	MOHAMED SATHAK A J COLLEGE OF ENGINEERING Chennai 603103	Fromat no.	TLP 05
		Rev.Date	01/02/2021
	LESSON PLAN - THEORY	Rev. No.	0

Department of Civil Engineering			
Name of the Subject	Structural Analysis I	Name of the handling Faculty	Mr B.Rizha ur Rahman
Subject Code	CE8502	Year / Sem	III / V

Course Objective

To introduce the students to basic theory and concepts of structural analysis and the classicalmethods for the analysis of buildings.

Course Outcome

Analyse beams, Frames and trusses using Energy method

Analyse of structural elements using moving loads and influence lines

Analyse of arches

Analyse of structural elements using slope deflection method

Analyse of structural elements using moment distribution method

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 ENERGY METHOD							
1	**Degree of static indeterminacies for plane frames**	T2	1	BB	L2	CO1	PO1-PO3
2	**Degree of kinematic indeterminacies for plane frames**	T2	1	BB	L2	CO1	PO1-PO3
3	**Analysis of indeterminate pin-jointed frames – energy method**	T2	1	BB	L3	CO1	PO1-PO3
4	**Problems on indeterminate pin-jointed frames**	T2	1	BB	L3	CO1	PO1-PO3
5	**Analysis of indeterminate rigid-jointed frames - energy method**	T2	1	BB	L3	CO1	PO1-PO3
6	**Problems on indeterminate rigid-jointed frames**	T2	1	BB	L3	CO1	PO1-PO3
7	**Analysis of indeterminate continuous beam**	T2	1	BB	L3	CO1	PO1-PO3
8	**Problems on indeterminate continuous beam**	T2	1	BB	L3	CO1	PO1-PO3
9	**Problems on indeterminate continuous beam**	T2	1	BB	L3	CO1	PO1-PO3

Suggested Activity: Problems on Analysis of continuous beams and frames by Energy Method

Evaluation method : Paper base evaluation

	UNIT II MOVING LOADS AND INFLUENCE LINES						
10	**Influence lines for reactions in statically determinate structures**	T2	1	BB	L2	CO2	PO1-PO3
11	**Influence lines for member forces in pin-jointed frames**	T2	1	BB	L3	CO2	PO1-PO3
12	**Influence lines for shear force and bending moment in beam sections**	T2	1	BB	L3	CO2	PO1-PO3

13	Calculation of critical stress resultants due to concentrated loads.	T2	1	BB	L3	CO2	PO1-PO3
14	Calculation of critical stress resultants due to distributed moving loads.	T2	1	BB	L3	CO2	PO1-PO3
15	Muller Breslau"s principle.	T2	1	BB	L2	CO2	PO1-PO3
16	Influence lines principle for continuous beams	T2	1	BB	L3	CO2	PO1-PO3
17	Influence lines principle for continuous beams and single storey rigid frames	T2	1	BB	L3	CO2	PO1-PO3
18	Indirect model analysis for influence lines of indeterminate structures	T2	1	BB	L3	CO2	PO1-PO3

Suggested Activity:Assignment - Problems on moving loads and influence lines.

Evaluation method : Paper base evaluation

UNIT III ARCHES

19	Arch structures - Introduction	T2	1	BB	L2	CO3	PO1-PO3
20	Analysis of three hinged arches - Parabolic	T2	1	BB	L3	CO3	PO1-PO3
21	Analysis of three hinged arches - Circular	T2	1	BB	L3	CO3	PO1-PO3
22	Analysis of two hinged arches - parabolic	T2	1	BB	L3	CO3	PO1-PO3
23	Analysis of two hinged arches - Circular	T2	1	BB	L3	CO3	PO1-PO3
24	Analysis of fixed arches - Parabolic	T2	1	BB	L3	CO3	PO1-PO3
25	Analysis of fixed arches - Circular	T2	1	BB	L3	CO3	PO1-PO3
26	Arches - settlement	T2	1	BB	L3	CO3	PO1-PO3
27	Arches - Temperature effects	T2	1	BB	L3	CO3	PO1-PO3

Suggested Activity: Assignment - Problems on Arches

Evaluation method : Paper base evaluation

UNIT IV SLOPE DEFLECTION METHOD

28	Slope deflection method – introduction	T2	1	BB	L2	CO4	PO1-PO3
29	Analysis of continuous beam	T2	1	BB	L3	CO4	PO1-PO3
30	Problems on Continuous beams	T2	1	BB	L3	CO4	PO1-PO3
31	Problems on Continuous beams	T2	1	BB	L3	CO4	PO1-PO3
32	Analysis of rigid frames (without sway)	T2	1	BB	L3	CO4	PO1-PO3
33	Problems on rigid frames (without sway)	T2	1	BB	L3	CO4	PO1-PO3
34	Analysis of rigid frames (with sway)	T2	1	BB	L3	CO4	PO1-PO3
35	Problems on rigid frames (with sway)	T2	1	BB	L3	CO4	PO1-PO3
36	Problems on rigid frames (with sway)	T2	1	BB	L3	CO4	PO1-PO3

