1. Computer Science

**Discrete Structures**

Sets, Relations, Functions. Pigeonhole Principle, inclusion-Exclusion Principle,
Equivalence and Partial Orderings, Elementary counting techniques, Probability
Measures for information and Mutual information.

Computability: Model of computation-Finite Automata, Pushdown Automata, Non-
determinism and NFA, DPDA and PDAs and language accepted by these structures,
Grammar, Languages, non-compatibility and Example of non-Computable problems.
Graph: Definition, walks, paths, trails, connected graphs, regular and bipartite graphs, cycles and circuits. Tree and rooted tree. Spanning trees. Eccentricity of a vertex radius and diameter of a graph, Central Graphs, Center(s) of a tree Hamiltonian and Eulerian

Computer Arithmetic

Prepositional (Boolean) Logic, Predicate Logic, Well-formed formulae (WFF)

Satisfiability and tautology.


Representation of Integers: Octal, Hex. Decimal and Binary. 2's complement and 1's complement arithmetic. Floating-point representation.

Programming in C and C++

Programming in C: Elements of C- Tokens, identifiers, data types in C. Control structures in C. Sequence, selection and iteration(s). Structured data types, arrays, structure, union, string, and pointers.

OO Programming Concepts: Class, Object, Instantiation, Inheritance, Polymorphism and Overloading.

Relational Database Design and SQL

E-R Diagrams and their transformation to relational design, Normalization-NF, 2NF, 3NF, BCNF and 4NF. Limitations of 4NF and BCNE.

SQL: Data Definition Language (DLL). Data Manipulation Language (DML), Data Control Language (DCL) commands. Database object like-Views, indexes, sequences, synonyms, data dictionary.

Computer Networks

Networks Fundamentals: Local Area Networks (LAN), Metropolitan Area Network (MAN), Wide Area Networks (WAN), Wireless Networks, Inter Networks.

Reference Models: The OSI model, TCP/IP model.

UNIX

The Unix System: File system, process management, bourne shell, shell variables, command line programming.

Filters and Commands: Pr, head, tail, cut, paste, sort, uniq, tr, join, etc, grep, egrep, fgrep, etc., sed, awk, etc.

System Calls (like): Create, open, close, read, write, isseek, link, Unlin,s tat, fstat, umask, chmod, exec, fork, wait, system.

Software Engineering


Software Metrics: Software Project Management

Software Design: System design, detailed design, function oriented design, object oriented design, user interface design, design level metrics.

Coding and Testing: Testing level metrics. Software quality and reliability, Clean room approach, software reengineering.

Current Trends and Technologies

The topics of current interest in Computer Science and Computer Applications shall be covered. The experts shall use their judgment from time to time to include the topics of popular interest, which are expected to be known for an application development software professional, currently, they include:
2 Mechanical Engineering

1. Thermodynamics


3. Fluid Mechanics:


4. Fluid Machinery and Steam Generators:


5. THEORY OF MACHINES:

6. MACHINE DESIGN:

Design of Joints : cotters, keys, splines, welded joints, threaded fasteners, joints formed by interference fits. Design of friction drives : couplings and clutches, belt and chain drives, power screws.

Design of Power transmission systems : gears and gear drives shaft and axle, wire ropes.

Design of bearings : hydrodynamics bearings and rolling element bearings.

7. STRENGTH OF MATERIALS:

Stress and strain in two dimensions, Principal stresses and strains, Mohr’s construction, linear elastic materials, isotropy and anisotropy, stress-strain relations, uniaxial loading, thermal stresses.

8. ENGINEERING MATERIALS:


9. PRODUCTION ENGINEERING:

Metal Forming : Basic Principles of forging, drawing and extrusion; High energy rate forming; Powder metallurgy.


10. INDUSTRIAL ENGINEERING:

Production Planning and Control : Forecasting – Moving average, exponential smoothing, Operations, scheduling; assembly line balancing, Product development, Break-even analysis, Capacity planning, PERT and CPM.

11. ELEMENTS OF COMPUTATION:

3 Electrical Engineering

Group-I: POWER SYSTEM
Transmission line parameters; Representation of short, medium, and long transmission lines – ABCD parameters; Circle Diagram; Per Unit representation; 3-Φ system; Short Circuit Studies; Sequence Networks; Load-flow Studies – Gauss Seidel method, Newton-Raphson Method; Automatic Generation Control; Load-Frequency Control; Automatic Voltage Regulator;

Group-II: POWER ELECTRONICS AND DRIVES Group
Characteristics and ratings of different thyristor family devices, their turn on and turn off methods with their protection, series and parallel connection of SCRs and their derating, controlled single phase and three phase rectifiers for different types of load viz. R, R-L, R-L-E, single phase and three phase voltage source and current source inverter,

Group-III: COMPUTER TECHNOLOGY Group

Group-IV: CONTROL AND INSTRUMENTATION Group
Mathematical Molding of physical systems, Transfer function of linear systems, Steady state errors and error constants, static error coefficients Time domain analysis, Stability of control system, Routh-Hurwitz’s stability criterion. Root locus plots, analysis of control system by root loci. Relationship between time and frequency response, Polar plot,
Bode’s Plot, Nyquist plot and Nyquist stability criterion, Relative Stability, Phase and Gain Margins, Constant M and N circle. Design of Feedback Controllers: Design of

Group-V: ELECTRONICS AND COMMUNICATION Group
4 Civil Engineering

Advanced Structural Mechanics, Finite Element Analysis, Advanced Theory and Design of Concrete Structures, Structural Dynamics, Theory and Design of Plates and Shells, Prestressed Concrete Design, Stability of Structures, Earthquake Engg
Environmental Chemistry and Microbiology, Physico-Chemical Process for Water and Wastewater Treatment, Biological Process Design for Wastewater Treatment, Air Quality Management, Environmental Impact Assessment, Solid Waste Management
5 Environmental

1. Definition, principles and scope of environmental science.

2. Ancient agenda for Environment as reflected in Sanskrit.

3. Environmental ethics, education and awareness role of youth, communities, professional, planners, decision makers and implementers.

