|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **23AD314** | **DATABASE MANAGEMENT SYSTEMS** | **L** | **T** | **P** | **C** |
| **3** | **0** | **0** | **3** |

**MODULE I INTRODUCTION 9**

Purpose of DBMS - Applications - Views of data - Data Abstraction - Instances and Schemas – Data Models - Database Design - Relational Databases - Database Architecture - Database users and administrators - History of Database systems. Entity- Relationship (E-R) Model: Basic concepts - Constraints - E-R Diagram - Weak Entity Sets

**MODULE II RELATIONAL MODEL 9**

Structure of Relational Databases - Relational Algebra Fundamentals - Introduction to SQL: Basic Structure - Set operations - Aggregate functions - Nested Sub queries - Complex queries – Join Expressions-Views - Modification of the database - Integrity constraints - Referential Integrity - Triggers – Assertions- Formal Relational Query Languages: The Tuple Relational Calculus- The Domain Relational Calculus.

**MODULE III DATABASE DESIGN 9**

Features of good relational design - Atomic domains and First Normal Form - Decomposition using Functional Dependencies - Functional Dependency theory - Normalization using Functional Dependencies - Decomposition using Multi-valued Dependencies.

**MODULE IV STORAGE 9**

RAID-File Organization- Organization of Records in Files- Data-Dictionary Storage-Indexing and Hashing: Basic concepts, Ordered Indices: Dense and Sparse Indices - MultiLevel Indices - Index Update. B+-Tree Index Files: Structure of a B+-Tree - Queries in B+-Trees. Static Hashing, Dynamic Hashing.

**MODULE V TRANSACTION MANAGEMENT 9**

Transaction Concepts and States - Concurrent Executions - Serializability. Concurrency control: Lock Based Protocols: Locks, Granting of Locks, 2-phase locking protocol - Timestamp Based Protocols - Validation based protocols - Deadlock Handling. Recovery Systems: Failure classification - Log based Recovery - Recovery with concurrent Transactions.

**COURSE OUTCOMES**

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

**CO1:** Knowledge in basic concepts and the architecture of database management systems, data models, relational database theory and the features of ER Model.

**CO2:** Ability to apply relational algebra operations and write appropriate SQL queries with suitable constraints for a given database application.

**CO3:** Master the sound design principles of relational database design using normalization concepts.

**CO4:** Ability to use different Database Storage structures, access techniques and Indexing methods in Database applications.

**CO5:** Knowledge in transaction processing concepts, Concurrency Control mechanism and Database Recovery methods.

**TOTAL: 45 PERIODS**

**TEXT BOOKS**

1. Abraham Silberschatz, Henry F.Korth, S.Sudharshan,"Database System Concepts", McGraw-Hill, Seventh Edition, 2019..

**REFERENCE BOOK**

1. Ramez Elmasri, Shamkant B. Navathe, "Fundamentals of Database Systems", Pearson Education, Seventh Edition, 2015.
2. Raghu Ramakrishnan, Johannes Gehrke, "Database Management Systems", McGraw Hill Education, Third Edition, 2014.
3. Peter Rob, CorlosM.Coronel, "Database Systems: Design, Implementation and Management," Thompson Learning Course Technology, Tenth edition, 2012.
4. Thomas M.Connolly and Carolyn E.Begg, "A Practical Approach to Design, Implementation and Management", Pearson, 6th Edition, 2014.

## CO-PO & PSO MAPPING

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CO** | **PO** | | | | | | | | | | | | **PSO** | | |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **1** | **2** | **3** |
| **1** | 3 | 3 | 3 |  |  |  |  |  |  | 2 |  | 3 | 3 |  | 3 |
| **2** |  | 3 |  | 2 | 3 |  |  |  | 2 |  |  | 3 |  | 3 | 3 |
| **3** | 3 |  | 3 |  |  |  |  |  |  |  | 3 |  |  | 3 | 3 |
| **4** | 3 |  |  | 3 | 3 |  |  |  |  |  |  |  | 3 | 3 | 3 |
| **5** | 3 |  |  | 3 |  | 2 | 2 |  |  |  |  |  |  | 3 | 3 |
| **AVg.** | **2.4** | **1.2** | **1.2** | **1.6** | **1.2** | **0.4** | **0.4** |  | **0.4** | **0.4** | **0.6** | **1.2** | **1.2** | **2.4** | **3** |

1-low, 2-medium,3-high