CE613PE: ADVANCED STRUCTURAL ANALYSIS (Professional Elective – II)

B.Tech. III Year II Sem.   **L   T/P/D   C**
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Course Objectives: The objectives of the course are to
- Understand the matrix method of analysis statically indeterminate frames and trusses.
- Know the transformation of coordinates and assembly of stiffness matrices
- Differentiate between flexibility and stiffness methods of analysis of beams, frames and plane trusses
- Understand the structural behavior of large frames with or without shear walls

Course Outcomes: After the completion of the course student should be able to
- Analyze the multistory building frames by various approximate methods.
- Solve the continuous beams, portal frames by matrix methods of analysis.
- Analyze and design of large frames with or without shear walls

UNIT- I
Introduction to matrix methods of analysis statically indeterminacy and kinematics indeterminacy-degree of freedom-coordinate system-structure idealization stiffness and flexibility matrices-suitability element stiffness equations-elements flexibility equations-mixed force-displacement equations-for truss element, beam element and tensional element
Transformation of coordinates-element stiffness matrix-and load vector-local and global coordinates.

UNIT- II
Assembly of stiffness matrix from element stiffness matrix-direct stiffness method-general procedure-bank matrix-semi bandwidth-computer algorithm for assembly by direct stiffness matrix method.

UNIT- III
Analysis of plane truss-continuous beam-plane frame and grids by Flexible methods.

UNIT- IV
Analysis of plane truss-continuous beam-plane frame and grids by stiffness methods.

UNIT- V
Special analysis procedures-static condensation and sub structuring-initial and thermal stresses.
Shear Walls Necessity-structural behavior of large frames with and without shear walls-approximate methods of analysis of shear walls.

TEXT BOOKS:
1. Matrix methods of structural analysis by Willam Weaver and gere, CBS Publishers.
2. Advanced Structural Analysis by A.K. Jain Nemchand Publishers

REFERENCES:
1. Advanced Structural Analysis by Devdas Menon, Narosa publishing house.
2. Matrix methods of structural analysis by Pandit and gupta
3. Matrix methods of structural analysis by J Meek
4. Structural Analysis by Ghali and Neyveli