4. Basic of Atmospheric Science and Biosphere:

   (A) ATMOSPHERE   (B) INTRODUCTION TO OCEAN

5. Basics of lithosphere, hydrosphere and biosphere.


7. Biogeochemical cycles, food chain and food web.

8. Habitat: Freshwater, marine, estuarine and terrestrial ecosystems.

9. Geographical classification and zones natural resources, conservation and sustainable development.

10. Concept and Scope of Environmental Chemistry:

    Definition and explanation for various terms, segments of environment.

    26 principles and cyclic pathways in the environments.

11. Chemistry of Biologically Important Molecules:

    Chemistry of Water: Unusual physical properties, hydrogen bonding in biological systems, unusual solvent properties, changes in water properties by addition of solute. Protein structure and biological functions, enzymes, enzyme metabolism, biosynthesis of DNA and RNA, mutations and Gene control during embryogenesis.


14. Biomes and Habitat Diversity: Classification of biomes, major biotic elements of each biome and their characteristics.

15. Biological diversity of India: Definition and nature, India’s biogeographically history, physiography, climate and its impact on biodiversity. Indian forest and vegetation types and diversity of flora and fauna.


17. Wetlands Forests and Semi-arid Habitats of India: Definition and types of wetlands, important wetlands of India and their conservation issues. Forests and semi-arid habitats of India: their distribution in India, ecological status of forests and arid lands, and their conservation.


Review of methodologies of EIA. Introduction to Check list, Matrix & Network methods for EIA.

Prediction of short & long term Impacts on environment (physical, biological & socio culture).

**20. Current Developments in the Subject.**
6 Electronics

Unit-I
Electronic Transport in semiconductor, PN Junction, Diode equation and diode equivalent circuit. Breakdown in diodes, Zener diodes, Tunnel diode, Semiconductor diodes, characteristics and equivalent circuits of BJT, JFET, MOSFET, IC fabrication—crystal growth, epitaxy, oxidation, lithography, doping, etching, isolation methods, metalization, bonding, Thin film active and passive devices.

Unit-II

Unit-III
Rectifiers, Voltage regulated ICs and regulated power supply, Biasing of Bipolar junction transistors and JFET. Single stage amplifiers, Multistage amplifiers, Feedback in amplifiers, oscillators, function generators, multivibrators, Operational Amplifiers (OPAMP)—characteristics and Applications, Computational Applications, Integrator, Differentiator, Wave shaping circuits, F to V and V to F converters. Active filters, Schmitt trigger, Phase locked loop.

Unit-IV
Logic families, flip-flops, Gates, Boolean algebra and minimization techniques, Multivibrators and clock circuits, Counters—Ring, Ripple. Synchronous, Asynchronous, Up and down shift registers, multiplexers and demultiplexers, Arithmetic circuits, Memories, A/D and D/A converters.

Unit-V
Architecture of 8085 and 8086 Microprocessors, Addressing modes, 8085 instruction set, 8085 interrupts, Programming, Memory and I/O interfacing, Interfacing 8155, 8255, 8279, 8253, 8257, 8259, 8251 with 8085 Microprocessors, Serial communication protocols, Introduction of Microcontrollers (8 bit)—8031/8051 and 8048.
7 Management

Unit—I

Managerial Economics—Demand Analysis
Production Function
Cost-output relations
Market structures
Pricing theories
Advertising
Macro-economics
National Income concepts
Infrastructure—Management and Policy
Business Environment
Capital Budgeting

Unit—II

The concept and significance of organisational behaviour—Skills and roles in an organisation—Classical, Neo-classical and modern theories of organisational structure—Organisational design—Understanding and Managing individual behaviour personality—Perception—Values—Attitudes—Learning—Motivation.
Understanding and managing group behaviour, Processes—Inter-personal and group dynamics—Communication—Leadership—Managing change—Managing conflicts.
Organisational development

Unit—III

Concepts and perspectives in HRM; HRM in changing environment
Human resource planning—Objectives, Process and Techniques
Job analysis—Job description
Selecting human resources
Induction, Training and Development
Exit policy and implications
Performance appraisal and evaluation
Potential assessment
Job evaluation
Wage determination
Industrial Relations and Trade Unions
Dispute resolution and Grievance management
Labour Welfare and Social security measures
Unit—IV

- Financial management—Nature and Scope
- Valuation concepts and valuation of securities
- Capital budgeting decisions—Risk analysis
- Capital structure and Cost of capital
- Dividend policy—Determinants
- Long-term and short-term financing instruments
- Mergers and Acquisitions

Unit—V

- Marketing environment and Environment scanning; Marketing Information Systems and Marketing research; Understanding consumer and industrial markets;
- Demand Measurement and Forecasting;
- Market Segmentation—Targeting and Positioning;
- Product decisions, Product mix,
8 Commerce

Unit—I

Business Environment

Meaning and Elements of Business Environment


Legal environment of Business in India, Competition policy, Consumer protection, Environment protection

