AE: Syllabus for Civil Engineering

**Mechanics:**
Bending moment and shear force in statically determinate beams. Simple stress and strain relationship: Stress and strain in two dimensions, principal stresses, stress transformation, Mohr’s circle. Simple bending theory, flexural and shear stresses, unsymmetrical bending, shear center. Thin walled pressure vessels, uniform torsion, buckling of column, combined and direct bending stresses.

**Structural Analysis:**
Analysis of statically determinate trusses, arches, beams, cables and frames, displacements in statically determinate structures and analysis of statically indeterminate structures by force/energy methods, analysis by displacement methods (slope deflection and moment distribution methods), influence lines for determinate and indeterminate structures. Basic concepts of matrix methods of structural analysis.

**Concrete Structures:**
Concrete Technology - properties of concrete, basics of mix design. Concrete design - basic working stress and limit state design concepts, analysis of ultimate load capacity and design of members subjected to flexure, shear, compression and torsion by limit state methods. Basic elements of prestressed concrete, analysis of beam sections at transfer and service loads.

**Steel Structures:**
Analysis and design of tension and compression members, beams and beam columns, column bases. Connections- simple and eccentric, beam–column connections, plate girders and trusses. Plastic analysis of beams and frames.

**Soil Mechanics:**
Origin of soils, soil classification, three-phase system, fundamental definitions, relationship and interrelationships, permeability &seepage, effective stress principle, consolidation, compaction, shear strength.


Hydrology: Hydrologic cycle, rainfall, evaporation, infiltration, stage discharge relationships, unit hydrographs, flood estimation, reservoir capacity, reservoir and channel routing. Well hydraulics.


Water requirements: Quality standards, basic unit processes and operations for water treatment. Drinking water standards, water requirements, basic unit operations and unit processes for surface water treatment, distribution of water. Sewage and sewerage treatment, quantity and characteristics of wastewater. Primary, secondary and tertiary treatment of wastewater, sludge disposal, effluent discharge standards. Domestic wastewater treatment, quantity of characteristics of domestic wastewater, primary and secondary treatment Unit operations and unit processes of domestic wastewater, sludge disposal.

Air Pollution: Types of pollutants, their sources and impacts, air pollution meteorology, air pollution control, air quality standards and limits.

Municipal Solid Wastes: Characteristics, generation, collection and transportation of solid wastes, engineered systems for solid waste management (reuse/ recycle, energy recovery, treatment and disposal).

Noise Pollution: Impacts of noise, permissible limits of noise pollution, measurement of noise and control of noise pollution.

Highway Planning: Geometric design of highways, testing and specifications of paving materials, design of flexible and rigid pavements.

Traffic Engineering: Traffic characteristics, theory of traffic flow, intersection design, traffic signs and signal design, highway capacity.

Surveying:

Importance of Surveying, principles and classifications, mapping concept, co-ordinate system, map projections, measurements of distance and directions, levelling, theodolite traversing, plane table surveying, errors and adjustments, curves.
AE: Syllabus for Electrical Engineering

**Electric Circuits and Fields:**
Network graph, KCL, KVL, node and mesh analysis, transient response of dc and ac networks; sinusoidal steady-state analysis, resonance, basic filter concepts; ideal current and voltage sources, Thevenin’s, Norton’s and Superposition and Maximum Power Transfer theorems, two-port networks, three phase circuits; Gauss Theorem, electric field and potential due to point, line, plane and spherical charge distributions; Ampere’s and Biot-Savart’s laws; inductance; dielectrics; capacitance.

**Signals and Systems:**
Representation of continuous and discrete-time signals; shifting and scaling operations; linear, time-invariant and causal systems; Fourier series representation of continuous periodic signals; sampling theorem; Fourier, Laplace and Z transforms.

**Electrical Machines:**
Single phase transformer – equivalent circuit, phasor diagram, tests, regulation and efficiency; three phase transformers – connections, parallel operation; autotransformer; energy conversion principles; DC machines – types, windings, generator characteristics, armature reaction and commutation, starting and speed control of motors; three phase induction motors – principles, types, performance characteristics, starting and speed control; single phase induction motors; synchronous machines – performance, regulation and parallel operation of generators, motor starting, characteristics and applications; servo and stepper motors.

