

SYLLABUS:-

1. Vector Mechanics with applications (2W): Definition and representation of vectors, projection and decomposition, force vector and types, dot product, 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.
2. Equilibrium in 2D and 3D (3W) - Free-body diagrams, Equations of static equilibrium, special cases like two-force, three-force and multi-force applications, plane trusses and frames.
3. Friction (2W) - Coulomb friction, tipping vs sliding, flat belt drives and pulleys, rolling resistance, screw friction.
4. Moments of area and inertia (1W) - First and second moments of area, centroid and radius of gyration, polar moment of area, axis theorems, moments of inertia
5. Concept of Stress and Strain (3W) - Stress-strain diagram, Hooke's law, factor of safety and design for strength, axial force diagram, normal stress, stress in oblique plane and shear stress, single and double shear, normal and shear strain, design for deflection.
6. Indeterminate problems involving uniaxial loading (1W).
7. Generalized Hooke's law (1W) - Poisson's ratio, generalized Hooke's law, relations between E , ν , G and K

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.