PCI4I001 STRUCTURAL ANALYSIS-I (3-0-0)

Module I

Concept of determinate and indeterminate structures, determination of degree of static and kinematic indeterminacy in plane frame and continuous structures.

Methods of Analysis: Equilibrium equations, compatibility requirements, Introduction to force and displacement methods.

Analysis of propped cantilever by consistent deformation method, Analysis of fixed and continuous beams by Moment-Area method, Conjugate beam method and theorem of three moments.

Module II

Energy theorems and its application, Strain energy method, Virtual work method, unit load method, Betti's and Maxwell's laws, Castigliano's theorem, concept of minimum potential energy.

Analysis of redundant plane trusses.

Deflection of pin jointed plane trusses. Analytical method and Williot –Mohr diagram. Introduction to space truss.

Module III

Rolling loads and influence lines for determinate structures, simply supported beams, cantilever, ILD for reaction, shear force and bending moment at a section, ILD for wheel loads, point loads and udl, maximum bending moment envelope.

Module IV

Analysis of three hinged arches, Suspension cable with three hinged stiffening girders subjected to dead and live loads, ILD for Bending Moment, Shear Force, normal thrust and radial shear for three hinged arches

Text Books:

1. Theory and Problems in Structural Analysis by L Negi, Mc Graw Hill
2. Structural Analysis by T.S. Thandamoorthy, Oxford University Press
3. Basic Structural Analysis by C S Reddy, McGraw Hill

Reference Books:

1. Elementary Structural Analysis by Norris and Wilber, McGraw Hill
2. Structural Analysis by Aslam Kassimali, Cengage Learing
3. Structural Analysis by R.C. Hibbeler, Pearson Education