

Course Modules of the Subject Taught for the Session Feb – May 2024-25 (Even Semester)

Course Syllabi with CO's

Faculty Name: Likhit M L				Academic Year: 2025-2026			
Department: CIVIL ENGINEERING							
Course Code	Course Title	Core/Elective	Prerequisite	Contact Hours			Total Hrs/ Sessions
				L	T	P	
BCV401	Analysis of Structures	Core	-	3	0	0	40
Objectives	<ul style="list-style-type: none"> Understand the Different Forms of Structural Systems. Determine the Strain Energy and Slope and Deflection of Beams, Trusses and Frames. Analyse arches and cable structures. Analyse different types of beams and frames using slope deflection method. Analyse different types of beams and frames using moment distribution method. 						
Topics Covered as per Syllabus							
Module-1							
Introduction and Analysis of Plane Trusses: Structural forms, Conditions of equilibrium, Compatibility conditions, Degree of freedom, Linear and nonlinear analysis, Static and kinematic indeterminacies of structural systems, Types of trusses, Assumptions in analysis, Analysis of determinate trusses by method of joints and method of sections. L1,L2,L3. 8 Hours							
Module-2							
DEFLECTION OF BEAMS: Moment area method: 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 (No numerical). Castigliano's theorems, application of Castigliano's theorems to calculate deflection of beams, trusses and frames (No numerical on unit load method). 8 Hours							
Module-3							
Arches and Cable Structures: Three hinged parabolic arches with supports at the same and 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. L1,L2,L3. 8 Hours							
Module-4							
Slope Deflection Method: 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 L1,L2,L3,L4 8 Hours							
Module-5							
Moment Distribution Method: Introduction, Definition of terms, Development of method, Analysis of continuous beams with support yielding, Analysis of orthogonal rigid plane frames including sway frames with kinematic indeterminacy up to 3 L1,L2,L3,L4 8 Hours							
List of 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.

URLs:

- <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>
- <https://nptel.ac.in/courses/105105109>

Course Outcomes

- identify the different forms of structural systems and analyse the trusses.
- Evaluate the slope and deflections in beams, frames and trusses by using moment area method and energy principle.
- Analyse and determine the stress resultants in arches and cables.
- Analyse the indeterminate structures and construct BMD AND SFD using slope deflection methods.
- Analyse the indeterminate structures and construct BMD AND SFD using Moment Distribution Method.

Internal Assessment Marks: Three Unit Tests each of 25 Marks, assignment component of the CIE will be 25 marks. For the course, CIE marks will be based on a scaled-down sum of two tests and other methods of assessment scaled down to 50 marks.

The Correlation of Course Outcomes (CO's) and Program Outcomes (PO's)

Subject Code:	BCV401		TITLE: Analysis of Structures					Faculty Name:	Likhith M L				
List of Course Outcomes	Program Outcomes												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	
CO-1													
CO-2													
CO-3													
CO-4													
CO-5													

Note: 3 = Strong Contribution 2 = Average Contribution 1 = Weak Contribution - = No Contribution

The Correlation of Course Outcomes (CO's) and Program Specific Outcomes (PSO's)

Subject Code:	BCV401	TITLE: Analysis of Structures g	Faculty Name:	Likhit M L
List of Course Outcomes	Program Specific Outcomes			
	PSO1	PSO2		
CO-1	-	2		
CO-2	-	2		
CO-3	-	2		
CO-4	-	2		

Note: 3 = Strong Contribution 2 = Average Contribution 1 = Weak Contribution - = No Contribution