| MCA108: Advanced Database Management System | |
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| **Teaching Scheme**<br>Lectures: 3 hrs/Week<br>Tutorials: 1 hr/Week<br><br>Credits: 4 | **Examination Scheme**<br>Class Test -12Marks<br>Teachers Assessment - 6Marks<br>Attendance – 12 Marks<br>End Semester Exam – 70 marks |

**Prerequisite**: - Computer Organization, Operating System, Data Structure, Mathematics

**Course Objectives:**

The objectives of this course are

1. Understand values of Data.
2. Understand significant role of DBMS.
3. Understand need for normalizing a Database.
4. Understand problems with unnecessary duplication of data.
5. Understand concepts of transaction
6. Understand concepts of concurrent transactions

**Unit-1 (6 Hours)**

**Introduction Database Systems:** An overview of database management system, Database System Vs File System, Database system concepts and architecture, data models schema and instances, data independence and data base language and interfaces, Data definitions language, DML, Overall Database Structure.

**Unit-II (10 Hours)**

**Data Modeling using Relational Data Model:** Modeling Techniques-Different Types of Models. Hierarchical Database, Network Database, and Relational Database. Relational data model-Codd's Rules, Concept of Domain, Tuple,and Cardinality. Introduction to ERD-ER model concepts, notation for ER diagram, mapping constraints, keys, Concepts of Super Key, candidate key, primary key, Generalization, aggregation.

**Unit-III (10 Hours)**

**Data Base Design & Normalization:** Functional dependencies, normal forms, first, second, third normal forms, BCNF, inclusion dependence, loss less join decompositions, normalization using FD, MVD, and JDs.

**Unit-IV (10 Hours)**

**Structured Query Language:** Features of SQL, SQL *PLUS, SQL V/s SQL *PLUS, Rules for SQL, SQL Delimiters, Components of SQL.**Constraints:** Data constraints, Types of data constraints: UNIQUE, NOT NULL at column level, CHECK, NULL value constraint

**PL/SQL:** Basic Introduction, Advantages of PL/SQL, The generic PL/SQL block, Literals, Variables, Constants, Comparisons, Comments. **Control Structure:** Conditional Control, Iterative Control and Sequential Control. **PL/SQL Transaction:** Oracle Transactions, Cursor, Types of Cursor: Implicit cursor, Explicit cursor.

**Unit-V (10 Hours)**

**Transaction Processing Concepts:** Transaction system, Testing of serializability, Serializability of schedules, conflict & view serializable schedule, recoverability, Recovery from transaction failures, log based recovery. Concurrency Control-Concurrency control, Protocols for concurrency control-locking, Time stamping, validation based protocol. Multiple granularity, Multi-version schemes, Recovery with concurrent transaction.

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**Unit-VI (10 Hours)**

**Modern Database Systems:** Transaction Processing in Distributed system, data fragmentation, Replication and allocation techniques for distributed system, overview of concurrency control and recovery in distrusted database. Parallel databases, multimedia databases, spatial and temporal databases, data warehousing and data mining, deductive databases.

**Text and Reference Books**


1. Database System Concepts, Henry Korth , A. Silberschatz, 5th Edition, 2005.
2. An Introduction to Database System, Bipin Desai, Galgotia Publications, 1991.
3. SQL, PL/SQL the Programming Language of Oracle, Ivan Bayross, BPB Publications, 4th Edition.
4. Schaum's Outline of "Fundamental of Relational Databases", Ramon A. Mata, Pauline K. Cushman, McGraw Hill, December, 2006.


**Course Outcomes:**

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| 1. Acquire knowledge of handling large volume of data. |
| 2. Acquire skills to deal with Real life database implementation. |
| 3. Response off faster queries and serve as many users as possible concurrently. |
| 4. Attain the capability to represent various real life problem domains using logic based techniques and use this to perform inference or planning. |
| 5. Fit with any Database project in industry after completion of degree. |

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