

Syllabus for Civil Engineering PGQP08(v)

Geotechnical Engineering

Three-phase system and phase relationships, index properties; Unified and Indian standard soil classification system; Permeability - one dimensional flow, Seepage through soils – two - dimensional flow, flow nets, uplift pressure, piping, capillarity, seepage force; Principle of effective stress and quicksand condition; Compaction of soils; One- dimensional consolidation, time rate of consolidation; Shear Strength, Mohr's circle, effective and total shear strength parameters, Stress-Strain characteristics of clays and sand; Stress paths

Sub-surface investigations - Drilling bore holes, sampling, plate load test, standard penetration and cone penetration tests; Earth pressure theories - Rankine and Coulomb; Stability of slopes – Finite and infinite slopes ; Stress distribution in soils – Boussinesq's theory; Pressure bulbs, Shallow foundations – Terzaghi's and Meyerhoff's bearing capacity theories,

Water Resources Engineering

Properties of fluids, fluid statics; Continuity, momentum and energy equations and their applications; Potential flow, Laminar and turbulent flow; Flow in pipes; Forces on immersed bodies; Hydrologic cycle, infiltration, unit hydrographs, ground water hydrology - steady state well hydraulics and aquifers; Application of Darcy's Law.

Environmental Engineering

Basics of water quality standards – Physical, chemical and biological parameters; Water quality index; Unit processes and operations; Engineered systems for solid waste management (reuse/ recycle, energy recovery, treatment and disposal).

Transportation Engineering

Geometric design of highways - cross-sectional elements, sight distances, horizontal and vertical alignments; Highway materials - desirable properties and tests; Desirable properties of bituminous paving mixes; Design factors for flexible and rigid pavements codes

Structural Engineering

System of forces, free-body diagrams, equilibrium equations; Internal forces in structures; Frictions and its applications; Centre of mass; Free Vibrations of undamped SDOF system ; Bending moment and shear force in statically determinate beams; Simple stress and strain relationships; Simple bending theory, flexural and shear stresses ; buckling of column, combined and direct bending stresses.