-3 assignments. Each assignment carries equal mark.							

SNo	USN	Assignment Description	Marks	CO	Level
1		Explain briefly the emission of the gasoline driven vehicles and diesel driven vehicles	5	CO7	L3
2		Define Noise pollution. Explain the sources and different methods to control the noise pollution	5	CO7	L3
3		Enumerate the following i) Acid rain and it effects ii) Bhopal gas tragedy	5	CO7	L3
4		Write short notes on (i) Air quality standards (ii) noise pollution standards (iii) Environmental policy (iv) Kyoto Protocol	5	CO7	L3
5		Explain the factors affecting the selection of the particulate air control devices	5	CO7	L3
6		Briefly explain the particulate matter removal by gravity settler with the neat sketch.	5	CO7	L3
7		Define noise. Explain sources of noise	5	CO7	L3
8		Discuss the effects of noise	5	CO7	L3
9		What are the important factors to be considers to minimize the exhaust from the automobiles	5	CO7	L3
10		Explain air pollution due to gasoline and diesel vehicles	5	CO7	L3
11		Explain preventive measures to control noise and vibrations	5	CO8	L2
12		Explain about noise abatement	5	CO8	L2
13		Explain about noise levels	5	CO8	L2
9		Write a note on global environmental issues	5	CO8	L2
10		Explain about acid rain and explain its effects	5	CO8	L2
11		Explain about green house gases and explain its effects	5	CO8	L2
12		Write a short note on indoor air pollution	5	CO8	L2
13		Explain about ozone depletion and explain its effects	5	CO8	L2
14		Explain briefly the emission of the gasoline driven vehicles and diesel driven vehicles	5	CO8	L2
15		Define Noise pollution. Explain the sources and different methods to control the noise pollution	5	CO8	L2
16		Enumerate the following i) Acid rain and it effects ii) Bhopal gas tragedy	5	CO8	L2
17		Write short notes on (i) Air quality standards (ii) noise pollution standards (iii) Environmental policy (iv) Kyoto Protocol	5	CO8	L2
18		Explain the factors affecting the selection of the particulate air control devices	5	CO8	L2
19		Briefly explain the particulate matter removal by gravity settler with the neat sketch.	5	CO8	L2
20		Define noise. Explain sources of noise	5	CO8	L2
21		Discuss the effects of noise	5	CO8	L2
22		What are the important factors to be considers to minimize the exhaust from the automobiles	5	CO8	L2
23		Explain air pollution due to gasoline and diesel vehicles	5	CO8	L2

24		Explain preventive measures to control noise and vibrations	5	CO8	L2
25		Explain about noise abatement	5	CO8	L2
26		Explain about noise levels	5	CO8	L2
27		Write a note on global environmental issues	5	CO8	L2
28		Explain about acid rain and explain its effects	5	CO8	L2
29		Explain about green house gases and explain its effects	5	CO8	L2
30		Write a short note on indoor air pollution	5	CO8	L2
31		Explain about ozone depletion and explain its effects	5	CO8	L2
32		Explain briefly the emission of the gasoline driven vehicles and diesel driven vehicles	5	CO8	L2
33		Define Noise pollution. Explain the sources and different methods to control the noise pollution	5	CO8	L2
34		Enumerate the following i) Acid rain and it effects ii) Bhopal gas tragedy	5	CO8	L2
35		Write short notes on (i) Air quality standards (ii) noise pollution standards (iii) Environmental policy (iv) Kyoto Protocol	5	CO8	L2
36		Explain the factors affecting the selection of the particulate air control devices	5	CO8	L2
37		Briefly explain the particulate matter removal by gravity settler with the neat sketch.	5	CO8	L2
38		Define noise. Explain sources of noise	5	CO8	L2
39		Discuss the effects of noise	5	CO8	L2
40		What are the important factors to be considers to minimize the exhaust from the automobiles	5	CO8	L2
41		Explain air pollution due to gasoline and diesel vehicles	5	CO8	L2
42		Explain preventive measures to control noise and vibrations	5	CO7	L3
43		Explain about noise abatement	5	CO7	L3
44		Explain about noise levels	5	CO7	L3
45		Write a note on global environmental issues	5	CO7	L3
46		Explain about acid rain and explain its effects	5	CO7	L3
47		Explain about green house gases and explain its effects	5	CO7	L3
48		Write a short note on indoor air pollution	5	CO7	L3
49		Explain about acid rain and explain its effects	5	CO7	L3
50		Explain about green house gases and explain its effects	5	CO7	L3
51		Write a short note on indoor air pollution	5	CO7	L3
52		Explain about ozone depletion and explain its effects	5	CO7	L3
53		Explain briefly the emission of the gasoline driven vehicles and diesel driven vehicles	5	CO7	L3
54		Define Noise pollution. Explain the sources and different methods to control the noise pollution	5	CO7	L3
55		Enumerate the following i) Acid rain and it effects ii) Bhopal gas tragedy	5	CO7	L3
56		Write short notes on (i) Air quality standards (ii) noise pollution standards (iii) Environmental policy (iv) Kyoto Protocol	5	CO7	L3
57		Explain the factors affecting the selection of the particulate air control devices	5	CO7	L4
58		Briefly explain the particulate matter removal by gravity settler with the neat sketch.	5	CO7	L3
59		Define noise. Explain sources of noise	5	CO7	L3
60		Discuss the effects of noise	5	CO7	L3
61		What are the important factors to be considers to minimize the exhaust from the automobiles	5	CO7	L3
62		Explain air pollution due to gasoline and diesel vehicles	5	CO7	L4
63		Explain preventive measures to control noise and vibrations	5	CO7	L4
64		Explain about acid rain and explain its effects	5	CO7	L4
65		Explain about green house gases and explain its effects	5	CO7	L4

