CE734A: Plastic Equilibrium in Soils   **3-0-0-0 [9]**

Course Contents:
Review of basic concepts of continuum mechanics: stresses, strains, compatibility conditions, transformation of stresses and strains in rotated co-ordinate system, constitutive relations, stress functions, stress and displacement formulations, plane stress and plane strain problems; Theory of plasticity: yield criterion, plastic potential and plastic flow rule, principle of maximum plastic work, strain hardening and perfect plasticity, isotropic and kinematic hardening, general stress-strain relations; Perfect plasticity constitutive relations: elastic models, plasticity models for cohesive and frictional soils. Method of stress characteristics or slip line method: theorem, formulation for stress characteristics, application to different geotechnical structures such as foundation problem, retaining wall problem, slope stability etc.; Limit analysis: lower and upper bound theorem of plastic collapse, lower and upper bound limit analysis, lower and upper bound analysis using linear programming, application to different geotechnical structures such as foundation problem, retaining wall problem, slope stability etc.; Shakedown analysis: concept and theorems, rolling and sliding line contacts, rolling and sliding point contacts, shakedown analysis using linear programming etc.