ACE Engineering Academy
Leading Institute for ESE/GATE/PSUs

UTTAR PRADESH PUBLIC SERVICE COMMISSION

Assistant Engineer

Online Test Series

Civil Engineering - Schedule

No.of Tests : 16	
Subject Wise Tests	12
Full Length Mock Tests	4

All tests will be Active upto UPPSC-AE Examination.

Subject wise Tests

(No.of Questions: 50, Max Marks: 150 and Time duration: 60 Minutes)

Test No	Name of the Subject	Date of Activation
Test-01 (Paper-I)	Engineering Mechanics + Strength of Materials	01-12-2021
Test-02 (Paper-II)	Fluid Mechanics, Open Channel Flow, Hydraulic Machines and Hydropower Engineering	02-12-2021
Test-03 (Paper-I)	Structural Analysis + Building Materials	03-12-2021
Test-04 (Paper-II)	Hydrology and Water Resources Engineering	04-12-2021
Test-05 (Paper-I)	Constructions technology, Planning and Management + Design of Steel Structure	05-12-2021
Test-06 (Paper-II)	Environmental Engineering	06-12-2021
Test-07 (Paper-I)	Design of concrete and masonry structures	07-12-2021
Test-08 (Paper-II)	Transportation Engineering	08-12-2021
Test-09 (Paper-I)	Geo Technical Engineering and Foundation Engineering	09-12-2021
Test-10 (Paper-II)	Survey and Engineering Geology	10-12-2021
Test-11 (Paper-I)	**General Hindi**	11-12-2021
Test-12 (Paper-II)	**General studies**	12-12-2021

(No.of Questions: 25, Max Marks: 75 and Time duration: 30 Minutes)

Full Length Mock Test

(No.of Questions: 125, Max Marks: 375 and Time duration: 150 Minutes)

Test No	Name of the Mock	Date of Activation
Test-13 (Paper-I)	Full Length Mock Test-01	23-12-2021
Test-14 (Paper-II)	Full Length Mock Test-02	30-12-2021
Test-15 (Paper-I)	Full Length Mock Test-03	06-01-2022
Test-16 (Paper-II)	Full Length Mock Test-04	13-01-2022

Note:

The Syllabus considered as per Notifivcation of UPPSC. ACE Engineering Academy does not take any responsibility for deviations in syllabus in the final UPPSC exam.

As per Notification of UPPSC each question carries ‘3’ marks and negative marking of 1/3rd (i.e. one mark) for each wrong answer.

The Dates of above Tests may Change according to the UPPSC Exam schedule.

Tests will be activated at 6:00 pm on scheduled day

CIVIL ENGINEERING
PAPER – I_Syllabus

General Hindi

Engineering Mechanics:
Units and Dimensions, SI units, vectors, concept of force, Concept of particle and rigid body Concurrent, Non- Concurrent and parallel forces in a plane, moment of force and varignon`s theorem free body diagram, conditions of equilibrium Principle of virtual work, equivalent force system.
First and second Moment of area, Mass moment of inertia, Static Friction, inclined plane and bearings, kinematics and kinetics, kinematics in Cartesion and Polar Coordinates, motion under uniform and non-uniform acceleration, motion under gravity, Kinetics of particle: Momentum and Energy principles, D` Alembert`s principle, Collision of elastic bodies, rotation of rigid, bodies, simple harmonic motion.

Strength of Materials:
Simple Stress and Strain, Elastic constants, axially loaded compression members, Shear force and bending moment, theory of simple bending, bending stress, Shear Stress, Beams of uniform strength, Leaf Spring, close coiled helical springs, Strain Energy in direct stress, bending & shear. Deflection of beams; Macaulay's method, Mohr's Moment area method, Conjugate beam method, unit load method, Torsion of shafts, Transmission of power, Elastic stability of columns, Euler's Rankin's and Secant formulae. Principal stresses and strains in two dimensions, Mohr's Circle, Theories of Elastic Failure, Thin and Thick cylinder, Stresses due to internal and external pressure Lame's equations.

Structural Analysis:
Castiglianios theorems I and II, Unit load method of consistent deformation applied to beams and pin jointed trusses. Slope-deflection, moment distribution, Kani's method of analysis and column Analogy method applied to indeterminate beams and rigid frames. Rolling loads and influence lines: Influence lines for reactions of beam, shear force and bending moment at a section of beam. Criteria for maximum shear force and bending moment in beams traversed by a system of moving loads, influence lines for simply supported plane pin jointed trusses, Arches: Three hinged, two hinged and fixed
arches, rib shortening and temperature effects, influence lines in arches, Matrix methods of analysis: Force method and displacement method of analysis of indeterminate beams and rigid frames. Plastic Analysis of beams and frames: Theory of plastic bending, plastic analysis, statical method, Mechanism method. Unsymmetrical bending: Moment of inertia, product of inertia, position of neutral axis and principal axis, calculation of bending stresses.