**Power Systems:**
Basic power generation concepts; transmission line models and performance; cable performance, insulation; corona and radio interference; distribution systems; per-unit quantities; bus impedance and admittance matrices; load flow; voltage control; power factor correction; economic operation; symmetrical components; fault analysis; principles of overcurrent, differential and distance protection; solid state relays and digital protection; circuit breakers; system stability concepts, swing curves and equal area criterion; HVDC transmission and FACTS concepts.

**Control Systems:**
Principles of feedback; transfer function; block diagrams; steady-state errors; Routh and Niquist techniques; Bode plots; root loci; lag, lead and lead-lag compensation; state space model; state transition matrix, controllability and observability.

**Electrical and Electronic Measurements:**
Bridges and potentiometers; PMMC, 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; potentiometric recorders; error analysis.
Analog and Digital Electronics:

Characteristics of diodes, BJT, FET; amplifiers – biasing, equivalent circuit and frequency response; oscillators and feedback amplifiers; operational amplifiers – characteristics and applications; simple active filters; VCOs and timers; combinational and sequential logic circuits; multiplexer; Schmitt trigger; multi-vibrators; sample and hold circuits; A/D and D/A converters; 8-bit microprocessor basics, architecture, programming and interfacing.

Power Electronics and Drives:

Semiconductor power diodes, transistors, thyristors, triacs, GTOs, MOSFETs and IGBTs – static characteristics and principles of operation; triggering circuits; phase control rectifiers; bridge converters – fully controlled and half controlled; principles of choppers and inverters; basis concepts of adjustable speed dc and ac drives.
AE: Syllabus for Sig. & Telecommunication Engineering

Networks:


Electronic Devices:

Analog Circuits:


Digital Circuits:

Boolean algebra, minimization of Boolean functions; logic gates; digital IC families (DTL, TTL, ECL, MOS, CMOS). Combinatorial circuits: arithmetic circuits, code converters, multiplexers, decoders, PROMs and PLAs. Sequential circuits: latches and flip-flops, counters and shift registers. Sample and hold circuits, ADCs, DACs. Semiconductor memories. Microprocessor (8085): architecture, programming, memory and I/O interfacing.

Signals and Systems:


Control Systems:
Basic control system components; block diagrammatic description, reduction of block diagrams. Open loop and closed loop (feedback) systems and stability analysis of these systems. Signal flow graphs and their use in determining transfer functions of systems; transient and steady state analysis of LTI control systems and frequency response. Tools and techniques for LTI control system analysis: root loci, Routh-Hurwitz criterion, Bode and Nyquist plots. Control system compensators: elements of lead and lag compensation, elements of Proportional-Integral- Derivative (PID) control. State variable representation and solution of state equation of LTI control systems.

**Communications:**

Random signals and noise: probability, random variables, probability density function, autocorrelation, power spectral density. Analog communication systems: amplitude and angle modulation and demodulation systems, spectral analysis of these operations, superheterodyne receivers; elements of hardware, realizations of analog communication systems; signal-to-noise ratio (SNR) calculations for amplitude modulation (AM) and frequency modulation (FM) for low noise conditions. Fundamentals of information theory and channel capacity theorem. Digital communication systems: pulse code modulation (PCM), differential pulse code modulation (DPCM), digital modulation schemes: amplitude, phase and frequency shift keying schemes (ASK, PSK, FSK), matched filter receivers, bandwidth consideration and probability of error calculations for these schemes. Basics of TDMA, FDMA and CDMA and GSM.

**Electromagnetics:**

Elements of vector calculus: divergence and curl; Gauss' and Stokes' theorems, Maxwell's equations: differential and integral forms. Wave equation, Poynting vector. Plane waves: propagation through various media; reflection and refraction; phase and group velocity; skin depth. Transmission lines: characteristic impedance; impedance transformation; Smith chart; impedance matching; S parameters, pulse excitation. Waveguides: modes in rectangular waveguides; boundary conditions; cut-off frequencies; dispersion relations. Basics of propagation in dielectric waveguide and optical fibers. Basics of Antennas: Dipole antennas; radiation pattern; antenna gain.
JE_ Civil Engineering

Building Materials:

Physical and Chemical properties, Classification, Standard tests, Uses and manufacture/quarrying of materials e.g. building stones, silicate based materials, cement (Portland), Asbestos products, Timber and Wood based Products, laminates, bituminous materials, paints, varnishes.

