10 CE 223 MECHANICS OF SOLIDS (SI UNITS)

II B.Tech II Semester

(with effect from the academic year 2011-2012)

Credits: 4

Lectures/Week: 4 Hrs *Sessional Marks: 40*

University Exam :3 Hrs *End Examination Marks: 60*

UNIT –I

Bending Moments and Shear Forces: Beam – Types of loads, Types of supports, Shear Force and Bending Moment diagrams for cantilever, simply supported and over hanging beams.

UNIT –II

Bending Stress in beams: Theory of simple bending – Assumptions – Derivation of bending equation, Moment of Resistance of rectangular section, I-Section and triangular section.

Shear stress: Equation for shear stress distribution across any cross section of beam – shear stress distribution across rectangular, circular, triangular, I-Sections.

UNIT –III

Deflections of Beams: Relation between curvature, slope and deflection, double integration method, Macaulay's method, Moment area method.

Torsional Stresses in shafts: Analysis of torsional stresses, Power transmitted, combined bending and torsion,

UNIT –IV

Complex Stresses: Stresses on an inclined plane under different uniaxial, biaxial conditions, Principal planes and principal stresses, Mohr's circle.

Theories of Failure: Applications to Machine Elements, Fixed Beams: Fixing moments for a fixed beam of uniform section, Effect of sinking support, Slope and deflection.

UNIT –V

Columns and struts: Columns with one end free and the other fixed, both ends fixed, One end fixed and other hinged, Limitations of Euler's formula

Cylinders and Spherical Shells: Stresses and strains in thin cylinders, Thin Spherical shell.

TEXT BOOKS:

1. Analysis of Structures : Vaizirani and Ratwani, Vol. 1, 1993 edition.
2. Advanced Topics in strength of Materials : Shah L.B. & Shah R.T.
3. Strength of Materials : Ramamrutham

REFERENCES:

1. Strength of Materials : Timoshenko.
2. Mechanics of structures Vol. I & II : S.B. Junakar
3. Strength of Materials : R.K. Rajput.