GYANODAYA UNIVERSITY

Gram – Suwakheda, Teh. Jawad, Dist. Neemuch (M.P.)

Research Entrance Syllabus

Subject: Computer Science Engineering

Set Theory & Algebra: Sets; Relations; Functions; Groups; Partial Orders; Lattice; Boolean Algebra. Digital Logic: Logic functions, Minimization, Design and synthesis of combinational and sequential circuits; Number representation. Computer Organization and Architecture: Machine instructions and addressing modes, ALU and data-path, CPU control design, Memory interface, I/O interface (Interrupt and DMA mode), Instruction pipelining, Cache and main memory, Secondary storage, 8085 microprocessor. Programming and Data Structures: Programming in C/C++; Functions, Recursion, Parameter passing, Scope, Binding; Abstract data types, Arrays, Stacks, Queues, Linked Lists, Trees, Binary search trees, Binary heaps. Algorithms: Divide & conquer, Branch & bound, Dynamic programming, Greedy techniques, NP-Hard & NP Complete. Theory of Computation: Regular languages and finite automata, Context free languages and Pushdown automata Compiler Design: Lexical analysis, Parsing, Syntax directed translation Operating Systems: Processes, Threads, Interprocess communication, Concurrency, Semaphores, Synchronization, Deadlock, CPU scheduling, Memory management and virtual memory, File systems, I/O systems, Protection and security. Databases: ER-model, Database design (integrity constraints, normal forms), Query languages (SQL). Information Systems and Software Engineering: information gathering, requirement and feasibility analysis, data flow diagrams, process specifications, input/output design, process life cycle, planning and managing the project, design, coding, testing, implementation, maintenance. Computer Networks: ISO/OSI stack, LAN technologies (Ethernet), Flow and error control techniques, TCP/UDP and sockets, IP(v4), Application layer protocols, Basic concepts of hubs, switches, gateways, and routers. Network security– basic concepts of public key and private key cryptography, digital signature, firewalls.

Subject: Mechanical Engineering

Metal Casting: Design of patterns, moulds and cores; solidification and cooling; riser and gating design, design considerations. Forming: Plastic deformation and yield criteria; fundamentals of hot and cold working processes;

Joining: Physics of welding, brazing and soldering; adhesive bonding; design considerations in welding.

Machining and Machine Tool Operations: Mechanics of machining, single and multi-point cutting tools, tool geometry and materials,

Fluid Mechanics: Fluid properties; fluid statics, manometry, buoyancy; fluid kinematics: Lagrangian and Eulerian description,

Heat Conduction: Steady state heat conduction, Transient heat conduction, Numerical solution to heat conduction,

Convection Heat transfer: Forced convection, Free convection and Mixed convection, Boiling and Condensation, Thermal radiation, radiation from black body, radiation properties of real bodies, Radiative exchange between surfaces

Thermodynamics: thermodynamic system and processes; phase diagrams, Laws of Thermodynamics, Temperature scales, Irreversibility and availability; behavior of ideal and real gases, properties of pure substances, Cycle analysis, Carnot cycle,

Engineering Mechanics: Free body diagrams and equilibrium; trusses and frames; virtual work; kinematics and dynamics of particles and of rigid bodies in plane motion, Strength of Materials: Stress and strain, stress-strain relationship and elastic constants,

Theory of Machines: Displacement, velocity and acceleration analysis of plane mechanisms; dynamic analysis of slider-crank mechanism; gear trains; flywheels.

Production Planning and Control: Forecasting models, aggregate production planning, scheduling, materials requirement planning.

Numerical Methods for Engineers: Solution of a system of linear algebraic equations, direct and iterative methods for matrix inversion, numerical solution of ODE, Taylor series expansion.

Subject: Electrical Engineering

Network theory: Sources, R, L, C elements;, KCL, KVL, Node and Mesh analysis, network theorems transient and steady state responses, sinusoidal analysis, resonance, two port networks, complex power and power factor in ac circuits.