Design of Steel Structure:
Structural steel:Factors of safety and load factors, rivetted, bolted and welded joints and its connections, Design by working, stress/limit state method of tension and compression member, beams of built up section, rivetted and welded plate girders, gantry girders, stancheons with battens and lacings, slab and gussetted column bases, Design of highway and railway bridges: Through and deck type plate girder, Warren girder, Pratt truss.

Design of concrete and masonry structures:
Reinforced Concrete: Working Stress and Limit State Method of design Recommendations of B.I.S. codes, design of one way and two way slabs, stairs-case slabs, simple and continuous beams of rectangular, T and L sections, compression members under direct load with or without eccentricity, isolated and combined footings, Cantilever and counter-fort type retaining walls, Water tanks: Design requirements as per B.I.S. code for rectangular and circular tanks resting on ground, Prestressed concrete: Methods and systems of prestressing, anchorages, analysis and design of sections for
flexure based on working stress, losses of prestress, Earth quake resistant design of building as per BIS code. Design of brick masonry as per I. S. Codes, Design of masonry retaining walls.

Building Materials:
Physical properties of construction materials with respect to their use: stones bricks, tiles, lime, glass, cement, mortars, Concrete, concept of mix design, pozzolans, plasticizers, super plasticizers, Special concrete: roller compacted concrete, mass concrete, self compacting concrete, ferro cement, fibre reinforced concrete, high strength concrete, high performance concrete, Timber: properties, defects and common preservation treatments, Use and selection of materials for various uses e.g. Low cost housing, mass housing, high rise buildings.

Constructions technology, Planning and Management:
Masonry constructions using brick, stone, construction detailing and strength characteristics paints, varnishes, plastics, water proofing and damp proofing materials. Detailing of walls, floors, roofs, staircases, doors and windows. Plastering, pointing, flooring, roofing and construction features. Retrofitting of buildings, Principle of planning of building for residents and specific uses, National Building code provisions and uses. Basic principles of detailed and approximate estimating, specifications, rate analysis, principles of valuation of real property. Machinery for earthwork, concreting and their specific uses, factors affecting selection of construction equipments, operating cost of equipments. Construction activity, schedules, organizations, quality assurance principles. Basic principle of network CPM and PERT uses in construction monitoring, cost optimization and resource allocation. Basic principles of economic analysis and methods. Project profitability: Basis principles of financial planning, simple toll fixation criterions.

Geo Technical Engineering and Foundation Engineering:
Types of soils, phase relationships, consistency limits particles size distribution, classifications of soils, structure and clay mineralogy. Capillary water, effective stress and pore water pressure, Darcy's Law, factors affecting permeability, determination of permeability, permeability of stratified soil deposits. Seepage pressure, quick sand condition, compressibility and consolidation, Terzaghi's theory of one dimensional consolidation, consolidation test.
Compaction of soil, field control of compaction total stress and effective stress parameters, pore pressure parameters, shear strength of soils, Mohr Coulomb failure theory, shear tests.
Earth pressure at rest, active and passive pressures, Rankin's theory Coulomb's wedge theory, Graphical method of earth pressure on retaining wall, sheetpile walls, braced excavation, bearing capacity, Terzaghi and other important theories, net and gross bearing pressure.
Immediate and consolidation settlement, stability of slope, total stress and effective stress methods, conventional methods of slices, stability number.
Subsurface exploration, methods of boring, sampling, penetration tests, pressure meter tests, essential features of foundation, types of foundation, design criteria, choice of type of foundation, stress distribution in soils, Boussinessq's theory, Westergaard method, Newmarks chart, pressure bulb, contact, pressure, applicability of different bearing capacity theories, evaluation of bearing capacity from filed tests, allowable bearing capacity, settlement analysis, allowable settlement, proportioning of footing, isolated and combined footings, rafts, pile foundation, types of piles, plies capacity,
static and dynamic analysis, design of pile groups, pile load test, settlement of piles lateral loads, foundation for bridges, Ground improvement techniques: sand drains, stone columns, grouting, soil stabilization geotextiles and geomembrane, Machine foundation: Natural frequency, design of machine foundations based on the recommendation of B.I.S. codes.

PAPER – II_Syllabus

General studies

Fluid Mechanics, Open Channel Flow, Hydraulic Machines and Hydropower Engineering:

Fluid Mechanics: Fluid properties and their roles in fluid motion, fluid statics including forces acting on plane and curved surfaces, Kinematics and Dynamics of Fluid flow: Velocity and acceleration, stream lines, equation of continuity, irrotational and rotational flow, velocity potential and stream functions, flownet, methods of drawing flownet, sourceand sink, flow separation, free and forced vorties.

Flow control volume equation, continuity, momentum and energy equations, Navier Strokes equation, Euler's equation of motion and application to fluid flow problems, pipe flow, plane, curved, stationary and moving vanes sluice gates, weirs, orifice meters and Venturi meters.

Dimensional Analysis and Similitude: Buckingham's Pi-theorem, dimensionless parameters, similitude theory, model laws, undistorted and distorted models.

Laminar Flow: Laminar flow between parallel, stationary and moving plates, flow through pipes.

