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UNIT I

Syllabus : Basic concepts, Advantages of DBMS over file processing systems, Data abstraction, Database languages, Data models, Data independence, Components of a DBMS, Overall structure of DBMS, Multi-user DBMS architecture, System catalogs, Data Modeling: Basic concepts, Entity, attributes, relationships, constraints, keys.

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UNIT II

Syllabus : ER and EER diagrams : Components of ER model, Conventions, Converting ER diagrams into tables

Relational Model : Basic concepts, Attributes and Domains, Codd's rules. **Relational Integrity :** Nulls, Entity, Referential integrities, Enterprise constraints, Views, Schema diagram . .

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UNIT III

Syllabus : Introduction to SQL : Characteristics and advantages SQL Data Types, Literals, DDL, DML, SQL Operators Tables: Creating, Modifying, Deleting, Views : Creating, Dropping, Updation using Views, Indexes, Nulls.

SQL DML Queries : SELECT query and clauses, Set operations, Tuple Variables, Set comparison, Ordering of Tuples , Aggregate Functions, Nested Queries, Database Modification using SQL Insert, Update, Delete Queries, Stored Procedure, Triggers, Programmatic SQL : Embedded SQL, Dynamic SQL, ODBC

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UNIT IV

Syllabus : Relational Databases Design : Purpose of Normalization, Data Redundancy and Update Anomalies, Functional Dependencies. The process of Normalization: 1NF, 2NF, 3NF, BCNF.

Introduction to Query Processing : Overview, Measures of Query cost, Selection and Join operations, Evaluation of Expressions

Introduction to Query optimization : Estimation, Transformation of Relational Expression

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UNIT V

Syllabus : Transaction Management : Basic concept of a Transaction, Properties of Transactions, Database architecture, Concept of Schedule, Serial Schedule.

Serializability : Conflict and View, Cascaded Aborts Recoverable and Non recoverable Schedules.

Concurrency Control : Need Locking methods Dead locks, Time stamping Methods. Optimistic Techniques, Multi-version Concurrency Control.

Different crash recovery methods : Shadow-Paging and Log-Based Recovery : Deferred and Immediate, Checkpoints.

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UNIT VI

Syllabus : Database Architectures : Centralized and Client-Server Architectures, 2 Tier and 3 Tier Architecture, Introduction to Parallel Database, Key elements of Parallel Database Processing, Architecture of Parallel Databases, Introduction to Distributed Databases, Architecture of Distributed Databases, Distributed Database Design.

Emerging Database Technology : Introduction to NoSQL Database-Internet Databases, Cloud Databases, Mobile Databases , SQLite Databases , XML Databases.

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