

## DATABASE MANAGEMENT SYSTEMS

(Common to CSE&IT)

**Course Code :13CT1110**

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### Course Educational Objectives:

To make the student confident in maintaining huge amount of data by creating tables, and accessing them.

- ❖ Capability of maintaining huge amount of data
- ❖ Design various database system and learn about different database models and their relationships
- ❖ To reduce the redundancy of data using the normal forms
- ❖ To learn external storage file organization and data indexing.
- ❖ To learn about transaction management
- ❖ To know about recovery mechanism

### Course Outcomes:

At the end of the course student would be able to

- ❖ Learn about the basics of databases.
- ❖ Learn about Structured Query language(SQL) to manipulate data available in the databases.
- ❖ Learn about how to normalize the tables in a database.
- ❖ Learn about PL/SQL.
- ❖ Learn about transaction management.

### UNIT-I

(12 Lectures)

History of Data base Systems. Data base System Applications, data base System VS file System – View of Data – Data Abstraction – Instances and Schemas – data Models – the ER Model – Relational Model – Other Models – Database Languages – DDL – DML – database Access for

applications Programs – data base Users and Administrator – Transaction Management – data base System Structure – Storage Manager – the Query Processor.

Data base design and ER diagrams – Beyond ER Design Entities, Attributes and Entity sets – Relationships and Relationship sets – Additional features of ER Model – Concept Design with the ER Model – Conceptual Design for Large enterprises.

## **UNIT-II (12 Lectures)**

Introduction to the Relational Model – Integrity Constraint Over relations – Enforcing Integrity constraints – Querying relational data – Logical data base Design – Introduction to Views – Destroying /altering Tables and Views. Relational Algebra – Selection and projection set operations – renaming – Joins – Division – Examples of Algebra overviews – Relational calculus – Tuple relational Calculus – Domain relational calculus – Expressive Power of Algebra and calculus.

## **UNIT-III (12 Lectures)**

Schema refinement – Problems Caused by redundancy – Decompositions – Problem related to decomposition – reasoning about FDS – FIRST, SECOND, THIRD Normal forms – BCNF – Lossless join Decomposition – Dependency preserving Decomposition – Schema refinement in Data base Design – Multi valued Dependencies – FORTH Normal Form.

## **UNIT-IV (12 Lectures)**

Transaction Concept- Simple Transaction Model-Storage Structure-Transaction State- Implementation of Atomicity and Durability, Isolation– Concurrent – Executions – Serializability- Recoverability – Implementation of Isolation-Transactions as SQL Statements– Test for serializability.

Concurrency Control: Lock – Based Protocols-Dead lock Handling– Timestamp Based Protocols- Validation- Based Protocols-Multi version schemes-insert, delete and predicate operations– Multiple Granularity-weak levels of consistency-concurrency in index structures.

## **UNIT-V (14 Lectures)**

Recovery System: Recovery and Atomicity – Log – Based Recovery – Recovery with Concurrent Transactions – Buffer Management – Failure

with loss of nonvolatile storage-Advance Recovery systems- ARIES-Remote Backup systems.

Data on External Storage – overview of physical storage media-RAID-File Organization and Indexing–Data Dictionary Storage– Cluster Indexes, Primary and Secondary Indexes – Index data Structures – Hash Based Indexing – Tree base Indexing – Comparison of File Organizations – Indexes and Performance Tuning- Intuitions for tree Indexes –B+ Trees: A Dynamic Index Structure.

### TEXT BOOKS:

1. Raghurama Krishnan, Johannes Gehrke, “*Data base Management Systems*”, 3<sup>rd</sup> Edition, TATA McGrawHill, 2008.
2. Silberschatz, Korth, “*Data base System Concepts*”, 6<sup>th</sup> Edition, McGraw Hill, 2010.
3. C.J.Date, “*Introduction to Database Systems*”, 7<sup>th</sup> Edition, Pearson Education, 2002.

### REFERENCES:

1. Peter Rob & Carlos Coronel, “*Data base Systems design, Implementation, and Management*”, 7<sup>th</sup> Edition, Pearson Education, 2000.
2. Elmasri Navrate, “*Fundamentals of Database Systems*”, 5<sup>th</sup> Edition, Pearson Education, 2007.