Electrical Machines: Single phase transformer, equivalent circuit, representation and tests, regulation and efficiency; three-phase transformers and analysis.DC machine of all types (generators and motors), analysis, characteristics, operation, tests and control, three-phase and single-phase induction motors, synchronous machine (generator and motor), its construction, starting, operation, characteristics, efficiency, and its protection methods.

Power Systems: Concepts of power generation, models and performance of transmission lines series and shunt compensation, insulators, load flow methods, voltage and frequency control,

Control Systems: Modeling and representation of systems, feedback transfer function, block transient and steady-state analysis of mechanism, LTI systems, stability analysis, Bode methods, lag, lead and lead-lag compensators.

Power Electronics: Characteristics and design of thyristor circuits, MOSFET, single and three-phase uncontrolled rectifiers, voltage and current commutated thyristor based converters, bidirectional converters,

Electromagnetic Fields: Coulomb's law, electric field, electric flux, Gauss's law, divergence, electric field and potential due to point, line, plane and spherical charge distributions.

Electrical and Electronic Measurements: Bridges and potentiometers, measurement of voltage, current, power, energy factor.

Analog and Digital Electronics: Diode circuits, clipping, clamping, rectifiers, amplifiers, biasing, equivalent circuit and response; oscillators and feedback amplifiers,

Subject: Pharmaceutical Science

Medicinal Chemistry Structure, nomenclature, classification, synthesis, SAR and mechanism of action of the following categories of drugs, which are official in Indian pharmacopoeia and British pharmacopoeia. Analgesics, Antidepressents, Anxiolytics, Neuroleptics, Hypnotics and sedative, Anticonvulsants, Antihistaminics, Local anaesthetics, Antianginal agents, Cardiotonic agent, Diuretic, Anticoagulants, Coagulants, Antihypertensive drugs, Adrenergic and Cholinergic drugs, Hypolipidemic agents.

Pharmacognosy and Phytochemistry Chemical tests for identification, chemistry, isolation, characterizations and estimation of phytopharmaceuticals belonging to the groups of terpenoids, steroids, Bioflavanoids, Purines, Alkaloids. Marine drugs, Nutraceuticals, Photosensitizing agents, Classification system of Plant drugs and Chemotaxonomy, Biosynthetic pathways, Factors affecting variability of drugs phyto constituents.

Pharmaceutics Physical, Chemical, therapeutic incompatibilities and its rectification methods. Formulation, preparation and quality control of tablets, capsules, liquid dosage forms, parental preparations, ointment and creams, suppositories, and controlled release product, Different methods of sterilization and evaluation of sterile products, sterility testing of pharmaceutical products e.g. sera, vaccines. New drug delivery systems. Biopharmaceutics and their importance in formulations. Pharmacology Pharmacology of Autocoids, Harmones, Hormone antagonists, Pharmacology of drug acting on central nervous systems, cardiovascular systems, Autonomic nervous systems, Gastro intestinal systems and Respiratory systems, Drug acting on the renal systems, Drug acting on the blood and blood forming organs.

Pharmaceutical Analysis Principles, Instrumentation and applications of the following, Absorption spectroscopy UV visible, IR, Flame photometry, Potentiometry, Fluorimetry, Conductometry. Principles of NMR, Mass spectroscopy, X-ray diffraction and different chromatographic techniques. Quality control of Radio pharmaceuticals. Microbiology Principles and methods of microbiological assays as per Indian pharmacopoeia, Serological and diagnostics tests, concept and methodology, Applications of microorganisms in Bioconversions and in pharmaceutical industry.

