



(SYLLABUS)

Course Code	23CE4501A	Year	III	Semester	I
Course Category	Professional Elective-I	Branch	CIVIL	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Strength of Materials, Structural Analysis
Continuous Internal Evaluation	30	Semester End Evaluation	70	Total Marks:	100

Course Objectives:

The objective of this course is to:

1. To enable students to understand and analyze the behavior of three-hinged and two-hinged arches under various loading conditions.
2. To equip students with approximate analytical methods for determining forces and displacements in frames subjected to gravity and lateral loads.
3. To impart knowledge of cable structures and suspension bridges, focusing on their behavior and response to different loadings.
4. To develop proficiency in the analysis of portal frames, including sway effects, using the Moment Distribution and Slope Deflection methods.
5. To train students in the application of Kani's method for the analysis of continuous beams and portal frames.

Course Outcomes:

Course will enable the student to:

CO	Statement	Blooms level
CO 1	1. Analyze the behavior of three-hinged and two-hinged arches under various loading conditions.	L3
CO 2	2. Apply approximate analytical methods for frames subjected to gravity and lateral loads.	L3
CO 3	3. Analyze cable structures and suspension bridges under various loads.	L3
CO 4	4. Analyze portal frames including sway effects, using Moment Distribution and Sloped deflection Methods.	L3
CO 5	5. Apply Kani's method to analyze continuous beams and portal frames	L3

Course Articulation Matrix:

[illegible]



Syllabus

Unit No	Content	Mapped COs
I	Three Hinged Arches: Elastic theory of arches – Eddy's theorem – Determination of horizontal thrust, bending moment, normal thrust and radial shear – effect of temperature. Hinges with supports at different levels. Two Hinged Arches: Determination of horizontal thrust, bending moment, normal thrust and radial shear – Rib shortening and temperature stresses.	CO1
II	Approximate Methods of Analyses: Application to building frames. (i) Portal Method (ii) Cantilever Method (iii) Substitute frame method for approximate analysis of multi-storey frames subjected to gravity loads and lateral loads. Shear force and bending moment diagrams - Elastic curve.	CO2
III	Cable Structures and Suspension Bridges: Introduction, characteristics of cable, analysis of cables subjected to concentrated and uniformly distributed loads, anchor cable, temperature stresses, analysis of simple suspension bridge.	CO3
IV	Moment Distribution Method: Analysis of Portal frames – including Sway- Substitute frame analysis by two cycle. Sloped deflection method: Analysis of Portal frames – including Sway. Shear force and bending moment diagrams - Elastic curve.	CO4
V	Kani's Method: Analysis of continuous beams—including settlement of supports and single bay portal frames without side sway. Shear force and bending moment diagrams - Elastic curve.	CO5

Learning Resource(s)

Text Book(s)

1. Structural Analysis by R.C. Hibbeler, Pearson, NewDelhi.
2. Analysis of Structures- Vol. I and II, V. N. Vazirani and M. M. Ratwani, Khanna Publishers, New Delhi.

Reference Book(s)

1. Mechanics of Structures Vol – II by H.J.Shah and S.B.Junnarkar, Charotar Publishing House Pvt. Ltd.
2. Structural Analysis by Devdas Menon, Narosa Publishing Housing Pvt. Ltd.
3. Structural Analysis: A Matrix Approach, G.S.Pandit and S.P.Gupta, McGraw Hill Pvt Ltd.

Web Materials:

1. <https://archive.nptel.ac.in/courses/105/106/105106050/>
2. https://onlinecourses.nptel.ac.in/noc25_ce110/preview