

RAMAKRISHNA MISSION VIDYAMANDIRA
CBCS Syllabus B.Sc. Computer Science Honours

Semester-III

Course Code: CMSA CC 7 Credit: 6

Course Type: Core Course

Course Outcome:

- i) Having a broad understanding of database concepts and database management system software
- ii) having a high-level understanding of major DBMS components and their function
- iii) To be able to model an application's data requirements using conceptual modeling tools like ER diagrams and design database schemas based on the conceptual model.
- iv) To be able to write SQL commands to create tables and indexes, insert/update/delete data, and query data in a relational DBMS.

CMSA CC 7 T: Database Management System

Credit: 4

Marks: 50

Introduction: Drawbacks of Legacy System; Advantages of DBMS; Layered Architecture of Database, Data Independence; Data Models; Schemas And Instances; Database Languages; Database Users, DBA; Data Dictionary; Functional Components of a DBMS. [5 L]

ER Model: Entity, Attributes and Relationship; Structural Constraints; Keys; ER Diagram of Some Example Database; Weak Entity Set; Symbolic Conventions; Specialization and Generalization; Constraints of Specialization and Generalization; Aggregation. [10 L]

Relational Model: Basic Concepts of Relational Model; Relational Algebra; Tuple Relational Calculus; Domain Relational Calculus. [13 L]

Integrity Constraints: Domain Constraints, Referential Integrity, Assertions, Triggers. [2 L]

Relational Database Design: Problems of Un-Normalized Database; Functional Dependencies, Derivation Rules, Closure of FD Set, Membership of a Dependency, Canonical Cover; Decomposition to 1NF, 2NF, 3NF Or BCNF Using FD; Lossless Join Decomposition Algorithm; Dependency preservation. [10 L]

SQL: Basic Structure, Data Definition, Constraints and Schema Changes; Basic SQL Queries (Selection, Insertion, Deletion, Update); Order by Clause; Complex Queries, Aggregate Function and Group by Clause; Nested Sub Queries; Correlated Sub Queries; Views (Insert-Able and

Updatable), Joined Relations; Set Comparisons (All, Some); Derived Relations Etc; Grant and Revoke, Transaction in SQL. [10 L]

Record Storage and File Organization: Fixed Length and Variable Length Records; Concepts of Disk Blocks; Spanned and Un-Spanned Organization of Records; Primary File Organizations and Access Structures Concepts; Unordered, Sequential, Hashed; Concepts of Primary and Secondary Index; Dense and Sparse Index; Index Sequential Files; Multilevel Indices. [8 L]

Transaction Processing: ACID Properties; Transaction States, Concurrent Execution; Serializability (Conflict and View), Recoverability, Test for Serializability. [2 L]

CMSA CC 7 P: Relational Database Management System

Credit: 2

Marks: 25

Introduction of SQL: DDL Commands, DML Commands [34 L]

Introduction to PL/SQL [6 L]

Recommended Books:

1. Database System Concepts by Henry F. Korth and Silberschatz Abraham; Mc.Graw Hill.
 2. Database System Design by Elmasri, Navathe, Somayajulu, Gupta; Pearson.
 3. An Introduction to Database Systems by C.J. Date, A.Kannan, S.Swamynathan; Pearson.
 4. Database Systems: A Practical Approach to Design, Implementation and Management by Connolly, Begg; Pearson.
 5. SQL, PL/SQL the Programming Language of Oracle by Ivan Bayross; BPB Publication
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