Policy Environment : Liberalization, Privatisation and globalisation, Second generation reforms, Industrial policy and implementation. Industrial growth and structural changes

Unit—II

Financial & Management Accounting

Basic Accounting concepts, Capital and Revenue, Financial statements

Partnership Accounts : Admission, Retirement, Death, Dissolution and Cash Distribution

Unit—III

Business Economics

Nature and uses of Business Economics, Concept of Profit and Wealth maximization. Demand Analysis and Elasticity of Demand, Indifference Curve Analysis, Law

Utility Analysis and Laws of Returns and Law of variable proportions

Cost, Revenue, Price determination in different market situations : Perfect competition, Monopolistic competition, Monopoly, Price discrimination and Oligopoly, Pricing strategies

Unit—IV

Business Statistics & Data Processing

Data types, Data collection and analysis, sampling, need, errors and methods of sampling, Normal distribution, Hypothesis testing, Analysis and Interpretation of Data

Correlation and Regression, small sample tests—t-test, F-test and chi-square test

Data processing—Elements, Data entry, Data processing and Computer applications

Computer Application to Functional Areas—Accounting, Inventory control, Marketing

Unit—V

Business Management

Principles of Management

Planning—Objectives, Strategies, Planning process, Decision-making

Organising, Organisational structure, Formal and Informal organisations, Organisational culture

Staffing

Leading : Motivation, Leadership, Committees, Communication

Controlling
9. Physics

I. Mathematical Methods of Physics

Dimensional analysis; Vector algebra and vector calculus; Linear algebra, matrices, Cayley Hamilton theorem, eigenvalue problems; Linear differential equations; Special functions (Hermite, Bessel, Laguerre and Legendre); Fourier series, Fourier and Laplace transforms; Elements of complex analysis: Laurent series-poles, residues and evaluation of integrals.

II. Classical Mechanics

Newton’s laws; Phase space dynamics, stability analysis; Central-force motion; Two-body collisions, scattering in laboratory and centre-of-mass frames; Rigid body dynamics, moment of inertia tensor, non-inertial frames and pseudoforces; Variational principle, Lagrangian and Hamiltonian formalisms and equations of motion; Poisson brackets and canonical Transformations.

III. Electromagnetic Theory

Electrostatics: Gauss’ Law and its applications; Laplace and Poisson equations, boundary value problems; Magnetostatics: Biot-Savart law, Ampere’s theorem, electromagnetic induction; Maxwell’s equations in free space and linear isotropic media; boundary conditions on fields at interfaces; Scalar and vector potentials; Gauge invariance; Electromagnetic waves in free space, dielectrics, and conductors.

IV. Quantum Mechanics

Wave-particle duality; Wave functions in coordinate and momentum representations; Commutators and Heisenberg's uncertainty principle; Matrix representation; Dirac’s bra and ket notation; Schroedinger equation (time-dependent and time-independent); Eigenvalue problems such as particle-in-a-box, harmonic oscillator, etc.; Tunneling through a barrier; Motion in a central potential; Orbital angular momentum.
V. Electronics

Semiconductor device physics, including diodes, junctions, transistors, field effect devices, homo and heterojunction devices, device structure, device characteristics, frequency dependence and applications; Optoelectronic devices, including solar cells, photodetectors, and LEDs; High-frequency devices, including generators and detectors; Operational amplifiers and their applications; Digital techniques and applications (registers, counters, comparators and similar circuits); A/D and D/A converters; Microprocessor and microcontroller basics.
10 Chemistry

Physical Chemistry:

1. Basic principles and applications of quantum mechanics – hydrogen atom, angular momentum.
2. Variational and perturbational methods.
4. Theoretical treatment of atomic structures and chemical bonding.
5. Chemical applications of group theory.
6. Basic principles and application of spectroscopy – rotational, vibrational, electronic, Raman, ESR, NMR.
7. Chemical thermodynamics.
8. Phase equilibria.

Inorganic Chemistry

1. Chemical periodicity
2. Structure and bonding in homo- and heteronuclear molecules, including shapes of molecules.
4. Chemistry of the main group elements and their compounds. Allotropy, synthesis, bonding and structure.
5. Chemistry of transition elements and coordination compounds – bonding theories, spectral and magnetic properties, reaction mechanisms.
6. Inner transition elements – spectral and magnetic properties, analytical applications.
Organic Chemistry

1. IUPAC nomenclature of organic compounds.
2. Principles of stereochemistry, conformational analysis, isomerism and chirality.
3. Reactive intermediates and organic reaction mechanisms.
5. Pericyclic reactions.
7. Transformations and rearrangements.

Interdisciplinary topics

1. Chemistry in nanoscience and technology.
2. Catalysis and green chemistry.
3. Medicinal chemistry.
4. Supramolecular chemistry.
5. Environmental chemistry.
UNIT – 1

Analysis: Elementary set theory, finite, countable and uncountable sets, Real number system as a complete ordered field, Archimedean property, supremum, infimum.


Sequences and series of functions, uniform convergence.

Linear Algebra: Vector spaces, subspaces, linear dependence, basis, dimension, algebra of linear transformations.


UNIT – 2

Complex Analysis: Algebra of complex numbers, the complex plane, polynomials, Power series, transcendental functions such as exponential, trigonometric and hyperbolic functions. Analytic functions, Cauchy-Riemann equations. Contour integral, Cauchy’s theorem, Cauchy’s integral formula, Liouville’s theorem, Maximum modulus principle, Schwarz lemma, Open mapping theorem. Taylor series, Laurent series, calculus of residues.

