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| **hjCourse Code: CSE2007** | **Course Title: Database Management Systems** | **TPC** | | **3** | **2** | **4** |
| **Version No.** | **2.0** | | | | | |
| **Course Pre-requisites/ Co-requisites** | **MAT1003** | | | | | |
| **Anti-requisites (if any).** | **SWE2006** | | | | | |
| **Objectives:** | 1. To introduce students to the fundamentals of Database Systems. 2. To train students to apply logical database design principles, including E-R diagrams and database normalization. 3. To focus on Relational data model concepts. 4. To enable students to construct simple and moderately advanced database queries using structured Query Language (SQL). 5. To encourage students to design and implement a small database project | | | | | |
| **CO's Mapping with PO's and PEO's**   |  |  |  | | --- | --- | --- | | **Course Outcomes** | **Course Outcome Statement** | **PO's / PEO's** | | CO1 | Understanding the need of Relational Database Management Systems over traditional File processing Systems and its different architectures | **PO1, PO4** | | CO2 | Conceptual data modelling and Relational Database designing | **PO1, PO2,** **PO3, PO4** | | CO3 | Learn the process of Database normalization | **PO1, PO2,** **PO3, PO4** | | CO4 | Database programming and optimization | **PO1, PO2,** **PO3, PO5** | | CO5 | Learn Transaction processing and Database recovery techniques | **PO1, PO5** | | CO6 | Learn storage and file structures, Hashing, and Indexing techniques | **PO1, PO3, PO5** | | **TOTAL  HOURS OF INSTRUCTIONS :   45** | | |   A | | | | | | |
| **Module No. 1** | **Introduction to DBMS and Conceptual data modelling** | | **6 Hours** | | | |
| Introduction and motivation, Data independence, Three schema architecture, Centralized and Client/Server architectures, Database components, Database users, Entity Types, Entity Sets, Attributes, Entity Type (Strong and Weak), Relationship Types, Relationship Sets, Roles, Structural Constraints, ER diagram construction. | | | | | | |
| **Module No. 2** | **Relational Data Model** | | **7 Hours** | | | |
| The Relational Data Model and Relational Database Constraints, key, null, referential integrity constraints, Relational Database Design using ER-to-Relational Mapping, Relational Algebra and 1Relational calculus. | | | | | | |
| **Module No. 3** | **Database design theory and Normalization** | | **8 Hours** | | | |
| Functional dependency (FD), Closure of FD, Closure of Attributes, Cover, Equivalence of FD, Canonical cover, Key generation, Desirable properties of decomposition. | | | | | | |
| **Module No. 4** | **SQL, Query Processing and Optimization** | | **7 Hours** | | | |
| SQL,Steps in Query Processing, Transforming SQL queries to Relational Algebra, Heuristic Query Optimization. | | | | | | |
| **Module No. 5** | **Transaction Processing, Concurrency Control, and Recovery** | | **9 Hours** | | | |
| **Transaction Processing:** Transaction and System concepts, Desirable properties of Transactions, Characterizing Schedules Based on Recoverability and Serializability, **Concurrency Control**: Two-Phase Locking, Timestamp Ordering, **Database Recovery:** Recovery Concepts, Immediate Update, Deferred Update, Shadow Paging. | | | | | | |
| **Module No. 6** | **Physical Database Design** | | **8 Hours** | | | |
| Storage and file structure: Memory Hierarchies and Storage Devices, Placing File Records on Disk, Hashing Techniques, Indexing Techniques (Primary Indexes, Secondary Indexes, Clustering Indexes, Multilevel Indexes, Dynamic Multilevel Indexes Using B-Trees and B+-Trees). | | | | | | |