Civil Engineering Syllabus
for
Competitive Examinations by Karnataka Public Service Commission (KPSC)
for the post of
Lecturer in Civil Engineering in Govt. Polytechnic Colleges

1. CIVIL ENGINEERING MATERIALS AND CONSTRUCTION
   Building Construction: Foundations; Stone Masonry; Brick Masonry - Rules for bonding, stretcher and header bonds and English Bond; Doors and Windows; Stairs - proportioning and designing of different types of staircases for residential and commercial buildings; Different types of roofs. RC Constructions - Lintels and sunshades, beams, one-way and two-way slabs. Plastering and pointing; types, preparation, properties, uses and defects. Formwork for construction. Damp proofing.

2. SOLID MECHANICS, STRUCTURAL ANALYSIS

3. CONCRETE TECHNOLOGY, REINFORCED CONCRETE STRUCTURES, STEEL STRUCTURES, PSC STRUCTURES
   RC STRUCTURES: Strength properties and behaviour of concrete and reinforcing steel. Basic principles of working stress design. Limit state design concepts. Designing of members subjected to flexure, shear,


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4. **FLUID MECHANICS, HYDROLOGY & WATER RESOURCES ENGINEERING**


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5. **HYDRAULIC STRUCTURES**


6. SOIL MECHANICS AND FOUNDATION ENGINEERING

SOIL MECHANICS: Soil formation, Three phase system, Index properties of soils, Soil classification, Hydraulics of soils, Stress distribution in soils, Soil compaction, One dimensional consolidation, Effective stress and pore water pressure, Shear strength of soils, Soil exploration, Earth pressure and its determination. Bearing capacity - Theoretical methods and Insitu tests, Stability of slopes by various approaches, Load carrying capacity of single and group of piles. Ground improvement techniques.

FOUNDATION ENGINEERING: Loads for foundation design, Depth of foundation, proportioning of footings, Geotechnical and structural design of isolated, combined and raft foundations. Analysis of pile groups. Design of piles and pile cap. Design of cantilever, counterfort and soil reinforced retaining walls.

7. TRANSPORTATION ENGINEERING

Traffic Engineering: Vehicular and road user characteristics, traffic studies, junctions and signals, traffic control devices
Highway alignment and geometric design: Highway alignment, cross-sectional elements, horizontal alignment and vertical alignment
Highway design and construction: design of flexible and rigid pavements, WBM and bituminous concrete roads and highway maintenance, highway drainage.
Railways: Rail gauges; coning; adzing; railway track components, functions, requirements, and width of formation; creep; tractive resistance; geometric design; points and crossings; stations and yards; signaling and interlocking.
Docks & Harbors: Types of harbors, tides, wind and waves, breakwaters, docks, quays, Transhi sheds, warehouses, navigational aids
Tunnels: Introduction to tunneling, tunneling through soils, soft and hard rocks, tunnel ventilation
Airports: Introduction to airport planning and development, Airport design standards

8. ENVIRONMENTAL ENGINEERING

Water pollution control: Effluent standards. Disposal of wastewater, Stream sanitation. Water quality indices; Solid waste management: Characteristics, treatment disposal; Air Pollution Control: Sources and Characteristics, effects, Control; Noise Pollution Control, measurement & analysis; Hazardous solid waste: Classified wastes, Disposal of hospital wastes; EIA: Introduction, case studies

9. SURVEYING

Introduction and Terminology, Basic Principles of Surveying, Measurement of horizontal distances, Chain surveying, Compass surveying, Compass traversing, Introduction to leveling, Reduction of leveling, Contouring, Plane table surveying, Theodolite surveying, Trigonometric leveling. Tacheometry, Curve setting, Computation of area and volumes, Electronic Distance measurement, Hydrographic surveying, Photogrammetry and Remote sensing, Preparation of Maps, Map Reading, Errors and its Classification, Precision and Accuracy, Probability Analysis.
Principles and uses of Electronic Theodolite, EDM, Total station, Features of Total Station, Characteristics of Total Station, Modern Surveying, Remote Sensing (RS), Global Position System (GPS), Maps, Global Information System (GIS) Systems.

10. BRIDGE ENGINEERING
Bridge site investigation and planning, bridge hydrology, Standards of loading for highway and railway bridges, Culverts, bridge superstructures, Design of R.C.C. beam and slab bridges, load distribution methods, Bearings, Design of bridge substructures and foundations, Design principles of prestressed concrete, steel and composite bridges, Introduction to cable stayed and suspension bridges, flyovers, temporary and movable bridges, construction and maintenance of bridges and flyovers.

11. ESTIMATION, COSTING AND SPECIFICATIONS
Methods of estimating, line estimate and detailed estimate, measurements, taking out quantities, typical estimates for buildings, and Civil Engineering works, Specifications for all types of building items. Analysis of rates, data for various building items, Earthwork calculations. Valuation of buildings.

12. CONSTRUCTION AND PROJECT MANAGEMENT
Introduction: project forms, management objectives and functions, Organizational chart of a construction company, Manager's duties and responsibilities; public relations; Leadership and team - work, ethics, morale, delegation and accountability.

Man and Machine: Man-power planning, training, recruitment, motivation, welfare measures and safety laws.

Machinery for Civil Engineering: Earth movers and hauling costs, factors affecting purchase, rent, and lease of equipment, and cost-benefit estimation.

Planning, scheduling and Project Management: Planning stages, construction schedules project specification, monitoring and evaluation; Bar-chart, CPM, PERT, network- formulation and time computation.

Departmental Procedures: specifications, tendering, contracting and arbitration.

13. ENVIRONMENTAL STUDIES