INFORMATION TECHNOLOGY

UNIT 1: ENGINEERING MATHEMATICS

Mathematical Logic: Propositional Logic; First Order Logic.

Probability: Conditional Probability, Mean, Median, Mode and Standard Deviation; Random

Variables; Distributions; uniform, normal, exponential, Poisson, Binomial.

Set Theory & Algebra: Sets; Relations; Functions; Groups; Partial Orders; Lattice; Boolean Algebra.

Combinatorics: Permutations; Combinations; Counting; Summation; generating functions; recurrence relations; asymptotics.

Graph Theory: Cut vertices & edges; covering; matching; independent sets; Coloring; Planarity; Isomorphism.

Linear Algebra: Algebra of matrices, determinants, systems of linear equations, Eigen values and Eigen vectors.

Numerical Methods: LU decomposition for systems of linear equations; numerical solutions of non-linear algebraic equations by Secant, Bisection and Newton-Raphson Methods; Numerical integration by trapezoidal and Simpson's rules.

Calculus: Limit, Continuity & differentiability, Mean value Theorems, Theorems of integral calculus evaluation of definite & improper integrals, Partial derivatives, Total derivatives, maxima & minima.

UNIT 2: THEORY OF COMPUTATION

Regular languages and finite automata, Context free languages and Push-down automata, Recursively enumerable sets and Turing machines, Undecidability, NP completeness.

UNIT 3: DIGITAL LOGIC

Logic functions, Minimization, Design and synthesis of combinational and sequential circuits; Number representation and computer arithmetic (fixed and floating point).

UNIT 4: 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.

UNIT 5: PROGRAMMING AND DATA STRUCTURES

Programming in C; Functions, Recursion, Parameter passing, Scope, Binding; Abstract data types, Arrays, Stacks, Queues, Linked Lists, Trees, Binary search trees, Binary heaps.

UNIT 6: ALGORITHMS

Analysis, Asymptotic notation, Notions of space and time complexity, Worst and average case analysis; Design: Greedy approach, Dynamic programming, Divide-and-conquer; Tree and graph traversals, connected components, Spanning trees, Shortest paths; Hashing, Sorting, Searching.

UNIT 7: OPERATING SYSTEM

Processes, Threads, Inter-process communication, Concurrency, Synchronization, Deadlock, CPU scheduling, Memory management and virtual memory, File systems,) I/0 systems, Protection and security.

UNIT 8: DATABASES

ER-model, Relational model (relational algebra, tuple calculus), Database design (integrity constraints, normal forms), Query languages (SQL), File structures (sequential files, indexing, B and B+ trees), Transactions and concurrency control.

UNIT 9: 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.

UNIT 10: COMPUTER NETWORKS

ISO/OSI stack, LAN technologies (Ethernet, Token ring), Flow and error control techniques, Routing algorithms, Congestion control, TCP/UDP and sockets, IP(v4) Application layer protocols (icmp, dns, smtp, pop, ftp, http); Basic concepts of hubs, switches, gateways, and routers. Web technologies: HTML, XML, basic concepts of client-server computing. Mobile Technologies: GSM, GPRS, Blue Tooth, Wifi, Wimax