UNIT – 3

Ordinary Differential Equations (ODEs):

Existence and Uniqueness of solutions of initial value problems for first order ordinary differential equations, singular solutions of first order ODEs, system of first order ODEs.

General theory of homogenous and non-homogeneous linear ODEs, variation of parameters, Sturm-Liouville boundary value problem, Green’s function.

Partial Differential Equations (PDEs):

Lagrange and Charpit methods for solving first order PDEs, Cauchy problem for first order PDEs. Classification of second order PDEs, General solution of higher order PDEs with constant coefficients, Method of separation of variables for Laplace, Heat and Wave equations.
UNIT – 4

Descriptive statistics, exploratory data analysis. Sample space, discrete probability, independent events, Bayes theorem. Random variables and distribution functions (univariate and multivariate); expectation and moments. Independent random variables, marginal and conditional distributions. Characteristic functions. Probability inequalities (Tchebyshef, Markov, Jensen). Modes of convergence, weak and strong laws of large numbers, Central Limit theorems (i.i.d. case).

Markov chains with finite and countable state space, classification of states, limiting behaviour of n-step transition probabilities, stationary distribution.

UNIT – 4

Numerical Analysis:

12 Bio & Life Sciences

1. MOLECULES AND THEIR INTERACTION RELAVENT TO BIOLOGY
   A. Structure of atoms, molecules and chemical bonds.
   B. Composition, structure and function of biomolecules (carbohydrates, lipids, 
      proteins, nucleic acids and vitamins).
   C. Stablizing interactions (Van der Waals, electrostatic, hydrogen bonding, 
      hydrophobic interaction, etc.).
   D. Principles of biophysical chemistry (pH, buffer, reaction kinetics, 
      thermodynamics, colligative properties).
   E. Bioenergetics, glycolysis, oxidative phosphorylation, coupled reaction, group 
      transfer, biological energy transducers.

2. CELLULAR ORGANIZATION
   A. Membrane structure and function: Structure of model membrane, lipid bilayer 
      and membrane protein diffusion, osmosis, ion channels, active transport, ion pumps, 
      mechanism of sorting and regulation of intracellular transport, electrical properties of 
      membranes.
   B. Structural organization and function of intracellular organelles: Cell wall, nucleus, 
      mitochondria, Golgi bodies, lysosomes, endoplasmic reticulum, peroxisomes, plastids, 
      vacuoles, chloroplast, structure & function of cytoskeleton and its role in motility.
   C. Organization of genes and chromosomes: Operon, interrupted genes, gene families, 
      structure of chromatin and chromosomes, unique and repetitive DNA, heterochromatin, 
      euchromatin, transposons.
   D. Cell division and cell cycle: Mitosis and meiosis, their regulation, steps in cell cycle, and 
      control of cell cycle.
   E. Microbial Physiology: Growth, yield and characteristics, strategies of cell division, 
      stress response.
3. FUNDAMENTAL PROCESSES

A. DNA replication, repair and recombination: Unit of replication, enzymes involved, replication origin and replication fork, fidelity of replication, extrachromosomal replicons, DNA damage and repair mechanisms.

B. RNA synthesis and processing: Transcription factors and machinery, formation of initiation complex, transcription activators and repressors, RNA polymerases, capping, elongation and termination, RNA processing, RNA editing, splicing, polyadenylation, structure and function of different types of RNA, RNA transport.

C. Protein synthesis and processing: Ribosome, formation of initiation complex, initiation factors and their regulation, elongation and elongation factors, termination, genetic code, aminoacylation of tRNA, tRNA-identity, aminoacyl tRNA synthetase, translational proof-reading, translational inhibitors, post-translational modification of proteins.

4. CELL COMMUNICATION AND CELL SIGNALING

A. Host parasite interaction: Recognition and entry processes of different pathogens like bacteria, viruses into animal and plant host cells, alteration of host cell behavior by pathogens, virus-induced cell transformation, pathogen-induced diseases in animals and plants, cell-cell fusion in both normal and abnormal cells.


C. Cellular communication: Regulation of hematopoiesis, general principles of cell communication, cell adhesion and roles of different adhesion molecules, gap junctions, extracellular matrix, integrins, neurotransmission and its regulation.
5. DEVELOPMENTAL BIOLOGY

A. Basic concepts of development: Potency, commitment, specification, induction, competence, determination and differentiation; morphogenetic gradients; cell fate and cell lineages; stem cells; genomic equivalence and the cytoplasmic determinants; imprinting; mutants and transgenics in analysis of development.

B. Gametogenesis, fertilization and early development: Production of gametes, cell surface molecules in sperm-egg recognition in animals; embryo sac development and double fertilization in plants; zygote formation, cleavage, blastula formation, embryonic fields, gastrulation and formation of germ layers in animals; embryogenesis, establishment of symmetry in plants; seed formation and germination.

C. Morphogenesis and organogenesis in animals: Cell aggregation and differentiation in Dictyostelium; axes and pattern formation in Drosophila, amphibia and chick; organogenesis – vulva formation in Caenorhabditis elegans; eye lens induction, limb development and regeneration in vertebrates; differentiation of neurons, post embryonic development-larval formation, metamorphosis; environmental regulation of normal development; sex determination.