Subject: Commerce

Accounting:- Basic accounting principles & concepts, IndAS, IFRS, Capital and Revenue. Journal & Ledger entries, Final A/c (Trading, P.&.L.& Balance Sheet), Partnership Accounts, Ratio Analysis, Cash Flow Analysis Cost & Management Accounting: Concept of different costs, Elements of Costs, Break- Even– Point analysis, Marginal Costing, Standard Costing, Budgetary control Financial Management:-. Concept and objectives, Capital Structure, Basic theories of capital structure, Capital Budgeting, Cost of Capital, Working Capital Management. Statistics:- Meaning, Collection and classification of data. Central tendency, Correlation and regression, Probability, Sampling Business Economics:- Introduction, Consumer Behavior, demand and supply, Indifference Curve Analysis, Cost & Revenue, Price determination in different markets, Law of Variable Proportions Principles of Management:- Concept, Planning, Decision making, Organization, Motivation, Leadership, Organization structure, Organizational Culture Business Communication: Meaning, role, principles, factors, Modern Techniques, Types of communication, Non Verbal Communication. Banking & Financial Institutions:- Types of banks & their functions, RBI Act 1934, Role of RBI and Financial Institution9s, NABARD & Rural Banking, E- Banking, Financial Institutions, Financial Regulators, Banking sector reforms Income Tax:- Basic Concepts, Residential Status, Incidence of tax for different tax payers, Exempted incomes, Heads of Income, Deductions and Rebates Marketing Management: Concept of Marketing & Marketing Management, Scope of Marketing, Marketing Mix, Product decisions, Pricing decisions, Promotion decisions, Distribution decisions, Market Segmentation, Targeting & Positioning, Product Life Cycle, Consumer Behavior. Human Resource Management (HRM): Concept of HRM, HR Planning, Recruitment, Selection, Job Description, Job Analysis, Job Specification, Training & Development, Performance Appraisal. Business and Corporate Laws: Indian Contract Act, 1872, Sale of Goods Act, 1930, RTI Act, Negotiable Instruments Act, 1881, Goods and Services Tax (GST), The Companies Act, 2013.

Subject: Biotechnology

Cell Signaling: Endocrine, Exocrine and synaptic signaling, surface and intracellular receptors, G proteins and generation of secondary messengers, mode of action of cAMP and Ca++ calmodulin, Target cell adaptation, cellular responses to environmental signals in plants and animals.

Water: Weak interactions in aqueous systems, Ionization of Water, pH, pKa, Titration curves of weak acids, Buffers, Henderson- Hasselbalch equations, Water as a reactant. Enzymes: Introduction, Classification and Mechanism of action, Concept of activation energy, Enzyme KineticsMichaelis-Menten and Lineweaver- Burk equation for single enzyme substrate catalyzed reactions, Units of enzyme activity, Turnover number.

Methods in Microbiology: Pure culture techniques, The theory and practice of sterilization, Principles of microbial nutrition, Construction of culture media, Enrichment of culture techniques for isolation of chemotrophs and photosynthetic microorganisms, Pure culture and its maintenance. Modes of plant regeneration: Micropropagation of Plants, Clonal fidelity of micropropagated plants, Explant factors, Nutrient medium factors, Somatic embryogenesis, Organogenesis, Synthetic seeds, Production of virus free plants; Somaclonal variations.

Cells and organs of the immune system including B-cells, cells. Antigen presenting cells, Natural killer cells, Haemopoiesis. Innate, acquired, active and passive

immunity. Cell mediated and humoral immunity, Antibody dependent cell mediate cytotoxicity. DNA as a genetic material, DNA replication in prokaryotes and eukaryotes, Bidirectional replication and rolling circle process, DNA damage and repair, Mechanisms including recombinations. Preparation of genomic and cDNA libraries, rDNA transfer methodologies. Cloning of genes in microbes, plants and animal systems. Concepts of Genetics: Mendel and experimental approach of genetics, Mendel rediscovered, Molecular explanation of Mendel's Laws, Extension of Mendel's work, Mitochondrial and Chloroplast DNA.

