Lesson Plan for the Session Jan - May 2025-2026 (Even Sem)

Faculty Name: L i k h i t M L
Subject with code: **Analysis of Structures - (BCV401)**
Semester with section: 4th Sem

Module No	Class.	Topics proposed to be covered	% portion covered	Remarks
1		Bridge Course, Introduction to subject, Mod 1: **Introduction and Analysis of Plane Trusses:** Structural forms	20	
		Conditions of equilibrium, Compatibility conditions, Degree of freedom		
		Linear and nonlinear analysis, Static indeterminacies of structural systems		
		kinematic indeterminacies of structural systems		
		Types of trusses		
		Assumptions in analysis		
		Analysis of determinate trusses by method of joints		
		Analysis of determinate trusses method of sections.		
2		Mod 2: **DEFLECTION OF BEAMS: Moment area method**	40	
		Derivation, Mohr's theorems, sign convention;		
		Application of moment area method to determinate prismatic beams		
		beams of varying cross section; Use of moment diagram by parts.		
		Strain Energy: Principle of virtual displacements, Principle of virtual forces		
		Strain energy and complimentary energy, Strain energy due to axial force, bending, shear and torsion		
		Castigliano's theorems, application of Castigliano's theorems to calculate deflection of beams		
		trusses and frames.		
3		Mod 3: **Arches and Cable Structures**	60	
		Three hinged parabolic arches with supports at the same level		
		Three hinged parabolic arches with supports at different levels.		
		Determination of normal thrust		
		radial shear and bending moment.		
		Analysis of cables under point loads and UDL.		
		Length of cables for supports at same and at different Levels		
		Stiffening trusses for suspension cables.		
4		Mod 4: **Slope Deflection Method**	80	
		Introduction, sign convention		
		development of slope deflection equation		
		Analysis of continuous beams including settlement of supports		
		Analysis of orthogonal rigid plane frames including sway frames with kinematic		

		indeterminacy up to 3		
		Numerical		
		Numerical		
		Numerical		
5		Mod 5: **Moment Distribution Method**	100	
		Introduction, Definition of terms		
		Development of method,		
		Analysis of continuous beams with support yielding		
		Analysis of orthogonal rigid plane frames		
		Analysis of orthogonal rigid plane frames including sway frames with kinematic indeterminacy up to 3		
		Numerical		
		Numerical		

Suggested Learning Resources

Books
1. Reddy, C.S., Basic Structural Analysis, 3 rd. ed., Tata McGraw-Hill Education Pvt. Ltd., New Delhi, 2011.
2. Hibbeler, R.C., Structural Analysis, 9 th edition., Pearson publications., New Delhi, 2012.
3. Thandavamoorthy, T.S., Structural Analysis, 6 th edition., Oxford University press., New Delhi,2015.
4. L S Negi and R S Jangid, "Structural Analysis", Tata McGraw-Hill Publishing Company Ltd.
5. D S Prakash Rao, "Structural Analysis: A Unified Approach", Universities Press 4
6. K.U. Muthu and H. Narendra, "Indeterminate Structural Analysis", IK International Publishing Pvt. Ltd.
7. Gupta S P, G S Pundit and R Gupta, "Theory of Structures", Vol II, Tata McGraw Hill Publications company Ltd.
8. V N Vazirani and M M Ratwani, "Analysis of Structures", Vol. 2, Khanna Publishers
9. Wang C K, "Intermediate Structural Analysis", McGraw Hill, International Students Edition. S. Rajashekhara and G. Sankarasubramanian, "Computational Structural Mechanics", PHI Learning Pvt. Ltd.,
10. S S Bhavikatti, structural analysis, vikas publishing house pvt.ltd., new Delhi
11. S Ramamrutham and R Narayanan,Theory of structures , Dhanpat Rai Publishing Company.

Web links and Video Lectures (e-Resources):
- ☐ https://nptel.ac.in/courses/105105166
- ☐ https://nptel.ac.in/courses/105105166
- ☐ https://nptel.ac.in/courses/105105166
- ☐ https://nptel.ac.in/courses/105105109
- ☐ https://nptel.ac.in/courses/105105109
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