PhD Admission Test-2022
Computer Science and Engineering
Syllabus

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

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 Organisation and Architecture : 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.

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.