

Subjects :Computer Applications

1. **INTRODUCTORY PROGRAMMING:**Introduction: Introduction to Computers, its generations, Computer Von Neumann Architecture, Major hardware and software components of a digital computer, Introduction to software, its classifications. Programming- its methodologies. Concepts of Machine and high level language, Assemblers and compilers
Algorithm : Problem solving methodologies, Bottom –up and Top down design, design and analysis of algorithms, Performance of an algorithm.
Features of high level languages, structured programming techniques, Assignment statement, input-output statements; Expressions; data types; conditional statements, Iterative statements; Array data type and use of arrays; character data type and text processing.
Functional and procedural abstraction; Recursion; Pointer data types etcFile and data processing
2. **DIGITAL SYSTEMS:** Representation of Information, ASCII and EBCDIC codes, error detection and correction: parity codes, Hamming Codes.
Logic Design: Boolean algebra, truth tables, minimization of Boolean functions- Karnaugh map, tabulation methods..
Combinational logic circuits, Implementation of Boolean functions using logic gates; Multiplexers, decoders, encoders, simple arithmetic and logic circuits.
Sequential circuits: flip-flops, shift registers and counters- synchronous and asynchronous.
Memory Devices: Semiconductor memory - RAM, ROM; Magnetic core and surface memory- disk, drum, tape; Access time and cost considerations, online and backup storage.
Basic CPU organization
3. **MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE**
Set, Functions and relation, Logic: truth tables, algebra of propositions, logical arguments, predicate calculus, Mathematical induction, recurrence relation, permutation and combination, Algebraic structure, Principle of counting, Matrices
4. **COMPUTER ORGANIZATION:** Simplified block diagram of a computer system, Instruction execution Model, Processor Organization, Assembly and machine language programming, Computer arithmetic, Data path organization, concept of a bus, Control structure, Memory Organization, Input output organization, I/O mapping and control Microprocessors, basic concepts of RISC architecture.
5. **COMPUTER BASED OPTIMISATION TECHNIQUES:** Linear Programming, Special type of linear programming problems: Transportation and assignment problems.
Integer programming introduction, Dynamic programming
6. **GRAPH THEORY:** Graphs, Components and Connectedness, Components and Connectedness algorithms, Trees and tree algorithms, Fundamental circuits; Spanning trees of a weighted graph; cut-sets and cut-vertices; Fundamental cut-sets; Connectivity and separativity; network flow; max-flow min-cut theorem.

Planner graph, Matrix representations of graph, Colouring problem, Directed graphs, Counting of labelled trees.

7. **COMPUTER ORIENTED NUMERICAL METHODS: Interpolation-Polynomial Interpolation, Numerical differentiation & integration, Simultaneous linear equations- Direct methods, Solution of non linear equations of one variable- Iterative methods, Ordinary differential equations of one and two variables.**
8. **SYSTEM SOFTWARE: Definition and classification of system software. Assemblers, Linkers and loaders, Case study of the Unix, Windows DLLs, OLEs. Compilers, Language and grammar, Lexical analysis, Parsing, LL(1), LR parsers, Parser generator (YACC), Intermediate code generation**

9. **DESIGN AND ANALYSIS OF ALGORITHMS: Algorithms, Models of Computation, Space and Time Complexity, Growth of functions, Upper and Lower bounds, Recurrences. Divide -and -Conquer, Branch and Bound, Backtracking, Dynamic Programming, Greedy Method. analysis of sorting, Graph & Data Structures based Algorithms: Sorting algorithms, Graph Algorithms, Hashing algorithms, BST, B-Trees Introduction to NP-Completeness, NP-Completeness proofs. Examples of NP-Complete problems.**
10. **DATABASE MANAGEMENT SYSTEM: Concept of database, its advantage and disadvantages, Database architecture, Client server model, Database models: ER/EER models; Relational, Network, Hierarchical, Relational and their comparisons. Relational Data model, Database storage structures, Database languages (SQL, Embedded SQL, PL/SQL, QBE). Query optimisation. Transaction Processing concepts, Recovery Techniques and protocols Brief overview of object relational databases, distributed databases, Spatial and temporal databases, deductive databases, multimedia databases.**
11. **OBJECT ORIENTED PROGRAMMING AND DESIGN: Structured Programming and Object Oriented Programming paradigms, Object Oriented Design & approaches, Object Modelling Techniques (OMT) tools, Phases of Object Oriented Development Object Design Concept in UML, Class model, state model, interaction model, Case studies in object oriented application design.**
12. **FORMAL LANGUAGE AND AUTOMATA THEORY: Concepts of Automata Theory, Automata and Languages, Finite Automata, Regular Expression (RE) and Languages and Non Regular Languages, Context Free Grammars and Languages, CHOMSKY NORMAL FORM (CNF), Pushdown – Automata, Non-Context-free Languages: Application of Pumping Lemma for non- Context free languages. Computability Theory, Turing Machines**
13. **OPERATING SYSTEMS: Evolution, current status and future trends. Process concepts, support for concurrent processes, Inter process communication issues, primitives. System Deadlock, Memory management, virtual memory, segmentation, paging, page scheduling and replacement algorithms. File Systems, Design of UNIX, LINUX- a case study. An overview of network and distributed operating systems.**

14. DATA COMMUNICATION AND COMPUTER NETWORKS: Overview: Goals of networking, types, application, topologies, Switching techniques, Standards, performance issues. Network Architecture, protocol, interface, and service concepts. Physical Layer, Data link layer, Network layer, Transport layer, Session and presentation layer, Application Layer: Email, Remote login, File transfer, Network file systems.

15. WEB TECHNOLOGY: Internet basics, Concept of client server computing, Web Client side inclusive scripts, VB scripts, Java scripts, ActiveX, ASP, Plugins, Case study- Netscape Communicator, Internet explorer. File server and mail, Web servers Web application development: HTML, DHTML with DTD concept, (head> and (body> section, able, form, frame, hyperlinks, web page design using HTML, authoring tools, - FrontPage and dream weaver. Web security, Web object model

16. DATA STRUCTURE AND ALGORITHMS: Concept of data structures and their effect on algorithms; Data object, abstract data type. Data structures: array, linked list, record, linear list, stacks and queue; Trees, Hash table; Algorithms for manipulation of the data structures, sorting, searching algorithms, graph algorithm. Concept of complexity of algorithms and their analysis

17. COMPUTER GRAPHICS: Overview of graphics systems: Display devices, CRT, raster and random scan displays, DVST, Flat panel and 3-D viewing devices, digital frame buffer. Raster Scan Systems, Graphics monitors and input devices, Output primitives, Attribute output primitives: line attributes, curve attributes, area fill attributes, character attributes. 2-D Graphics, Basic and composite transformations, Viewing and clipping, 3-D Graphics, Three dimensional display methods, 3-D transformation, translation, rotation and scaling. Visible surface detection methods