

# DEPARTMENT OF MCA

## FIRST SEMESTER

### CORE COURSE I: RELATIONAL DATABASE MANAGEMENT SYSTEMS

<b>Course Code</b> :	<b>Credits</b> : <b>04</b>
<b>L:T:P:S</b> : <b>3:1:0:0</b>	<b>CIA Marks</b> : <b>50</b>
<b>Exam Hours</b> : <b>03</b> <b>100</b>	<b>ESE Marks</b> :

#### Learning Objectives:

- To understand the fundamentals of data models and conceptualize and depict a database system using ER diagram
- To make a study of SQL and relational database design.
- To know about data storage techniques and query processing.
- To impart introductory knowledge on NoSQL.

#### Course Outcomes:

At the end of the Course, the Student will be able to:

<b>CO1</b>	Explain difference between file system and database system, the basic concepts of data models and its classification like ER model, relational model, network model, object oriented model and case study as ER model.
<b>CO2</b>	Discuss the relational database terminologies; analyze types of keys in relational database system. Understand the Relational algebra and improve the performance of database by normalization and hence the types of normal forms.
<b>CO3</b>	Implementation of Relational Database in Oracle SQL, analyzing of DDL, DML and DRL statements, Joins, Group functions and Integrity Constraints with syntax and examples.
<b>CO4</b>	Demonstrate the types of PL/SQL statements with examples and hence discuss the purpose of Cursors, Triggers, Procedures and Functions in PL/SQL with its implementation.
<b>CO5</b>	Analyze the types of subprograms in PL/SQL like functions and procedures. Describe how to write triggers in PL/SQL block. Explain the Transaction States and properties of Transactions.

#### Mapping of COs to POs and PSOs:

	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>
<b>CO1</b>	3	1	2	1	-	1	3	2	1	1
<b>CO2</b>	3	1	2	2	-	1	3	2	1	-
<b>CO3</b>	3	2	2	2	1	2	3	3	2	1
<b>CO4</b>	3	2	2	2	1	2	3	3	2	1
<b>CO5</b>	3	2	2	2	1	2	3	3	2	1

**3-Strong 2-Medium 1-Low**

<b>Module No.</b>	<b>Contents of Module</b>	<b>Hrs</b>	<b>COs</b>
<b>1</b>	Introduction to Databases- Characteristics of the Database -Advantages of using DBMS - Categories of Data Models-Schemas and Instances -Three-Schema Architecture-Data Independence- <b>Conceptual Modeling using ER Model:</b> Entities and Attributes, Entity types and Entity sets, Relationship types, Degree of a Relationship Type, Weak Entity types, Notations for ER diagrams, Naming Conventions, An Example ER diagram.	<b>12</b>	<b>CO1</b>

2	<b>Relational Model Concepts:</b> Domains, Attributes, Tuples, Relations, Types of Keys- <b>Relational Algebra:</b> Unary Operations, Operations from Set Theory, Cartesian product, Division and Rename. <b>Normalization:</b> Purpose of Normalization – Functional Dependencies –First Normal Form, Second Normal Form, Third Normal Form-Boyce-Codd Normal Form (BCNF).	12	CO2
3	<b>Basic SQL:</b> Attribute Data types and Domains in SQL -DDL Commands- DML Commands-Select statement using where, in, between, order by, like, distinct, relational operators and logical operators- Numeric functions-Character functions -Date functions- - SQL Group functions - SQL Set Operators – Commit-Rollback-Integrity Constraints in SQL.	12	CO3
4	Nested Query-Inner Joins-Outer Joins- <b>PL/SQL:</b> Structure of PL/SQL Block-Decision making statements in PL/SQL-Loop Statements in PL/SQL- <b>Cursors:</b> Implicit Cursor-Explicit Cursor- <b>Exception Handling:</b> Built-in Exceptions -User-Defined Exceptions.	12	CO4
5	<b>Subprograms in PL/SQL:</b> Procedures and Functions- <b>Triggers in PL/SQL:</b> Syntax, Benefits and types of triggers- <b>Transaction and System Concepts:</b> Transaction States, The System Log, Commit point of a Transaction, Desirable properties of Transactions.	12	CO5

#### Text Books:

1. Ramez Elmasri and Shamkant B. Navathe, “**Fundamentals of Database Systems**”, 7<sup>th</sup> Edition, Pearson Education, 2017. (Modules I,II,V)
2. Sharad Maheswari and Ruchin Jain, “**Introduction to SQL and PL/SQL**”, Firewall Media, 2016. (Modules III,IV)

#### Reference Books:

1. Dr. Sanjeev Sharma, “**Advanced Database Management Systems**”, 1st Edition, Wiley India, 2024.
2. Avi Silberschatz, Henry F. Korth and S. Sudarshan. “**Database System Concepts**”, 6<sup>th</sup> Edition, McGraw Hill, 2020.
3. Raghurama Krishnan and Johannes Gehrke, “**Data Base Management Systems**”, TMH 3rd Edition,2003

#### E-References:

1. <https://nptel.ac.in/courses/106/105/106105175/>
2. <https://www.db-book.com/db6/slide-dir/index.html>
3. <https://beginnersbook.com/2015/04/dbms-tutorial/>
4. <https://www.technolamp.co.in/2011/09/database-management-systems-dbms-imp.html>