CIVIL ENGINEERING

1. **Engineering mechanic :** Static's units and dimensions, SI units, vectors, coplanar and non coplanar force Systems, equations of equilibrium, free body diagram, static friction, virtual work distributed force systems, first and second moments of area, mass movement of inertia.

2. **Kinematics and dynamics :** Velocity and acceleration in Cartesian and curvi linear coordinative systems, equations of motion and their integration, principles of conservation of energy and momentum, collision of elastic bodies, rotation of rigid bodies about fixed axis, simple harmonic motion.

3. **Strength of materials :** Elastic isotropic and homogenous materials, stress and strain, elastic constants, relation among elastic constants, axially loaded determinate and indeterminate members, shear force and bending moment diagrams, theory of simple bending, shear stress distribution, stitched beams.

4. **Deflection of beams :** Macaulay method, Mohr theorems, conjugate beam method, torsion, torsion of circular shafts, combine bending, torsion, and axial thrust, close coiled helical springs, strain energy, strain energy in direct stress, shear stress bending and torsion, thin and thick cylinders, columns and struts, Euler and Rankiane loads, principal stress and strains in two, dimensions, Mohrcircle-theories of elastic failure. Structural analysis, indeterminate beams proposed, fixed and continuous beams shear force and bending moment diagram, deflections, three hinged and two hinged arches, rib-shortening, temperature effects, influence lines.

5. **Trusses :** Method of joints and method of sections, deflection of plane pin-joined trusses.

6. **Rigid frames :** Analysis of rigid frames and continues beams by theorem of three moments, moment distribution method slope deflection method. Kani method and column analogy method metric analysts. Rolling loads and influence lines for beams and pin-joined girders.

7. **Soil Mechanics :** Classification and identification of soils, phase relationships surface tension and capillary phenomena, in soils, laboratory and field determination of coeff of permeability, seepage forces, flow nets, critical hydraulic gradient permeability of stratified deposits : Theory compaction, compaction control total and effective stress, pole pressure coefficient, shear strength param in terms of total and effective stress, Mohr coulomb theory, total and effective stress analysis of soil slopes, active and passive pressure, Rankiene and coulomb theories and earth pressure, pressure distribution of French sheeting, retaining walls, sheet pile walls, soil consolidation, terzahigh one dimensional theory of consolidation primary and secondary settlement.

8. **Foundation Engineering** : Exploratory programme for sub-surface investigations. Common types of boring and sampling, field test and their interpretation, water level observation, stress distribution beneath loaded areas by Bossiness and Steinbrenner methods use of influence chars, constant pressure distribution determination of ultimate bearing capacity of Terzaghi, Skemptom and Hansen's methods allowable bearing pressure beneath footings and rafts settlement enteria, design aspects of footings and rafts, bearing capacity of piles and pile groups, pile load tests, under reamed piles for swelling soil-well foundations, conditions of statistical equilibrium vibration analysis of single degree freedom system, general consideration for design of machine foundation : Earth quake effects on soil foundation system, liquefaction.

9. **Fluid Mechanics** : Fluid properties, fluid static, forces on place and curved surface, stability of floating and submerged bodies.

10. **Kinematics** : Velocity, stream lines, continuity equations, accelerations, irrigational and rotational flow, velocity potential and steam functions, flow net, separation and stagnation.

11. **Dynamics** : Euler's equation along streamline, energy and momentum equation, Bernoulli's theorem application's to pile flow and free surface flows, free and forced vortices.

12. **Dimensional analysis and similitude** : Buckingham's theorem dimensionless parameter Sunilantics undistorted models, boundary layer on a float plate, drag and lift on bodies.

13. **Laminar and turbulent** : Laminar flow through pipe and between parallel plates, transition to turbulent flow, turbulent flow through pipes, friction factor variation, energy loss and expansions, contraction and other no uniformities, energy grade line and hydraulic grade line, pipe networks, water hammer.

14. **Compressible flow** : Isothermal and isentropic glows velocity of propagation of pressure wave, mach number, sub-sonic and supersonic flows shoot waves.

15. **Open channel flow** : Uniform and non uniform flows specific energy and specific flows critical depth, flow in contracting transition, free overall wires hydraulic jump surges gradually varied flow equation and its integration, surface profiles.

16. **Surveying** : General principles: Sing conventions, chain surveying principles of plane table surveying two-point problem, three-point problem compass surveying, traversing, bearing, local attraction, traverse computations corrections.

17. **Leveling** : Temporary and permanent adjustments, fly levels, reciprocal leveling, contour leveling, volume computations, refraction and curvature corrections, theodolite adjustment, traversion, heights and distance, tachometric surveying.

Curved setting by chain and by theodolite, horizontal and vertical curves, triangulation and base line measurements, satellite stains, trigonometric leveling astronomical surveying, Celestin coordinates, solution of spherical triangles, determination of azimuth, latitude, longitude and time.

Principles of aerial photogrammetry hydrographic surveying.