Course Title: Analysis of Indeterminate Structures			
[As per Choice Based Credit System (CBCS) scheme]			
SEMESTER:V			
Subject Code	15CV52	IA Marks	20
Number of Lecture Hours/Week	04	Exam Marks	80
Total Number of Lecture Hours	50	Exam Hours	03
	CREDITS – 04	**Total Marks-100**	

Course objectives: This course will enable students to

1. Ability to apply knowledge of mathematics and engineering in calculating slope, deflection, bending moment and shear force using slope deflection, moment distribution method and Kani's method.

2. Ability to identify, formulate and solve problems in structural analysis.

3. Ability to analyze structural system and interpret data.

4. Ability to use the techniques, such as stiffness and flexibility methods to solve engineering problems

5. Ability to communicate effectively in design of structural elements

Modules	Teaching Hours	Revised Bloom's Taxonomy (RBT) Level
Module -1		
Slope Deflection Method: Introduction, sign convention, development of slope deflection equation, analysis of continuous beams including settlements, Analysis of orthogonal rigid plane frames including sway frames with kinematic indeterminacy ≤ 3	10 hours	L_2, L_4, L_5
Module -2		
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 ≤ 3	08 Hours	L_2, L_4, L_5
Module -3		
Kani's Method: Introduction, Concept, Relationships between bending moment and deformations, Analysis of continuous beams with and without settlements, Analysis of frames with and without sway	08 Hours	L_2, L_4, L_5
Module -4		
Matrix Method of Analysis (Flexibility Method) : Introduction, Axes and coordinates, Flexibility matrix, Analysis of continuous beams and plane trusses using system approach, Analysis of simple orthogonal rigid frames using system approach with static indeterminacy ≤ 3	12 Hours	L_2, L_4, L_5
Module -5		
Matrix Method of Analysis (Stiffness Method): Introduction, Stiffness matrix, Analysis of continuous beams and plane trusses using system approach, Analysis of simple orthogonal rigid frames using system approach with kinematic indeterminacy ≤ 3	12 Hours	L_2, L_4, L_5

Course outcomes: After studying this course, students will be able to:

1. Determine the moment in indeterminate beams and frames having variable moment of inertia and subsidence using slope defection method

2. Determine the moment in indeterminate beams and frames of no sway and sway using moment distribution method.

3. Construct the bending moment diagram for beams and frames by Kani's method.

4. Construct the bending moment diagram for beams and frames using flexibility method

5. Analyze the beams and indeterminate frames by system stiffness method.

Program Objectives:

- Engineering knowledge

- Problem analysis

- Interpretation of data

Question paper pattern:

- The question paper will have 5 modules comprising of ten questions. Each full question carrying 16 marks

- There will be two full questions (with a maximum of three subdivisions, if necessary) from each module.

- Each full question shall cover the topics as a module

- The students shall answer five full questions, selecting one full question from each module. If more than one question is answered in modules, best answer will be considered for the award of marks limiting one full question answer in each module.

Text Books:

1. Hibbeler R C, **" Structural Analysis",** Pearson Publication

2. L S Negi and R S Jangid, **"Structural Analysis",** Tata *McGraw-Hill* Publishing Company Ltd.

3. D S Prakash Rao, **"Structural Analysis: A Unified Approach"**, Universities Press

4. K.U. Muthu, H.Narendra etal, **"Indeterminate Structural Analysis",** IK International Publishing Pvt. Ltd.

Reference Books:

1. Reddy C S, **"Basic Structural Analysis"**, *Tata McGraw-Hill* Publishing Company Ltd.

2. Gupta S P, G S Pundit and R Gupta, **"Theory of Structures**", Vol II, Tata McGraw Hill Publications company Ltd.

3. V N Vazirani and M M Ratwani, **"Analysis Of Structures**", Vol. 2, Khanna Publishers

4. Wang C K, **"Intermediate Structural Analysis",** McGraw Hill, International Students Edition.

5. S.Rajasekaran and G. Sankarasubramanian, **"Computational Structural Mechanics",** PHI Learning Pvt. Ltd.,