D. Morphogenesis and organogenesis in plants: Organization of shoot and root apical meristem; shoot and root development; leaf development and phyllotaxy; transition to flowering, floral meristems and floral development in Arabidopsis and Antirrhinum.
1. Philosophical Foundation of Education

Relationship of Education and Philosophy

Western Schools of Philosophy:

- Idealism, Realism, Naturalism, Pragmatism, Existentialism, Marxism with special reference to the concepts of knowledge, reality and values and their educational implications for aims, contents and methods of education.

Indian Schools of Philosophy (Sankhya, Vedanta, Buddhism, Jainism, Islamic traditions) with special reference to the concept of knowledge, reality and values and their educational implications

Contributions of Vivekananda, Tagore, Gandhi and Aurobindo to educational thinking

National values as enshrined in the Indian Constitution, and their educational implications

Modern concept of Philosophy: Analysis—Logical analysis, Logical empiricism and Positive relativism—(Morris L. Frigge)

2. Sociological Foundations of Education

Relationship of Sociology and Education

Meaning and nature of Educational sociology and Sociology of education

Education—as a social sub-system—specific characteristics

Education and the home

Education and the community with special reference to Indian society

Education and modernization

Education and politics

Education and religion

Education and culture

Education and democracy

3. Psychological Foundations of Education

Relationship of Education and Psychology

Process of Growth and Development

- physical, social, emotional and intellectual

- development of concept formation, logical reasoning, problem solving and creative thinking; language development

- individual differences—determinants; role of heredity and environment; implications of individual differences for organising educational programmes

Intelligence—its theories and measurement

Learning and Motivation

Theories of learning—Thorndike is connectionism; Pavlov’s classical and Skinner’s operant conditioning; Learning by insight; Hull’s reinforcement
1. **Constitutional Law of India**
   Preamble
   Fundamental Rights and Duties
   Directive Principles of State Policy
   Judiciary
   Executive
   Union State Legislative Relations
   Emergency Provisions
   Amendment of the Constitution
   Writ Jurisdiction

2. **Legal Theory**
   Nature and Sources of Law
   Positivism, Natural Law Theory, Sociological Jurisprudence
   Theories of Punishment
   Rights and Duties
   Concepts of Possession and Ownership

3. **Public International Law**
   Nature of International Law and its relationship with Municipal Law
   Sources of International Law
   Recognition of States and Governments
   United Nations
   Settlement of International Disputes
   Human Rights

4. **Family Law**
   Concepts in Family Law
   Sources of Family Law in India
   Marriage and Dissolution of Marriage
5. **Law of Contracts—General Principles**
   Essentials of a valid contract
   Offer, acceptance and consideration
   Capacity to Contract—Minor’s contract
   Elements vitiating contract—mistake, fraud, misrepresentation, public policy, coercion, undue influence, frustration of contract
   Remedies for breach of contract—Damages.

6. **Law of Torts**
   Foundation of Tortuous Liability
   General Defences to an action of Torty
   Vicarious Liability
   Remoteness of Damages
   Contributory Negligence
   Absolute and Strict Liability

7. **Law of Crimes—General Principles**
   Nature and Definition of Offence
   General Exceptions
   Common Intention and Common Object
   Criminal Attempt, Conspiracy and Abetment
   Offences against Women

8. **Labour Law**
   Concepts—Industry, Industrial Dispute and Workman
   Trade Unions—Rights and Immunities of Registered Trade Union; Registration and its advantages
   Methods for Settlement of Industrial Disputes under Industrial Disputes Act, 1947
   Strike and Lockout as Instruments of Collective Bargaining
1. British Literature from Chaucer to the present day
2. Criticism and Literary Theory.

Unit – I : Literary Comprehension (with internal choice of poetry stanza and prose passage; four comprehension questions will be asked carrying 4 marks each).

Unit – II : Up to the Renaissance

Unit – III : Jacobean to Restoration Periods

Unit – IV : Augustan Age: 18th Century Literature

Unit – V : Romantic Period

Unit – VI : Victorian and Pre-Raphaelites

Unit – VII : Modern British Literature

Unit – VIII : Contemporary British Literature

Unit – IX : Literary Theory and Criticism up to T. S. Eliot

Unit – X : Contemporary Theory
1. वैदिक साहित्य

देवता :
अंगिरः; सचिवः; विष्णु; इन्द्र; रुद्र; दुर्गापति; अश्विनी; वरुण; उष्णु; सोम
विष्णु-वस्तु :
संहितायणे; ब्राह्मण एवं आरण्यक; उपनिषदः
सन्वाद सूतकः
पुरुरवः—उर्ध्वी; यम—यमी; सर्वा—पणि; विश्वामित्र—नदी

2. दर्शन

ईश्वरकृष्ण की सांख्यकारिका :
सत्कार्यवाद; पुरुष-स्वरूप; प्रकृति-स्वरूप; सृष्टिक्रम; प्रत्ययसर्ग; कैलाप्य
सदानन्द का बेदान्तसार :
अनुजन्य-चतुष्य; अजान; अश्वरोप-अपवाद; लिङ्गशिरोत्वति; पंजीरकरण; विवर्त; जीवनमुक्ति
केशवविमुख की तक्रमकृष्ण/अरब्रह्म का तर्कग्रंथ :
पद्यार्थ; कारण; प्रमाण—प्रत्यक्ष; अनुमान; उपमान; शब्द

3. व्याकरण एवं भाषाविज्ञान

व्याकरण :
परिमापार्वती—संहिता; गुण; बृहत्ति; प्रातिपदिक; नदी; बि; उपधा; अपूर्त; गति; वद; विभाषा;
सर्वन्याच; विद्; प्रमुख; सर्वनाम-स्थान; निघा
कास्क : सिद्धान्तकृष्णमुदी के अनुसार
समास : लघुसिद्धान्तकृष्णमुदी के अनुसार