Molecular approach to environment arrangement, degradative plasmids, Xenobiotics, Biological detoxification

Subject: Chemistry

Organic Chemistry Carbonium ions, carbanions, carbenes, nitrenes, radicals and arynes, Reactive intermediates, Nucleophilic, Electrophilic, Radical substitution, Addition and Elimination reactions. Barton,Baeyer-villigier, Birch, Chichibabin, Clemmensen Diels-alder, Friedel crafts, Hoffmann, Hofmann- Loffler-Freytag, Hydroboration, Lossen, Mannich, Michael addition, MeerweinPonndorf-Verley, Perkin, Grignard, Reimer-Tiemann, Reformatsky, Storkenamine, Wittig, Wolff Kishner. Oppenaur oxidations, Robinson annulations, Routine functional group transformations and inter-conversions of simple functionalities, Aldol, Clasien, Stobbe and Dieckmann, Schmidt, Condensations, Beckmann and Fries, Favorski, Curtius Rearrangements. Stereochemistry and Conformational Analysis: Pericyclic Reactions, Photochemistry, Dyes. Physical Chemistry: Basic principles and applications of quantum mechanics, Variational and perturbational methods. Basics of atomic structure, electronic configuration, shape of orbitals, hydrogen atom spectra. Theoretical treatment of atomic structures and chemical bonding. Chemical applications of group theory. Basic principles and application of spectroscopy– rotational, vibrational, electronic, Raman, ESR, NMR. Chemical thermodynamics. Phase equilibria. Statistical thermodynamics. Chemical equilibria. Electrochemistry, Chemical kinetics, Polymer chemistry, Solid State Chemistry, Collids and surface phenomena, Non-ideal systems, Inorganic Chemistry Chemical periodicity. Structure and bonding, Concepts of acids and bases, Chemistry of the main group elements and their compounds. Allotropy, synthesis, bonding and structure, Chemistry of transition elements and coordination compounds, Inner transition elements, organometallic compounds, Cages and metal clusters, Analytical chemistry separation techniques. Spectroscopic electro- and thermo analytical methods, Bioinorganic chemistry, Physical characterisation of inorganic compounds by IR, Raman, NMR, EPR, Mössbauer, UV-, NQR, MS, electron spectroscopy and microscopic techniques. Nuclear chemistry.

Subject: Physics

Mathematical Methods of Physics: Eigenvalues and eigenvectors, linear ordinary differential equations, Special functions. Fourier series, Transforms, Elements of complex analysis, Elementary probability theory, Partial differential equations, Tensors.

Classical Mechanics: Central force motions, two body Collisions- scattering in lab and C.m. frames, Rigid body dynamics, Non-inertial frames and pseudo forces, Lagrangian and Hamiltonian formalism. Special theory of relativity

Electromagnetic Theory: Laplace and Poisson equations, boundary value problems, Maxwell's equations in free space and linear isotropic media, Scalar/ vector potentials, gauge invariance, Transmission lines and wave guides, Retarded potentials.

Quantum Mechanics: Schrödingers equation and its Applications for simple problems, Heisenberg uncertainty principle, Dirac notation , Motion in a central potential, angular momentum algebra, Hydrogen atom, Approximation methods, Pauli exclusion principle, Elementary theory of scattering,

Thermodynamic and Statistical Physics: Laws of thermodynamics, Thermodynamic potentials, Maxwell relations, chemical potential, phase equilibria, micro- and macro-states, Micro-canonical, canonical and grand-canonical ensembles and partition functions, Free energy and its connection with thermodynamic quantities, Classical / quantum statistics, Magnetism.

Electronics and Experimental Methods: Semiconductor devices, frequency dependence and application, Opto-electronic devices, Operational amplifiers and their applications, Digital techniques and applications, Microprocessor and microcontroller basics.

Atomic & Molecular Physics: Spectrum of He and alkali atoms, LS & JJ couplings, Zeeman, Paschen-Bach & Stark effects, Frank-Condon principle, Born-Oppenheimer approximation, Diatomic molecules, spectra, Lasers.

