DATA BASE MANAGEMENT SYSTEMS

COURSE CODE: 20CA3107 **L T P C**

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COURSE OUTCOMES:
At the end of the course student will be able to

CO1: Practice database concepts and design Entity Relationship models.
CO2: Distinguish procedural and non-procedural query languages.
CO3: Apply normalization techniques to normalize the database.
CO4: Identify the concept of transactions and concurrency protocols.
CO5: Prepare the database Recovery methods and Indexing strategies.

UNIT-I **(10 Lectures)**

History of Data base Systems: Data base System Applications, database 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 —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 ERModel – Conceptual Design for Large enterprises.

Learning Outcomes:
At the end of the module, students will be able to

1. Recognize when to use files and when to use a DBMS(L2)
2. Explain how data can be stored and processed.(L2)
3. Interpret data modeling tools like Entity-Relationship Diagrams.(L3)

UNIT-II **(10 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 – Relational calculus –Tuple relational Calculus– Domain relational calculus

Learning Outcomes:
At the end of the module, students will be able to

1. Conceptualize/Represent the data using relational model.(L2)
2. Implement queries using relational algebra and calculus.(L3)
3. Summarize what views are for and how to use them.(L2)

UNIT-III (10 Lectures)

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

Learning Outcomes:

At the end of the module, students will be able to

1. Practice functional dependencies and their relationship to keys.(L3)
2. Find the keys given a set of functional dependencies.(L2)
3. Identify tables that are not normalized and decompose normalized tables.(L3)

UNIT-IV (10 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. Concurrency Control: Lock – Based Protocols-Dead lock Handling– Timestamp Based Protocols-Validation- Based Protocols-Multi version schemes-insert, delete and predicate operations– Multiple Granularity

Learning Outcomes:

At the end of the module, students will be able to

1. Identify transactions and their properties (ACID).(L2)
2. Summarize the anomalies that occur without ACID properties.(L3)
3. Explain the locking protocols used to ensure Isolation.(L2)

UNIT-V (10 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

Data on External Storage – overview of physical storage media-RAID-File Organization and Indexing-Data Dictionary Storage–Cluster Indexes, Primary and Secondary Indexes – Index dataStructures – Hash Based Indexing – Tree base Indexing —B+ Trees: A Dynamic Index Structure.

Learning Outcomes:

At the end of the module, students will be able to

1. Identify the logging techniques used to ensure Atomicity and Durability.(L2)
2. Apply recovery techniques used to recover from crashes.(L4)
3. Summarize how different indexing techniques work.(L3)

TEXT BOOKS:

1. RaghuRamakrishnan, Johannes Gehrke, "*Data base Management Systems"*, 3rd Edition, TATA McGrawHill, 2008.
2. Silberschatz, Korth, "*Data base System Concepts"*, 6thEdition, McGraw Hill, 2010.
3. C.J.Date, "*Introduction to Database Systems"*, 7th Edition, Pearson Education, 2002.

REFERENCES:

1. Peter Rob & Carlos Coronel, "*Data base Systems design, Implementation, and Management"*, 7th Edition, Pearson Education, 2000.
2. ElmasriNavrate, "*Fundamentals of Database Systems"*, 5thEdition, Pearson Education, 2007.