



# COMPETE INDIA ZONE

AN ENGINEERING ENTERPRISE BY IITians

## Civil Engineering (CE) – ESE Syllabus

Both Objective and Conventional Type Papers

### PAPER - I

S.NO.	SUBJECT NAME	SYLLABUS
1	<b>Building Materials</b>	Stone , Lime, Glass, Plastics, Steel, FRP, Ceramics, Aluminium, Fly Ash, Basic Admixtures, Timber, Bricks.  <b>Aggregates:</b> Classification, properties and selection criteria.  <b>Cement:</b> Types, Composition, Properties, Uses, Specifications and various Tests; Lime & Cement Mortars and Concrete: Properties and various Tests; Design of Concrete Mixes; Proportioning of aggregates and methods of mix design.
2	<b>Solid Mechanics</b>	Elastic constants, stress, plane stress, Mohr's circle of stress, strains, plane strain, Mohr's circle of strain, Elastic theories of failure, Principal Stresses, Bending, Shear and Torsion.
3	<b>Structural Analysis</b>	Basics of strength of materials, Types of stresses and strains, bending moments and shear force, concept of bending and shear stresses; Analysis of determinate and indeterminate structures; Trusses, beams, plane frames; Rolling loads, Influence Lines, Unit load method & other methods; Free and Forced vibrations of single degree and multi degree freedom system; Suspended Cables; Concepts and use of Computer Aided Design.
4	<b>Design of Steel Structures</b>	Principles of Working Stress methods, Design of tension and compression members, Design of beams and beam column connections, built-up sections, Girders, Industrial roofs, Principles of Ultimate load design.
5	<b>Design of Concrete and Masonry Structures</b>	Limit state design for bending, shear, axial compression and combined forces; Design of beams, Slabs, Lintels, Foundations, Retaining walls, Tanks, Staircases; Principles of pre-stressed concrete design including materials and methods; Earthquake resistant design of structures; Design of Masonry Structure.

6	<b>Construction Practice, Planning and Management</b>	Construction - Planning, Equipment, Site investigation and Management including Estimation with latest project management tools and network analysis for different Types of works; Analysis of Rates of various types of works; Tendering Process and Contract Management, Quality Control, Productivity, Operation Cost; Land acquisition; Labour safety and welfare.
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## PAPER - II

S.NO.	SUBJECT NAME	SYLLABUS
1	<b>Fluid Mechanics</b>	<p><b>FLUID MECHANICS, OPEN CHANNEL FLOW, PIPE FLOW:</b> Fluid properties; Dimensional Analysis and Modelling; Fluid dynamics including flow kinematics and measurements; Flow net; Viscosity, Boundary layer and control, Drag, Lift, Principles in open channel flow, Flow controls. Hydraulic jump; Surges; Pipe networks.</p> <p><b>HYDRAULIC MACHINES AND HYDROPOWER:</b> Various pumps, Air vessels, Hydraulic turbines - types, classifications &amp; performance parameters; Power house - classification and layout, storage, pondage, control of supply.</p>
2	<b>Hydrology and Water Resources Engineering</b>	<p><b>HYDROLOGY:</b> Hydrological cycle, Ground water hydrology, Well hydrology and related data analysis; Streams and their gauging; River morphology; Flood, drought and their management; Capacity of Reservoirs.</p> <p><b>WATER RESOURCES ENGINEERING:</b> Multipurpose uses of Water, River basins and their potential; Irrigation systems, water demand assessment; Resources - storages and their yields; Water logging, canal and drainage design, Gravity dams, falls, weirs, Energy dissipaters, barrage Distribution works, Cross drainage works and head-works and their design; Concepts in canal design, construction &amp; maintenance; River training, measurement and analysis of rainfall.</p>
3	<b>Environmental Engineering</b>	<p><b>WATER SUPPLY ENGINEERING:</b> Sources, Estimation, quality standards and testing of water and their treatment; Rural, Institutional and industrial water supply; Physical, chemical and biological characteristics and sources of water, Pollutants in water and its effects, Estimation of water demand; Drinking water Standards, Water Treatment Plants, Water distribution networks.</p> <p><b>WASTE WATER ENGINEERING:</b> Planning &amp; design of domestic waste water, sewage collection and disposal; Plumbing Systems. Components and layout of sewerage system; Planning &amp; design of Domestic Waste-water disposal system; Sludge management including treatment, disposal and re-use of treated effluents; Industrial waste waters and Effluent Treatment Plants including institutional and industrial sewage management.</p> <p><b>SOLID WASTE MANAGEMENT:</b> Sources &amp; classification of solid wastes along with planning &amp; design of its management system; Disposal system, Beneficial aspects of wastes and Utilization by Civil Engineers.</p> <p><b>AIR AND NOISE POLLUTION AND ECOLOGY:</b> Concepts &amp; general methodology.</p>

4	<b>Geotechnical Engineering</b>	<p><b>GEO-TECHNICAL ENGINEERING:</b> Soil exploration - planning &amp; methods, Properties of soil, classification, various tests and interrelationships; Permeability &amp; Seepage, Compressibility, consolidation and Shearing resistance, Earth pressure theories and stress distribution in soil; Properties and uses of geo-synthetics.</p> <p><b>FOUNDATION ENGINEERING:</b> Types of foundations &amp; selection criteria, bearing capacity, settlement analysis, design and testing of shallow &amp; deep foundations; Slope stability analysis, Earthen embankments, Dams and Earth retaining structures: types, analysis and design, Principles of ground modifications.</p>
5	<b>Surveying</b>	<p><b>SURVEYING:</b> Classification of surveys, various methodologies, instruments &amp; analysis of measurement of distances, elevation and directions; Field astronomy, Global Positioning System; Map preparation; Photogrammetry; Remote sensing concepts; Survey Layout for culverts, canals, bridges, road/railway alignment and buildings, Setting out of Curves.</p> <p><b>GEOLOGY:</b> Basic knowledge of Engineering geology &amp; its application in projects</p>
6	<b>Transportation Engineering</b>	<p><b>HIGHWAYS</b> - Planning &amp; construction methodology, Alignment and geometric design; Traffic Surveys and Controls; Principles of Flexible and Rigid pavements design.</p> <p>Tunnelling, alignment, methods of construction, disposal of muck, drainage, lighting and ventilation.</p> <p>Planning of railway systems, terminology and designs track modernisation; Maintenance.</p> <p>Harbours - Terminology, layouts and planning.</p> <p>Airports - layout, planning &amp; design.</p>

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