

A.P.P.S.C. Government Polytechnic College Lecturer Posts

Civil Engineering Syllabus

Paper I: General Studies and Mental Ability

- Major Current Events and Issues of International, National, and State of Andhra Pradesh.
- General Science and its applications to the day to day life Contemporary developments in Science & Technology and Information Technology.
- History of India – emphasis will be on a broad general understanding of the subject in its social, economic, cultural, and political aspects with a focus on AP and the Indian National Movement.
- Geography of India with a focus on Andhra Pradesh.
- Indian polity and Governance: constitutional issues, public policy, reforms and eGovernance initiatives.
- Indian Economy and Planning
- Sustainable Development and Environmental Protection
- **Disaster management:** vulnerability profile, prevention, and mitigation strategies, Application of Remote Sensing and GIS in the Assessment of Disaster
- Logical reasoning, analytical ability, and logical interpretation.
- **Data Analysis:** Tabulation of data Visual representation of data Basic data analysis (Summary Statistics such as mean, median, mode, and variance) and Interpretation.

Paper II: Civil Engineering

1. Analysis of Structures:

Stresses in beams; combined bending and direct stresses; axially and eccentrically loaded columns Closed-coiled and open-coiled; helical springs under axial load and axial twist; carriage springs Analysis of thin and thick cylinders; compound cylinders Analysis of statically determinate plane trusses; method of joints and method of sections

Deflection and slope of beams by Double integration Macaulay's, Moment area and Conjugate beam methods

Analysis of statically indeterminate beams by flexibility and stiffness methods; propped cantilevers, fixed beams and continuous beams

Strain energy method, slope-deflection method, moment distribution method and Kani's method of analysis of indeterminate structures.

Struts subjected to axial loads, buckling, Euler's formula for strut with different support conditions

2. Structural Design:

Reinforced concrete, concrete technology, R.C.C. Design, working stress method and limit state method, Design of beams, design of axially loaded columns, Design of oneway and two-way slabs, design of continuous beams and slabs; Design of wall footings and isolated footings, combined footings, raft foundations, and retaining walls by limit state method, water tanks, Deck-slab and T-beam bridges by working stress method. Structural Steel — design of riveted and welded joints, design of tension members; Design of compression members; simple and compound beams. Design of plate girders, crane girders and roof-trusses. Elements of pre-stressed concrete.

3. Fluid Mechanics and Hydraulic Machines:

Fluid properties; fluid statics; fluid-flow concepts; Laminar and turbulent flow; steady and unsteady-flow, uniform and non-uniform flow; continuity equation; Euler's equation of motion; Bernoulli's equation, Hydrostatic force on plane and curved surface Momentum equation and applications;

Moment of Momentum equation, Dimensional analysis and similitude; Flow through Pipes: Viscous flow-laminar flow through circular pipes; velocity distribution in laminar flow. Turbulent flow in pipes, velocity distribution in turbulent flow

Flow Measuring Devices- Measurement of discharge, venturimeter, orifice meter, notches and weirs, Measurement of velocity, Pitot tube

Hydraulic machines; Turbines and pumps; basic equations; performance selection, specific speed

4. Water Resources Engineering:

Steady flow through open channels. Uniform flow in channels; Chezy's and Manning's formulae. Specific energy and critical depth. Hydraulic jump — Momentum equation for a hydraulic jump. Surface Water hydrology; Hydrologic cycle, hydrologic data measurement of precipitation, evaporation, transpiration, and infiltration. Runoff, determination of run-off. Stream gauging; Hydrograph and unit hydrograph, flood routing. Ground water resources, Darcy's law, Dupuits equation, yield of wells, recuperation test.

5. Surveying:

Chain surveying; compass surveying, plane table surveying; leveling and contouring, Minor instruments; Areas and Volumes; Theodolite surveying and traversing; Tachometry; Curve ranging; setting out works. Principles and uses of triangulation, hydrographic surveying, Aerial photogrammetry and photo interpretation, remote sensing and electromagnetic distance measurement.

6. Geotechnical Engineering:

Physical properties of soils; identification and classification of soils; soil compaction; permeability and seepage; stress distribution in soil; consolidation; shear strength of soil; stability of earth slopes; site investigation and sub soil exploration; lateral earth pressure and

retaining walls; bearing capacity and shallow foundations; pile foundations; well foundations; Machine foundations.

7. Transportation Engineering:

Highway Engineering; classification of roads; highway alignment and surveys; geometric design of highways; elements of traffic engineering; highway materials and testing; elements of pavement design; construction and maintenance of earth gravel, W.B.M., bituminous and concrete roads; highway drainage

Railway Engineering; engineering surveys for a new railway route, gauge and gauge problem; track components; ballast; sleepers; rail fastenings; Station and station yards; requirements and requirement for station yards; signaling and inter locking. Elements of cross drainage works; causeways; culverts; bridges

8. Environmental Engineering:

Water supply engineering; source of water supply, conveyance of water, distribution system; quality of water; treatment of water; filtration; disinfection; method of water treatment

Air pollutants – monitoring, quantification and standards

Characteristics of sewage: composition; B.O.D., C.O.D., aerobic and anaerobic decomposition; chemistry of sanitary sewage; sewage disposal; primary and secondary treatment of sewage; design of sewers