Condensed Matter Physics: Bravais lattices, Reciprocal lattice, Diffraction and the structure factor, bonding of solids, Elastic properties, phonons, Free electron theory, Hall effect , Periodic potential, Type-I and type-II superconductors,

Nuclear and Particle Physics: Binding energy, semi empirical mass formula, liquid drop model, Nature of the nuclear force, form of nucleon-nucleon potential, charge-independence and charge-symmetry of nuclear forces, Deuteron problem, Shell structure. Fission and fusion,

Subject: Hindi Literature

Hindi Literature: Ancient and Medieval Literature, Modern Hindi Literature, Regional Literature (e.g., Awadhi, Braj, Maithili, etc.), Literary Movements and Trends Literary Criticism and Theory: Major Literary Criticisms (e.g., Rasa, Dhvani, Alamkara, etc.), Literary Terms and Concepts, Schools of Literary Criticism Hindi Language and Grammar: Phonetics and Phonology, Morphology and Syntax, Vocabulary and Semantics, Stylistics and Composition History of Hindi Language and Literature: Evolution of Hindi as a Language, Development of Hindi Literature through the ages Influential Writers and their works, Literary Periods and Movements Comparative Literature: Comparative Analysis of Hindi Literature with other Indian Languages, Comparative Analysis of Hindi Literature with World Literature, Translation Studies Literary History and Literary Criticism in Hindi: Historical Overview of Hindi Literature, Notable Hindi Literary Critics and their works

Subject: English

Classical and Renaissance Drama, Modern & Contemporary Drama, Shakespeare & Renaissance Literature,

English Poetry, English Fiction & Short Story, Indian Writing in English, Indian Literature in Translation, Major Indian regional literatures, Indian literary traditions, Commonwealth & World Literature

Linguistics & English Language, Language ELT: an introduction (History, Place, Position, Problems, Prospects and Future), Language acquisition and language learning, Listening, Speaking, Reading, Writing, Communicative Language Teaching, Computer-aided language learning, English for academic purposes, English for specific purposes, Business English Communication: Business letter, Report Writing, E-Communication, Basic concepts of Language Testing and assessment, eaching literature.

Literature Indian Literature, Victorian Age, Literary Theories, Literary Devices

Subject: Political Science

Political Theory: Nature of Political Theory, its main concerns, decline and resurgence since 1970s Liberalism and Marxism, Individual and Social Justice, Role of Ideology, Theories of change: Lenin, Mao, Gandhi. Political Thought: Plato and Aristotle, Machiavelli, Hobbes, Locke, Rousseau and J.S.Mill, Karl Marx, Gandhi, M.N. Roy, Aurobindo Ghosh.

Comparative Politics and Political Analysis: Approaches to the study of Comparative Politics, Constitutionalism in theory and practice, Executive, Legislature and Judiciary and with special reference to India, USA, UK and Switzerland, Party system and role of opposition, Electoral Process, Separation of Powers, Rule of Law and Judicial Review.

Political Development: Political Modernization, Political Socialization and Political Culture, Power and Authority, Political Elite. Making of the Indian Constitution: Fundamental Rights and Duties and Directive Principles, Union Executive, Parliament, Supreme Court, Judicial Activism, Indian Federalism, Theory, Practice and Problems.

Dynamics of State politics: Local Governments, Rural and Urban, Political Parties, Pressure Groups and Public Opinion, Elections, Electoral Reforms, Class, Caste, Gender, Dalit and Regional Issues, Problems of Nation-Building and Integration

Growth of Public Administration as a discipline and New Public Administration: Theories of Organization (Classical, Scientific, Human Relations) Principles of Organization, Chief Executive, Control over Administration, Judicial & Legislative, Bureaucracy. Development Planning and Administration in India: Bureaucracy and Challenges of Development, Administrative Culture, Administrative Corruption and Administrative Reforms, Panchayati Raj, Impact of Liberalization on Public Administration

Theories of International Relations: Ideology, Power and Interest, Conflicts and Conflict Resolution, Changing concept of National Security and Challenges to the Nation-State System, Arms and Arms-control, India's foreign Policy, India and Regional Organizations (SAARC, ASEAN).