66		Write a short note on indoor air pollution	5	CO7	L4
67		Explain about ozone depletion and explain its effects	5	CO7	L4
68		Explain briefly the emission of the gasoline driven vehicles and diesel driven vehicles	5	CO7	L4
69		Define Noise pollution. Explain the sources and different methods to control the noise pollution	5	CO7	L4
70		Enumerate the following i) Acid rain and it effects ii) Bhopal gas tragedy	5	CO7	L4
71		Write short notes on (i) Air quality standards (ii) noise pollution standards (iii) Environmental policy (iv) Kyoto Protocol	5	CO7	L4
72		Explain the factors affecting the selection of the particulate air control devices	5	CO7	L4
73		Briefly explain the particulate matter removal by gravity settler with the neat sketch.	5	CO7	L4
74		Define noise. Explain sources of noise	5	CO7	L3
75		Discuss the effects of noise	5	CO7	L3
76		What are the important factors to be considers to minimize the exhaust from the automobiles	5	CO7	L3
77		Explain air pollution due to gasoline and diesel vehicles	5	CO7	L3
78		Explain preventive measures to control noise and vibrations	5	CO7	L3
79		What are the important factors to be considers to minimize the exhaust from the automobiles	5	CO7	L3
80		What are the important factors to be considers to minimize the exhaust from the automobiles	5	CO7	L3

F. EXAM PREPARATION

1. University Model Question Paper

Course:		Air pollution and control						Month / Year		May /2018	
Crs Code:		17CV551	Sem:	5	Marks:	100		Time:		180 minutes	
-	**Note**	Answer all FIVE full questions. All questions carry equal marks.							**Marks**	**CO**	**Level**
1	a	Define air pollution. Explain primary and secondary air pollutant							8	CO1	L2
	b	Explain the sources and consequence of air pollutants for the following (i) Sulphur-di-oxide (ii) Ozone (iii) Dust (iv) Fumes							8	CO1	L2
		OR									
2	a	Enumerate the effects of the air pollution on human health and vegetation							8	CO2	L2
	b	Define inversion. Briefly explain the different types of inversion with the aid of neat sketch.							6	CO1	L2
	C	Write a short note on photo-chemical smog							2	CO2	L2
3	a	Explain the structure and the composition of atmosphere							8	CO3	L2
	b	With a neat sketch Explain the Plume behavior for the different atmospheric conditions							8	CO3	L2
		OR									
4	a	Explain the Gaussian plume dispersion equation for the gaseous pollutants							6	CO4	L3
	b	A coal fired power plant releases from the stack SPM at the rate of 2.3g/s. The stack height is 60m while the temperature of the stack gases is 160 and the ambient air temperature is 30C.the wind velocity at the stack height is 2.5m/s, while the stack gas velocity is 5.0m/s. The stack diameter is 3.5m. The atmosphere pressure is 1.005 bar. The wind speed at 10m height from the ground is 1.95 m/s. Estimate the ground level concentration for 1and 2 km downwind distance take the standard deviations for 1km as σy= 34, σz=14; for 2km σy= 63, σz= 22 respectively.							10	CO4	L3
5	a	What is meant by air sampling? Explain non-isokinetic, isokinetic sampling and sampling train							8	CO5	L3

