UPPSC AE Syllabus 2024

The UPPSC AE Syllabus 2024 will differ for each job and trade. The written test consists of two papers, Paper I and Paper II. Here is the UPPSC AE syllabus for Paper I and Paper II for all professions.

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UPPSC AE Syllabus Paper-I

Paper I is broken into two pieces. The two components are General Hindi and Main Subject (Paper I). Find the detailed curriculum for UPPSC AE Paper I below.

UPPSC AE Syllabus for General Hindi

Topics for General Hindi covered in UPPSC AE Syllabus	
हिंदी भाषा का मूलभूत ज्ञान (स्वर, व्यंजन, रस)	वाक्य-क्रम व्यवस्थापन
प्रत्यय	उपसर्ग और प्रत्यय
समास	विपरीतार्थक शब्द
मुहावरे और लोकोक्तियाँ	संधि तथा संधि-विच्छेद
अनेक शब्दों के लिए एक शब्द	अनेकार्थक शब्द
उचित शब्द से दिए गए रिक्त स्थान की पूर्ती	पर्यायवाची शब्द
विलोम शब्द	शब्द युग्म
लिंग परिवर्तन	वचन परिवर्तन
वर्ण, वर्तनी और उच्चारण	

UPPSC AE Syllabus for Civil Engineering

Part	Topics for Civil Engineering
Part A	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 Cartesian 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 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
Part B	Structural Steel Design
	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
	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
	Prestressed concrete: Methods and systems of prestressing, anchorages, analysis and design of sections for flexure based on working stress
	Losses of prestress, Earthquake resistant design of building as per BIS code
	Design of brick masonry as per I. S. Codes, Design of masonry retaining walls
Part C	Building Materials

	Physical properties of construction materials concerning their use: stones, bricks, tiles, lime, glass, cement, mortars, Concrete, the concept of mix design, pozzolans, plasticisers, super plasticisers
	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, waterproofing and damp proofing materials
	Detailing of walls, floors, roofs, staircases, doors and windows, Plastering, pointing, flooring, roofing and construction features
	Retrofitting buildings, Principle of planning for residents and specific uses, National Building code provisions and uses
	Basic principles of detailed and approximate estimating, specifications, rate analysis, and real property valuation principles
	Machinery for earthwork, concreting and their specific uses, factors affecting selection of construction equipment, operating cost of equipment
	Construction activity, schedules, organisations, quality assurance principles

	The 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
Part D	GeoTechnical Engineering & 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, and the permeability of stratified soil deposits
	Seepage pressure, quicksand condition, compressibility and consolidation, Terzaghi's theory of one-dimensional consolidation, and 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, sheet pile walls, braced excavation
	Bearing capacity, Terzaghi and other important theories, net and gross bearing pressure, Immediate and consolidation settlement, stability of the 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, Boussinesq's theory, Westergaard method, Newmark's chart, pressure bulb, contact pressure
	Applicability of different bearing capacity theories, evaluation of bearing capacity from field tests, allowable bearing capacity, settlement analysis, allowable settlement
	Proportioning of footing, isolated and combined footings, rafts, pile foundation, types of piles, piles 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

UPPSC AE Syllabus for Mechanical Engineering

Topics for Mechanical Engineering covered in UPPSC AE Syllabus	
Engineering Mechanics	Analysis of force systems
	Friction
	Centroid and centre of gravity

	Trusses and beams
	The principle of virtual work
	Kinematics and kinetics of particle
	Kinematics and kinetics of rigid bodies
Mechanism and Machines	Velocity and acceleration of links
	Cams and followers
	Gears and gear train
	Clutches
	Belt drives
	Brakes and dynamometers
	Flywheel and governors
	Balancing of rotating and reciprocating masses
	Balancing of multi-cylinder engines
	Free and forced vibration
	Damped vibration

	Whirling of shafts
Mechanics of Solids	Stresses and strains
	Compound stresses strains
	Torsion of circular shafts
	Stresses and deflections in beams
	Unsymmetrical bending
	Curved beams
	Thin and thick cylinders and spheres
	Buckling of columns
	Energy methods
	Helical and leaf springs
Design of Machine Elements	Design for Static and dynamic loading
	Theories of failure
	Fatigue principles of design
	Rivetted, welded and bolted joints