Major Issues of Hill Region of Uttarakhand: Problem of deforestation, Ecology, Problem of Unemployment, Problems of Ex-servicemen, Disaster management, Political Pressure groups operating in the Hill Region, Working of local Self-Government in the Hill Region

Subject: Sociology

Sociological Theory: Classical sociological theories (e.g., Marx, Durkheim, Weber), Contemporary sociological theories (e.g., functionalism, conflict theory, symbolic interactionism), Feminist theories, Postmodern and post-structuralist theories Research Methods in Sociology: Qualitative research methods (e.g., interviews, ethnography, content analysis), Quantitative research methods (e.g., surveys, statistical analysis), Mixed methods research, Research design and ethics in sociology Social Institutions: Family and marriage, Education, Economy and work, Religion Social Stratification and Inequality: Social class, Race and ethnicity, Gender, Intersectionality Social Change and Social Movements: Globalization and its impact on society, Social movements and activism, Social change theories, Technology and society Sociology of Culture: Culture and society, Cultural identity and representation, Popular culture and media Cultural globalization Sociology of Gender: Gender roles and socialization, Feminist theories and perspectives, Gender inequality and discrimination, Intersectionality and gender Sociology of Deviance and Crime: Theories of deviance and crime, Social control and punishment, Juvenile delinquency White-collar crime Sociology of Health and Illness: Social determinants of health, Medicalization and pharmaceuticalization, Health disparities and inequalities, Sociology of mental health Urban Sociology: Urbanization and urban development, Urban poverty and inequality, Urban planning and governance, Urban social movements.

Subject: Economics

Public Finance: government Economic Activities, Expenditure, Revenue, Taxation, Debt. Fiscal Policy, Federalism, Decentralization. International Economics: Trade Theories, Terms of Trade, Balance of Payment, Foreign Exchange, Economic Integration. Indian Economy & Development Policy: Characteristics, Economic Trends, Plans. Current Economic Issues: National, Regional, Global, Economic Programmes, Polices, Debates. Basic Economics Concept: Micro Economics Theories of Consumption Production Cost, General Equilibrium. Pricing and Output under different market structure: Factor Pricing. Welfare Economics. Macro Economics: National Income Accounts classical. New classical, New classical. Keynesian, Post Keynesian. Money: Supply debate, Old & Modern Quantity Theories. Interest Rates, Business Cycle theories, Banking. Growth Development Planning: Concepts, Approach, Growth Theories & Models. Quantitative Methods: Mathematical & Statistical Methods.

Subject: Psychology

Biological Bases of Behavior: Neuroanatomy and neurophysiology, Endocrine system and hormones, Genetics and behavior, Psychopharmacology. Cognitive Processes: Perception and attention, Learning and memory, Thinking and problem-solving, Language and communication. Developmental Psychology: Cognitive development, Social and emotional development, Lifespan development, Developmental theories. Social Psychology: Social perception and cognition, Attitudes and persuasion, Group dynamics and intergroup relations, Social influence and conformity. Personality Theories and Assessment: Major theories of personality, Personality assessment techniques, Psychodynamic, humanistic, and trait approaches, Self-concept and self-esteem. Abnormal Psychology and Psychopathology: Classification and diagnosis of mental disorders, Etiology and risk factors for psychological disorders, Treatment approaches and interventions, Assessment and evaluation of psychopathology Applied Psychology: Organizational psychology and industrial/organizational behavior, Educational psychology and learning theories, Health psychology and behavioral medicine, Counseling and psychotherapy approaches. Cognitive Neuroscience: Brain imaging techniques, Cognitive neuroscience of perception, attention, and memory, Neural correlates of consciousness, Cognitive processes and brain connectivity. Cross-cultural and Multicultural Psychology: Cultural influences on behavior and cognition, Cross-cultural research methods, Diversity and multicultural issues in psychology, Cultural competency and sensitivity in psychological practice.

