

Subject: Strength of Materials

Class: Second year

Hours: 2 hrs (Theoretical) , 2 hrs (Practical)

Objectives:

The student must know the relations between externally applied loads and their internal effects on bodies (Strains, Deformations , and Stresses).

Week	Syllabus
1&2&3	Simple stress: Analysis of internal forces , Simple stress , Shearing stress , Bearing stress.
4&5&6	Riveted & Welded Connections: Types of riveted joints , Strength of a simple lap joint , Structural riveted joints , Welded constructions.
7&8& 9&10	Simple Strain: Stress-strain diagram , Hooke's law , Axial deformation , Poisson's ratio , Biaxial & Tri-axial deformations , Statically indeterminate members , Thermal stresses.
11& 12	Torsion: Derivation of torsion formulas , Longitudinal shearing stress , Shear flow.
13&14&15	Shear and Moment in Beams: Shear & moment , Shear & moment diagrams , Relations between load ; shear & moment.
16&17& 18&19	Stresses in Beams: Derivation of flexure formulas , Economic sections , Unsymmetrical beams , Analysis of flexure action , Formula for horizontal shear stress.
20&21& 22&23	Beams Deflections: Theorem of area-moment method , Double integration method.
24&25& 26&27	Combined Stresses: Combined axial & flexural loads , Kern of a section , Loads applied off axes of symmetry , Stress at a point , Mohr's circle , Transformation of strain components.
28&29&30	Columns: Critical loads , Long columns by Euler's formula , Intermediate columns , Empirical formulas.

References:

- 1. Strength of Materials / Ferdinand L. Singer & Andrew Pytel.**
- 2. Strength of Materials / R. S. Khurmi.**
- 3. Solution of Problems in Strength of Materials and Mechanics of Solids / S. A. Urry & P.J. Turner.**