4.2 DATABASE MANAGEMENT SYSTEM

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RATIONALE

The diploma holders in Computer Science and Engineering need to understand about Relational Data base to manage the data at backend for different applications. They should be able to develop basic table and write query to fetch the required data. Hence this subject.

LEARNING OUTCOMES

After undergoing the subject, the students will be able to:

- understand the concept of Database system and Client Server Architecture
- understand and develop the concepts of Data Modeling, Security and Integrity.
- convert and compare the designs and differentiate between the keys
- understand and execute different SQL queries and PL / SQL programs
- convert database in the form of table
- normalize the database using normal forms.
- understand the concept of query processing and Transaction processing

DETAILED CONTENTS

12. Database System Concept & Data Modeling (10 Periods)

Basic concepts, Advantages of a DBMS over file processing system, Data Abstraction, Database Languages, Data Independence. , Components of a DBMS and overall structure of a DBMS. ,Three views of Data (External View, Conceptual View, Internal View), Three level architecture of DBMS, Data Independence, , Client Server Architecture

13. Data Model (10 Periods)

Define data model, Data Models : Network Model Hierarchical Model, E-R Model, Advantage & Disadvantages of each Data Model

ER Model :

Entity sets and relationship sets- Attributes - Keys in entity and relationship sets : (a) Super Key (b) Candidate Key (c) Primary Key (e) Unique Key - Mapping constraints, Participation Constraint, E-R diagram, Notations. Strong Entity Set and Weak Entity Set

14. Relation Model (10 Periods)

Advantages, Disadvantages, Codd's 12 rules , Definition of Relations, Schema, Sub schema. Relational Model Constraints (Domain, Tuple Uniqueness, Key Constraints, Integrity Constraints, Entity constraints).
Relations algebra (Basic operation: Union intersection difference and Cartesian product), Additional Relational Algebraic Operations (Projection, Selection rows, Division, rename and join) , Converting ER Model to Relational Model.

15. Relational Database Design (11 Periods)

Purpose of Normalization, Data redundancy and updating anomalies, Functional Dependencies and Decomposition, Process of Normalization using 1NF, 2NF, 3NF, multivalued dependencies and BCNF , Forth Normal Form, Fifth Normal Form,

16. MYSQL/SQL (11 Periods)

Data definition language, Data manipulation language, SQL, Object naming conventions, Object naming guidelines, Data types, Tables (Creating , Inserting,Updating and deleting tables and using constraints), Views, Indexes,

SQL Command :- DESCRIBE, SELECT, WHERE CLAUSE, DISTINCT CLAUSE, ORDER BY,HAVING, LOGICAL OPERATIONS, SQL OPERATORS, JOIN

Aggregate functions, String functions and date time functions, Null values

17. PL-SQL (10 Periods)

User defined function, Control of flow statement of PL/SQL, Procedures/Stored procedures, transaction, triggers, cursors, granting and revoking.

18. NO-SQL: Inroducton ,Usages,And Application. (03 Periods)

19. SECURITY (05 Periods)

Authorization and View- Security constraints - Integrity Constraints- Encryption

LIST OF PRACTICALS

STRUCTURED QUERY LANGUAGE

1. Creating Database
   - Creating a database
   - Creating a table
   - Specifying relational data types
   - Specifying constraints
   - Creating indexes

2. Table and Record Handling
   - INSERT statement
   - Using SELECT and INSERT together
   - DELETE, UPDATE, TRUNCATE Statement.
   - DROP, ALTER statement

3. Retrieving Data From a Database
   The SELECT statement
   - Using the WHERE clause
   - Using Logical Operators in the WHERE clause
   - Using In, BETWEEN, LIKE, ORDER BY, GROUP BY & HAVING clause
   - Using Aggregate Functions
   - Combining Tables Using JOINS

4. Design of database for any application.

INSTRUCTIONAL STRATEGY

Explanation of concepts using real time examples, diagrams etc. For practical sessions books along with CDs or learning materials with specified activities are required. Various exercises and small applications should be given along with theoretical explanation of concepts.

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests
- Actual laboratory and practical work, exercises and viva-voce
- Software installation, operation, development and viva-voce

RECOMMENDED BOOKS

1. An Introduction to Database System - C. J. Date
2. Database System Concepts - A. Silberschatz, S. Sudarshan& H. F. Korth
3. Database Concepts and Systems - LvanBayroos/SPD
4. Fundamental of Database System - R. Elmashri& S. B. Navathee-books/e-tools/relevant software to be used as recommended by AICTE/UPBTE/NITTTR.

Websites for Reference:

http://swayam.gov.in

http://spoken-tutorial.orgs

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Periods)	Marks Allotted (%)
1	10	15
2	10	15
3	10	15
4	11	17
5	11	17
6	10	10
7	03	04
8	05	07
Total	**70**	**100**