Subject: Social Work

Social Work Theories and Perspectives: Major theories in social work (e.g., systems theory, ecological perspective, strengths-based perspective, etc.), Historical development of social work, Contemporary perspectives in social work practice, Ethical principles and professional values in social work. Social Work Practice: Direct practice with individuals, families, and groups, Community practice and social action, Policy analysis and advocacy, Crisis intervention and trauma-informed practice. Social Policy and Social Welfare: Historical and current social welfare policies, Policy analysis and evaluation, Social justice and social welfare, Welfare state models and their implications. Human Behavior and Development: Human development theories across the lifespan, Social and cultural factors influencing human behavior, Socialization processes and identity formation, Psychological and social aspects of human behavior. Social Work Administration and Management: Organizational theory and behavior, Leadership and supervision in social work, Program planning, implementation, and evaluation, Resource mobilization and grant writing. Community Development and Social Change: Community development models and approaches, Participatory methodologies in community work, Social change theories and strategies, Community organizing and empowerment. Gender, Race, and Social Justice: Gender and social work practice, Race, ethnicity, and social work practice, Intersectionality and multiple identities, Anti-oppressive and anti-discriminatory practice Mental Health and Psychosocial Interventions: Mental health theories and disorders, Assessment and intervention in mental health settings, Trauma-informed care and psychosocial support, Substance abuse and addiction treatment International Social Work and Global Perspectives: International social work practice and principles, Global social issues and challenges, Cross-cultural competence and cultural diversity, Human rights and social work practice.

Subject: Management

General Management: Concept of Management, Evolution of Management, Functions & Principles of Management. Managerial Communication: Introduction, Types, Medium, Barriers and Techniques. Organisational Behaviour: Concepts and Significance of OB, Understanding and Managing Behaviour- Personality, Perception, Values, Attitudes, Learning and Motivation, Leadership, Managing Conflicts, Organisational Development. Human Resources Management: Concepts and perspective in Human Resource Management, process and techniques, Recruitment and Selection, Performance Appraisal system and evaluation, Methods of Training and Development, Dispute Resolution and Grievance Management, Labour Welfare and Social Security Measures. Financial Management: Concept, Nature and Scope, Functions, Financial Instruments, Capital Structure & its Theories, Cost of Capital, Capital Budgeting, Working Capital Management, International Financial Management Marketing Management: Concepts , Nature and Scope, Marketing Mix– Product, Price, Place and Promotion, Role and Relevance of segmentation, Targeting and Positioning, Product Life Cycle, Branding and Packaging, Retailing, Consumer Behaviour, Marketing of Services Statistics: Techniques and its uses, Descriptive Statistics.

Subject: Computer Applications

Data Structures: Stack: Definition, Representation, Stack as ADT, Operations and Applications: Polish and reverse polish expressions, Infix to postfix conversion, evaluation of postfix expression, infix to prefix, postfix to infix conversion;

Queue: Definition, Representation, Queue as ADT, Operations,. Linked lists: singly linked list, doubly linked and its applications.

Discrete Mathematical Structures: Propositional logic, equivalences, Sets and set operations, Function definition and representation, types of function. Permutations, combinations, Graphs, terminology and special types of graphs, representation of graphs and its applications.

