

PhD Admission Test-2024

Computer Applications

Programming Skills: Procedural programming using C, C++ and JAVA, data types, arrays, recursion, functions, pointers, structures & union, file handling; OOPS Concepts: Classes and objects, constructors and destructors, Function and Operator overloading, inheritance and polymorphism, Exception handling, STL, Generics.

Data Structures: Linked list, Multi list, Stack & Queue; Tree: Binary Tree, Tree traversals, BST, AVL Tree, Red-black Tree. Splay Tree, B Tree, B+ Tree; Skip-lists; Hash Table; Priority Queue. Graph: Depth-first and Breadth-first Search. Searching and Sorting Methods

Algorithms: Asymptotic notation, Amortized Analysis, Recurrences, Notions of space and time complexity, Algorithm Correctness and Efficiency; Algorithm based puzzles; Algorithm Design Paradigms: Greedy Algorithms, Dynamic Programming, Divide-and-Conquer; Backtracking; String Matching; Graph algorithms: MST, Shortest paths, Connected components; Series Evaluation; Matrix Operations

Operating Systems: Synchronization Mechanisms, Process Deadlocks, Resource Models, Local and Global states. Scheduling, Comparative Performance Analysis, Concurrency Control, Shared Memory, File Systems, Coordination of Processes and related Algorithms.

Database Systems: Database design, ER-model, Relational model, Storage and File Structures. Indexing and Hashing. Transactions and Concurrency control. Recovery, Query Processing & Optimization. Object Oriented DBMS, Extended ER-Model.

Computer Organization and Architecture & Digital Logic: Boolean algebra, Combinational and sequential circuits, Minimization. Number representations and computer arithmetic (fixed and floating point) , Design and synthesis of combinational and sequential circuits; Computer arithmetic (fixed and floating point). Machine instructions and addressing modes, ALU, CPU control design, Memory interface , I/O interface, Instruction pipelining, Cache and main memory.

Software Engineering: Software Processes, Software life cycle models, Size Metrics, Design Metrics, Information Flow Metrics, Cost estimation, COCOMO model, Data Flow Diagrams, Software Requirement and Specifications, Cohesion & Coupling, Boundary value analysis, Equivalence class testing, Decision table testing, Cause effect graphing, Path testing, Data flow and mutation testing, unit testing, integration and system testing, Debugging, Testing Tools.

Computer Networks : ISO/OSI stack, TCP/IP, LAN technologies (Ethernet, Token ring), Flow and error control techniques, Routing algorithms, Congestion control, TCP/UDP, IP(v4), Application layer protocols; Basic concepts of hubs, switches, gateways, and routers, Network security, IPv6 Protocols and its Applications, High speed local and wide area networks, Virtual Private networks.

Web Designing: Basic Structure of HTML Page,Dynamic HTML with Java Script, Cascading Style Sheet ,JAVA SCRIPT ,XML ,XML Schema – Defining, Accessing XML Document.