



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal - 500 043, Hyderabad, Telangana

COURSE CONTENT

STRUCTURED QUERY LANGUAGE

V Semester: CSE

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P		CIA	SEE	Total
ACSE25	Open Elective	2	0	0	2	40	60	100
Contact Classes: 48	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes: 48			
Prerequisite: Information Security and Management								

I. COURSE OVERVIEW:

This course introduces the fundamental and advanced concepts of Structured Query Language (SQL) for managing and manipulating relational databases. It covers database concepts, data definition, data manipulation, query formulation, joins, subqueries, constraints, transactions, and database security. The course emphasizes writing efficient SQL queries, designing normalized database structures, and ensuring data integrity. By the end of the course, students will be able to create, manage, and query databases effectively for real-world data-driven applications.

II. COURSES OBJECTIVES:

The students will try to learn

- I. The fundamentals of databases, relational database management systems, and the role of SQL in data management.
- II. The use of SQL data definition and manipulation commands to create, modify, and manage database structures and records.
- III. Query formulation using SQL to retrieve, filter, sort, group, and summarize data efficiently.
- IV. Advanced SQL concepts including joins, subqueries, views, transactions, and security mechanisms for reliable database applications.

III. COURSE OUTCOMES:

At the end of the course students should be able to:

- CO1 Understand the fundamental concepts of databases, DBMS, and Structured Query Language (SQL).
- CO2 Design and create relational database structures using appropriate SQL data definition commands.
- CO3 Apply SQL data manipulation and query techniques to retrieve and manage data effectively.
- CO4 Analyze and implement joins, subqueries, and views to solve complex database queries.
- CO5 Use transactions, constraints, and security commands to ensure data integrity and consistency.
- CO6 Develop efficient and optimized SQL solutions for real-world database applications.

IV. COURSE CONTENT:

MODULE - I: INTRODUCTION TO SQL AND DATABASES (09)

Introduction to databases and database management systems, data vs information, characteristics and advantages of DBMS, types of databases, relational database concepts, introduction to RDBMS, overview and history of SQL, SQL data types, categories of SQL statements (DDL, DML, DQL, DCL, TCL), basic SQL syntax and rules.

MODULE – II: DATA DEFINITION LANGUAGE (DDL) (10)

Introduction to data definition language, creating databases and tables using CREATE statement, defining and modifying table structures using ALTER, removing database objects using DROP and TRUNCATE, constraints and their types (PRIMARY KEY, FOREIGN KEY, UNIQUE, NOT NULL, CHECK, DEFAULT), modifying constraints, viewing table structure and metadata.

MODULE – III: DATA MANIPULATION AND QUERY LANGUAGE (10)

Data manipulation using INSERT, UPDATE, and DELETE statements, data retrieval using SELECT statement, filtering

data with WHERE clause, sorting results using ORDER BY, grouping data with GROUP BY and HAVING clauses, aggregate functions (COUNT, SUM, AVG, MIN, MAX), use of DISTINCT keyword, operators (arithmetic, comparison, logical, BETWEEN, IN, LIKE).

MODULE – IV: JOINS, SUBQUERIES AND VIEWS (10)

Introduction to joins and their importance, types of joins (INNER JOIN, LEFT JOIN, RIGHT JOIN, FULL JOIN), querying data from multiple tables, subqueries and their types (single-row and multi-row subqueries), correlated subqueries (overview), views and their advantages, creating, modifying, and deleting views, set operations (UNION, UNION ALL, INTERSECT, EXCEPT).

MODULE – V: ADVANCED SQL AND DATABASE MANAGEMENT (9)

Indexes and their types, creation and usage of indexes, stored procedures and user-defined functions, triggers and their applications, transaction management concepts (COMMIT, ROLLBACK, SAVEPOINT), database security and user management (GRANT, REVOKE), basics of SQL performance tuning and best practices.

IV. TEXT BOOKS:

1. Ramakrishnan, R. and Gehrke, J., “Database Management Systems”, McGraw-Hill Education, 3rd Edition.
2. Silberschatz, A., Korth, H. F., and Sudarshan, S., “Database System Concepts”, McGraw-Hill Education, 6th Edition.

V. REFERENCE BOOKS:

1. Elmasri, R. and Navathe, S. B., “Fundamentals of Database Systems”, Pearson Education, 7th Edition.
2. Ullman, J. D., Widom, J., and Garcia-Molina, H., “Database Systems: The Complete Book”, Pearson Education, 2nd Edition.

VI. ELECTRONICS RESOURCES:

1. <https://www.w3schools.com/sql/>
2. <https://www.sqltutorial.org/>

VII. MATERIALS ONLINE

1. Course Outline Description
2. Lecture notes
3. PowerPoint presentation
4. Definitions and Terminology
5. Tutorial Question Bank
6. Case Studies
7. Real life Examples
8. Complex Engineering Problems
9. Tech Talk Topics
10. Concept Video Topics
11. Open-ended Exercises
12. Assignments
13. Model Question Paper – I
14. Model Question Paper – II
15. GATE Question Bank
16. Previous Question Papers and Solutions