RDBMS with SQL

Subject Description

1. Introduction to the Database Systems
2. Data Models
3. The Relational Database Model (RDBMS)
4. Relational Set Operators
5. Data Redundancy
6. Entity Relationship (ER) Modelling
7. Developing an ER Diagram
8. Normalization of Database Tables
9. Normalization and Database Design
10. Introduction to SQL
11. Advanced Data Definition Commands
12. Joining Database Tables
13. Advanced SQL Functions
14. Assessment

**More Detailed Syllabus**

UNIT 1: INTRODUCTION

1. The SQL Language
2. The Role of SQL
3. SQL Success Factors  
   a. Official SQL Standards

b. Microsoft Support

c. Relational Foundation  
d. Complete Database Language  
e. Client/ Server Architecture

f. Retrieving Data

g. Creating a Database

UNIT 2: RELATIONAL DATABASES

1. Early Data Models  
   a. File Management Systems  
   b. Hierarchical Databases  
   c. Network Databases
2. The Relational Data Model  
   a. The Sample Database  
   b. Tables  
   c. Primary Keys  
   d. Relationships  
   e. Foreign Keys
3. Codd’s 12 Rules for Relational Databases

UNIT 3: RETRIEVING DATA

1. SQL Basics  
   a. Name:  
   i) Table Names  
   ii) Column Names

b. Data Types  
c. Constants

1. Simple Queries
2. The SELECT Statement  
   i) The SELECT Clause

ii) The FROM Clause

1. Multitable Queries (Joins)
2. Duplicate Rows
3. Row Selection
4. Search Conditions
5. The Comparison Test (=, <,>, <=, >=)
6. The Range Test (BETWEEN)
7. The Set Membership Test (IN)
8. The Pattern Matching Test (LIKE)
9. The Null Value Test (IS NULL)
10. Compound Search Conditions (AND, OR and NOT)
11. Sorting Query Results (ORDER BY Clause)

UNIT 4: RELATIONAL ALGEBRA – THE FOUNDATION

1. Introduction
2. Operators: Select, Project, Rename, Union, Intersection, Minus, Cartesian Product, Theta Join, Equijoin, Natural Join, Division
3. Relations and Predicates
4. Relational Operators and Logical Operators
5. JOIN and AND
6. RENAME
7. Projection, Restriction and AND
8. Extension and AND
9. UNION and OR
10. Database Updates
11. Data Integrity
12. Transaction Processing

UNIT 5: DATABASE DESIGN I: PROJECTION – JOIN NORMALIZATION

1. Introduction
2. Creating a Database
3. SQL Security
4. Avoiding Redundancy
5. Join Dependency
6. Normalization upto BCNF
7. The role of FDs and Keys in Optimization
8. Boyce – Codd Normal Form (BCNF)
9. Surrogate Keys
10. Entity Relationship (ER) Modelling
11. What is Type?

UNIT 6: DATA MODELS

1. The Entity Relationship Model
2. Advantages and Disadvantages of E-R Data Model

UNIT 7: SQL TODAY and TOMORROW

1. Database Processing and Stored Procedural SQL
2. SQL and Data Warehousing
3. SQL and Application Servers
4. SQL and XML
5. Database Market Trends
6. Enterprise Database Market maturity
7. Software-as-a-Service (SaaS)
8. Database Server Appliances
9. SQL Standardization
10. SQL in Next Decade
11. Distributed Databases
12. Massive Data Warehousing for Business Optimization
13. Embedded Databases
14. Cloud Based and Horizontally Scalable Databases