Suggested Activity: Assignment - Problems on slope and deflection

Evaluation method : Paper base evaluation

UNIT V MOMENT DISTRIBUTION METHOD

37	Slope deflection method – introduction	T2	1	BB	L2	CO5	PO1-PO3
38	Analysis of continuous beam	T2	1	BB	L3	CO5	PO1-PO3
39	Problems on Continuous beams	T2	1	BB	L3	CO5	PO1-PO3
40	Problems on Continuous beams	T2	1	BB	L3	CO5	PO1-PO3
41	Analysis of rigid frames (without sway)	T2	1	BB	L3	CO5	PO1-PO3
42	Problems on rigid frames (without sway)	T2	1	BB	L3	CO5	PO1-PO3
43	Analysis of rigid frames (with sway)	T2	1	BB	L3	CO5	PO1-PO3
44	Problems on rigid frames (with sway)	T2	1	BB	L3	CO5	PO1-PO3
45	Problems on rigid frames (with sway)	T2	1	BB	L3	CO5	PO1-PO3

Suggested Activity: Assignment - Problems on Moment Distribution Method

Evaluation method : Paper base evaluation

Content Beyond the Syllabus Planned

1	Analysis of 3D frames
2	Comparison of slope deflection method with other classical method

Text Books

1	Vaidyanathan, R. and Perumal, P., "Comprehensive structural Analysis – Vol. I & II", Laxmi Publications, New Delhi, 2003
2	BhavaiKatti, S.S, "Structural Analysis – Vol. 1 Vol. 2", Vikas Publishing House Pvt. Ltd., New Delhi,

Reference Books

1	Ghali.A, Nebille,A.M. and Brown,T.G. "Structural Analysis" A unified classical and Matrix approach" 6th edition. Spon Press, London and New York, 2013.
2	Coates R.C, Coutie M.G. and Kong F.K., "Structural Analysis", ELBS and Nelson, 1990
3	Pandit G.S. & Gupta S.P. "Structural Analysis – A Matrix Approach", Tata McGraw Hill 2004.
4	William Weaver Jr. & James M. Gere, "Matrix Analysis of Framed Structures", CBS Publishers and Distributors, Delhi, 2004
5	Gambhir. M.L., "Fundamentals of Structural Mechanics and Analysis"., PHI Learning Pvt. Ltd., New Delhi, 2011.

Website / URL References

1	https://nptel.ac.in/courses/105/101/105101085/

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	ENERGY METHOD	0	2	7	0	0	0	9	0	9
Unit 2	MOVING LOADS AND INFLU	0	2	7	0	0	0	9	0	9
Unit 3	ARCHES	0	1	8	0	0	0	9	0	9
Unit 4	SLOPE DEFLECTION METHO	0	1	8	0	0	0	9	0	9
Unit 5	MOMENT DISTRIBUTION M	0	1	8	0	0	0	9	0	9
Total		0	7	38	0	0	0	45	0	45
Total Percentage		0	15.556	84.4444	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	1										1	2
CO2	3	2	1										1	2
CO3	3	2	1										1	2
CO4	3	2	1										1	2
CO5	3	2	1										1	2
Avg	3	2	1										1	2

Justification for CO-PO mapping

CO1	PO1 : Engineering Knowledge in different types of structures. , PO2 : Problem analysis in frames and trusses, PO3 : Design frames ,PSO1: Apply their skills to analyse structures, PSO2 : Apply their acquired professional skills to analyse structural components
CO2	PO1 : Engineering Knowledge in different types of structures. , PO2 : Problem analysis in Moving loads and influence lines ,PSO1: Apply their skills to analyse structures, PSO2 : Apply their acquired professional skills to analyse structural components
CO3	PO1 : Engineering Knowledge in different types of structures. , PO2 : Problem analysis in Arches, PSO1: Apply their skills to analyse structures, PSO2 : Apply their acquired professional skills to analyse structural components
CO4	PO1 : Engineering Knowledge in different types of structures. , PO2 : Problem analysis of beams and frames using slope deflection method, PSO1: Apply their skills to analyse structures, PSO2 : Apply their acquired professional skills to analyse structural components
CO5	PO1 : Engineering Knowledge in different types of structures. , PO2 : Problem analysis of beams and frames using Moment Distribution Method, PSO1: Apply their skills to analyse structures, PSO2 : Apply their acquired professional skills to analyse structural components

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   :

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