

# **Database Management System COURSE**

## 1) **Introductory concepts of DBMS**

- Database
- Database concept
- Purpose of DBMS
- Database components and Layer
- Database Architecture
- Database Model
- E-R codd's Rule
- Database users and DBA

## 2) **RDBMS concept**

- Relation
- Keys
- Relational Model
- Structure of Relational Database
- Relation Algebra syntax
- Relational Algebra Queries

## 3) **Entity-Relationship Model**

- Basic concept
- Design process
- E-R diagram
- different types of entities & relationships
- weak entity set
- Extended E-R features :

## 4) **Generalization**

## 5) **Specialization**

## 6) **Aggregation**

- Constraints of IS-A relationship
- Reduction of E-R database schema

## 7) **Relational Database Design**

- Function dependency
- Dependency preservation
- Lossless and lossy decomposition
- Multivalued dependency
- Normalization - 1NF, 2NF, 3NF, BCNF, 4NF, 5NF

## 8) **SQL**

- datatype
- SQL Languages : DDL, DML, DCL, TCL, DQL
- Create, Alter, Drop, Rename , Add column
- Insert, Update, Delete Queries
- distinct
- order by
- truncate and delete command difference
- NULL value – IS NULL / IS NOT NULL

- LIKE - LIKE with escape – NOT LIKE escape ""
- alias name
- and / or / not
- not in / in operator
- Arithmetic operator (+,-,\*,/,=,!)
- between operator
- dual table
- in-built function
  - 1) String/Char Functions
  - 2) Numeric/Math Functions
  - 3) Date/Time Functions
  - 4) Conversion Function
  - 5) Analytic Function
  - 6) Advanced Function
  - 7) Grouping Function
- Constraints with system table entry
- group by
- having by
- Joins ( inner , left , right , full)
- set operators (Union / union all / intersect / minus)
- Any / all
- case when
- with clause
- sub query / nested query and co-related sub-query
- EXISTS / NOT EXISTS
- View
- Index
- sequence
- materialized view

## 9) Security

- DCL concept
- Discretionary access control
- Mandatory access control
- Role-based access control
- Grant / Revoke command
- set role
- create user

## 10) PL/SQL block

- PL/SQL block concept
- PL/SQL conditional statements
  - 1) Simple Loop with exit and continue
  - 2) For loop
  - 3) While loop
  - 4) IF-ELSE condition

- 5) case-end case
- 6) Goto statement

- Cursors
- Procedure
- Function
- Package
- Trigger
- Exception handling
- Array Type

## 11) Transaction Management

- TCL command
  - 1) commit
  - 2) savepoint
  - 3) rollback
- Transaction management
- ACID property
- Schedule
- Serializability and testing of serializability
- state of transactions
- concurrent executions of transactions and related problems
- solution to concurrency related problems and concurrency control techniques
- Deadlock
- Deadlock detection
- Techniques to control deadlock
- Starvation
- Deadlock Recovery
- Database Recovery - Log based Recovery