

# CIVIL ENGINEERING

**STATICS** : Coplaner and multi planer system free body diagrams, centroid second moment of plane figure force and funicular polygons, principle of virtual work suspension systems and cetenary.

**DYNAMICS** : Units and dimensions, Gravitational and absolute system, MKS & S.I. Unit.

**KINEMATICS:** Rectilinear and Curvilinear motion, Relative motion, Instantaneous centre.

**KINETICS** : Mass moment of inertia, simple harmonic motion, momentum and impulse equations of motion of rigid body rotating about a fixed axis.

**STRENGTH OF MATERIALS** : Homogeneous and isotropic media, stress and strain elastic constants, tension and compression in one direction, reveted and welded joints.

Compound stresses: Principal stresses and principal straints, simple theories of failure.

Bending moments and shear forced diagrams. Theory of bending, shear stress distribution in cross section of beams Deflection of beams.

Analysis of laminated beams and non-prismatic structures.

Theories of columns, middle-third and middle-fourth rules.

Three pinned arch analysis of simple frames, Torsion of shafts combined bending direct and torisonal stresses in shafts.

Strain energy in elastic deformation, impact fatigue and creep.

**SOIL MECHANICS:** Origin of soils, classification void ratio, Moisture content permeability, Compaction..

Seepage; Construction of flow nets, Determination of shear strength parameters for different drainage and stress conditions- Triaxial, unconfined and direct shear tests.

Earth pressure theories - Rankine's and coulomb's analytical and graphical methods, stability of slops.

Soil consolidation - Terzaghi's theory for one dimensional consolidation, rate of settlement and ultimate settlement, effective stress pressure distribution in soils, soil stabilization. Foundations- Bearing capacity of footings, Piles, Wells, Sheets piles.

**FLUID MECHANICS** : Properties of fluids.

Fluid Statics -- Pressure at a point force on plane and curved surface, buoyancy stability of floating and submerged bodies, dynamics of fluid flow, Laminar and turbulent flow, equation of continuity energy and momentum equation, Bernoullis theorem, cavitation, Velocity, potential and steam functions, rotational, irrotational flow, vortices, flow net, Fluid flow measurement..

Dimensional analysis : Units and dimensions - non-dimensional numbers, Buck-ingham's pi-theorem, principles of similitude and application.

Viscous flow : Flow between static plate and circular tubes boundary layer concepts: drag and lift.

Incompressible flow through pipe : Laminar and turbulent flow, critical velocity, friction losses, loss due to sudden enlargement and contraction energy grade lines.

Open Channel flow - uniform and non-uniform flows, specific energy and critical depth, gradually varied flow surface profiles, standing wave flume, surges and waves.

**SURVEYING :** General principles, sign convention surveying instruments and their adjustment, recording of survey observations, plotting of maps and sections, errors and their adjustments. Measurement of distances, directions and heights, correction to measure length and bearings, correction for local attractions, measurement of horizontal and vertical angles, levelling operations, refraction and curvature corrections, Chain and compass survey, theodolite and tacheometric traversing, traverse computation; plane table survey, solution of two and three points problems, contour surveying, setting out direction and grades & type of curves, setting out of curves and excavation lines for building foundations.