MECHANICS OF MATERIALS

UNIT - I STRESS STRAIN AND DEFORMATION OF SOLIDS
Rigid and Deformable bodies – Strength, Stiffness and Stability – Stresses; Tensile, Compressive and Shear – Deformation of simple and compound bars under axial load – Thermal stress – Elastic constants – Strain energy and unit strain energy – Strain energy in uniaxial loads.

UNIT - II BEAMS - LOADS AND STRESSES
Types of beams: Supports and Loads – Shear force and Bending Moment in beams – Cantilever, Simply supported and Overhanging beams – Stresses in beams – Theory of simple bending – Stress variation along the length and in the beam section – Effect of shape of beam section on stress induced – Shear stresses in beams – Shear flow

UNIT - III TORSION
Analysis of torsion of circular bars – Shear stress distribution – Bars of Solid and hollow circular section – Stepped shaft – Twist and torsion stiffness – Compound shafts – Fixed and simply supported shafts – Application to close-coiled helical springs – Maximum shear stress in spring section including Wahl Factor – Deflection of helical coil springs under axial loads – Design of helical coil springs – stresses in helical coil springs under torsion loads

UNIT - IV BEAM DEFLECTION

UNIT - V ANALYSIS OF STRESSES IN TWO DIMENSIONS
Biaxial state of stresses – Thin cylindrical and spherical shells – Deformation in thin cylindrical and spherical shells – Biaxial stresses at a point – Stresses on inclined plane – Principal planes and stresses – Mohr’s circle for biaxial stresses – Maximum shear stress - Strain energy in bending and torsion.

TEXT BOOK:

REFERENCES:
These transverse loads will cause a bending moment $M$ that induces a normal stress, and a shear force $V$ that induces a shear stress. These forces can and will vary along the length of the beam, and we will use shear & moment diagrams (V-M Diagram) to extract the most relevant values. Constructing these diagrams should be familiar to you from statics, but we will review them here. There are two important considerations when examining a transversely loaded beam: How is the beam loaded? point load, distributed load (uniform or varying), a combination of loads; How is the beam supported? simple beam, cantilever, fixed-end beam...

Wet Stress (WS) for Phytophthora ramorum as modelled using CLIMEX with the CliMond dataset of historical climate normals centred on 1975. Where WS = 0, soil moisture does not limit the distribution of $P$. ramorum and where WS > 0 wet stress is represented by a factor of 1000, with increasing limitation as WS increases. (TIF). View full-text.

Being based on a Minkowskian unit normal vector field depending on position only, the theory we develop here is completely different from what we presented till now throughout the book. Read more. Chapter.