CIVIL ENGINEERING

SOIL MECHANICS AND GEOTECHNICAL ENGINEEERING

Origin of soils, soil classification, three-phase system, fundamental definitions, relationship and interrelationships, permeability & seepage, effective stress principle, shear strength, consolidation, compaction,

Sub-surface investigations-scope, drilling bore holes, sampling, penetration tests, plate load test. Earth pressure theories, effect of water table, layered soils. Stability of slopes-infinite slopes, finite slopes, Foundation types-foundation design requirements. Shallow foundations-bearing capacity, effect of shape, water table and other factors, stress distribution, settlement analysis in sands & clays, Deep foundations pile types, dynamic & static formulae, load capacity of piles in sands & clays, negative skin friction.

FLUID MECHANICS AND WATER RESOURCES ENGINEERING

Properties of fluids, principle of conservation of mass, momentum, energy and corresponding equations, potential flow, applications of momentum and Bernoulli's equation, laminar and turbulent flow, flow in pipes, Concept of boundary layer and its growth. Uniform flow, critical flow and gradually varied flow in channels, specific energy concept, hydraulic jump. Forces on immersed bodies, flow measurement in channels, tanks and pipes. Dimensional analysis and hydraulics modeling. Kinematics of flow specific speed of pumps and turbines.

Hydrologic cycle, rainfall, evaporation, infiltration, stage discharge relationships, unit hydrographs, flood estimation, reservoir capacity, reservoir and channel routing. Well hydraulics.

Duty, delta, estimation of evapo-transpiration. Crop water requirements. Design of lined and unlined canals, waterways, head works, gravity dams. Design of weirs on permeable foundation. Types of irrigation.

Rainfall, stream flow measurements, runoff, hydrographs, flood studies, reservoir and channel routing, flood forecasting. Flood protection measures, river training works, well hydraulics. Irrigation: command area and crop-water requirement.

STRENGTH OF MATERIALS & THEORY OF STRUCTURES:

Normal stress, shearing stress, Normal strain. Hooke's Law. Stress strain behavior of mild steel, Poisson's Ration. Shearing strain. Torsion of Circular shaft. Relations among load. Shear and Bending Movement. Shear and Bending Movement Diagrams. Pure Bending. Bending of members. Made of several Materials. Shearing stresses in a Beam. Mohr's circle for plain stress. Principle stresses. Maximum Shearing. Euller's formula for pin-Ended columns and columns with other End conditions. Equation of the Elastic Curve by Double Integration method, slop and Deflection of Determinate Beam by Momenet Area Theorems. Deflections and slop by Energy Methods. Castigliano's Theorem. Stability and Degree of indeterminacy Rolling loads and influence lines for Determinate Beams.Trusses and floor Ginders. Cables and Three-Hinged Arch.

STRUCTURAL DESIGN

Concrete Technology-properties of concrete, basics of mix design., Working stress methods of design, singly and doubly reinforced sections, rectangular and Test beans, shear torsion and development length one and two way slabs, short and long column, Design of isolated footings, Introduction of limit state design. Design for flexure, shear and compression. Design of riveted and welded connections, tension compression members Splicing and lacing. Beam column connection. Roof trusses.

HIGHWAY AND RAILWAY ENGINEERING

Highway geometric Design. Cross sectional elements. Sight distance horizontal and vertical alignment, Types and components of Pavement structures. Design of flexible Pavements. Traffic characteristics : Road user and vehicular characteristics, traffic volume studies, O-D studies and traffic capacity studies.

Railways: Components, construction and maintenance of rail tracks. points and crossing.

SURVEYING:

Contouring. Theodolite and its adjustment. Measurement of angles and setting out lines. Trigonometrical leveling. Tacheometry. Curves and different methods of setting out curves, introduction to electronic. Theodolites and total stations.

ENVIRONMENTAL ENGINEERING;

Estimation of quantity of water per capital demand, population forecasting, water quality parameters, treatment of water, distribution system. Estimation of quantity of sewage, dry weather flow and storm run off. Sewer appurtenances, characteristics off sewage, treatment and disposal of sewage sludge digestion.