Course Syllabus for Jr. Engineer (Civil)

1. **Construction Technology & Management, Building Construction:**
   Pile Foundations, Coffer Dams, Caissons, Control of Ground Water in Excavations, Temporary Works, Construction of Earthquake Resistant Buildings, Special Structures, Demolition of structure. **Building Construction**: Introduction, Subsurface Investigation, Shallow Foundation, Masonry Construction, Plain and Reinforced Concrete Construction, Doors and Windows, Stairs and Staircases, Floorings, Roofs and Roof Coverings, Wall Finishes, Temporary Works , Special Treatments.
2. **Surveying:**
   Plane Table Survey, Theodolite Traversing, Trigonometric levelling, Curves, Computation of Areas, Hydrography, Setting out Works, Tachometric Surveying, Geodetic Surveying, Theory of Errors, Remote Sensing, Aerial photogrammetry, Geographical Information System
3. **Irrigation Engineering**
   Introduction, Water requirements of crops, Methods of irrigation, Irrigation channels, Diversion headworks, Cross drainage works, Canal regulation works, distributory head regulator, Sprinkler irrigation, Drip irrigation method, Irrigation efficiencies, Water management in high water table areas
4. **Water and Wastewater Engineering**
   Water quantities Requirement, Collection and Conveyance of Water, Water Treatment Processes, Distribution System, Collection and Estimation of Sewage, Hydraulic Design of Sewer, Unit Operations for Waste Water Treatment, Design of Facilities for Physical, Chemical & Biological Treatment of Waste Water.
5. **Structural Engineering**
   Theory of structures, Concrete Technology, RCC Design, Steel design, Structural Design, Flexural design, Flexural and shear design, Axial load design, Torsion design, Combined shear and torsion, hear, flexural, punching, torsion, Bond and development length, Combined axial, shear, flexure, Limit State design of Steel elements: Axial force design, Flexural design for beams, Footing, Torsion design , Connections, Plastic Design, Torsion, Thin cylinder, Fundamentals, Displacement of determinate beams and plane truss: Arches, cables and suspension bridges, Strain energy, Influence lines, Direct and bending stresses, Columns and struts, Fixed and continuous beams, Consistent deformation method, Energy principles, Slope deflection method, Moment distribution, Kani's method, Influence lines for indeterminate structures, Pre stressed Concrete, Transportation Structures.
6. **Fluid Mechanics and Hydraulics:**
   Fluids, Hydrostatics, Fluid Kinematics, Fluid Dynamics, Flow Through Pipes, Measurement of Flow, Compressible Fluid Flow Basic Concepts of Open Channel Flow, Uniform Flow In Open Channel, Specific Energy And Specific Force, Gradually Varied Flow

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7 **Hydrology and Water Resources Engineering**

Introduction, Hydrologic cycle, Climate and water availability, Water balances, Precipitation, Hyetograph and Hydrograph Analysis, Groundwater, Reservoir, Hydroelectric Power, Flood Management, Hydrologic Analysis and Design, Drought Management and Water Harvesting, Water Resources Planning and Development

8. **Concrete Technology**

General, Ingredients of Concrete, Fresh concrete, Hardened concrete, Durability and permeability of concrete, Concrete in aggressive environment, Special Concrete, Special concreting techniques, Concrete mix design, Repair and rehabilitation,

9 **Soil Mechanics and Foundation Engineering:**

Introduction, field of soil mechanics, phase diagram physical and index properties of soil, classification of soils, stress condition in soils, Determination of shear parameters, Soil Compaction and composition of soils, standard and modified protector test,. Consolidation of soil, Earth pressure, Plastic equilibrium in soils, Stability of slopes,

Foundation Engg: Introduction Shallow Foundation, Machine Foundation Machine foundation, Pile Foundation, Special Foundations

10. **Estimating, Costing and Valuation** :

Estimate, glossary of technical terms, analysis of rates, methods and unit of measurement, Items of work - earthwork, Brick work (Modular & Traditional bricks), RCC work, Shuttering, Timber work, Painting, Flooring, Plastering. Boundary wall, Brick building, Water Tank, Septic tank, Bar bending schedule, Centre line method, Mid-section formula, Trapezodial formula, Simpson's rule. Cost estimate of Septic tank, flexible pavements, Tube well, isolates and combined footings, Steel Truss, Piles and pile-caps. Valuation - Value and cost, scrap value, salvage value, assessed value, sinking fund, depreciation and obsolescence, methods of valuation.

11. **Environmental Engineering**:

Quality of water, source of water supply, purification of water, distribution of water, need of sanitation, sewerage systems, circular sewer, oval sewer, sewer appurtenances, sewage treatments. Surface water drainage. Solid waste management - types, effects, engineered management system. Air pollution - pollutants, causes, effects, control. Noise pollution - cause, health effects, control.

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