Surveying:

Principles of surveying, working of prismatic compass and bearings, Plane table surveying, Theodolite traverse, Adjustment of theodolite, Levelling and contouring, Curvature, Refraction correction, Permanent adjustment of dumpy level, Methods of contouring and uses of a contour map, Tachometric survey.

Soil Mechanics:

Origin of soil phase diagram, Definitions, Of void ratio porosity, Degree of saturation, Water content specific gravity of soil grains and unit weights, Grain size distribution curves for different solid and their uses, Atterjerg's limits isi soil classification, Plasticity chart, Coefficient of permeability, Effective stress, Consolidation of soils.

Soil:

Calculation shear strength of soils, direct shear test, Vane shear test, Triaxial test, Soil compaction, Lab compaction Lab compaction test, Moisture content and bearing capacity of soils, Plate load test, and Standard penetration test.

Hydraulics:


Environmental Engineering:

Quality of water, Source of water supply, Purification of water, Distribution of water, Need of sanitation, Sewerage systems, Circular sewers, Oval sewer, Sewer appurtenances, Surface water drainage sewage treatments.
JE_Electrical Engineering

Basic Electrical Engg. And Electt. Measurements:

Concepts of currents, Voltage, Resistance, Power and energy, their units, Ohm's law. Circuit Law: Kirchhoff's law
Solution of simple network problems, Network theorems and their applications, Electro-magnetism concept of flux, Emf, Reluctance, Magnetic circuits, Electro-magnetic induction, Self and mutual inductance, A.C. fundamentals
Instantaneous, Peak, R.m.s. And average values of alternating waves, Equation of sinusoidal wave form, Simple series
and parallel a.c. Circuits consisting of R.L. and C. Resonance, Measurement and measuring instruments
Moving coil and moving iron ammeters and voltmeters, Extension of range, Watt meters, Multimeters, Megger, Basic
Electronics.

Electrical machines:

Basic principles D, C motors of generators, their characteristics, Speed control and starting of D.C. motors, Losses and
efficiency of D.C. machines.

1-phase and 3-phase Transformers:

Principles of Operation, Equivalent Circuit, Voltage Regulation O.C. And S.C. Tests, Efficiency, Auto Transformers,
Synchronous Machines, Generation Of Three Phase Emf, Armature Reaction, Voltage Regulation, Parallel Operation
Of Two Alternators, Synchronizing, Starting And Applications Of Synchronous Motors, 3-Phase Induction Motor,
Rotating Magnetic Field, Principle Of Operation, Equivalent Circuit, Torque Speed Characteristics, Starting And Speed
Control Of 3-Phase Induction Motors, Fractional Kw Motors, 1-Phase Induction Motors A.C. Series Motor, Reluctance
Motor.

General, Transmission and Distribution:

Different types of power stations, Load factor, Diversity factor, Demand factor, Simple problems thereon, Cost of
generation inter connection of power stations, Power factor improvement, Various types of tariffs, Types of faults
Short circuit current for symmetrical faults, Switchgears-rating of circuit breakers: Principles of a are extinction by oil
and air, H.R.C. fuses, Protection earther leakage, Over current Buchhotz relayMerz-Prince system of protection of
generators & transformers, Protection of feeders and bus bars., Lightning arresters, Various transmission and
distribution systems, Comparison of conductor materials. Efficiency for different systems.

Utilization of Electrical Energy:

Illumination, Electric heating, Electric welding, Electroplating, Electric drivers and motors.
JE: Diploma in Sig & Telecom

**Basic Electronics**
Basics of Semiconductor-type & N-type Semiconductor. Classification of Semiconductors & comparison between Semiconductor, Insulators & Conductors. Concept of diode & formation of PN Rectifying diode, Review of P-type and N-type

**Electrical Technology**

**Principles of Digital Techniques**
Fundamental concepts of Boolean algebra, Fundamental concepts of different number system, Conversion of different number system, Compare different logic families, explain the operation of basic logic gates, Design basic digital circuits, Design of combinational logic circuits

**Instrumentation & Measurement**
Define the physical quantities with proper units to ensure precise technical communication, Use correct units for given Measurement. Compare different types of transducer on their performance characteristics and applications, learn the operating principles of transducers for Measurement of pressure flow.
ASSISTANT MANAGER _ FINANCE

Accounting


(a) Hire purchase and installment sale transactions
(b) Investment accounts
(c) Insurance claims for loss of stock and loss of profit.

