SUBJECT NO-ME11003, SUBJECT NAME- BASIC ENGINEERING MECHANICS

LTP- 3-1-0,CRD- 4

SYLLABUS :-

1. Vector Mechanics with applications: Definition and representation of vectors, projection and decomposition, force vector and types, dot product, resolving force vector along and perpendicular to a given direction, cross product and scalar triple product, moment of force about a point and axis, force couple and couple moment, force system, simple distributed force, parallel and concurrent force systems, equivalent force system and simplest resultant, applications. 2. Equilibrium in 2D and 3D - Constraints, Free-body-diagrams, Equations of static equilibrium, special cases like two-force, three-force and multi-force applications, plane trusses and frames. 3. Friction - Coulomb friction, tipping vs sliding, flat belt drives and pulleys, screw-jack, rolling resistance. 4. Internal Forces - axial force and torque diagrams, Shear force and bending moment diagrams. 5. Concept of Stress and Strain - Stress-strain diagram, factor of safety, uniaxial loading, single and double shear, applications. 6. Generalized Hooke's law - Poisson's ratio, Generalized Hooke's law, Relations between E, nu, G and K 7. Indeterminate problems involving uniaxial loading. Text Books: 1. Vector Mechanics for Engineers - Statics and Dynamics (12th Edition, SIE) by Ferdinand P. Beer, E. Russell Johnston Jr., et al. |2019. 2. Mechanics of Materials, 8th Edition, Si Units by Ferdinand Beer, E. Johnston, et al. | 2020.null