3SE02: STRUCTURAL ANALYSIS - II
CREDITS – 4 (LTP: 3,1,0)

Course Objectives:

1. To impart knowledge of analysis of the various structures using different methods.
2. To impart the concept of plastic method.
3. To explain the concept and analysis of pre-stressed elements.

Teaching and Assessment Scheme:

Teaching Scheme (Hours per Week)			Credits	Assessment Scheme				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE	CE	ESE	CE	150
3	1	0	4	60	40	20	30	

Course Contents:

Unit No.	Topics	Teaching Hours
1	**Analysis of Framed Structures:** Analysis of Indeterminate Beams, Trusses and Plane Frames using energy principle, Analysis of Indeterminate Beams using Unit load method.	06
2	**Fixed and Continuous Beams:** Computation of fixed-end actions due to Primary Loads and secondary effects, beams of varying moment of inertia. Theorem of three moments.	04
3	**Slope Deflection Method:** Analysis of continuous beamsdue to Primary Loads and secondary effects, Analysis of simple portal frame with and without sway.	06
4	**Moment Distribution Method:** Analysis of continuous beamsdue to Primary Loads and secondary effects, Analysis of simple portal frame with and without sway.	07
5	**Matrix Methods for Structural Analysis:** Flexibility method and Stiffness method to analyze framed structures by system approach with and without secondary effects.	08
6	**Plastic Method:** Concept, Assumptions, Shape factor for different cross section, Collapse load, Load factor, Plastic modulus of section, Plastic moment of resistance, Computation of collapse load for fixed beam, continuous beam and plane frame.	06
7	**Pre-Stressed Elements** Introduction, Properties of high strength materials, Basics of prestressing – pre tensioning and post tensioning, Load-balancing concept, losses in prestress.	04
8	**Approximate Method:** Introduction, Approximate method of Structural analysis for multi- storeyed frames with lateral loads by Portal and Cantilever method. Substitute frame method for gravity loads.	04
	Total	**45**

List of References:

1. Junarkar S.B. and Shah H.J.; “Mechanics of Structures Vol-II”,Charotar publishing house, Anand.

2. Wang C. K., “Indeterminate Structures”.
3. Bhavikatti S S, “Structural Analysis” New age publications.
4. Patil H.S., Patil Y.D. and Patel Jignesh,“Structural Analysis-I”, Synergy Knowledgeware.
5. Popov E.P., “Engineering Mechanics of Solids” Prentice Hall of India, New Delhi.
6. Hibbler R C, “Structural Analysis” Pearson Education.
7. Krishnaraju N., “Prestressed Concrete”, Tata McGraw-Hill Private Limited, New Delhi
8. **www.nptel.iitm.ac.in/courses/**

Course Outcomes (COs):

At the end of this course students will be able to …

1. Analyze various structures with secondary effects for various loadings.
2. Apply Plastic method of analysis.
3. Determine the stresses in prestressed elements.