

# Course Contents

## Unit I : Introduction

(07 Hours)

Introduction to Database Management Systems, Purpose of Database Systems, Database-System Applications, View of Data, Database Languages, Database System Structure, Data Models, Database Design and ER Model : Entity, Attributes, Relationships, Constraints, Keys, Design Process, Entity Relationship Model, ER Diagram, Design Issues, Extended E-R Features, converting E-R & EER diagram into tables. (Refer Chapter 1)

## Unit II : SQL AND PL/SQL

(07 Hours)

**SQL** : Characteristics and advantages, SQL Data Types and Literals, DDL, DML, DCL, TCL, SQL Operators, Tables : Creating, Modifying, Deleting, Views: Creating, Dropping, Updating using Views, Indexes, SQL DML Queries : SELECT Query and clauses, Set Operations, Predicates and Joins, Set membership, Tuple Variables, Set comparison, Ordering of Tuples, Aggregate Functions, Nested Queries, Database Modification using SQL Insert, Update and Delete Queries. **PL/SQL** : concept of Stored Procedures & Functions, Cursors, Triggers, Assertions, roles and privileges, Embedded SQL, Dynamic SQL. (Refer Chapter 2)

## Unit III : Relational Database Design

(08 Hours)

Relational Model : Basic concepts, Attributes and Domains, CODD's Rules, Relational Integrity: Domain, Referential Integrities, Enterprise Constraints, Database Design : Features of Good Relational Designs, Normalization, Atomic Domains and First Normal Form, Decomposition using Functional Dependencies, Algorithms for Decomposition, 2NF, 3NF, BCNF, Modeling Temporal Data. (Refer Chapter 3)

## Unit IV : Database Transactions and Query Processing

(08 Hours)

Basic concept of a Transaction, Transaction Management, Properties of Transactions, Concept of Schedule, Serial Schedule, Serializability : Conflict and View, Cascaded Aborts, Recoverable and Non-recoverable Schedules, Concurrency Control : Need, Locking Methods, Deadlocks, Time-stamping Methods, Recovery methods : Shadow-Paging and Log-Based Recovery, Checkpoints, Query Processing, Query Optimization, Performance Tuning. (Refer Chapter 4)

## Unit V : Parallel and Distributed Databases

(07 Hours)

Introduction to Database Architectures: Multi-user DBMS Architectures, Case study- Oracle Architecture. **Parallel Databases** : Speedup and Scale up, Architectures of Parallel Databases.

**Distributed Databases** : Architecture of Distributed Databases, Distributed Database Design, Distributed Data Storage, Distributed Transaction : Basics, Failure modes, Commit Protocols, Concurrency Control in Distributed Database. (Refer Chapter 5)

## Unit VI : NoSQL Database

(08 Hours)

Introduction to NoSQL Database, Types and examples of NoSQL Database - Key value store, document store, graph, Performance, Structured versus unstructured data, Distributed Database Model, CAP theorem and BASE Properties, Comparative study of SQL and NoSQL, NoSQL Data Models, Case Study-unstructured data from social media. Introduction to Big Data, HADOOP : HDFS, MapReduce. (Refer Chapter 6)



**UNIT I****Chapter 1 : Introduction to DBMS****1-1 to 1-36**

**Syllabus :** Introduction to Database Management Systems, Purpose of Database Systems, Database-System Applications, View of Data, Database Languages, Database System Structure, Data Models, Database Design and ER Model : Entity, Attributes, Relationships, Constraints, Keys, Design Process, Entity Relationship Model, ER Diagram, Design Issues, Extended E-R Features, Converting ER & EER diagram into tables.

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**UNIT II****Chapter 2 : SQL and PL/SQL****2-1 to 2-46**

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**PL/SQL:** Concept of Stored Procedures & Functions, Cursors, Triggers, Assertions, Roles and privileges, Embedded SQL, Dynamic SQL.

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**Syllabus :** Relational Model : Basic concepts, Attributes and Domains, Codd's Rules, Relational Integrity: Domain, Referential Integrity, Enterprise Constraints. Database Design: Features of Good Relational Designs. Normalization, Atomic Domains and First Normal Form, Decomposition using Functional Dependencies, Algorithms for Decomposition, 2NF, 3NF, BCNF, Modeling Temporal Data.

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**Syllabus :** Basic concept of a transaction, Transaction Management, Properties of Transaction, Concept of Schedule, Serial schedule, Serializability : Conflict and View, Cascaded Aborts, Recoverable and Non-recoverable schedules, Concurrency Control : Need, Locking Methods, Deadlocks, Time-Stamping Methods, Recovery Methods : Shadow-paging and Log-Based Recovery, Checkpoints, Query Processing, Query Optimization, Performance Tuning.

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## UNIT V

## Chapter 5 : Parallel and Distributed Databases

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**UNIT VI****Chapter 6 : NoSQL Database****6-1 to 6-18**

**Syllabus :** Introduction to NoSQL Database, Types and examples of NoSQL Database- Key value store, document store, graph, Performance, Structured verses unstructured data, Distributed Database Model, CAP theorem and BASE Properties, Comparative study of SQL and NoSQL, NoSQL Data Models, Case Study - unstructured data from social media, ntroduction to Big Data, Hadoop : HDFS, MapReduce.

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