## operations and functions of different components of Databases.

**CS-404B** 

2. To understand the types of integrity constraints in a relational database system and the concepts of SQL to create and access the database.

1. To understand the fundamental concepts, historical perspectives, current trends, structures,

(OPEN ELECTIVE)

- 3. To understand basic concepts of ER model and database design using normalization process.
- 4. To understand concurrency, Recovery techniques.

#### COURSE OUTCOMES:

COURSE OBJECTIVES:

#### After successful completion of the course, the students are able to

- 1. understand basic concepts and use of various database systems.
- 2. enforce integrity constraints to maintain validity & accuracy.
- write relational expressions for the queries.
- 4. design and develop a database using normalization theory.
- 5. use different concurrency control and Recovery techniques.

## UNIT I

Databases and Database Users : Introduction - An Example - Characteristics of the Database Approach - Actors on the Scene - Workers behind the Scene - Advantages of Using the DBMS Approach.

Database System Concepts and Architecture : Data Models, Schemas, and Instances -Three-Schema Architecture and Data Independence - Database Languages and Interfaces - The Database System Environment - Centralized and Client/Server Architectures for DBMSs

#### UNIT II

Data Modeling Using the Entity-Relationship (ER) Model : Using High- Level Conceptual Data Models for Database Design - An Example Database Application - Entity Types, Entity Sets, Attributes, and Keys - Relationship Types, Relationship Sets, Roles, and Structural Constraints - Weak Entity Types.

The Relational Data Model and Relational Database Constraints : Relational Model Concepts -Relational Model Constraints and Relational Database Schemas - Update Operations, Transactions, and Dealing with Constraint Violations.

#### UNIT III

SQL-99 : Schema Definition, Constraints, Queries, and Views : SQL Data Definition and Data Types - Specifying Constraints in SQL - Schema Change Statements in SQL - Basic Queries in SQL – More Complex SQL Queries - INSERT, DELETE, and UPDATE Statements in SQL - Views (Virtual Tables) in SQL.

#### UNIT IV

Functional Dependencies and Normalization for Relational Databases : Informal Design Guidelines for Relation Schemas - Functional Dependencies - Normal Forms Based on Primary Keys - General Definitions of Second and Third Normal Forms, Boyce-Codd Normal Form.

#### Introduction to Transaction Processing Concepts and Theory :

Introduction to Transaction Processing - Transaction and System Concepts - Desirable Properties of Transactions - Characterizing Schedules Based on Recoverability -Characterizing Schedules Based on serializability.

# DATABASE MANAGEMENT SYSTEMS

3

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## UNIT V

**Concurrency Control Techniques :** Two-Phase Locking Techniques for Concurrency Control - Concurrency Control Based on Timestamp Ordering.

**Database Recovery Techniques :** Recovery Concepts - Recovery Techniques Based on Deferred Update - Recovery Techniques Based on Immediate Update - Shadow Paging.

## LEARNING RESOURCES:

### TEXT BOOK(s):

Fundamentals of Database Systems, Ramez Elmasri and SHamKanth B.Navate Pearson Education, 5th edition.

## **REFERENCE BOOK(s):**

- 1. Introduction to Database Systems, C.J.Date Pearson Education.
- Data Base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATA McGrawHill, 3rdEdition.
- 3. Data base System Concepts, Abraham Silberschatz, Henry.F.Korth, McGraw hill, 5th edition.