CE1012E MECHANICS OF SOLIDS

Course Schedule

Total hours: 39

1. Introduction to Mechanics of Solids, Evaluation policy
2. Tension, compression and shear: Types of external loads, self-weight, internal stresses, normal and shear stresses
3. Strain, Hooke's law, Poisson's ratio
4. Stress strain diagrams, working stress
5. Elongation of bars of constant and varying sections
6. Statically indeterminate problems in tension and compression
7. Assembly and thermal stresses
8. Strain energy in tension, compression and shear
9. Theory of simple bending: limitations, bending stresses in beams
10. Beams of different cross sections
11. Moment of resistance, beams of two materials
12. Shear stresses in bending, strain energy in bending
13. Torsion: Torsion of circular solid shafts
14. Hollow shafts, strain energy in shear and torsion
15. Open and close-coiled helical springs
16. Concepts of shear flow and shear centre

17. Analysis of stress and strain: Stress on inclined planes for axial and biaxial stress fields

18-19, Principal stresses, Mohr's circle of stress

20. Principal stress problem as an eigenvalue problem

21-22, Principal strains, strain rosette, principal stresses in bending

23-24, Deflection of beams: Differential equation of elastic curve

25. Slope and deflection of beams by successive integration

26-27, Macaulay's method

28-29, Moment area method

30-31, Conjugate beam method

32. Theory of columns: Axial loading of short strut

33-35, Long columns, differential equation of elastic curve, Euler formula for different supports

36-37, Eccentric loading, direct and bending stresses

38-39, Buckling load as an eigenvalue problem

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