



# SILVER OAK UNIVERSITY

## College of Technology (01)

Bachelor of Technology in (CE/IT/CE-CC/CE-MLAI/CSE-CS) Engineering

Subject Name: Data Base Management Systems

Subject Code: 1010043217

Semester: 3<sup>rd</sup>

### Prerequisite:

1. Basic knowledge of Computer Programming

### Objective:

1. Database is an integral part of real-life application system. The course will enable student understand the different issues involved in the design and implementation of a database system. Student will learn the physical and logical database designs, database modeling, relational, hierarchical, and network models.
2. Student will learn to use data manipulation language to query, update, and manage a database. Student 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 and Examination Scheme:

Teaching Scheme					Evaluation Scheme				Total Marks
L	T	P	Contact Hours	Credit	Theory		Practical		
					CIE (TH)	ESE (TH)	CIE (PR)	ESE (PR)	
4	0	4	8	6	40	60	20	30	150

### Content:

Unit No.	Contents	Teaching Hours	Weightage %
1	<b>Database system architecture:</b> Data Abstraction, Data Independence, Data Definition Language (DDL), Data Manipulation Language (DML).	03	05
2	<b>Data models:</b> Entity-relationship model, network model, relational and object oriented data models, integrity constraints, data manipulation operations.	05	12
3	<b>Relational query languages:</b> Relational algebra, Tuple and domain relational calculus, SQL3, DDL and DML constructs, Open source and Commercial DBMS - MYSQL, ORACLE, DB2, SQL server.	04	08
4	<b>Relational database design:</b> Domain and data dependency, Armstrong's axioms, Normal forms, Dependency preservation, Lossless design.	04	10

5	<b>Query processing and optimization:</b> Evaluation of relational algebra expressions, Query equivalence, Join strategies, Query optimization algorithms.	05	10
6	<b>Storage strategies:</b> Indices, B-trees, hashing	04	07
7	<b>Transaction processing:</b> Concurrency control, ACID property, Serializability of scheduling, Locking and timestamp based schedulers, Multi-version and optimistic Concurrency Control schemes, Database recovery.	04	15%
8	<b>Database Security:</b> Authentication, Authorization and access control, DAC, MAC and RBAC models, Intrusion detection, SQL injection.	04	07%
9	<b>SQL Concepts:</b> 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 sub-queries, join, Exist, Any, All , view and its types., transaction control commands.	07	18%
10	<b>PL/SQL Concepts:</b> Cursors, Stored Procedures, Stored Function, Database Triggers	03	08%

### Course Outcome:

Sr. No.	CO statement	Unit No
CO-1	Recognize the various elements of Database Management Systems	1,2
CO-2	Given a problem statement, identify the entities and their relations and draw an E-R diagram and design database applying normalization	3,4
CO-3	Solve the given problem using Relational Algebra, Relational Calculus, SQL and PL/SQL	5,7,9,10
CO-4	Apply and relate the concepts of transaction, concurrency control, recovery and security in database	6,7,8
CO-5	Recognize the purpose of query processing, optimization and demonstrate the SQL query evaluation	8,9,10

### Teaching & Learning Methodology: -

The various methods or tools follows 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 example using Projector and Computer.
3. Experiments shall be performed in the laboratory related to course contents.

### List of Experiments:

1. To study DDL-create and DML-insert commands.
2. Create table 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
11. To study Transaction control commands.
12. DDL Command:  
Alter table: add column, remove column, add constraint, remove constraint, Drop table
13. Write Cursor. 14. Write Trigger.
15. Design a database for Online Examination.
16. Design a database for Online Attendance System.

**Books Recommended: - (minimum 3 books)**

1. List of Open “Database System Concepts”, 6th Edition by Abraham Silberschatz, Henry F. Korth, S. Sudarshan, McGraw-
2. Hill.
3. “Fundamentals of Database Systems”, 7th Edition by R. Elmasri and S. Navathe, Pearson
4. “An introduction to Database Systems”, C J Date, Pearson.
5. “Modern Database Management”, Hoffer , Ramesh, Topi, Pearson.
6. “Principles of Database and Knowledge – Base Systems”, Vol 1 by J. D. Ullman, Computer Science Press.
7. “Understanding SQL”, Martin Gruber, BPB
8. “SQL- PL/SQL”, Ivan bayross

**Source Software/learning website:**

- <http://silveroakuni.ac.in/video-lecture>
- <https://nptel.ac.in/>
- <https://nptel.ac.in/courses/106/105/106105175/>