	b	Explain any one method for measuring the concentration of the oxides of nitrogen in stack	8	CO5	L4
		OR			
6	a	With the help of the neat sketch explain high volume air sampler for measurement of particulate matte	8	CO6	L4
	b	What is meant by air quality monitoring? Explain any four methods of calculation of air pollution indices for monitoring of air pollutants.	8	CO6	L4
7	a	Explain the factors affecting the selection of the particulate air control devices.	8	CO7	L2
	b	Briefly explain the particulate matter removal by gravity settler with the neat sketch.	8	CO7	L2
		OR			
8	a	Write short notes on (i) Air quality standards (ii) noise pollution standards (iii) Environmental policy (iv) Kyoto Protocol	12	CO8	L2
	b	Write a short note on indoor air pollution	4	CO8	L2

2. SEE Important Questions

Course:		Air polltion and control					Month / Year	May /2018	
Crs Code:		17CV551	Sem:	5	Marks:	100	Time:	180 minutes	
	Note	Answer all FIVE full questions. All questions carry equal marks.					-	-	
Module	Qno.	Important Questions					**Marks**	**CO**	**Year**
1	1	Define air pollution. Identify various sources of generation of pollution					CO1	L2	2004
	2	Classify the air pollutants in to different categories, indicating their sources					CO1	L2	2004
	3	Distinguish between a) primary air pollutant & secondary air pollutant b) stationary and mobile sources of air pollutants					CO1	L2	2004
	4	Distinguish between stationary and mobile sources of air pollutants					CO1	L2	2007
	5	Explain the following terms with respect to air pollutants a)point sources b)area sources c)line sources					CO1	L2	2007
2	1	Explain the role of meteorological factors influencing air pollution in the atmosphere					CO2	L3	2005
	2	Explain stable and unstable atmosphere and inversion of the atmosphere					CO2	L3	2005
	3	Explain the following atmospheric conditions a)super-adiabatic b)sub-adiabatic c)Neutral d)Inversion					CO2	L3	2009
	4	Define wind rose. Explain the importance of wind roses in air pollution studies					CO3	L3	2006
	5	Describe with neat sketches, how different atmospheric conditions give rise to different kinds of plumes					CO3	L3	2004
3	1	Define Sampling. Explain preliminary consideration and stages of Sampling					CO4	L4	2006
	2	Write a note on Stack sampling.					CO4	L4	2006
	3	Explain procedure to measurement of suspended particulate matter in ambient air using High volume air Sampler.					CO4	L4	2007
	4	Describe sampling train with the help of neat diagram.					CO5	L4	2004
	5	Sketch and explain different kinds of plumes depending upon different environmental conditions					CO5	L4	2004

4	1	Explain with a neat sketch, the principle and construction of fabric filter, give applications	CO6	L3	2004
	2	Explain the control of air pollutants by the use of the Cyclone Separators control devices with neat sketch	CO6	L3	2004
	3	On what principle the settling chamber works. Explain with advantages & disadvantages	CO6	L3	2006
	4	Explain the collection of particulate pollutant using Dust fall Jar.	CO6	L3	2004
	5	Write about the sampling methods for collecting gaseous air pollutants.	CO6	L3	2007
5	1	Explain briefly the emission of the gasoline driven vehicles and diesel driven vehicles	CO7	L2	2009
	2	Define Noise pollution. Explain the sources and different methods to control the noise pollution	CO7	L2	2007
	3	Enumerate the following i) Acid rain and it effects ii) Bhopal gas tragedy	CO7	L2	2007
	4	b. Write short notes on (i) Air quality standards (ii) noise pollution standards (iii) Environmental policy (iv) Kyoto Protocol	CO8	L2	2004
	5	Explain the factors affecting the selection of the particulate air control devices	CO8	L2	2005

