

# SYLLABUS OF Ph.D.(COMPUTER SCIENCE & INFORMATION TECHNOLOGY)

## Entrance Test

**Computer Organization and Architecture:** Representations of Integers, K-MAP, 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, Addressing modes, Architectural classification schemes, multiprocessors..

**Programming languages:** Programming in C: elements of C-Tokens, identifiers, data types in C. Control structure in C. sequence, selection & iteration(s). structure, union, string, and pointers. C++ Programming: Functions parameter passing. Class and objects. Constructors and destructors. Overloading, inheritance, templates, exception handling, Pointers, Virtual Function Late Binding, Friend function, Friend class, Overview of JAVA.

**Data Structures:** Simple and composite structure, Recursion, Parameter passing, Scope, Binding; Abstract data types, Arrays, Stacks, Queues, Linked Lists, Trees, Binary search trees, Binary heaps, Graph theory. Tree and graph traversals, Connected components, Spanning trees, Shortest paths; Hashing, Sorting, Searching.

**Theory of Computation:** Regular languages and finite automata, DFA, NFA Context free languages and Push-down automata, Recursively enumerable sets and Turing machines, Undesirability. LR Parser, construction of SLR and canonical LR parser table, using ambiguous grammar, creating YACC lexical analyzer with LEX, error recovery in YACC, Chomsky hierarchy of languages, CFG.

**Operating System:** Processes, Threads, Inter-process communication, Concurrency, Synchronization, Deadlock, CPU scheduling, Belady's anomaly, Memory management and virtual memory, File systems, I/O systems, Protection and security.

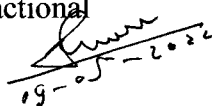
**Databases:** ER-model, Relational model (relational algebra, tuple calculus), Database design (integrity constraints, normal forms), Query languages (SQL), File structures (sequential files, indexing, B and B+ trees), Transactions and concurrency control.

**Computer Networks:** ISO/OSI stack, LAN technologies (Ethernet, Token ring), Modulation Techniques, Flow and error control techniques (error correcting & detecting, CRC), Routing algorithms, Congestion control, TCP/UDP and sockets, IP(v4), hubs, switches, gateways, and routers. Aloha, S-Aloha, Protocols, Network security - basic concepts of public key and private key cryptography, digital signature, firewalls, B-ISDN, ATM.

**Mobile communication:** Introduction, Cellular system infrastructure, Registration, Handoff Parameters and Underlying support, Roaming Support Using Backbone to Mobile IP, Functions of Mobile IP, Registration, Tunneling, Dynamic Host configuration protocol. Introduction, Characteristics and Applications of Mobile Adhoc Network (MANET) Routing, Routing Classification.

**Parallel Computing :** Parallelism and its types, classification scheme, Multiprocessor and Micro Computer, Memory Module, Pipelining, Collision, RISC, CISC, Calculation of MAL, Multidimensional Array, Dependence Analysis.

**Data Warehousing and Data Mining –** What is data mining?, Data Mining: On what kind of data?, Data mining functionality, Are all the patterns interesting?, Classification of data mining systems, What is a data warehouse?, A multi-dimensional data model, Data warehouse architecture, Data warehouse implementation, Further development of data cube technology, From data warehousing to data mining. Concept of Transaction, Transactional database, Distributed Database, Commit Protocols.

  
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