STRUCTURAL ANALYSIS
Code: CE402
Contact: 3L + 1 T
Credits: 4

Module 1
Review of basic concept of mechanics: Equilibrium, Free body diagram, Determinate and Indeterminate structures, Degree of indeterminacy for different types of structures: Beams, Frames, Trusses [4]

Module 2
Analysis of determinate structures: Portal frames, arches, cables [4]

Module 3
Strain energy: Due to axial load, bending and shear, Torsion; Castigliano's theorems, theorem of minimum potential energy, principle of virtual work, Maxwell's theorem of reciprocal deflection, Betti's law [4]

Module 4
Deflection determinate structures: Moment area and Conjugate beam method, Energy methods, Unit load method for beams, Deflection of trusses and simple portal frames. [8]

Module 5
Influence line diagrams: Statically determinate beams and trusses under series of concentrated and uniformly distributed rolling loads, criteria for maximum and absolute maximum moments and shears. [6]

Module 6
Analysis of statically Indeterminate beams: Theorem of three moments, Energy methods, Force method (method of consistent deformations) [for analysis of propped cantilever, fixed beams and continuous beams (maximum two degree of indeterminacy) for simple loading cases], Analysis of two-hinged arch. [8]

Module 7
Analysis of statically Indeterminate structures:
Moment distribution method - solution of continuous beam, effect of settlement and rotation of support, frames with or without side sway.
Slope Deflection Method –Method and application in continuous beams and Frames.
Approximate method of analysis of structures: Portal & Cantilever methods [8]