G. Content to Course Outcomes

1. TLPA Parameters

Table 1: TLPA -Quantity Surveying and Contracts Management

Module-#	Course Content or Syllabus (Split module content into 2 parts which have similar concepts)	Content Teaching Hours	Blooms' Learning Levels for Content	Final Blooms' Level	Identified Action Verbs for Learning	Instruction Methods for Learning	Assessment Methods to Measure Learning
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*
1	Definition, Sources, classification and characterization of air pollutants. Effects of air pollution on health, vegetation & materials.	5	- L1 - L2	L2	Understand	Lecture	Internal assessment and Assignment
1	.Types of inversion, photo chemical smog	5	- L2 - L5	L5	Evaluate	Lecture	Internal assessment and Assignment
2	Temperature lapse rate & stability, wind velocity & turbulence, plume behavior, measurement of meteorological	5	- L4 - L5	L5	Evaluate	Lecture	Internal assessment and Assignment
2	variables, wind rose diagrams, Plume Rise, Estimation of effective stack height and mixing depths. Development of air quality models-Gaussian dispersion model	5	- L4 - L5	L5	Evaluate	Lecture	Internal assessment and Assignment
3	Sampling of particulate and gaseous pollutants (Stack, Ambient & indoor air pollution),	5	- L1 - L2	L2	Understand	Lecture	Internal assessment and Assignment
3	Monitoring and analysis of air pollutants (PM2.5, PM10, SOX, NOX, CO, NH3)	5	- L4 - L5	L5	Evaluate	Lecture	Internal assessment and Assignment
4	Particulate matter and gaseous pollutants-settling chambers,	5	- L2	L2	Understand	Lecture	Internal assessment and Assignment

4	Cyclone separators, scrubbers, filters & ESP.	5	- L2	L2	Understand	Lecture	Internal assessment and Assignment
5	Air pollution due to automobiles, standards and control methods. Noise pollution causes, effects and control, noise standards.	5	- L2	L2	Understand	Lecture	Internal assessment and Assignment
5	Environmental issues, global episodes, laws, acts, protocols	5	L2	L2	Understand	Lecture	Internal assessment and Assignment

2. Concepts and Outcomes:

Table 2: Concept to Outcome – Quantity Surveying and Contracts Management

Module-#	Learning or Outcome from study of the Content or Syllabus	Identified Concepts from Content	Final Concept	Concept Justification (What all Learning Happened from the study of Content / Syllabus. A short word for learning or outcome)	CO Components (1.Action Verb, 2.Knowledge, 3.Condition / Methodology, 4.Benchmark)	Course Outcome **Student Should be able to ...**
A	*I*	*J*	*K*	*L*	*M*	*N*
1	Evaluate detailed and abstract estimates for Buildings.	Estimation of building.	Estimation	Estimation	- Understand - Mathametical -Longwall & Shortwall -	Evaluate detailed and abstract estimates for Buildings.
1	Evaluate detailed Estimate for Rcc Bilding Componenets.	Estimation of rcc Componenets.		Scheduling	- Analyze - RCC Components. - -	Evaluate detailed Estimate for Rcc Bilding Componenets.
2	Evaluate detailed for Steel trusses and Rcc Sewers.	Estimation of RCC Sewers..	Estimation	Estimation of sewers	- Analyze - Sanitation. - -	Evaluate detailed for Steel trusses and Rcc Sewers.
2	Evaluate detailed Estimate for Earth work Excavation for road.	Estimation of Roads		Quantity of earth work.	- Analyze - Road. - Mid section, Mean section,	Evaluate detailed Estimate for Earth work Excavation for road.
3	Understand the Specification of building work..	Specifications	Analysis of Rates	Material Specifications	- Understand - Building - -	Understand the Specification of building work..
3	Evaluate rate analysis for various Civil Engineering components.	Rate analysis		Schedule of rates	- Apply - Schedule of rates. - -	Evaluate rate analysis for various Civil Engineering components.
4	Understand the Contract management and its process.	Contract management	Tender	Quoting of tender	- Understand - Contract. - -	Understand the Contract management and its process.
4	Understand the Laws of Contract	Laws of CM.		Law Contract	- Understand - Law	Understand the Laws of Contract

	management .					management .
5	Student should be able to Understand the Contract management post awards .	estimates	Valuation	Estimating of property.	- Understand - Mathamatical	Student should be able to Understand the Contract management post awards .
5	Student should be able to Understand the Valuation of civil work.	Valuate.		Valuation of property.	- Understand - local Property value.	Student should be able to Understand the Valuation of civil work.