IV Semester

ANALYSIS OF STRUCTURES			
Course Code	**21CV44**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	2+2+0+0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	3	Exam Hours	3

Course objectives: This course will enable students

1. To determine slope and deflections in beams and trusses.
2. To analyse arches and cable structures.
3. To analyse different structural systems and interpret data using slope deflection method.
4. To apply matrix operations in analysing structures.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1. Video tube, NPTEL materials
2. Quiz/Assignments/Open book test to develop skills
3. Encourage collaborative learning in the class with site visits related to subject and impart practical knowledge

Module-1

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; *Conjugate beam method* – Real beam and conjugate beam, conjugate beam theorems; Application of conjugate beam method to determinate beams of varying cross sections.

Teaching-Learning Process	Chalk and talk, Demonstration using relevant structural analysis software.

Module-2

Energy Principles and Energy Theorems: *Principle of virtual displacements*; *Principle of virtual forces*, Strain energy and complementary energy; Strain energy due to axial force, bending shear and torsion; Deflection of determinate beams and trusses using total strain energy; Deflection at the point of application of single point load; *Castigliano's theorems*, application of Castigliano's theorems to calculate deflection of trusses, frames; Special application – Dummy unit load method.

Teaching-Learning Process	Chalk and talk, Demonstration using relevant structural analysis software.

Module-3

Arches and Cables: Three-hinged circular and parabolic arches with supports at the same and different levels; Determination of normal thrust, radial shear and bending moment; Analysisof cables under point loads and UDL; Length of cables with supports at the same and different levels; Stiffening trusses for suspension cables.

Teaching-Learning Process	Chalk and talk, Demonstration using relevant structural analysis software.

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

Teaching-Learning Process	Chalk and talk, Demonstration using relevant structural analysis software.