



SILVER OAK UNIVERSITY

Computer Application

Integrated M.Sc(IT)

Subject Name: Database Management Systems

Subject Code:

Semester: I

Prerequisite: Basic knowledge of Computer Programming

Objective:

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. 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			Credits	Evaluation Scheme				Total Marks
L	T	P		Internal		External		
				Th	Pr	Th	Pr	
4	0	2	5	40	20	60	30	150

Content:

Unit No.	Course Contents	Teaching Hours	Weightage %
1	Introduction: Introduction and applications of DBMS, Purpose of data base, Data, Independence, Database System architecture- levels, Mappings, Database, users and DBA.	03	05
2	Data models: Entity-relationship model, network model, relational and object-oriented data models, integrity constraints, data manipulation operations, Extended E-R Features, Design of an E-R Database Schema Reduction of an E-R Schema to Tables.	06	12
3	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.	04	08

4	Relational database design: Domain and data dependency, Armstrong's axioms, Normal forms, Dependency preservation, Lossless design.	05	10
5	Query processing and optimization: Evaluation of relational algebra expressions, Query equivalence, Join strategies, Query optimization algorithm.	05	10
6	Storage strategies: Indices, B-trees, hashing.	04	07
7	Transaction processing: Transaction concepts, properties of transactions, serializability of transactions, testing for serializability, System recovery, Two-Phase Commit protocol, Recovery and Atomicity, Log-based recovery, concurrent executions of transactions and related problems, Locking mechanism, solution to concurrency related problems, deadlock, two-phase locking protocol, Isolation, Intent locking.	08	15
8	Database Security: Authentication, Authorization and access control, DAC, MAC and RBAC models, Intrusion detection, SQL injection.	04	07
9	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 sub-queries, join, Exist, Any, All ,view and its types., transaction control commands.	09	18
10	PL/SQL Concepts: Cursors, Stored Procedures, Stored Function, Database Triggers	04	08

Course Outcome:

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

List of Experiments/Tutorials:

1. To study DDL-create and DML-insert commands
2. Create table and insert sample data in tables.
3. Perform queries involving predicates LIKE, BETWEEN, IN etc.
4. To Perform various data manipulation commands, aggregate functions and sorting concept on all created tables.
5. To study Single-row functions.
6. Displaying data from Multiple Tables (join)
7. To apply the concept of Aggregating Data using Group functions.
8. To solve queries using the concept of sub query.
9. To apply the concept of security and privileges
10. To study Transaction control commands
11. Write Cursor
12. Write Trigger

Major Equipment:

Computer system with DBMS system

Books Recommended:-

1. "Database System Concepts", 6th Edition by Abraham Silberschatz, Henry F. Korth, S. Sudarshan, McGraw-Hill.
2. "Fundamentals of Database Systems", 7th Edition by R. Elmasri and S. Navathe, Pearson
3. "An introduction to Database Systems", C J Date, Pearson.
4. "Modern Database Management", Hoffer , Ramesh, Topi, Pearson.
5. "Principles of Database and Knowledge – Base Systems", Vol 1 by J. D. Ullman, Computer Science Press.

List of Open Source Software/learning website:

1. <https://www.tutorialspoint.com/dbms/>
2. <https://www.w3schools.com/sql/>
3. <https://www.codecademy.com/learn/learn-sql>
4. <https://in.udacity.com/>