Operating Systems Management: Process Management and Mutual Execution: Process, Process States, Process Description, Process Control, Execution of the Operating System, Security Issues, Processes and Threads, Symmetric Multi-processing (SMP

Memory Management: Swapping, Contiguous Memory Allocation, Paging, Segmentation, Segmentation with Paging, demand paging Process Creation, Page Replacement,

Transaction Management: Transaction Concept, A Simple Transaction Model, Transaction Atomicity and Durability, Serializability, Transaction Isolation and Atomicity, Transaction Isolation Levels, Implementation of Isolation Levels.

Computer organization: Binary Systems and Combinational Logic Digital Computers and Digital Systems. Binary Numbers, Number Base Conversion, Octal and Hexadecimal Numbers, Binary Code, Binary Storage and Registers, Binary Logic, and Integrated Circuits. Digital Logic Gates, The map Method, Two–and Three–Variable Maps, Four–Variables Map. Arithmetic Circuits and Sequential Logic NAND and NOR Implementation, Other Two-Level Implementations, Adders, subtractors, binary Parallel Adder, Decimal Adder, Decoders, Multiplexers

Transmission Concepts, Analog and Digital Data Transmission, Communication media, Digital modulation techniques (FDMA,TDMA,CDMA). DNS: Domain Name Space, Domain Resource Records, Content and internet traffic, content delivery networks, peer-to-peer networks.

Subject: Library and Information Science

Foundations of Library and Information Science: History and development of library and information science,Theoretical foundations and concepts, Information ethics and professional values, Intellectual freedom and censorship Information Organization and Management: Cataloging and classification systems (e.g., AACR2, RDA, Dewey Decimal Classification, Library of Congress Classification, etc.), Metadata standards and schemes, Information retrieval systems and techniques, Knowledge organization systems Information Sources and Services: Reference services and information literacy, Digital libraries and electronic resources, Collection development and management, User needs assessment and information-seeking behavior Information Technology and Systems: Information systems and databases, Digital preservation and archiving, Web technologies and content management, Information security and privacy Research Methods in Library and Information Science: Research design and methodology, Quantitative and qualitative research methods Data collection and analysis, Literature review and citation management Library Management and Administration: Library planning and strategic management, Financial management and budgeting, Human resource management, Marketing and outreach strategies Information Policy and Intellectual Property: Copyright laws and intellectual property rights, Information policy and legislation, Open access and open educational resources, Digital rights management Digital Libraries and Information Retrieval: Digital library design and development, Information retrieval algorithms and models, User interface design and user experience (UX), Information visualization and data mining Knowledge Management: Knowledge creation and organization, Knowledge sharing and transfer, Knowledge management systems and tools, Organizational learning and innovation Specialized Areas in Library and Information Science: Academic libraries,Publiclibraries,School libraries, Archives and special collections.

Subject: Education

Educational Philosophy and Foundations: Philosophical foundations of education, Theories of learning and teaching, Historical development of education, Sociological and psychological perspectives in education. Research Methods in Education: Research design and methodology, Quantitative research methods, Qualitative research methods, Mixed methods research Educational Psychology: Cognitive development and learning theories, Motivation and self-regulated learning Assessment and evaluation in education, Individual differences and inclusive education Curriculum and Instruction: Curriculum theory and design, Instructional strategies and methods, Assessment and evaluation of student learning, Technology integration in the curriculum Educational Leadership and Administration: Educational leadership theories and practices, School organization and management Educational policy and governance, Educational law and ethics Teacher Education and Professional Development: Teacher preparation programs and practices, Pedagogical content knowledge, Reflective teaching and professional growth, Mentoring and teacher induction programs Educational Measurement and Evaluation: Principles of educational measurement, Test construction and validation, Assessment and evaluation techniques, Data analysis and interpretation Comparative and International Education: Comparative education systems and policies, Cross-cultural perspectives in education Global educational reforms and challenges, Education and development Educational Technology: Integration of technology in education, E-learning and online education, Digital tools and resources for teaching and learning, Educational technology research and evaluation Specialized Areas in Education: Early childhood education, Higher education, Special education, Adult and lifelong learning.