



SILVER OAK UNIVERSITY

College of Technology

Bachelor of Technology

Information Technology

Course Name: Database Management Systems

Course Code: 1010043223

Semester: 3rd

Prerequisite:

Basic knowledge of Computer Programming

Objective:

1. Database is an integral part of real-life application systems. The course will enable students to understand the different issues involved in the design and implementation of a database system. Students will learn the physical and logical database designs, database modeling, relational, hierarchical, and network models.
2. Students will learn to use data manipulation language to query, update, and manage a database. Students will understand essential DBMS concepts such as: database security, integrity, concurrency, storage strategies etc. The students will get the hands-on practice of using SQL and PL/SQL concepts.

Teaching Scheme:

Teaching Scheme				
L	T	P	Contact Hours	Credit
4	0	4	8	6

Contents:

Unit	Topics	Teaching Hours	Weightage %
1	Database system architecture and Data models: : Data Abstraction, Data Independence, Data Definition Language (DDL), Data Manipulation Language (DML), Entity-relationship model, network model, relational and object oriented data models, integrity Constraints, data manipulation operations.	12	17
2	Relational query languages: Relational algebra, Tuple and domain relational calculus, SQL3, DDL and DML constructs, Open source and Commercial DBMS - MYSQL, ORACLE, DB2, SQL server.	05	08
3	Relational database design:	05	10

	Domain and data dependency, Armstrong's axioms, Normal forms, Dependency preservation, Lossless design.		
4	Query processing and optimization, Storage strategies: Evaluation of relational algebra expressions, Query equivalence, Join strategies, Query optimization algorithms, Indices, B-trees, hashing Indices, B-trees, hashing	12	17
5	Transaction processing: Concurrency control, ACID property, Serializability of scheduling, Locking and timestamp based schedulers, Multi-version and optimistic Concurrency Control schemes, Database recovery.	05	15
6	Database Security: Authentication, Authorization and access control, DAC, MAC and RBAC models, Intrusion detection, SQL injection.	06	07
7	SQL and PL/SQL Concepts: Basics of SQL, DDL, DML, DCL, structure – creation, alteration, defining constraints – Primary key, foreign key, unique, not null, check, IN operator, aggregate functions, Built-in functions – numeric, date, string functions, set operations, sub-queries, correlated subqueries, join, Exist, Any, All, view and its types., transaction control commands, Cursors, Stored Procedures, Stored Function, Database Triggers.	12	26

Course Outcome:

Sr. No.	CO statement	Unit
CO-1	Recognize the various elements of Database Management Systems	1
CO-2	Design Entity-relation diagram for the gathered requirements of the domain.	2,3
CO-3	Solve the given problem using Relational Algebra, Relational Calculus, SQL and PL/SQL.	4
CO-4	Apply the concepts of transaction, concurrency control, recovery and security in the database.	5,6
CO-5	Identify the purpose of query processing, optimization and demonstrate the SQL query evaluation.	7

Teaching & Learning Methodology:

The various methods or tools followed by the faculties to teach the above subject are:

1. The course includes a laboratory, where students have an opportunity to build an appreciation for the concepts being taught in lectures.
2. Lectures with live practical examples using Projector and Computer.

3. Experiments shall be performed in the laboratory related to course contents.

List of Experiments:

Total Hours: 56

Sr.No	Practical Name
1	To study DDL-create and DML-insert commands.
2	Create tables and insert sample data in tables.
3	Create Table with Constraints. Ø Required data constraints/Null Constraints Ex: In the student database, every student must have an associated student name. Student_name should not be NULL. Ø Check Constraints Ex: Customer table having name and gender which can be M or F. Ø Primary Key Constraints Ex: Employee table having Emp_id which must be a Primary key.
4	Perform queries involving predicates LIKE, BETWEEN, IN etc.
5	To perform various data manipulation commands, aggregate functions and sorting concept on all created tables.
6	To study Single-row functions.
7	Displaying data from Multiple Tables (join)
8	To apply the concept of Aggregating Data using Group functions.
9	To solve queries using the concept of sub query. 10. To apply the concept of security and privileges.
10	To study Transaction control commands.
11	DDL Command: Alter table: add column, remove column, add constraint, remove constraint, Drop table
12	Write Cursor. 14. Write Trigger.
13	Design a database for Online Examination.
14	Design a database for Online Attendance System.

Books Recommended:

1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan, “List of Open Database System Concepts”, McGraw-Hill .
2. R. Elmasri and S. Navathe, “Fundamentals of Database Systems”, Pearson.
3. C J Date, “An introduction to Database Systems”, Pearson.
4. Hoffer , Ramesh, Topi, “Modern Database Management”, Pearson..

