AMMV09 MECHANICS OF SOLID

UNIT-1 STRESS AND STRAIN

1.1 Stress and strain at a point- Tension, Compression,
1.2 Shear Stress- Hooke's Law
1.3 Relationship among elastic constants- Stress Strain Diagram for Mild Steel,
1.4 TOR steel, Concrete
1.5 Ultimate Stress- Yield Stress
1.6 Factor of Safety- Thermal Stresses- Thin Cylinders and Shells
1.7 Strain Energy due to Axial Force- Resilience
1.8 Stresses due to impact and Suddenly Applied Load- Compound Bars.

UNIT-2 SHEAR AND BENDING IN BEAMS

2.1 Beams and Bending- Types of loads,
2.2 Supports- Shear Force and Bending Moment Diagrams for statically determinate beam with concentrated load,
2.3 UDL, uniformly varying load.
2.4 Theory of Simple Bending- Analysis of Beams for Stresses-
2.5 Stress Distribution at a cross Section due to bending moment and shear force for Cantilever,
2.6 Simply supported and overhanging beams with different loading conditions- Flitched Beams.

UNIT-3 DEFLECTION

1.1 Double integration method Macaulay's methods
1.2 Area moment method
1.3 Conjugate beam method for computation of slopes and deflections of determinant beams.

UNIT-4 TORSION

4.1 Torsion of Circular and Hollow Shafts
4.2 Elastic Theory of Torsion- Stresses and Deflection in Circular Solid and Hollow Shafts
4.3 Combined bending moment and torsion of shafts- strain energy due to torsion
4.4 Modulus of Rupture- Power transmitted to shaft- Shaft in series and parallel
4.5 Closed and Open Coiled helical springs
4.6 Leaf Springs- Springs in series and parallel- Design of buffer springs.

UNIT-5 COMPLEX STRESSES AND PLANE TRUSSES

5.1 2 D State of Stress
5.2 2 D Normal and Shear Stresses on any plane
5.3 Principal Stresses and Principal Planes
5.4 Mohr's circle
5.5 Plane trusses: Analysis of plane trusses
5.6 Method of joints- method of sections.

References Books:

1. Gambhir. M.L., "Fundamentals of Solid Mechanics", PHI Learning Private Limited., New Delhi, 200-
2. Timoshenko.S.B. and Gere.J.M, “Mechanics of Materials”, Van Nos Reinbhold, New Delhi 1--5.