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

Semester-IV

Course Code: 4CMSMJC3
Course Type: Major Course

Course Outcome:
i)   To understand the theory behind database management systems.
ii) To understand the correlation between Oracle software and DBMS resources of a computer.
iii) To be able to write SQL on the Oracle 10g/11g/MySql platform.
iv) Apply DBMS Principles to solve real world problems and analyze tradeoffs in different designs.

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4CMSMJC3: Database Management Systems

Credit: 3   **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.   **[4 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.   **[5 L]**

Relational Model: Basic Concepts of Relational Model; Relational Algebra; Tuple Relational Calculus; Domain Relational Calculus.   **[3 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]**

Transaction Processing: ACID Properties; Transaction States, Concurrent Execution; Serializability (Conflict and View), Recoverability, Test for Serializability. **[6 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. **[5 L]**

4CMSMJC3 (Practical): Database Management Systems

Credit: 2 **Marks: 25**

Introduction of SQL: DDL Commands, DML Commands **[25 L]**

Introduction to PL/SQL **[5 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