Civil Engineering, IV-Semester
CE-4005 Structural Analysis-I

COURSE OBJECTIVE

To understand the concept of determinate and indeterminate structures, analyses of determinate and indeterminate structures. To understand the principle of virtual work and the application of influence line diagrams in structural analysis problems. The course runs through a number of techniques which are used for the analysis of civil engineering structures.

COURSE CONTENT

Virtual work and Energy Principles: Principles of Virtual work applied to deformable bodies,

Strain energy and complementary energy, Energy theorems, Maxwell's Reciprocal theorem,

Analysis of Pin-Jointed frames for static loads.

Indeterminate Structures-I: Static and Kinematics indeterminacy, Analysis of Fixed and Continuous beams by theorem of three moments, Effect of sinking and rotation of supports, Moment distribution method (without sway)

Indeterminate Structures - II: Analysis of beams and frames by slope Deflection method, Column Analogy method.

Arches and Suspension Cables: Three hinged arches of different shapes, Eddy's Theorem, Suspension cable, stiffening girders, Two Hinged and Fixed Arches - Rib shortening and Temperature effects.

Rolling loads and Influence Lines: Maximum SF and BM curves for various types of Rolling Loads, focal length, EUDL, Influence Lines for Determinate Structures- Beams, Three Hinged Arches.

COURSE OUTCOME

Ability to distinguish between determinate and indeterminate structures. Ability to analyze determinate and indeterminate structures.

Ability to use influence line diagrams as a valid tool for structural analysis.

REFERENCE

1. Rammamurtham, Theory of Structures, Dhanpat Rai .
2. Bhavikatti S.S. Analysis of Structures (I&II) Vikas Publication
3. B C Punmia, Theory of Structures, Firewall Media.
4. A Kassimali, Structural Analysis, Cengage Learning.
6. A Ghali, A Neville, T G Brown, Structural Analysis: CRC Press.
7. Hibbler, Structure Analysis -1, Pearson Education India
8. C S Reddy, Basic Structural Analysis, Tata McGraw Hill Publishing Company.
9. Pandit and Gupta, Theory of Structures – I, McGraw Hills
10. West HH, Fundamental of Structural Analysis, Wiley India
11. Das MM, Structural Analysis, PHI
12. Thandavamurthy TS, Structural Analysis, Oxford
13. Muthuku, Azmi I, Basic Structural Analysis, IK International Publisher
14. C KWang, Intermediate Structural Analysis, McGraw Hill
15. J Kinney Sterling, Indeterminate structural Analysis, Addison-Wesley
16. RR Mamuther S Theoty of Structures Dhanpat Rai
17. Jain O.P.-Jain B.K. Theory& Analysis of Structures (I&II) Nem Chand