4. संस्कृत साहित्य एवं काव्यशास्त्र

निम्नलिखित प्रार्थना का सामान्य अध्ययन :
पद्य : रघुवंश; भेद्वर्त; किरातार्क; श्रीमुपालवध; नैवधीयवर्त; बुढ़वर्त
गद्य : दशकुमारवर्त; हर्षवर्त; काव्यवर्ती
नाटक : स्त्रियावसेवला; अभिज्ञानशाकुन्तल; मृदुकंत; उत्तररामचरित; मुद्राराक्षस; रलावली; बेणीसंहार
काव्यशास्त्र :
साहित्यदर्पण :
काव्य की परिभाषा
काव्य की अन्य परिभाषाओं का खण्डन
शब्दशक्ति—संकेतग्रंथ; अभिधा; लक्षण; व्यञ्जना
Unit—I
General characteristics of Visual art/Fundamentals of visual art: Space, form, size, shape, line, colour, texture, tonal values, perspective, design and aesthetic organization of visual elements in art object (composition). The uses of two and three dimensions in visual art. Tactile quality in art. Environment and art. Perceptual and conceptual aspects in art.

Unit—II
Interrelationship of various arts: Rhythm, structure, use of space, visual properties, materials, techniques (traditional and modern), ideas, themes (narrative and non-narrative) conceptual, abstract elements between performing, cinematic, literary and plastic art.

Unit—III
Traditional and Modern mediums and materials in making visual arts: Painting, sculpture, print-making, mural, graphic design and multimedia art. Inventions, adaptations and development of these mediums and materials from the pre-historic period to present-day all over the world.

Unit—IV
Traditional and Modern techniques, processes and procedures, used in making painting, sculpture, print-making, mural, graphic design and multimedia art, such as modeling, carving, building, casting, different way of handling of colour pigment (like impasto, glazing, burnishing, drip), etching, relief, surface printing, fresco buono, fresco secco, etc. Printing processes including computer graphic, etc.

Unit—V
Relevance of the study of the history of world art (including history of advertising and marketing) for the students of Visual Arts in general and Art History as an area of specialization.
Unit—I
Information, Information Science, Information Society
Information as a Resource/Commodity
Information Transfer Cycle—Generation, Collection, Storage and Dissemination
Role of Information in Planning, Management, Socio-economic Development, Technology transfer
Communication—Channels, barriers
Intellectual Property Rights—Concept, Copyright, Censorship—Print and Non-print Media
Library and Information Policy at the National Level

Unit—II
Laws of Library Science
Library Resource Sharing and Networking
Library Movement and Library Legislation in India
Library Extension Services
Library and Information Science Education in India
Library and Information Profession

Unit—III
Sources of Information—Primary, Secondary and Tertiary—Documentary and Non-documentary
Reference Sources—Encyclopaedias, Dictionaries, Geographical Sources, Biographical Sources, Year-books/Almanacs, Directories, and Handbooks, Statistical (salient features and evaluation)
Bibliographical Sources—Bibliographies, Union Catalogues, Indexing and Abstracting Journals (salient features and evaluation)
E-documents, E-books, E-Journals

Unit—IV
Reference and Information services, Referral Service
Online Services
Translation Services
Reprographic Services

Unit—V
Organisation of knowledge/information
Modes of formation of subjects
Library Classification—Canons and Principles
Library Classification Schemes—DDC, UDC and CC
Library Cataloguing—Canons and Principles
Library Cataloguing Codes—CCC and AACR-II
Bibliographic Records—International standards—ISBDs, MARC and CCF
Indexing—Pre-coordinate, Post-coordinate
Vocabulary Control—Thesaurus, Lists of Subject Headings
Databases—Search Strategies, Boolean Operators
Knowledge Management
1. हिंदी भाषा और उसका विकास

अप्रैंस ( अपहरू सहित ) और पुरातन हिंदी का सम्बन्ध, काव्यभाषा के रूप में अवधि का उदय और विकास, काव्यभाषा के रूप में राजभाषा का उदय और विकास, साहित्यिक हिंदी के रूप में खड़ी बोली का उदय और विकास, मानक हिंदी का भाषा वैज्ञानिक विवरण ( रूपमय ), हिंदी की बोलियाँ — व्याख्यान तथा क्षेत्र, नारीली शिष्य की विकास और उसका मानकीकरण

हिंदी प्रसार के आन्दोलन, प्रमुख व्यक्तियों तथा संस्थाओं का योगदान, राजभाषा के रूप में हिंदी

हिंदी भाषा-प्रयोग के विविध रूप — बोली, मानकभाषा, सम्प्रभृतीभाषा, राजभाषा और राष्ट्रभाषा, संचार माध्यम और हिंदी

2. हिंदी साहित्य का इतिहास

हिंदी साहित्य का इतिहास-दर्शन, हिंदी साहित्य के इतिहास-लेखन की पद्धतियाँ

हिंदी साहित्य के प्रमुख इतिहास प्रत्येक, हिंदी के प्रमुख साहित्यिक केन्द्र, संस्थाएँ एवं पत्र-पत्रकारी, हिंदी साहित्य के इतिहास का काल-विवाह और नामकरण