	Shafts
	Springs
	Bearings
	Brakes
	Clutches
	Flywheels
Engineering Materials	Crystal systems and crystallography
	Crystal imperfections
	Alloys and phase diagrams
	Heat treatment
	Ferrous and non-ferrous metals and alloys
	Mechanical properties and testing
Manufacturing	Metal casting
	Metal forming
	Metal joining

	Mechanics of metal cutting
	Machining and machine tool operations
	Unconventional machining methods
	Limits, fits and tolerances
	Inspection: Surface roughness, comparators
	Computer integrated manufacturing
	Flexible manufacturing systems
	Jigs and fixtures
Industrial Engineering	Production, planning and control
	Inventory control and operation
	Research
	CPM and PERT
Mechatronics and Robotics	Microprocessors and microcontrollers
	Architecture

	Programming
	Computer interfacing
	Programmable logic controller
	Sensors and actuators
	Piezoelectric accelerometers
	Hall effect sensors
	Optical encoder
	Resolver
	Inductosyn
	Pneumatic and Hydraulic Actuators
	Stepper motor
	Control system
	Mathematical modeling
	Control signals
	Controllability and observability

	Robotics: Robot classification, robot specification
	Notation: Direct and inverse kinematics, homogeneous coordinates and arm equation of four-axis SCARA Robot

UPPSC AE Syllabus for Electrical Engineering

Topics for Electrical Engineering covered in UPPSC AE Syllabus	
Networks and Systems	Steady-state and Transient-state Analysis of systems
	Thevenin's-, Norton's-, Superposition- and Maximum Power Transfer-theorems
	Driving point Transfer functions
	Two-port networks
	Laplace and Fourier transforms and their applications in Network analysis
	Z-transforms for discrete systems
	R-L, R-C & L-C network synthesis
E.M. Theory	Analysis of electrostatic and magnetostatic fields
	Laplace, Poisson and Maxwell equations

	Solution of boundary value problems
	Electromagnetic wave propagation
	Ground and space waves
	Propagation between Earth Station and Satellites
Control Systems	Mathematical modelling of dynamic linear continuous systems
	Block diagrams and Signal flow graphs
	Time-response specifications
	Steady-state error
	Routh-Hurwitz criterion
	Nyquist techniques
	Root Loci
	Bode Plots
	Polar Plot, and stability analysis
	Lag-, Lead-, Lag-Lead-compensation
	State-space modelling

	State transition matrix
	Controllability and observability
Elements of Electronics	Basics of semiconductor diodes
	BJT, FET and their characteristics
	Different types of transistors and FET amplifiers equivalent circuits and frequency response
	Feedback oscillators
	Colpitts oscillator and Hartley Oscillator
	Operational amplifiers-characteristics and applications
Power System Analysis and Design	Line parameters and calculations
	Performance of Transmission lines
	Mechanical design of overhead lines and Insulators
	Corona and radio interference
	Parameters of single- and three-core Cables
	Bus admittance matrix

	Load flow equations and methods of solutions
	Fast-decoupled load flow
	Balance- and Unbalanced-faults analysis
	Power system stability
	Power system transients and travelling Waves
	EHV Transmission
	HVDC transmission
	Concepts of FACTS
	Voltage Control and Economic operation
	Concepts of distributed generation
	Solar and wind power
	Smart grid concepts
Elements of Electrical Machines	General concepts of E.m.f., m.m.f., and torque in rotating machines
	DC Machines: motor and generator characteristics, equivalent circuits, commutation and armature reaction, starting and speed controls of motors

	Synchronous Machines: performance, regulation, Parallel operation of generators, motor starting, characteristics and applications
	Transformers: phasor-diagram and equivalent circuit, efficiency, and voltage regulation, auto-transformers, 3-phase transformers
Measurement	Basic methods of measurement
	Precision and standards
	Error analysis
	Bridges and Potentiometers
	Moving coil, Moving iron, dynamometer and induction type instruments
	Measurement of voltage, current, power, energy, and power factor
	Instrument transformers
	Digital voltmeters and multimeters
	Phase-, time- and frequency measurement
	Q-meters
	Oscilloscopes

	Basics of sensors and data acquisition system
	Instrumentation systems for pressure and temperature measurements

