Course Code	Course Name	Credits
20MCACC103	Data Base Management System	03

❖ Aim of the Course:

1 Database Management System (DBMS) aims to present an introduction with a prominence on how to organize, maintain and retrieve data proficiently and effectively from the Database system. We also aim to create a strong foundation for application database design based on the concepts related to database, database models and database operations.

❖ Course Overview and Context:

1 The course is divided into five units. We start our course with basic concepts and database architecture in the first unit. Moving forward, we focus on data models and types of database systems in the second unit. Then, we design the structure of the database using the entity relationship diagram in the third unit. We would remove duplicate data from the database using several normalization techniques in the fourth unit. At the end we would focus upon the transaction, ACID properties, concurrency control and database security.

❖ Course Outcomes:

Sr #	Course Outcome	Cognitive Level
1	**Recall** basic concepts of database systems and its architecture.	Remember
2	**Recall and Extrapolate** types of data models and database systems.	Remember, Understand
3	**Draw** an Entity-Relationship diagram. Extrapolate the concept of Normalization.	Apply
4	**Distinguish** between the DDL, DCL, TCL, DML, DQL. **Extrapolate** the restricting and sorting the data.	Understand, Apply
5	**Extrapolate** the concepts of joining, grouping and subquery.	Understand,Apply

❖ Content of the Course:

Unit-1 Basic concepts & Database system Architecture

- **Basic concepts**
  Introduction to Data, Information, Data Item or Fields, database and database systems, Records, Files, Metadata, System Catalog, Data Warehouse, Data dictionary, DBA and File oriented System versus database system.
- **Database system Architecture**
- Schemas, Sub-schemas, Instances;
- Three-level ANSI SPARC Database Architecture (Internal Level, Conceptual Level, External Level)
- Advantages of three-tier Architecture;
- Functions of DBMS.

Unit-2 Data Models & Types of Database System

- **Types of Data models** (Physical Data Models, Hierarchical Data Model, Network Data Model, Relation Data Model, Entity – Relationship (E-R) Data Model, Object – oriented Data Model).
- **Types of Database Systems** (Centralized Database System, Parallel Database System, Parallel Database System, Client / Server Database System, Distributed Database System.

Unit-3 Entity-Relationship (ER) Model& Normalization

- Basic Entity – Relationship Concepts;
- Entities, Relationship, Attributes, E – R Diagram symbols, Examples;
- Specialization and Generalization.
- Introduction to Normalization
- Normal forms (1 NF, 2 NF, 3 NF, BCNF)

Unit-4 SQL Statements DDL, DML, DCL, TCL

- **Use of DDL Statements to Create and Manage Tables**
  - Categorize the main database objects
  - Review the table structure
  - List the data types available for columns
  - Create a simple table
  - Decipher how constraints can be created at table creation
  - Describe how schema objects work
- **Data Manipulation Statements**
  - Describe each DML statement
  - Insert rows into a table
  - Change rows in a table by the UPDATE statement
  - Delete rows from a table with the DELETE statement
  - Save and discard changes with the COMMIT and ROLLBACK statements
- **Retrieve Data using the SQL SELECT Statement**
  - List the capabilities of SQL SELECT statements
  - Generate a report of data from the output of a basic SELECT statement
  - Select All Columns
  - Select Specific Columns
  - Use Column Heading Defaults
  - Use Arithmetic Operators
  - Understand Operator Precedence
  - Learn the DESCRIBE command to display the table structure
- **Restricting and Sorting Data**
  - Write queries that contain a WHERE clause to limit the output retrieved
  - List the comparison operators and logical operators that are used in a WHERE clause
  - Describe the rules of precedence for comparison and logical operators
  - Use character string literals in the WHERE clause
  - Write queries that contain an ORDER BY clause to sort the output of a SELECT statement
  - Sort output in descending and ascending order

Unit-5 Joining, Grouping and Subqueries

- **Aggregate Data Using the Group Functions**
  - Use the aggregation functions to produce meaningful reports
  - Divide the retrieved data in groups by using the GROUP BY clause
  - Exclude groups of data by using the HAVING clause
- **Display Data from Multiple Tables Using Joins**
  - Write SELECT statements to access data from more than one table
  - View data that generally does not meet a join condition by using outer joins
  - Join a table to itself by using a self-join
- **Use Sub-queries to Solve Queries**
  - Describe the types of problem that sub-queries can solve
  - Define sub-queries

- List the types of sub-queries
- Write single-row and multiple-row sub-queries
- Multiple-Column Subqueries
- Pairwise and Non-pairwise Comparison
- Scalar Subquery Expressions
- Solve problems with Correlated Subqueries
- Update and Delete Rows Using Correlated Subqueries
- The EXISTS and NOT EXISTS operators
- Invoke the WITH clause

❖ Learning Resources:

Sr #	Textbook | References | Internet Links
1	Database Systems Concepts, design and Applications 2/e Singh, S. K., PearsonEducation, New Delhi, 2011
2	An introduction to Database Systems, C J Date, Addition-Wesley.
3	Silberschatz, Korth, "Data base System Concepts"., McGraw hill, 2008.
4	Raghu Ramakrishnan and Johannes Gehrke, Database Management Systems (3/e), McGraw Hill, 2003
5	Sommerville, "Software Engineering", 8th Edition, Pearson Education
6	Peter Rob and Carlos Coronel, Database System- Design, Implementation and Management (7/e), Cengage Learning, 2007.
7	Json Price, Oracle Database 12c SQL, Master SQL, Oracle Press
8	"Oracle Database SQL Language Reference 12c" Release 1

❖ Assignments (Optional):

Sr #	Description	Available From (Date)	Submission Date
1	Unit-1 and Unit-2	After 3 Weeks	Within 10 Days
2	Unit-3 and Unit-4	After 6 Weeks	Within 10 Days