आदिकाल : हिंदी साहित्य का आरम्भ कब और कैसे ? रासो-साहित्य, आदिकालीन हिंदी का जैन साहित्य, विद्वंद्व और नाथ साहित्य, अमृत खुशार की हिंदी कविता, विद्वानति और उनकी पदावली, आरम्भिक ग्रंथ तथा लोकिक साहित्य

मध्यकाल : भक्त-आन्दोलन के उदय के सामाजिक-सांस्कृतिक कारण, प्रमुख निर्गुण एवं समुद्र सम्प्रदाय, बैराजा भक्त की सामाजिक-सांस्कृतिक पुष्टि-भूमि, आलमार सन, प्रमुख सम्प्रदाय और आचार, भक्त-आन्दोलन का अंतिम साहित्य विकास और हिंदी का अंत-प्रादेशिक वैशिष्ट्य

3. हिंदी साहित्य की गद्य विवाहां

हिंदी उपन्यास : प्रेमचंद पूर्व उपन्यास, प्रेमचंद और उनका युग, प्रेमचंद के परवर्ती प्रमुख उपन्यासकार : जैनेन्द्र, अजोय, हजारी प्रसाद हिंदेवरी, यसपाल, अमृतलाल नागर, फरीदलाल रेणु, भीम साहनी, कुंपिता सोबनी, हिन्दुराम वर्मा, नेशता मेहता, श्रीलाल शुक्ल, राही मासूम रजा, रंगेय राजव, मनूर भण्डारी

हिंदी कहानी : बीसवीं सदी की हिंदी कहानी और प्रमुख कहानी आन्दोलन

हिंदी नाटक : हिंदी नाटक और रंगमंच, विकास के चरण और प्रमुख नाटककृतियाँ : अंधेरा नगरी, चंद्रमुख, आंधामुख, अधे-अधूरे, आड़वां युग, हिंदी एकाकी

हिंदी निबंध : हिंदी निबंध के प्रकार और प्रमुख निबन्धकार — रामचंद्र शुक्ल, हजारीप्रसाद हिंदेवरी, कुबरेनाथ राय, विनाधिनवास ग्रंवर, हरिशंकर परशुराम

हिंदी आलोचना : हिंदी आलोचना का विकास और प्रमुख आलोचक : रामचंद्र शुक्ल, नन्दनारायण वाजपेयी, हजारी प्रसाद हिंदेवरी, रामबलादशाम, डॉं नारायण, डॉं नामकर सिंह, विजयदेव नारायण साही

हिंदी का अन्य गद्य विवाहाँ : रेखाचित्र, संस्मरण, बातचीत-साहित्य, आत्मकथा, जीवनी और संस्मरण

4. काव्यशास्त्र और आलोचना

भरत भुवन का रस सूत्र और उसके प्रमुख व्याख्याकार

रस के अवयव

साधारणकरण

शब्द शास्त्रीयाँ और ध्वनि का स्वरूप

अलंकार — यमक, रलेख, ककोक्कित, उपमा, रूपक, उद्धरण, जंदेह, धार्मिकान, अतिसंशोधक, अन्योक्तिक, समासोक्तिक, अस्वयुक्त, विशेषोक्तिक, दूषान्त, उद्दहरण, प्रतिबंधतृप्तिक, निर्देशन, अर्थन्तरण, विभवना, अर्थभित्ति और विशेषध्वासा

रीति, गुण, दोष
20 Psychology

1. Perceptual Processes
   Approaches to the Study of Perception: Gestalt and physiological approaches
   Perceptual Organization: Gestalt, Figure and Ground, Laws of Organization
   Perceptual Constancy: Size, Shape and Brightness, Illusion; Perception of Depth and Movements.
   Role of motivation and learning in perception

2. Learning Process
   Classical conditioning: Procedure, Phenomena and related issues
   Instrumental learning: Phenomena, Paradigms and theoretical issues
   Reinforcement: Basic variables and schedules
   Verbal learning: Methods and materials, organizational processes

3. Memory and forgetting
   Memory processes: Encoding, Storage, Retrieval
   Stages of memory: Sensory memory, Short-term Memory (STM) and Long-term Memory (LTM)
   Episodic and Semantic memory
   Theories of Forgetting: Interference, decay, retrieval

4. Thinking and Problem Solving
   Theories of thought processes: Associationism, Gestalt, Information processing
   Concept formation: Rules and strategies
   Reasoning: Deductive and inductive
   Problem-solving: Type and strategies
   Role of concepts in thinking

5. Motivation and Emotion
   Basic motivational concepts: Instincts, needs, drives, incentives, motivational cycle
   Approaches to the study of motivation: Psychoanalytical, ethological, S-R Cognitive, humanistic
   Biological Motives: Hunger, thirst, sleep and sex
   Social Motives: Achievement, affiliation, approval
   Exploratory behaviour and curiosity
   Physiological correlates of emotions
   Theories of emotions: James-Lange, Canon-Bard, Schachter and Singer
   Conflicts: Sources and types
1. **Theory of Public Administration**


   Theories — Classical, Human Relations, Bureaucratic, Public Choice and Principal Agent relationship.

2. **Comparative Public Administration**

   Comparative Public Administration — Nature and Scope.

   Theories and Models of Comparative Public Administration — Contributions of Fred Riggs, Montgomery and Ferrel Heady.


   Various Control Mechanisms over Administration in U.K. U.S.A. and India.

   Citizen and Administration — Machinery for redressal of citizen's grievances in U.K., U.S.A. and India.

3. **Development Administration**

   Development Administration — Meaning, Nature and Scope, Concept of Development Administration; Development Administration and Traditional Administration; Characteristics of Administration in Developed and Developing Countries.

