MOHAMED SATHAK A J COLLEGE OF ENGINEERING, Chennai - 603103

LESSON PLAN - THEORY

Department of CIVIL ENGINEERING

Name of the Subject	Structural Design and Drawing	Name of the handling faculty	R.EMILREYAN
Subject Code	CE8703	Year / Sem	IV/VII

Course Objective

This course aims at providing students with a solid background on the principles of structural engineering design. Students will be acquire the knowledge of liquid retaining structures, bridges components, retaining wall and industrial structures.

Course Outcome

Design and draw reinforced concrete Cantilever and Counterfort Retaining Walls

Design and draw flat slab as per code provisions

Design and draw reinforced concrete and steel bridges

Design and draw reinforced concrete and steel water tanks

Design and detail the various steel trusses and Gantry girders

Lesson Plan

Sl. No.	Topic(s)	T / R* Book	Periods Required	Mode of Teaching (BB / PPT / NPTEL / MOOC / etc)	Blooms Level (L1-L6)	CO	PO
	UNIT I RETAINING WALLS						
1	Introduction	T1	3	PPT	L2	CO1	PO1,PO2, PO3,PO4
2	Cantilever retaining wall with shear key	T1	5	PPT	L2	CO1	PO1,PO2, PO3,PO4
3	Cantilever retaining wall with inclined backfill	T1	4	PPT	L3	CO1	PO1,PO2, PO3,PO4
4	Counterfort retaining wall	T1	3	BB	L3	CO1	PO1,PO2, PO3,PO4
Suggested Activity: Assignment - Design and drwaing of retaining walls							
Evaluation method : Paper based							
	UNIT II FLAT SLAB AND BRIDGES						
5	**Design of Flat Slabs with and without drops by Direct Design Method of IS code**	T1,R1,R3	2	BB	L3	CO2	PO1,PO2, PO3,PO4
6	**Design and Drawing Flat Slabs**	T1	2	PPT	L3	CO2	PO1,PO2, PO3,PO4
7	**IRC Specifications and Loading**	T2	2	PPT	L3	CO2	PO1,PO2, PO3,PO4
8	**RC Solid Slab Bridge**	T1	2	PPT	L3	CO2	PO1,PO2, PO3,PO4
9	**Steel Foot**	T1	1	PPT	L2	CO2	PO1,PO2, PO3,PO4
10	**Over Bridge - Design and Drawing**	T1	6	BB	L3	CO2	PO1,PO2, PO3,PO4
Suggested Activity: Case Studies of slab bridges							
Evaluation method : Paper based							
	UNIT III LIQUID STORAGE STRUCTURES						
11	**RCC Water Tanks**	T1	3	PPT	L2	CO3	PO1,PO2, PO3,PO4
12	**On ground, Elevated Circular, underground Rectangular Tanks**	T1	3	PPT	L3	CO3	PO1,PO2, PO3,PO4
13	**Hemispherical Bottomed Steel Water Tank**	T1	3	PPT	L2	CO3	PO1,PO2, PO3,PO4
14	**Design and Drawing**	T1	6	BB	L3	CO3	PO1,PO2, PO3,PO4
Suggested Activity: Case Studies - Overhead water tanks							
Evaluation method : PPT Presentation							
	UNIT IV INDUSTRIAL STRUCTURES						
15	**Design of I purlin**	T1	4	PPT	L2	CO4	PO1,PO2, PO3,PO4
16	**Design of channel purlin**	T1	4	PPT	L2	CO4	PO1,PO2, PO3,PO4
17	**Design of angle purlin**	T1	2	PPT	L2	CO4	PO1,PO2, PO3,PO4
18	**Beam columns**	T1	2	PPT	L2	CO4	PO1,PO2, PO3,PO4
19	**Steel truss**	T1	2	PPT	L2	CO4	PO1,PO2, PO3,PO4
20	**Design and Drawing**	T1	1	BB	L3	CO4	PO1,PO2, PO3,PO4
Suggested Activity: Assignment on Roofing elements							
Evaluation method : Paper based							
	UNIT V GIRDERS AND CONNECTIONS						
49	**Plate Girders**	T1	1	PPT	L2	CO5	PO1,PO2, PO3,PO4
50	**Behaviour of Components**	T1	2	PPT	L2	CO5	PO1,PO2, PO3,PO4
51	**Deign of Welded Plate Girder**	T1	2	PPT	L2	CO5	PO1,PO2, PO3,PO4
52	**Design of Industrial Gantry Girders**	T1	2	PPT	L2	CO5	PO1,PO2, PO3,PO4
53	**Design of Eccentric Shear and Moment Resisting connections.**	T1	2	PPT	L2	CO5	PO1,PO2, PO3,PO4
54	**Design and Drawing**	T1	6	BB	L3	CO5	PO1,PO2, PO3,PO4
Suggested Activity: Case Studies - Plate girders							
Evaluation method							
Content Beyond the Syllabus Planned							
1	**Construction of walls for overway bridges**						

