MCA -202 Data Base Management System **L T**
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Course objectives:
The goal of this course is to teach the fundamentals of the database systems at master level. A variety of topics will be covered that are important for modern databases in order to prepare the students for real life applications of databases. The course aims to impart knowledge of the concepts related to database and operations on databases. It also gives the idea how database is managed in various environments with emphasis on security measures as implemented in database management systems.

UNIT – I

Basic Concepts: File Systems vs. DMBS, Characteristics of the Data Base Approach, Abstraction and Data Integration, Database users, Advantages and Disadvantages of a DBMS.

Data Base Systems Concepts and Architecture: Schema and Instances, DBMS architecture and Data Independence, Data Base languages and Interfaces, DBMS functions and component modules, Centralized and Client/Server Architectures for DBMS, Data Models.

Entity Relationship Model: Entity Types, Entity Sets, Attributes & keys, Relationships, Relationships Types, Roles and Structural Constraints, Design issues, E-R Diagrams, Design of an E-R Database Schema, Reduction of an E-R schema to Tables.

Relational Data Model: Relational model concepts, Integrity constraints over Relations, Relational Algebra– Basic Operations, Relational Calculus, Codd Rules.

UNIT – II

SQL: Data Definition and Data Types, Components of SQL: DDL, DML, and DCL, Schema Change Statement in SQL, Views, Joins& Queries in SQL, Specifying Constraints & Indexes in SQL, Database Triggers, SQL Injection.

Relational Data Base Management System: RDBMS, Basic structure, Date Base Structure & its manipulation in an RDBMS, Storage Organization.

Conventional Data Models: An overview of Network and Hierarchical Data Models.

UNIT – III

Relational Data Base Design: Functional Dependencies, Decomposition, Normal forms based on primary keys (1 NF, 2 NF, 3 NF, & BCNF), Multi-valued Dependencies, 4 NF, Join dependencies, 5 NF, Algorithms for Query Processing and Optimization;

Transaction Processing Concepts: Introduction to Transaction Processing, Transaction & System Concepts, Properties of Transaction, Schedules and Recoverability, Serializability of Schedules.

Concurrency Control Techniques: Locking Techniques, Time stamp ordering, Multi-version Techniques, Optimistic Techniques, Granularity of Data items.

UNIT – IV

Recovery Techniques: Recovery concepts, Recovery Techniques in centralized DBMS, Object and Object-Relational Databases; Database Security and Authorization.
Data Base Security: Introduction to Data base Security issues.
Enhanced Data Models: Temporal Database Concepts, Multimedia Databases, Deductive Databases, XML and Internet Databases; Mobile Databases, Geographic Information Systems, Genome Data Management, Distributed Databases and Client-Server Architectures.

Text Book:

1. Elmasri And Navathe, "Fundamentals of Database Systems", Seventh Edition, Pearson. ISBN-10: 0-13-397077-9.ISBN-13: 978-0-13-397077-7.

Reference Books:

1. Bipin C. Desai: An Introduction to Database System, Galgotia Publication, N. Delhi.
2. Raghu Rama krishnan& Johannes Gehrke: Database Management Systems, 2 nd edition, Mcgraw Hill International Edition.
3. Peter Rob, Carlos Colonel: Database system Design, Implementation, and Measurement, Cengage Learning, 2 nd Ed.
4. C.J. Date: An Introduction to Data Bases Systems 7 th Edition, Addison Wesley N. Delhi.
5. Abraham Silberschatz, Henry F. Korth, S. Sudarshan, "Database System Concepts" Sixth Edition. ISBN 978-0-07-352332-3

Course Outcomes:

By the end of the course, Students will be able to
CO 1. Understand the concept of database and techniques for its management.
CO 2. Design different data models at conceptual and logical level and translate ER Diagrams to Relational Data Model.
CO 3. Normalize the database.
CO 4. Write queries using Relational Algebra.
CO 5. Describe the file organization schemes for DBMS.
CO 6. Describe and use features for Concurrency and Recovery.
CO 7. Understand data security standards and methods.

Note: In each theory paper, nine questions are to be set. Two questions are to set from each Unit and candidate is required to attempt one question from each unit. Question number nine will be compulsory, which will be of short answer type with 5-10 parts, out of the entire syllabus. In all, five questions are to be attempted.