



**Mahatma Gandhi University, Nalgonda**

**Ph.D. Entrance Test 2024**

**Part B Syllabus of Computer Science and Informatics**

**Unit 1. Programming and Data Structures:**

Algorithm, flow chart, C Language - Control Statements, Functions, Structures, union and files, pointers in C, Object oriented Programming and features- C ++; Java and Python Programming. Abstract data types and data structures - stacks, queues, linked list, Trees, AVL trees, Graphs, complexity of algorithms, divide and conquer, greedy, dynamic programming searching and traversal techniques, backtracking, Branch & Bound, NP Hard and NP Complete problems. HTML, JavaScript, Dynamic HTML, XML and Multimedia systems.

**Unit 2. Computer Organization and Architecture:**

Processor basics, CPU organization, Data representation, Arithmetic representation, ALU's control design, Micro Programming, Nano Programming, Memory Hierarchy, Cache and Virtual memory concepts, Parallel processing: PP in Uniprocessor, pipelining, SIMD and Vector Processing, Multi programming, Data Flow computing. Introduction to VLSI computing.

**Unit 3. Computer Networks:**

Evolution of Data Communications and Networks, Transmission fundamentals, signals, media, encoding and modulation, switching techniques, OSI & TCP/IP models, functions and performance details of all layers. Network security and communication security. Network programming Sockets, TCP client server, Multiplexing and Socket options. UDP Sockets. IPC and Remote Login.

**Unit 4. Operating Systems and system Programming:**

Process, CPU scheduling, Process synchronization, deadlock, memory management, file system interface I/O systems assembles, Macros and MACRO processors, Linkers, Distributed systems communications, synchronizations, deadlocks, filesystems, shared memory Unix Utilities, Problem solving approaches in Unix, Unix internals, Unix Process, Threads and signals and Inter Process Communication.

**Unit 5. Data Base Management Systems:**

File systems, various data models, Relational algebra and calculus, Query optimization and evaluation, Database design, Concurrency control and recovery,

Storing and Indexing, Distributed data base design, Distributed Transaction Management, Reliability, Data Mining primitives, Languages and system Architecture, Mining association rules, classification and prediction, Cluster Analysis. Software Development life Cycle, Management of Software Engineering, Software Engineering Tools, introduction to UML Concepts.