

4th Semester	RPR4C003	Strength of Materials	L-T-P 3-0-0	3 CREDITS
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Module-I: (12hrs)

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: (12hrs)

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: (07hrs)

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.

Module-IV: (07hrs)

Deflection of Beams: Slope and deflection of beams by integration method and area-moment method.

Module-V: (07 hrs)

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.

Books:

- Strength of Materials- G.H.Ryder, Macmillan India.
- Mechanics of Materials- J.M.Gere and S.Timoshenko.
- Strength of Materials by R.Subramaniam, Oxford University Press
- Mechanics of Materials-I- E.J. Hern; Paragaman.
- Introduction to Mechanics of Solids- Crandell, Dahl and Lardner, McGraw Hill.
- Mechanics of Materials by Beer and Johnston, Tata McGraw Hill