Boundary Layer: Laminar and turbulent boundary layer on a flat plate, laminar sub-layer, smooth and rough boundaries, submerged flow, drag and lift and its applications.

Turbulent flow through pipes: Characteristics of turbulent flow, velocity distribution, pipe friction factor, hydraulic grade line and total energy line, siphons, expansion and contractions in pipes pipe networks, water hammer in pipes and surge tanks.

Open Channel Flow: Flow types, uniform and nonuniform flows, momentum and energy correction factors, Specific energy and specific force, critical depth, resistance equations and roughness coefficient, rapidly varied flow, flow in transitions, Brink flow, Hydraulic jump and its applications, waves and surges, gradually varied flow, classification of surface profiles, control section, Integration of varied flow equation and their solution.

HYDRAULIC MACHINESAND HYDROPOWER:

Centrifugal pumps-Types, characteristics, Net Positive Suction-head (NPSH), specific speed, Pumps in series and parallel.

Reciprocating pumps, Air vessels, Hydraulic ram, efficiency parameters, Rotary and positive displacement pumps, diaphragm and jet pumps.

Hydraulic turbines: types, classification, Choice of turbines, performance parameters, controls, characteristics, specific speed.

Principles of hydropower development:Types, layouts and component works, surge tanks, 'types and choice, Flow duration curves and dependable flow, Storage and pondage, Pumped storage plants, Special types of hydel plants.

Hydrology and Water Resources Engineering:

Hydrology: Hydrologic cycle, precipitation, evaporation, transpiration, infiltration, overland flow, hydrographs, flood frequency analysis, flood routing through a reservoir, channel flow routing- Muskingam method.

Ground Water flow: Specific yield, storage coefficient, coefficient of permeability, confined and unconfined aquifers, radial flow into a well under confined and unconfined conditions, Open wells and tube wells. Ground and surface water recourses single and multipurpose projects, storage capacity of reservoirs, reservoir losses, reservoir sedimentation. Water requirements of crops consumptive use, duty and delta, irrigation methods,

Irrigation efficiencies.

Canals: Distribution systems for cannal irrigation, canal capacity, canal losses, alignment of main and distributory canals, Design of cannal by kennedy's and Lacey's thoeorie, Water logging and its prevention.

Diversion head works: Compenents, Principles and design of weirs on permeable and impermeable foundations, Khosla's theory, Bligh's creep theory Storage works. Cross drainage works.

Types of dams, design principles of gravity and earth dams, stability analysis. Spillways: Spillway types energy dissipation.

River training: Objectives of river training, methods of river training and bank protection.

Transportation Engineering:

Highway Engineering: Principles of Highway alignments, classification and geometric design, elements and standards for roads.

Pavement: flexible and rigid pavements Design principles and methodology. Construction methods and materials for stabilized soil. WBM, Bituminous works and Cement Concrete roads.

Surface and sub-surface drainage arrangements for roads, culvert structures. Pavement distresses and strengthening by overlays.

Traffic surveys and their application in traffic planning, Typical design features for channelized, intersection, rotary etc., signal designs, standard traffic signs and markings.

Railway Engineering: Permanent way, ballast, sleeper, chair and faslenings, points, crossings, different types of turn outs, cross-over, setting out of points, Maintenance of track, super elevation, creep of rails ruling gradients, track resistance tractive effort, curve resistance, Station yards and station buildings, platform sidings, turn outs, Signals and interlocking, level crossings.

Air port Engineering: Layouts, Planning and design.

Environmental Engineering:

Water supply: Estimation of water demand, impurities in water and their significance, physical, chemical and bacteriological parameters and their analysis, waterborne diseases, standards for potable water.

Water collection & treatment: Intake structures, principles and design of sedimentation tank, coagulation cum flocculation units slow sand filter, rapid sand filter and pressure filter, theory & practices of chlorination, water softening, removal of taste and salinity, Sewerage Systems, Domestic and industrial wastes, storm, sewage, separate and combined systems, flow through sewers, design of sewers.

Waste water characterization: Solids, Dissolved oxygen (DO), BOD COD, TOC, and Nitrogen, Standards for disposal of effluent in normal water course and on to land.

Waste water treatment: Principles and design of wastewater Treatment units--, Screening, grit chamber, sedimentation tank activated sludge process, trickling filters, oxidation ditches, oxidation ponds, septic tank; Treatment and disposal of sludge; recycling of waste water.

Solid waste management: Classification, Collection and disposal of solid waste in rural and urban areas, Principles of solid waste management.

Environmental pollution: Air and water pollution and their control acts. Radioactive waste and their disposal Environmental impact assessment of Thermal power Plants, mines and river valley projects, Sustainable development.

Survey and Engineering Geology:

Surveying: Common methods and instruments for distance and angle measurements in Civil Engineering works, their use in plane table traverse survey, levelling, triangulation, contouring and topographical maps. Survey layouts for culverts canal, bridge, roads, railway alignment and buildings.

Basic principles of photogrammetry and remote sensing. Introduction to Geographical information system.

Engineering Geology: Basic concepts of Engineering geology and its applications in projects such as dams, bridges and tunnels.