**Structural Engineering**

**Advanced Reinforced Concrete Structures:**

*Concrete Technology:* Concrete as structural material, strength of concrete and its significance, Strength porosity relationship, Factors effecting compressive strength, Behavior of concrete under stress states, Durability of concrete and its significance, Sulphate attack, Alkali aggregate reaction, Corrosion of embedded steel in concrete and concrete deterioration due to corrosion of steel and its preventive measures.

*Design of Slender Columns:* Concentrically loaded slender columns, eccentrically loaded slender columns, Slender columns subjected to axial and transverse loads, Structural behavior of columns in braced and unbraced frames, Codal procedure for design of slender columns.

*Flat Slabs:* Elements of flat slabs, Codal procedure for design of flat slabs, Behavior of flat slab inshear, One way and two way shear, Opening in flat slabs, Effect of pattern loading in flat slabs. *Deep Beams:* General features, Parameter influencing design, Flexural bending and shear stresses in deep beams. Design provisions of IS-456, Checking for local failures, Detailing of reinforcement in deep beams.

*Over Head Service Reservoir:* Special design considerations, Design requirements of materials, complete design and drawing details of an overhead service reservoir.

*Yield Line Analysis:* Design of slabs of various shapes and having various support conditions using yield line analysis approach.

*Design of Beam Column Joints:* Types of joints, Joints in multistoreyed buildings, Forces acting on joints, Design of joints for strength, Anchorage requirement in joints and detailing of reinforcement in joints.

**References:**

1. Advanced R.C.Design by Krishna Raju.
3. Reinforced Concrete Structures by Park and Pauley.
4. Reinforced Concrete Structural Elements – Behaviour Analysis and Design by Purushothaman.
5. Concrete Technology by M.S. Shetty.