2	Designing procedures and standards for bridges

Text Books

1	Krishnaraju N, Structural Design and Drawing, Universities Press, 2009.
2	Punmia B.C.,Ashok Kumar Jain and Arun KumarJain,Comprehensive Design of Steel Structures, Laxmi Publications Pvt. Ltd., 2003.

Reference Books

1	Krishnamurthy D,Structural Design and Drawing VolI,IIandIII,CBS Publishers, 2010.
2	Shah V L and Veena Gore,Limit State Design of Steel Structures
3	IS 456(2000) Indian Standard Plain and Reinforced Concrete-Code of Practice, Bureau of Indian Standards, New Delhi.
4	IS800-2007,Structures Publications, 2009.

Website / URL References

1	https://www.youtube.com/watch?v=Bu5jehcXjzs
2	https://www.youtube.com/watch?v=9E4M6MCD4aI

Blooms Level

Level 1 (L1) : Remembering	Lower Order Thinking	Fixed Hour Exams	Level 4 (L4) : Analysing		Higher Order Thinking	Projects / Mini Projects
Level 2 (L2) : Understanding			Level 5 (L5) : Evaluating			
Level 3 (L3) : Applying			Level 6 (L6) : Creating			

Mapping syllabus with Bloom's Taxonomy LOT and HOT

Unit No	Unit Name	L1	L2	L3	L4	L5	L6	LOT	HOT	Total
Unit 1	RETAINING WALLS	0	6	9	0	0	0	15	0	15
Unit 2	FLAT SLAB and BRIDGES	0	14	1	0	0	0	15	0	15
Unit 3	LIQUID STORAGE STRUCTURES	0	6	9	0	0	0	15	0	15
Unit 4	INDUSTRIAL STRUCTURES	0	9	6	0	0	0	15	0	15
Unit 5	GIRDERS AND CONNECTIONS	0	9	6	0	0	0	15	0	15
Total		0	44	31	0	0	0	75	0	75
Total Percentage		0	59%	41%	0	0	0	100%	0	100%

CO PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	2									2	2
CO2	3	2	3	2									2	2
CO3	3	2	3	2									2	2
CO4	3	2		2									2	2
CO5	3	2	3	2									2	2
CO6	3.00	2.00	3.00	2.00									2.00	2.00
Avg														

Justification for CO-PO mapping

CO1	PO1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems. PO2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. PO3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations. PO4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
CO2	PO1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems. PO2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. PO3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations. PO4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
CO3	PO1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.PO2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.PO3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.PO4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
CO4	PO1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.PO2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.PO3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.PO4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
CO5	PO1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.PO2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.PO3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.PO4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

3	High level	2	Moderate level	1	Low level

*Kindly sign with date

Name & Sign of Faculty Incharge :

Name & Sign of Subject Expert :

Head of the Department :