CE501PC: STRUCTURAL ANALYSIS – II

B.Tech. III Year I Sem.   L T P C
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Course Objectives:

- • Identify the various actions in arches.
- • Understand classical methods of analysis for statically indeterminate structures.
- • Differentiate the approximate and numerical methods of analysis for indeterminate structures.
- • Find the degree of static and kinematic indeterminacies of the structures.
- • Plot the variation of S.F and B.M when a moving load passes on indeterminate structure

Course Outcomes:

- • Analyze the two hinged arches.
- • Solve statically indeterminate beams and portal frames using classical methods.
- • Sketch the shear force and bending moment diagrams for indeterminate structures.
- • Formulate the stiffness matrix and analyze the beams by matrix methods.

UNIT – I

- Two Hinged Arches: Introduction – Classification of Two hinged Arches – Analysis of two hinged parabolic arches – Secondary stresses in two hinged arches due to temperature and elastic shortening of rib.
- Moment Distribution Method - Analysis of continuous beams with and without settlement of supports using - Analysis of Single Bay Single Storey Portal Frames including side Sway - Analysis of inclined frames -Shear force and Bending moment diagrams, Elastic curve.

UNIT – II

- Kani's Method: Analysis of continuous beams including settlement of supports - Analysis of single bay single storey and single bay two Storey Frames including Side Sway using Kani's Method - Shear force and bending moment diagrams - Elastic curve.
- Cables and suspension bridges: Equilibrium of a Suspension Cable subjected to concentrated loads and uniformly distributed loads - Length of a cable - Cable with different support levels - Suspension cable supports - Suspension Bridges - Analysis of Three Hinged Stiffening Girder Suspension Bridges.

UNIT – III

- Matrix Methods -Flexibility Matrix Method: Introduction to Flexibility matrix methods of analysis ;Analysis of continuous beams including settlement of supports ; Analysis of pin-jointed determinate plane frames

UNIT – IV

- Matrix Methods - Stiffness Matrix Method:: Introduction to Stiffness matrix methods of analyses using 'system approach' up-to three degree of indeterminacy– Analysis of continuous beams including settlement of supports- Analysis of pin-jointed determinate plane frames ; Analysis of single bay single storey portal frames using stiffness method - Shear force and bending moment diagrams - Elastic curve.

UNIT – V

- Influence Lines for Indeterminate Beams: Introduction – Influence line diagram for shear force and bending moment for two span continuous beam with constant and different moments of inertia - influence line diagram for shear force and bending moment for propped cantilever beams.

TEXT BOOKS:

1. Structural Analysis Vol –I &II by Vazarani and Ratwani, Khanna Publishers.
2. Structural Analysis Vol I & II by G.S. Pandit S.P. Gupta Tata McGraw Hill Education Pvt. Ltd.
3. Indeterminate Structural Analysis by K.U. Muthu et al., I.K. International Publishing House Pvt. Ltd

REFERENCE BOOKS:

4. Structural analysis T. S Thandavamoorthy, Oxford university Press
5. Mechanics of Structures Vol –II by H.J. Shah and S.B. Junnarkar, Charotar Publishing House Pvt. Ltd.
6. Basic Structural Analysis by C.S. Reddy., Tata McGraw Hill Publishers.
7. Examples in Structural Analysis by William M.C. McKenzie, Taylor & Francis.
8. Structural Analysis by R. C. Hibbeler, Pearson Education
9. Structural Analysis by Devdas Menon, Narosa Publishing House.
10. Advanced Structural Analysis by A.K. Jain, Nem Chand & Bros.