

XE	Engineering Sciences
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XE3: Solid Mechanics**Section XE3.1 Mechanics of Rigid Bodies**

Equivalent forces and moments; equilibrium equations; analysis of determinate trusses and frames; sliding and sticking friction; the principle of minimum potential energy and its relation to stable equilibrium; particle kinematics and dynamics; dynamics of inter-connected and/or constrained rigid bodies under planar motion; systems that conserve energy and/or momentum.

Section XE3.2 Mechanics of Deformable Bodies

Definition of stress and strain; Transformation of stresses and strains; Principal Stresses; Mohr's circle for plane stress and plane strain; Elastic Constants; Generalized Hooke's Law; Thermal Stresses; Theories of Failure - von Mises, Tresca and maximum principal stress theories.

Axial force, shear force, and bending moment diagrams; axial, shear, and bending stresses; combined stresses; deflection (for symmetric bending); systems with up to one degree of static indeterminacy (i.e., up to one support or internal force not determinable from static equilibrium alone); energy methods (Castigliano's theorems); torsion of circular shaft; Euler Buckling; thin-walled pressure vessels.

Section XE3.3 Vibrations

Free and forced vibration of single-degree-of-freedom systems; effect of damping; base excitation.