

PPD3I104 STRENGTH OF MATERIAL

Module-I(10 classes)

Analysis of axially loaded members: Composite bars in tension and compression-temperature stresses in composite rods-statically indeterminate problem. 2D Stress system, Principal Planes, Principal stress, Mohr's stress circle, Members in biaxial state of stress: Stresses in thin cylinders, thin spherical shells under internal pressure-wire winding of thin cylinders. Strain & deformation: Two dimensional state of strain, Principal Strains, Calculation of principal stresses from principal strains, Strain measurement.

Module-II(10 classes)

Shear force and bending moment diagrams for simple beams: Support reactions for statically determinate beams, relationship between bending moment and shear force, shear force and bending moment diagrams.

Simple bending of beams: Theory of simple bending of initially straight beams, distribution of normal and shear stress, composite beams.

Module-III(12 classes)

Torsion in solid and hollow circular shafts, Twisting moment, strength of solid and hollow circular shafts, Strength of shafts in combined bending and twisting, Close-coiled helical springs. Deflection of Beams: Slope and deflection of beams by integration method and area-moment method.

Module-IV(10 classes)

Buckling of columns: Euler's theory for initially straight columns with various end conditions. Theories of failure: maximum principal stress theory, maximum shear stress theory, maximum principal strain theory, Maximum strain energy theory and maximum distortion energy theory.

TEXT BOOK(S):

1. Strength of Materials- G.H.Ryder, Macmillan India.
2. Mechanics of Materials- J.M.Gere and S.Timoshenko.
3. Strength of Materials by R.Subramaniam, Oxford University Press

REFERENCE(S):

1. Mechanics of Materials-I- E.J. Hern; Paragaman.
2. Introduction to Mechanics of Solids- Crandell, Dahl and Lardner, McGraw Hill.
3. Mechanics of Materials by Beer and Johnston, Tata McGraw Hill
4. Mechanics of Materials by R.C.Hibbeler, Pearson Education