**APGENCO AE (ASSISTANT ENGINEERS) CIVIL SYLLABUS**

**1.  Strength of materials and theory of structures:**
Simple stresses and strains, Hooke’s Law, elastic constants, stress strain curve of mild steel stresses on oblique planes – Principal stresses and strains, Mohr’s stress circle,  temperature  stresses,  compound  bars,  shear  force  and  bending  moment diagrams  for beams, bending  and  shear  stresses  in beams,  strain energy  principles, torsion  of  circular  shafts  –  Pure  torsion  and  combined  with  bending  and  thrust, deflections of simple beams,  thin and  thick    cylinders, columns and struts, direct and bending  stresses,  trusses, propped  cantilevers  and  fixed  beams, arches,  cables and
suspension  bridges;  moving  loads  and  influence  lines;  static  and  kinematic indeterminacies,  Continuous  beams  and  portal  frames-movement  distribution,  Kani’s and matrix methods.  Unsymmetrical Bending and shear Centre.
 **2.  Reinforced Concrete:**
Materials – properties, grades and tests, workability and mix design of concrete –  basic  concepts  of  working  stress  and  limit  state methods  of  design  –  Limit  state design of beams, slabs, columns, footings.  Circular and flat slabs, water tanks, bridges –  IRC specifications and  loadings, Slabs and T – beam bridges,  retaining walls, Pre-stressed concrete – basic concepts, losses and analysis and design of beams including end block.

**3.  Steel structure:**
Rivetted  and  welded  joints,  Connections  –  eccentric  and  framed,  simple  and compound beams,  tension and  compression members, plate and gantry girders,  roof trusses, plate girder and  truss bridges, water  tanks, roof  trusses,  tubular sections and design,  transmission  towers,  column  bases,  plastic  analysis,  basic  principles, theorems, methods of analysis, analysis and design of determinate and  indeterminate beams and frames.

**4.  Geo-Technical Engineering:**
Origin  and  classification  of  soils,  three  phase  system,  basic  definitions  and relations, effective stress.  Permeability, capillarity and seepage of soils, flownets, flow through  earthen  dams,  compressibility,  consolidation  and  compaction  of  soils,  shear strength,  stability of  slopes, earth pressures and  retaining walls,  stress distribution  in soils,  settlement  analysis,  subsurface  exploration  and  site  investigations,  bearing capacity of soils, shallow and deep foundations, pile foundations.

**5.  Other Topics:**
Elements of  surveying – Chain, plane  table,  compass and  theodolite,  leveling, building materials and construction, formwork, CPM and PERT.
 **6.  Fluid Mechanics and Machinery:**
Properties of fluids, pressure measurement fluid statics, buoyancy and flotation, fluid  kinematics  and  fluid  dynamics,  orifices  and  mouthpieces,  notches  and  weirs, laminar  and  turbulent  flows,  flow  through  pipes,  forces  on  immersed  bodies,  flow  in open  channels,  impact  of  jets, Hydraulic  turbines  and  pumps,  dams,  power  houses, hydrology and hydro power plants.