UPPSC AE Syllabus for Agriculture Engineering

Topics for Agriculture Engineering covered in UPPSC AE Syllabus	
Thermodynamics and Heat Engines	Concept of energy, temperature and heat equations
	Laws of thermodynamics
	Pure substances and their properties
	Entropy
	Rankine, air standard Otto, Diesel and Joule cycles
	Indicator diagrams
Farm Power	Sources and status of power in India
	Farm power and agricultural productivity relationship
	Construction and operational features of IC engines
	Various systems of IC engine namely carburetion, ignition, cooling, lubrication

	Valves and valve timing
	Special features of diesel engines
	Tractors and their classification
	Power transmission
	Repair and maintenance
	Tractor testing and tractor economics
	Power tillers – their economics and suitability
	Energy in Agriculture
Farm Machinery	Design, construction, operation, repair and maintenance of tillage tools, implements and equipment
	Mould board and disk plough
	Harrows, cultivators, rotary tiller
	Seeding and planting machines
	Hoe, weeders, sprayers and dusters
	Harvester, threshers and combines

	Soil and crop factors influencing machine performance and energy requirements
	Selection of farm machines
	The economics of agricultural mechanization
	Earth moving machinery
Heat and Mass Transfer	Thermal properties of materials
	Steady state and transient heat conduction
	Natural and forced convection
	Boiling, condensation
	Thermal radiation exchange
	Heat exchangers
	Heat and mass transfer analogy
	Fick's laws of diffusion
	Psychrometrics
	Analysis of heat and mass transfer processes

	Instrument and measurement systems
Process and Food Engineering	Unit operations in post-harvest processing (cleaning, grading, drying, size reduction, evaporation, pasteurization, distillation etc.)
	Processing of cereals, pulses, oil seeds, fruits & vegetables, animal feed, spices, dairy products, meat etc.
	Design of processing equipment and systems
	Milking machines
Storage and Handling	Changes in stored products during storage
	Storage of food grains and their products, perishables (vegetable, fruits, dairy products, meat, and eggs)
	Storage systems - air tight ventilated, refrigerated, modified atmospheric and controlled atmospheric storages
	Packaging
	Conveyors
	Design and management of storage and handling systems
	Reducing losses in storage and handling

UPPSC AE Syllabus Paper-II

Paper II is broken into two sections: General Studies and Main Subject (Paper II). Find the detailed curriculum for UPPSC AE Paper-II below.

UPPSC AE Syllabus for General Studies

Topics for General Studies covered in UPPSC AE Syllabus	
Indian Polity, Economy & Culture	Indian National Movement
Current National and International Events	Logical Reasoning
Indian Agriculture, Commerce & Trade	History of India
Population, Ecology & Urbanisation	World Geography & Indian Geography
General Science	Natural Resources of India
Culture and Traditions of Uttar Pradesh	Elementary Mathematics (Arithmetic, Algebra, and Geometry)

UPPSC AE Syllabus for Civil Engineering

Topics for Civil Engineering covered in UPPSC AE Syllabus		
Part	**Topic**	**Subtopics**

Part-A	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, source and sink, flow separation, free and forced vortices. Flow control volume equation, continuity, momentum and energy equations, Navier-Stokes 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	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 Machines & 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 bondage, Pumped storage plants, Special types of hydel plants.
Part-B	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, the storage capacity of reservoirs, reservoir losses, and reservoir sedimentation. Water requirements of crops consumptive use, duty and delta, irrigation methods, Irrigation efficiencies.
	Canals	Distribution systems for canal irrigation, canal capacity, canal losses, alignment of main and distribution canals, Design of canal by Kennedy's and Lacey's theories, Water logging and its prevention

	Diversion head works	Components, 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
Part-C	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 stabilised soil. WBM, Bituminous works and Cement Concrete roads. Surface and sub-surface drainage arrangements for roads, and culvert structures. Pavement distresses and strengthening by overlays. Traffic surveys and their application in traffic planning, Typical design features for channelised, intersection, rotary etc., signal designs, standard traffic signs and markings
	Railway Engineering	Permanent way, ballast, sleeper, chair and fastenings, points, crossings, different types of turnouts, cross-over, setting out of points, Maintenance of track, superelevation, creep of rails ruling gradients, track resistance tractive effort, curve resistance, Station yards and station buildings, platform sidings, turnouts, Signals and interlocking, level crossings
	Airport Engineering	Layouts, Planning and design.

