

**Entrance Test Syllabus for
Master of Computer Science & Applications**

Database Management System: Database users, Database Systems Architecture: Data Models, Schema and Instances, Data Independence, Database languages, DBMS functions. Entity Types, Entity Sets, Attributes, keys, Relationships, Roles and Structural Constraints, E-R Diagrams, Design of an ER Database Schema, Reduction of an ER schema to Tables. Relational Model Concepts, Integrity Constraints over Relations, Relational Algebra Operations. Data Definition and Data Types, DDL, DML, and DCL, Views & Queries in SQL, Constraints & Indexes in SQL.

Functional Dependencies, Decomposition, Normal forms based on primary keys- (1NF, 2NF, 3NF, BCNF), Multi-valued Dependencies, 4 NF, Join dependencies, 5 NF. Transaction Processing Concepts: Introduction to Transaction, Properties of Transaction, Transaction Processing System Concepts, Schedules and Recoverability, Serializability of Schedules.


Object Oriented Programming: Data-types, Variables, Static Variables, Operators in C++, Arrays, Strings, Structure, Functions, Recursion, Control Statements. Classes and Objects, Access Specifiers: Private, Public and Protected, Member functions of the class, Constructor and Destructor, Parameterized Constructor, Copy Constructors. Function Overloading, Static Class Members, Static Member Functions, Friend Functions, Operator Overloading: Unary and Binary Operator Overloading. Abstract class, Virtual function, Pure virtual function, Overloading vs. Overriding. Memory management: new, delete, object Creation at Run Time, This Pointer. Exception handling: Throwing, Catching, Rethrowing an exception, specifying exceptions, processing unexpected exceptions, Exceptions when handling exceptions, resource capture and release.

Computer Networks: Uses, Network categorization and Hardware: Broadcast and point-to-point networks, LAN, MAN, WAN, Internetworks, Topologies, Wireless networks, Network Software: Protocols, Services, network architecture, design issues, OSI Reference model, TCP/IP Reference model, Introduction to Example Networks: Internet, Connection-Oriented Networks – X.25, Frame Relay, ATM

Data Link Layer Design issues: Framing, error control, Flow Control, Error Detection and correction; Elementary Data Link Protocols, Sliding Window Protocols; Medium Access Control: Aloha, CSMA protocols, Collision free protocols, Limited Contention Protocols; Wavelength division Multiple access protocol, Wireless LAN Protocol: MACA; IEEE 802.3 Ethernet, IEEE 802.4 Token Bus; IEEE 802.5 Token ring, Digital Cellular, Radio: GSM, CDMA, FDDI

Operating Systems: Services, System Calls, System Programs, Process operations, Interprocess Communication, Scheduling Criteria, Scheduling Algorithms, Comparative Study of Scheduling Algorithms.

Critical Section Problem, Semaphores, Classical Process Co-ordination Problems and their Solutions, Monitors, Synchronization Examples. Deadlocks: Deadlock Characterization, Deadlock Prevention and Avoidance, Deadlock detection and Recovery.



Swapping, Paging, Segmentation, Virtual Memory Concepts: Demand Paging, Page Replacement Algorithms, Thrashing, Storage Management: File Concepts, File Access and Allocation Methods.

Artificial Intelligence: AI applications, The predicate calculus: Syntax and semantic for propositional logic and FOPL, Clausal form, inference rules, resolution and unification. Knowledge representation: Network representation through Associative network & conceptual graphs, Structured representation- Frames & Scripts. Search algorithms- uninformed search (Depth first search, Breadth first search) and informed search (Hill climbing, Best first, A* algorithm, mini-max), computational complexity, Properties of search algorithms (Admissibility, Monotonicity, Optimality, Dominance). Knowledge acquisition: Definition of Knowledge, Types of learning (Learning by automata, Genetic algorithms, Intelligent editors, Learning by induction). Natural Language Processing (NLP): Problems in understanding natural languages, Different stages of language analysis, Chomsky Hierarchy of formal languages, Transition network parsers (TNP), Augmented Transition Network Parsers (ATNP).

