PAE3I103 STRENGTH OF MATERIALS

UNIT I.   BASICS AND AXIAL LOADING

Stress and Strain – Hooke"s Law – Elastic constants and their relationship– Statically determinate cases - statically indeterminate cases –composite bar. Thermal Stresses – stresses due to freely falling weight.

UNIT II.   STRESSES IN BEAMS

Shear force and bending moment diagrams for simply supported and cantilever beams-Bending stresses in straight beams-Shear stresses in bending of beams with rectangular, I & T etc cross sections-beams of uniform strength

UNIT III.   DEFLECTION OF BEAMS

Double integration method – McCauley"s method - Area moment method – Conjugate beam method-Principle of super position-Castigliano"s theorem and its apllication

UNIT IV.   TORSION

Torsion of circular shafts - shear stresses and twist in solid and hollow circular shafts – closely coiled helical springs.

UNIT V.   BI AXIAL STRESSES

Stresses in thin circular cylinder and spherical shell under internal pressure – volumetric Strain. Combined loading – Principal Stresses and maximum Shear Stresses - Analytical and Graphical methods.

TEXT BOOKS

1. Nash William – "Strength of Materials", TMH, 1998
2. Timoshenko.S. and Young D.H. – "Elements of strength materials Vol. I and Vol. II"., T. Van Nostrand Co-Inc Princeton-N.J. 1990.

REFERENCES

1. Dym C.L. and Shames I.H. – "Solid Mechanics", 1990.