

**MATS SCHOOL OF INFORMATION TECHNOLOGY**

**MATS University**

**Entrance Test Syllabus of Ph. D.**

**(COMPUTER APPLICATION & INFORMATION TECHNOLOGY)**

**Computer Organization and Architecture:**

Machine instructions and addressing modes, CPU control design, Memory interface, I/O interface (Interrupt and DMA mode), Instruction pipelining, Cache and main memory, Addressing modes

**Data Structures:**

Recursion, Parameter passing, Arrays, Stacks, Queues, Linked Lists, Trees, Binary search trees, Graph theory, Spanning trees, Shortest paths: Hashing, Sorting, Searching.

**Programming languages:**

Programming in C: 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, Overview of .net.

**Operating System:**

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

**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, An automatic parser the generator, YACC, lexical analyzer with LEX, Chomsky hierarchy of languages, CFG.

**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 and Communication:**

LAN technologic (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 Security and Communication:**

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, Mobile Adhoc Network (MANET) Routing, Routing Classification.

**Parallel Computing and Architecture:**

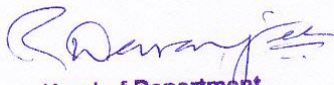
Parallel computer architecture and its types, classification scheme, Multiprocessor and Micro Computer, Memory Module, Pipelining, collision, RISC, CISC, Calculation of MAL, Multidimensional Array, Dependence Analysis.


**Data Warehousing and Data Mining and Big Data:**

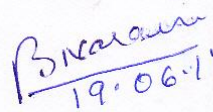
Data Mining, Data mining functionality, Classification of data mining systems, Data warehouse, A multi-dimensional data model, Data warehouse architecture, Data warehouse implementation, Further development of data cube technology, From data warehousing to data mining, Concept of Transaction, Transactional tabase, Distributed Database, Commit Protocols, Fundamental of Big Data, Hadoop.

**Digital Image Processing:**

Digital image processing, Types to processing, Segmentation, color image processing, Object Recognition and representation.

  
**Head of Department**  
**School of Information Technology**  
**MATS University**

  
19.06.17  
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