Part-D	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
	Wastewater characterization	Solids, Dissolved oxygen (DO), BOD COD, TOC, and Nitrogen, Standards for disposal of effluent in normal water course and on to land
	Wastewater 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

Part-E	Surveying	Common methods and instruments for distance and angle measurements in Civil Engineering works, their use in plane table traverse survey, leveling, triangulation, contouring and topographical maps. Survey layouts for culverts, canals, bridges, roads, railway alignments 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

UPPSC AE Syllabus for Mechanical Engineering

Topic	**Subtopics**
Thermodynamics	Thermodynamic systems and processes
	Properties of pure substances
	Concepts and applications of zeroth, first, and second law of thermodynamics
	Entropy, availability, and irreversibility
	Detailed analysis of thermodynamic cycles
	Ideal and real gases
	Fuels and combustion
Fluid Mechanics	Basic concepts and properties of fluids

	Manometry
	Fluid statics
	Buoyancy
	Equations of motion
	Bernoulli's equation and applications
	Viscous flow of incompressible fluids
	Laminar and turbulent flows
	Flow through pipes and head losses
	Dimensional analysis
	Forces on immersed bodies and boundary layer over a flat plate
	Isentropic and adiabatic flows
	Normal shock waves
Heat Transfer	Modes of heat transfer
	Steady and unsteady heat conduction
	Thermocouple time constant

	Critical thickness of insulation
	Heat transfer from fins
	Momentum and energy equations for boundary layer flow on a flat plate
	Free and forced convection
	Radiation heat transfer
	Stefan-Boltzmann law
	Shape factor
	Black and grey body radiation heat exchange
	Boiling and condensation
	Heat exchanger analysis
	LMTD and NTU – effectiveness methods
Energy Conversion	SI and CI engines
	Performance characteristics and testing of IC engines
	Combustion phenomena in SI and CI engines

	Carburetion and fuel injection systems
	Emissions and emission control
	Reciprocating and rotary pumps
	Pelton wheel, Francis, and Kaplan turbines
	Velocity diagrams, impulse and reaction principles
	Steam and gas turbines
	Rankine and Brayton cycles with regeneration and reheat
	High-pressure boilers
	Draft
	Condensers
	Unconventional power systems
	Utilization of solar energy
	Reciprocating and rotary compressors
	Theory and applications of propulsions
	Pulsejet and ramjet engines

Environmental Control	Vapour compression
	Vapour absorption
	Steam jet and air refrigeration systems
	Properties of refrigerant and their nomenclature
	Psychometrics properties and processes
	Psychrometric relations
	Use of psychrometric chart
	Load estimation
	Supply air conditions
	Sensible heat factors

	Air conditioning system layout
	Comfort chart
	Comfort and industrial air conditioning

UPPSC AE Syllabus for Electrical Engineering

Topic	**Subtopics**
Power Electronics & Drives	Semiconductor
	Power diodes
	Power transistors
	Thyristors
	Triacs
	GTOs (Gate Turn-Off Thyristors)
	MOSFETs (Metal-Oxide-Semiconductor Field-Effect Transistors)
	IGBTs (Insulated-Gate Bipolar Transistors)

	Static characteristics and principles of operation
	Triggering circuits
	Single-phase controlled rectifiers - fully controlled and half controlled
	Three-phase controlled rectifiers - fully controlled and half controlled
	Smoothing and filters
	Regulated power supplies
	DC-DC choppers
	Inverters
	Speed control circuits for DC and AC drives
	Basics of electric drives
	Types of electric drives
	Quadrant operation
	Reversing and braking of electric motors
	Estimation of power ratings

	Traction motors
Digital Electronics	Boolean algebra
	Logic gates
	Combinational logic circuits
	Sequential logic circuits
	Multiplexers
	Multivibrators
	Sample and hold circuits
	A/D (Analog-to-Digital) converters
	D/A (Digital-to-Analog) converters
	Basics of filter circuits and applications
	Active filters
	Semiconductor memories
Microwaves and Communication Systems	Electromagnetic wave in guided media