4. **Indian Administration**

   Administrative Legacies at the time of Independence — Civil Services; District and Revenue Administration.

   Organisation of Government at the Central level — Organisation of Secretariat, Ministries and Departments, Cabinet Secretariat, P.M.O.

   Organisation of Government at the State level — Secretariat, Role of Chief Secretary, Organisation of Ministries, Departments and Directorates.

5. **Research Methodology**

   Types of Research

   Identification of Problem and Preparation of Research Design.

   Research Methods in Social Sciences.

   Hypothesis.
1. **Geomorphology**: Fundamental concepts; Endogenous and Exogenous forces; Denudation and weathering; Geosynclines, continental drift and plate tectonics; Concept of geomorphic cycle; Landforms associated with fluvial, glacial, arid, coastal and karst cycles.

2. **Climatology**: Composition and structure of the atmosphere; Heat budget of the earth; Distribution of temperature; Atmospheric pressure and general circulation of winds; Monsoon and jet stream; Tropical and temperate cyclones; Classification of world climates; Koppen's and Thornthwaite's schemes.

3. **Oceanography**: Ocean deposits; Coral reefs; Temperature and salinity of the oceans; Density of sea water; Tides and ocean currents.

   **Bio-Geography**: World distribution of plants and animals; Forms and functions of ecosystem; Conservation and management of ecosystems; Problems of pollution.

4. **Geographic Thought**: General character of Geographic knowledge during the ancient and medieval period; Foundations of Modern Geography; Determinism and possibilism; Areal differentiation and spatial organization.

5. **Population Geography**: Patterns of world distribution; Growth and density of population; Patterns and processes of migration; Demographic transition.

   **Settlement Geography**: Site, situation, types, size, spacing and internal morphology of rural and urban settlements; City-region; Primate city; Rank-size rule; Settlement hierarchy; Christaller's Central Place theory; August Lösch's theory of market centres.
1. CONCEPTS, IDEAS AND TERMS

Bharatvarsha
Sabhā and Samiti
Varnasrama
Purusharthas
Rina
Samskaras
Yajna
Doctrines of Karma
Dandāniti / Arthasastra
Saptanga
Dharmavijaya
Stupa / Chaitya
Nagara / Dravida / Vesara
Bodhisattva / Tirthankara
Alvars / Nayanars
Sreni
Kara / Vishti
Stridhana
Memorial stones
Agraharas
Khilafat
Sulah-i-kul
Maharashtra-dharma
Turkan-i-Chahīghāni
Watan
Baluta
Iqta
Jizyah
Madad-i-maash
Amaram
Raya-Rekho
Jangama

2. ANCIENT INDIAN HISTORY

Sources:
Archaeological Sources
Exploration, excavation, epigraphy, numismatics, monuments

Literary Sources
Indigenous: Primary and Secondary — problems of dating, myths, legends, poetry, scientific literature, literature in regional languages, religious literature.
Foreign accounts: Greek, Chinese and Arab writers.

Pre-history and Proto-history
Man and Environment — geographical factors. Hunting and gathering (Paleolithic and Mesolithic); Beginning of agriculture (Neolithic and Chalcolithic).

Indus Valley Civilization — origin, date, extent, characteristics, decline, survival and significance.

Iron age; Second urbanisation.

3. MEDIEVAL INDIAN HISTORY

Sources
Archaeological, epigraphic and numismatic materials and monuments.
Chronicles.
Literary sources — Persian, Sanskrit and Regional languages.
Archival materials.
Foreign travellers' accounts.

Political Developments
The Sultanate — the Ghurids, the Turks, the Khaljis, the Tughlaqs, the Sayyids and the Lodis.
Foundation of the Mughal Empire — Babur, Humayun and the Suris; expansion from Akbar to Aurangzeb.
Decline of the Mughal empire — political, administrative and economic causes.
Later Mughals and disintegration of the Mughal empire.
The Vijayanagara and the Bahmanis — rise, expansion and disintegration.
The Maratha movement, the foundation of Swaraj by Shivaji; its expansion under the Peshwas; Maratha Confederacy — causes of decline.
1. Political Theory and Thought
   - Ancient Indian Political Thought: Kautilya and Shanti Parva.
   - Greek Political Thought: Plato and Aristotle.
   - Contemporary Political Thought – I: Lenin, Mao, Gramsci.
   - Contemporary Political Thought – II: Rawls, Nozic and Communitarians.

2. Comparative Politics and Political Analysis
   - Evolution of Comparative Politics as a discipline; nature and scope.
   - Approaches to the study of comparative politics: Traditional, Structural-Functional, Systems and Marxist.
   - Organs of Government: Executive, Legislature, Judiciary – their interrelationship in comparative perspective.

3. Indian Government and Politics
   - National Movement, Constitutional Developments and the Making of Indian Constitution.
   - Constitution as Instrument of Socio-Economic Change, Constitutional Amendments and Review.

4. Public Administration
   - Development of Public Administration as a discipline; Approaches to the study of Public Administration: Decision-making, Ecological and Systems; Development Administration.
   - Theories of organization.

5. International Relations
   - Contending Theories and Approaches to the study of International Relations; Idealist, Realist, Systems, Game, Communication and Decision-making.
   - Power, Interest and Ideology in International Relations; Elements of Power: Acquisition, use and limitations of power, Perception, Formulation and Promotion of National Interest, Meaning, Role and Relevance of Ideology in International Relations.