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|  | | | | **Course Title: DATABASE MANAGEMENT SYSTEMS** | | | | | | | | | | | | | | | | |
| **Course Code :**  **21CST503** | | | | **No. of Credits: 3: 0: 0**  **(L-T-P)** | | | | | | **No. of lecture hours/week : 3** | | | | | | |
| **Exam Duration : 3 hours** | | | | **CIE+ Assignment + SEE = 45+5+50=100** | | | | | | **Total No. of Contact Hours : 42** | | | | | | |
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| **Course Objectives:** | | | **Description** | | | | | | | | | | | | | | | | | |
| 1. To understand the different issues involved in the design and implementation of a database system.  2. To study the physical and logical database designs, database modeling, relational algebra concepts.  3. To understand and use data manipulation language to query, update and manage a database.  4. To develop an understanding of essential DBMS concepts such as normalization and transaction concepts. | | | | | | | | | | | | | | | | | |
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| **Unit No** | **Syllabus Content** | | | | | | | | | | | | | | | | | | | **No of Hours** |
| **1** | **Introduction:** Introduction, an example, Characteristics of Database approach; Advantages of using DBMS approach; Data models, schemas and instances; three schema architecture and data independence; Database languages and interfaces; Classification of Database management systems. Entity-Relationship model; using High- Level conceptual Data Models for database Design; An example Database Application; Entity types, Entity Sets, Attributes and Keys; Relationship types, Relationship Sets, Roles and structural Constraints; Weak Entity types; Refining the ER Design, ER to relational schema diagram mapping | | | | | | | | | | | | | | | | | | | 9 |
| **2** | **Relational Model and Relational Algebra:** Relational Model Concepts; relational Model constraints and Relational Database Schemas; update operations, Transactions and dealing with constraint violations; Unary Relational Operations; SELECT and PROJECT; Relational Algebra Operations from Set Theory; Binary Relational Operations: JOIN and DIVISION; Additional Relational Operations; Examples of Queries in Relational Algebra. | | | | | | | | | | | | | | | | | | | 8 |
| **3** | **SQL:** Specifying basic constraints in SQL; schema change statements in SQL; Basic queries in SQL; More complex SQL queries-Insert, Delete and Update statements in SQL; Specifying constraints as Assertion and Trigger; Views (Virtual Tables) in SQL. | | | | | | | | | | | | | | | | | | | 8 |
| **4** | **Database Design:** Informal Design Guidelines for Relation Schemas; Functional Dependencies; Normal Forms Based on Primary Keys; General Definitions of Second and Third Normal Forms; Boyce-Cod Normal form, Properties of Relational Decompositions; Algorithms for relational Database Schema Design; Multi-valued Dependencies and Fourth Normal Form; Join Dependencies and Fifth Normal Form | | | | | | | | | | | | | | | | | | | 9 |
| **5** | **Transaction Management:**  Transaction and System Concepts, Desirable Properties of Transactions, characterizing schedules based on Recoverability, characterizing schedules based on Serializability. Two-Phase Locking Techniques for Concurrency Control, Concurrency Control based on Timestamp ordering. | | | | | | | | | | | | | | | | | | | 8 |
| **Course Outcomes** | | **Description** | | | | | | | | | | | | | | | | **RBT Levels** | | |
| **CO1** | | Understand the basic concepts and architecture associated with DBMS so as to employ the conceptual and relational models to design large database systems. | | | | | | | | | | | | | | | | **L4** | | |
| **CO2** | | Create, maintain and manipulate a relational database using SQL. | | | | | | | | | | | | | | | | **L4** | | |
| **CO3** | | Analyze the database design & normalize it so that the data conforms to design principles. | | | | | | | | | | | | | | | | **L4** | | |
| **CO4** | | Apply the characteristics of database transactions and assess how they affect database integrity and consistency. | | | | | | | | | | | | | | | | **L3** | | |
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| **CO-PO Mapping** | | **PO1** | | | **PO2** | **PO3** | **PO4** | | | **PO5** | **P06** | **PO7** | **PO8** | | **PO9** | **PO10** | **PO11** | | **PO12** | |
| **CO1** | | **3** | | | **3** | **3** | **2** | | |  |  |  |  | |  |  |  | |  | |
| **CO2** | | **3** | | | **3** | **3** | **3** | | | **2** |  |  |  | |  |  |  | |  | |
| **CO3** | | **3** | | | **3** | **2** | **2** | | |  |  |  |  | |  |  |  | |  | |
| **CO4** | | **2** | | | **2** | **2** |  | | |  |  |  |  | |  |  |  | |  | |
| **Strong -3 Medium -2 Weak -1** | | | | | | | | | | | | | | | | | | | | |
| **TEXT BOOKS:** | | | | | | | | | | | | | | | | | | | | |
| 1. Fundamental of Database Systems by Elmasri and Navathe, 7th Edition, Addison-Wesley, 2015, **ISBN-10:** 0133970779, **ISBN-13:** 978-0133970777 | | | | | | | | | | | | | | | | | | | | |
| **REFERENCE BOOKS:** | | | | | | | | | | | | | | | | | | | | |
| 1. Database Management Systems by Raghu Ramakrishnan and Johannes Gehrke – 3rd Edition, McGraw-Hill, 2006.  2. An Introduction to Database Systems by C.J. Date, A. Kannan, S. Swamynathan, 8th Edition, Pearson Education,2013.  3. Data Base system Concepts by Silberschatz, Korth and Sudharshan, 5th edition McGraw Hill, 2011. | | | | | | | | | | | | | | | | | | | | |
| **SELF STUDY REFERENCES / WEBLINKS:** | | | | | | | | | | | | | | | | | | | | |
| 1. Database Management System: <https://onlinecourses.nptel.ac.in/noc19_cs46/course> 2. Introduction to Database Management Systems: <https://www.youtube.com/watch?v=OMwgGL3lHlI&list=PLBlnK6fEyqRiyryTrbKHX1Sh9luYI0dhX> 3. SQL Tutorial - Full Database Course for Beginners: <https://www.youtube.com/watch?v=HXV3zeQKqGY> | | | | | | | | | | | | | | | | | | | | |
| **COURSE COORDINATORS:** | | | | | | | | | **Dr. Asha, Mrs. Veena Potdar** | | | | | | | | | | | |