	Waveguide components
	Resonators
	Microwave tubes
	Microwave generators and amplifiers
Analog Communications Basics	Modulation and demodulation
	Noise and bandwidth
	Transmitters and receivers
	Signal-to-noise ratio
	Digital communication basics
	Sampling
	Quantizing
	Coding
	Frequency- and time-domain multiplexing

	Sound and vision broadcast
	Antennas
	Transmission lines at audio and ultra-high frequencies
Induction & Special Machines	Three-phase induction motors
	Rotating magnetic field
	Torque-slip characteristics
	Equivalent circuit and determination of its parameters
	Starters
	Speed control
	Induction generators
	Single-phase induction motors
	Theory and phasor diagrams
	Characteristics
	Starting and applications
	Repulsion motor

	Series motor
	E.m.f. equation and phasor diagram and performance
	Servomotors
	Stepper motors
	Reluctance motors
	Brushless DC motors (BLDC)
Power System Protection and Switchgear	Methods of Arc Extinction
	Restriking voltages and recovery voltage
	Testing of circuit breakers
	Protective relays
	Protective schemes for power system equipment
	Surges in transmission lines and protection
Numerical Methods	Solution of non-linear algebraic equations

	Single and multistep methods for the solution of differential equations
Electrical Engineering Materials	Crystal structure and defects
	Conducting materials
	Insulating materials
	Magnetic materials
	Superconductors
Elements of Microprocessors	Data representation and representation of integer and floating-point numbers
	Organisation and programming of a microprocessor
	ROM and RAM memories
	CPU of a microcomputer
	Interfacing memory and I/O devices
	Programmable peripheral and communication interface
	Application of microprocessors

UPPSC AE Syllabus for Agriculture Engineering

Topic	Subtopics
Hydraulics and Fluid Mechanics	Fluid properties, units and dimensions: surface tension and capillarity, equation of continuity, Bernoulli equation, Laminar and turbulent flow, steady and unsteady flow, Flow of fluids in pipes and open channels, design of open channels for non-erosive and non-silting velocities, most economical cross-section, measurement of irrigation water and other water measuring devices viz. weirs, notches, orifices and flumes.
Surveying and Leveling	Linear measurements; survey methods and devices used; the principle of levelling, simple, differential and profile levelling; Contouring and characteristics of contour lines; Land levelling and grading, earthwork estimation
Soil and Water Conservation Engineering	Forms of precipitation; hydrologic cycle; Point rainfall analysis, frequency analysis, agricultural watershed and its management; water management in the agri-horti-aquaculture system, mechanics of water and wind erosion; Rational method of prediction of peak runoff and its limitations; the concept of unit hydrograph and instantaneous hydrograph; factors affecting erosion and runoff; water erosion control measures – contour cultivation, strip cropping, terracing, afforestation, pastures; Design of gully control structures – temporary and permanent; stream bank erosion; flood routing; flood amelioration by upstream soil water management; wind erosion control measures and sand dunes stabilisation
Irrigation Pumps	Design, construction, performance characteristics, selection, installation, servicing and maintenance of different pumps (reciprocating, centrifugal, gear, turbine, submersible, propeller, jet); Hydraulic ram; Renewable and non-renewable power sources for pumping solar pumps

Irrigation & Drainage Engineering	Water wealth and irrigation in India; Soil water plant relationship; Forms and occurrence of soil water; methods and devices for soil moisture measurement; water requirement of crops; irrigation scheduling; irrigation methods – their hydraulics and design flood, border, furrow, sprinkler and drip irrigation, concept of irrigation efficiencies; water conveyance and control; Design of canals. Lacey and Kennedy's theories. Drainage needs and its benefits; Darcy's Law, hydraulic conductivity; drainage coefficient; drainage methods, surface drainage (drainage of flat and sloping lands); design of open ditches their alignment and construction; designs and layout of subsurface drains; depth and spacing of drains and drainage outlets; installation of drains and drainage wells; drainage of salt-affected areas.
Ground Water Hydrology and Tube well Engineering	Occurrence and movement of groundwater, steady and transient flow into wells, well interference, well drilling, design of well assembly and gravel pack, installation of good screen, completion and development of wells
Rural Engineering	Building materials and their properties; Farm stead planning, and design of dairy barns; poultry, goat-sheep, and piggery housing; selection of site, planning and design of rural houses, farm roads, village drainage; waste disposal and sanitary structures; cost estimates, greenhouse construction