

**M.Sc., (Computer Science) – Entrance Examination**

**Syllabus**

**1. Computer Organization and Architecture**

Machine instructions and addressing modes. ALU, data-path and control unit. Instruction pipelining. Memory hierarchy: cache, main memory and secondary storage; I/O interface (interrupt and DMA mode).

**2. Mathematical Foundations for Computer Science**

Logic: proposition – logical operators- truth tables –normal forms. Graph Theory: Basic concepts – Matrix representation of graphs – shortest path problem –Trees –binary trees.

**3. Data Structures and Algorithms**

Representation and operations on Arrays, Linked List, Stack, Queues, Circular queue, Priority queue, Trees and Graphs

Searching: Linear search, Binary search. Sorting: Insertion Sort- Bubble sort- Merge Sort – Quick Sort- Heap sort.

**4. Database Management Systems**

Structure of Relational Databases - Database Schema - Keys. SQL: Overview of the SQL Query - Language - SQL Data Definition - Basic Structure of SQL Queries - Set Operations - Aggregate Functions - Nested Subqueries

E-R Model: Overview of the Design Process - The Entity Relationship Model - Reduction to Relational Schemas

Normal Forms - Decomposition Using Functional Dependencies - Decomposition Using Multivalued Dependencies- More Normal Forms.

**5. Operating Systems**

Introduction to Operating Systems- Multiprocessing, Multi-Tasking, Multiprogramming. Processes, threads, Inter-process communication, concurrency and synchronization. Deadlock-Avoidance, Prevention-Detection. CPU scheduling, Disk Scheduling. Memory management- paging, segmentation and virtual memory. File systems.

## **6. Computer Networks**

Data Communications - Networks - Network Types, Network Models: TCP/IP Protocol Suite- The OSI Model - Physical Layer-Multiplexing- Spread Spectrum, Transmission Media: Guided Media-Unguided Media, Switching: Circuit Switched Network-Packet Switching

Data Link Layer: Error Deduction and Correction.Network Layer Services: IPV4 Addresses-Internet Protocol-Routing Algorithms - IPV6 Addressing. Transport Layer : Transport Layer Protocols- User Datagram Protocol - TCP:TCP Services. Application Layers : Word Wide Web & HTTP - FTP - Email – DNS

## **7. Programming Logic**

Expressions and statements- Data-type handling and various constructs (conditional, loop, functions)recursions; functions and procedures - call by value, call by reference

## **8. Aptitude and Reasoning**

Profit and Loss, Percentage, Average, Problems on H.C.F and L.C.M, Odd Man Out and Series, Time and Distance, Time and Work, Problems on Ages, Ratio and Proportion, Simple and Compound Interest.

Verbal Reasoning, Number Series, Letter and Symbol Series, Statement and Argument, Statement and Assumption