

**CIVIL ENGINEERING**  
**(DIPLOMA STANDARD)**

**SUBJECT CODE: 299**

**UNIT - I: ENGINEERING MECHANICS**

Direct Stresses and strains (Tensile and compressive) due to Axial forces – Deformation of elastic bar due to uni-axial force - Shear force and bending moment diagrams for statically determinate beams - Geometrical properties of sections - Stresses in beams due to bending – Stresses in shafts due to torsion – Pin jointed perfect frames with vertical loads on nodal points (method of joints only).

**UNIT - II: MECHANICS OF STRUCTURE**

Deflection of cantilever and simply supported beams – Shear force and bending moment diagrams for statically indeterminate structures (Propped cantilever, Fixed Beams, continuous beams, Non-sway Portal frames) using Mohr's theorems and moment distribution method.

Euler's and Rankin's formula for columns – Stresses due to eccentric loads – combined stresses due to direct loads and bending moments in rectangular sections.

**UNIT - III: CONSTRUCTION MATERIALS & CONSTRUCTION PRACTICE**

Bricks, Tiles, Cement, Fine Aggregate, Coarse Aggregate, Timber, Ply wood, Steel, Glass, Plastics, PVC, UPVC, Paints, Mortars, Concrete – Different types, qualities, requirements, standard specifications, Admixtures for cement mortar and concrete.

Different types of Foundations, Masonry, Floors, Roofs, Doors and Windows, Weathering Course, Damp proof course, Plastering, Painting, Colour Washing – Specifications for different works.

**UNIT - IV: TRANSPORTATION ENGINEERING**

Roads – Different types – methods of formation of water bound macadam, bituminous and concrete roads – Hill roads – Requirements – Camber, gradient, super elevation, carriage way, pavements, drainage system, sight distance etc., Traffic Engineering,

Bridges – Classification of bridges – Site selection and alignment – Foundation, substructure and super-structure.

Sub-grade soil – Soil mass as a three phase system – Grain size classification - Atterberg limits – IS Classification of soils–Compaction – Shear strength - Road Arboriculture – Express Highways – Rapid Transport System.

### **UNIT - V: HYDRAULICS**

Measurement of pressure in liquids – Pressure distribution and total pressure on immersed surfaces – Types of flow (Laminar, turbulent, steady, unsteady, uniform, non-uniform) – Flow through pipes –Losses – Hydraulic gradient and total energy lines. Bernoulli's theorem – use of Orifice, Mouthpiece, Orifice meter and Venturimeters – Flow through channels – Bazin's and Manning's formula – Economical sections for open channels, Pumps – Reciprocating pumps – Centrifugal pumps – Characteristics – Discharge – Power and efficiency, Ground water – Types of well – Test for yield of wells.

### **UNIT - VI: SURVEYING**

Types of Surveys –Chain surveying – Compass surveying – Levelling – Contour surveying –Theodolite surveying – Trigonometrical levelling – Tacheometry – Field work – Simple problems. Curves, Global Positioning System (GPS), Remote sensing – Photogrammetric Surveying and Hydrographic Surveying, Total Station and Geographical Information System (GIS).

### **UNIT - VII: ENVIRONMENTAL ENGINEERING AND POLLUTION CONTROL**

Sources of water – Conveyance of water – Treatment of water – Quality of water – Tests on water –Distribution systems – Sewers – Collection and conveyance of sewage– Sewer Appurtenances – Drainage arrangements and Sanitary fittings in buildings –Treatment and disposal of sewage, Solid waste Management.

Environmental pollution – Air – water – Soil – Noise - Pollution Control.

## **UNIT - VIII: ESTIMATING AND COSTING**

Systems of taking out quantities – Trade and Group systems – Material requirement for different items of works – Preparation of data for works – Report writing – Valuation of buildings and properties – Fixation of rents – Approximate estimates – Detailed estimate and Abstract estimate for buildings, well, sump, septic tanks, compound wall, roads etc.

## **UNIT - IX: STRUCTURAL ENGINEERING**

Reinforced cement concrete structure – Analysis and design of singly and Doubly reinforced rectangular and T-beam sections – Cantilever, simply supported, continuous beams – One way and two way slabs – Lintels and sunshades – Staircases – Rectangular and circular short columns – Isolated column footings. (All designs by Limit State Method only).

Steel structures – simple beams – Tension and compression members – simple columns.

## **UNIT - X: CONSTRUCTION MANAGEMENT**

Planning of a project – Factors to be considered – Project reports – Organization structure on construction departments – Construction planning – CPM and PERT networks – Contracts – Tenders and Tender documents – Bill- Supervision and Quality control – Safety measures in construction sites – Banking practice – Cash flow diagrams.

Entrepreneurship, Ethics in Engineering, Use of computers – Information Management, Financial Management, Disaster Management – Types of Natural calamities – Causes for major disaster – Preparedness – Response and Recovery.