

Course Code	:	<b>CSPC52</b>
Course Title	:	<b>Database Management Systems</b>
Number of Credits	:	<b>3-0-0-3</b>
Pre-requisites (Course Code)	:	<b>-</b>
Course Type	:	<b>PC</b>

### Course Objectives

- To learn data models, conceptualize and depict a database system using ER diagram
- To understand the internal storage structures in a physical DB design
- To know the fundamental concepts of transaction processing techniques
- To understand the concept of Database Design in Normalization techniques
- To know the manipulation of SQL Queries

### Course Contents

#### UNIT I Introduction

Purpose of Database System - Views of data - data models - database management system - three-schema architecture of DBMS - components of DBMS - E/R Model - Conceptual data modelling - motivation - entities - entity types - attributes - relationships - relationship types - E/R diagram notation - examples.

#### UNIT II Relational Model

Relational Data Model - Concept of relations - schema-instance distinction - keys - referential integrity and foreign keys - relational algebra operators - SQL - Introduction - data definition in SQL - table - key and foreign key definitions - update behaviours - Querying in SQL - notion of aggregation - aggregation functions groupby and having clauses - embedded SQL.

#### UNIT III Database Design

Dependencies and Normal forms - dependency theory - functional dependencies - Armstrong's axioms for FD's - closure of a set of FD's - minimal covers - definitions of 1NF - 2NF - 3NF and BCNF - decompositions and desirable properties of them - algorithms for 3NF and BCNF normalization - 4NF and 5NF.

#### UNIT IV Transactions

Transaction processing and Error recovery - concepts of transaction processing - ACID properties - concurrency control - locking based protocols for CC - error recovery and logging - undo - redo - undo-redo logging and recovery methods.

#### UNIT V Implementation Techniques

Data Storage and Indexes - file organizations - primary and secondary index structures - various index structures - hash-based dynamic hashing techniques - multi-level indexes - B+ trees.

### Course Outcomes

Upon completion of this course, the students will be able to:

- Install, configure, and interact with a relational database management system
- Master the basics of SQL and construct queries using SQL
- Design and develop a large database with optimal query processing
- Develop efficient storage scheme of saving and retrieving Records and Files
- Design the database with normalization techniques