

## I. INTRODUCTION TO DATABASES (CREDITS:4)

### Section-A

*Unit I:* Introduction to Database Systems: Databases , Characteristics of a Database, Functions of a Database, Database Usage and Environment, Database Users, Classification of DBMSs, Database Administrator, Database History, Before the Advent of Databases, Database Approach, Data Modelling, Database Architecture Levels (Views), Data Abstraction Layer, Schema, Data Independence,

*Unit II:* Data Models, Types of Data Models, Relational Data Model, Fundamental Concepts in Relational Model, Entity Relationship Model, Integrity Rules and Constraints, Business Rules, Relationship Types, Relational Design and Redundancy, Data Redundancy, Data Anomalies, How to Avoid Anomalies

*Unit III:* Normalization: Functional Dependencies, Rules of Functional Dependencies, Dependency Diagram, Normal Forms, Database Design

### Section -B

*Unit IV:* Transaction Processing Systems: Batch, On-line, Real time, Transaction ACID Properties. Database Protection: Security Issues, Discretionary Access Control-Granting and Revoking Privileges.

*Unit V:* Database Concurrency: Problems of Concurrent Databases, Serializability and Recoverability, Concurrency Control Methods-Two Phase Locking, Time Stamping. Database Recovery: Recovery Concepts, Recovery Techniques-Deferred Update, Immediate Update, Shadow Paging.

*Unit VI:* Introduction to SQL: Data Definition Language (DDL) Commands, Table Constraints, User Defined Types, Data manipulation Language (DML) Commands, INSERT Statement, SELECT Statement, Where Clause, Special Operators, AND /OR Operators, SQL Aggregate Functions, Order By Clause, Group By Clause, Data control Language (DCL), Applying Integrity Constraints. Functions, Procedures and Packages. Using Cursors and Triggers, SQL

Join Statements: Inner Joins, Outer Joins, Database Development Process, Software Development Life Cycle (SDLC), Database Life Cycle