

## Syllabus for Civil Discipline

1. **Soil Mechanics and Foundation Engineering** – Basic Knowledge on the subject ,
  - Fundamental definition & Inter relationship-(i) Void Ratio (ii) Porosity (iii) Degree of saturation (iv) Bulk Density (v) Dry Density (vi) Submerged density .(vii) specific gravity (viii) Moisture content
  - Index Properties- Grain size distribution from sieve analysis and Hydrometer test, the Atterburg Limits (Liquid Limit, Plastic Limit, Shrinkage Limit), Plasticity Index, IS classification based on grain size
  - Shear strength of soil- Linear relationship of shear stress with cohesion, friction and normal stress. General , punching & local shear failure
  - Settlement of shallow foundation- Immediate & consolidation settlement for sand and clay for a single layer soil under vertical load
  - Bearing capacity: Different Terminologies
  
2. **Engineering Mechanics, Strength of Materials & Analysis of Structure** – Basic knowledge on the subject, simple numerical.
  - Fundamental Definition( qualitative/quantitative)-(i) Force (ii) Moment(iii)Center of gravity(iv) Moment of inertia(v) Bending Moment(vi) shear Force(vii) torsion (viii) Elasticity (ix) stress (x) strain (xi) Fixed Support (xii) Hinged Support (xiii) roller Support
  - Parallelogram law forces , resolution of forces
  - Bending moment, shear force-Single span with different types of support at ends and with UDL, concentrated Load, Diagrams
  - Deflection pattern -Single span having different types of support at ends and with UDL & concentrated load.
  
3. **Design of structures** – Basic knowledge on the subject , simple numerical
  - Loads – Different types of Loads (Dead Load , Live Load, Wind Load , Seismic Load etc.), Calculation of dead load for residential / office buildings from floor and masonry, Provision of IS-875 (Table -1, part-2) for live load of different facilities , parameters of wind load(section 5 of IS – 875(part-3), Earthquake zones and zonal factors(IS 1893(part-1)-2002 , table 2 & Annex E)
  - Fundamental definitions : i) column, ii) Beam, iii) Slab, iv) Truss, v) Space Frame
  - RCC Design: What is RCC, Why RCC is used, Design of RCC Singly reinforced beam with the help of SP-16. Design of axially loaded column (Clause 39.3 of IS 456-2000), Design of slab (the relevant table –Annexure D, Table – 26 of IS 456-2000 )and chart from IS456/SP16). Basic knowledge on Compressive and Tensile zones, cover, Neutral Axis, Effective depth, Moment of resistance, Under reinforced, over reinforced, doubly

reinforced sections, one way and 2-way slab, Development length, control of deflection (CL 23.2 and 24.1 of IS-456).

- Detailing of RCC Structures – Clause 26.5 of IS 456 regarding Requirements of Reinforcement for Structural members, provisions of SP-34 (Handbook on concrete reinforcement and detailing).
  - Design of Steel Structure – Basic knowledge on design of Tension member, compression member and flexural (bending) member (Refer IS 800 – 1984 & SP6), Welded Joint.
4. **Public Health Engineering** - Knowledge on important features of water supply system, water and sewage treatment, waste water management.
  5. **Surveying**- Basic Knowledge of the Subject
  6. **Construction Practice** - Basic Knowledge on the Subject & relevant IS codes.
    - Units – conversion of units from FPS to metric and vice-verse
    - Mensuration – calculation of area and volume of different 2 dimensional and 3 dimensional figures.
    - Concrete Technology – characteristic and permissible strengths of concrete and reinforcement , different nominal mix proportions , basic knowledge about design mix, material requirement for different grades of concrete, water cement ratio, the salient features of section 2, IS 456-2000 regarding materials, workmanship, inspection and testing with respect to cement(cl 5.1), aggregates (cl 5.3), water (cl 5.4), admixture (cl. 5.5), reinforcement (cl. 5.6), concrete (cl. 6), workability of concrete (cl. 7), Table – 5, Table – 9, formwork (cl. 11), assembly of reinforcement (cl. 12), Transporting, placing compaction and curing (cl. 13), Sampling and strength of designed concrete mix (cl. 15).
    - Construction of Steel structure.
    - Construction of Brick masonry structure.
    - Quality Control – Material Testing.
    - Construction of Roads and pavement.
    - Site Supervision / Monitoring.
  7. **Rate analysis, Estimation & Measurement** – Detail knowledge on the subject & relevant IS codes
  8. **Civil engineering Manual** – Knowledge on important features of the Manual.