Issues in Partnership Accounts

Accounting in Computerized Environment

Business Laws


Company Law

The Companies Act, 2013, Preliminary, Prospectus, Share and Share capital

Ethics

Principles of Business Ethics, Environment Issues, Ethics in Workplace, Ethics in Marketing and Consumer Protection, Ethics in Accounting and Finance

Communication
Elements of Communication, Communication in Business Environment, Basic Understanding of Legal Deeds and Documents

**Cost Accounting**
Introduction to Cost Accounting, Materials, Labor, Overheads, Non-Integrated Accounts, Methods, Job and Batch, Contract, Operating, Process and Operation, Standard Costing, Marginal Costing, Budgets and Budgetary Control

**Financial Management**

**Income-tax**

**Service tax**
Concepts and general principles, Charge of service tax and Valuation, Payment of service tax and filing of returns

**VAT**
Concepts and general principles, Input Tax Credits and Composition Scheme for Small Dealers, VAT Procedures

**Advanced Accounting**
Conceptual Framework for Preparation and Presentation of Financial Statements
Accounting Standards
AS 4: Contingencies and Events occurring after the Balance Sheet Date
AS 5: Net Profit or Loss for the Period, Prior Period Items and Changes in Accounting Policies
AS 11: The Effects of Changes in Foreign Exchange Rates
AS 12: Accounting for Government Grants
AS 16: Borrowing Costs
AS 19: Leases
AS 20: Earnings per Share
AS 26: Intangible Assets
AS 29: Provisions, Contingent Liabilities and Contingent Assets

Advanced Issues in Partnership Accounts, Company Accounts, Employee stock option plan and Buy back of securities, Amalgamation and Reconstruction, Underwriting of shares and debentures, Redemption of debentures, Accounting for Special Transactions, Insurance Companies, Banking Companies, Electricity Companies, Departmental accounts, Branch accounts including foreign branches

**Auditing and Assurance**
Auditing Concepts, Auditing and Assurance Standards, Preparation for an Audit, Internal Control, Vouching, Verification of Assets and Liabilities, Company Audit, Audit Report, Special Audits

**Information Technology**
Computer software, Data Storage, Retrievals and Data Base Management Systems, Computer Networks & Network Security, Internet and other technologies, Flowcharts, Decision Tables

**Strategic Management**
Business Environment, Business Policy and Strategic Management, Strategic Analyses Strategic Planning, Formulation of Functional Strategy, Strategy Implementation and Control, Reaching Strategic Edge
SYLLABUS FOR ACCOUNT ASSISTANT

B. COM: COMMERSE

Financial Accounting :


Cost Accounting :


Taxation :

Income Tax: Definitions; Basis of Charge; Incomes which do not form Part of Total Income. Simple problems of Computation of Income (of Individuals only) under Various Heads, i.e., Salaries, Income from House Property, Profits and Gains from Business or Profession, Capital Gains, Income from other sources, Income of other Persons included in Assessee’s Total Income. Set - Off and Carry Forward of Loss.Deductions from Gross Total Income. Salient Features/Provisions Related to VAT and Services Tax.

Business Law


Auditing :

Company Audit: Audit related to Divisible Profits, Dividends, Special investigations, Tax audit. Audit of Banking, Insurance, Non-Profit Organizations and Charitable Societies/ Trusts/Organizations.

Financial Management :


Cost of capital: Concept, Computation of Specific Costs and Weighted Average Cost of Capital. CAPM as a Tool of Determining Cost of Equity Capital.


Financial Markets and Institutions:


Financial Services: Mutual Funds, Venture Capital, Credit Rating Agencies, Insurance and IRDA.

Organisation Theory and Behaviour, Human Resource Management and Industrial Relations

Organisation Theory:

Nature and Concept of Organisation; External Environment of Organizations - Technological, Social, Political, Economical and Legal; Organizational Goals - Primary and Secondary goals, Single and Multiple Goals; Management by Objectives.


Organisational Design–Basic Challenges; Differentiation and Integration Process; Centralization and Decentralization Process; Standardization / Formalization and Mutual Adjustment. Coordinating Formal and Informal Organizations. Mechanistic and Organic Structures


Organisation Behaviour:
Meaning and Concept; Individual in organizations: Personality, Theories, and Determinants;
Perception - Meaning and Process.


**Human Resources Management (HRM):**