

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
STRENGTH OF MATERIALS – 1

SEMESTER –III

TEACHING SCHEME	L=3; P/D=2; TA=1
EXAMINATION SCHEME	Theory = 3hours; marks= 100
PRACTICAL / DRAWING	Internal evaluation marks: 20 External evaluation marks: 30 Tutorial marks: 25 Total Marks : 75

1. Strength and Elasticity: Stress, strain, elasticity, stress-strain characteristics, Hook's law, elastic constants and proportionality, yield limit, ultimate strength, proof stress, factor of safety, working stress and load factor.
2. Mechanical properties of materials: Metals- ductility, brittleness, toughness, malleability, behaviour of ferrous and non-ferrous metals in tension and compression, shear and bending stress, standard test pieces, influence of various parameters on test results, true and nominal stress, modes of fracture, characteristics stress-strain curves, strain hardening, Izod, Charpy and tension impact tests, fatigue strength, endurance limit, creeps of metals, co-relation between different mechanical properties, testing machines and special features, different types of extensometers and compressometers, measurement of strain by electrical resistance strain gauges.
3. Bending moment and shear force: Diagrams in statically determinate beams including cantilevers subjected to concentrated uniformly distributed and varying loads and inplane moment loading, BM and SF diagrams by analytical and graphical methods, relation between bending moment, shear force and rate of loading, points of contraflexure.
4. Stress in beams: Theory of simple bending, bending stresses and their distribution, moment of resistances, modulus of section, built-up & composite beam sections, beams of uniform strength, distribution of shear stress.
5. Torsion: Circular, solid and hollow section shafts, shear stress and strain due to torsion, angle of twist, torsional moment of resistance, power transmitted by a shaft, keys and couplings, closed coiled helical springs.
6. Principal stresses and strains: Compound stresses, analysis of principal planes and principal stress, Mohr circle of stress, principal strains, angle of obliquity of resultant stress, principal stress in beams and shafts subjected to bending and torsion, with and without axial stress.
7. Columns: Different end conditions, effective length, least radius of gyration, theory of long columns, application and limitations, secant formula used by I. S. Code.

REFERENCES:

1. Timoshenko and Young, Elements of Strength of Materials, Affiliated East West Press.
2. Ryder G. H. , Strength of Materials, ELBS, Hong Kong.