

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

Database Management Systems

(Computer Science Engineering)

II B.Tech I Semester

Course Code	Category	Hours/Week			Credits	Maximum Marks		
194GA05302	PCC	L	T	P	C	CIA	SEE	Total
		3	0	0	3	30	70	100

Objectives

-) To understand the different issues involved in the design and implementation of a database system.
-) To understand and use data manipulation language to query, update, and manage a database.
-) To develop an understanding of essential DBMS concepts such as: E-R Model, Relational Model, Transaction Model, storage organization model.

Unit I – Introduction to Databases

Database System Applications, Purpose of Database Systems, Views Of Data, Database Languages, Relational Databases. Database Design, Database Storage And Querying, Database Architecture, Database Users and Administrator and History of Databases.

Unit II – Relational databases

Relational Model: Structure of Relational Databases, Database Schema, Keys, Relational Query languages, Relational Algebra, Tuple Relational Calculus and Domain Relational calculus. Relational Operations.

SQL: SQL data definition, Basic Structure of SQL Queries, Additional Basic operations, Set Operations, Null Values, Aggregate Functions, Nested Queries, Modification of databases, Join Expressions, views, Transactions, Integrity Constraints, SQL datatypes and schemas, Authorization, Functions and procedures, Triggers, Recursive Queries.

Unit III – Database Design

Database Design with E-R Model: Overview of the Design Process, The Entity-Relational Model, Constraints, Removing Redundant Attributes in Entity set, Reduction to Relational Schema, Entity-Relationship Design issues, Extended E-R features, Alternative Notions for Modelling, Other accepts of Database Design.

Relational Database Design: Features of Good Relational Designs, Atomic Domains and First Normal Form, Decomposition using Functional Dependencies, Algorithms for Decomposition, Decomposition using multivalued Dependencies. More Normal forms, Database-Design Process, Modelling Temporal Data.

Unit IV – Transaction Management

Fundamentals of Transaction: Transaction Concept, A simple Transaction Model, storage Structure, Transaction Atomicity and Durability, Transaction Isolation, Serializability, Transactional Isolation and Atomicity, Transaction Isolation levels, Implementation of Isolation Levels, Transactions as SQL Statements.

Concurrency Control in Transactions: Lock-Based Protocols, Deadlock Handling, Multiple Granularity, Timestamp-Based Protocols, Validation Protocols, Multiversion Schemes. **Recovery system:** Failure Classification, Storage, Recovery and Atomicity, Recovery Algorithm, Buffer Management and Failure with Loss of Non-volatile.

Unit V – Data Storage and Querying

Storage and File Structure: Overview of physical storage media, magnetic disk and flash storage, RAID, tertiary storage, File Organization, Organization of Records in Files, Data-Dictionary Storage, Database Buffer.

Indexing and hashing: Ordered Indices, B+-Tree Index Files, B+-Tree Extensions, Multiple-Key Access, Static hashing, Dynamic Hashing, Comparison of Ordered Indexing and Hashing, Bitmap Indices, Index Definition in SQL.

Query processing and Optimization: Measures of Query Cost, selection Operations, sorting, Join

operations, Other Operations, Evaluation of Expressions. Transformation of Relational Expressions, Estimating Statistics of Expression Results, choice of Evaluation plans and Materialized views

Text Books:

1. “Database System Concepts”, 6th Edition by Abraham Silberschatz, Henry F. Korth, S. Sudarshan, McGraw-Hill, 2013.
2. “Database Management Systems”, 3rd Edition by Raghurama Krishan, Johannes Gehrke McGraw Hill, 2014.

Reference Books:

1. “Principles of Database and Knowledge – Base Systems”, Vol 2 by J. D. Ullman, Computer Science Press, 1989.
2. “Fundamentals of Database Systems”, 7th Edition by R. Elmasri and S. Navathe, Pearson Education, 2015.
3. “Concepts of Database Management”, by Joy L. Starks, Philip J. Pratt, Shelly Cashman Series, 2018.

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY**Database Management Systems Laboratory**

(Computer Science Engineering)

II B.Tech I Semester:

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P		CIA	SEE	Total
194GA05303	PCC	0	0	3	1.5	30	70	100

Objectives

-) To understand the fundamentals of SQL and PL/SQL.
-) To use DDL, DML statements for design of database Schemas.
-) To use PL/SQL language constructs to implement triggers, stored procedures, stored functions and cursors.

List of Experiments:

1. Write SQL queries to CREATE TABLES for various databases using DDL commands (i.e. CREATE, ALTER, DROP, TRUNCATE).
2. Write SQL queries to MANIPULATE TABLES for various databases using DML commands (i.e. INSERT, SELECT, UPDATE, DELETE,).
3. Write SQL queries to create VIEWS for various databases (i.e. CREATE VIEW, UPDATE VIEW, ALTER VIEW, and DELETE VIEW).
4. Write SQL queries to perform RELATIONAL SET OPERATIONS (i.e. UNION, UNION ALL, INTERSECT, MINUS, CROSS JOIN, NATURAL JOIN).
5. Write SQL queries to perform SPECIAL OPERATIONS (i.e. ISNULL, BETWEEN, LIKE, IN, EXISTS).
6. Write SQL queries to perform JOIN OPERATIONS (i.e. CONDITIONAL JOIN, EQUI JOIN, LEFT OUTER JOIN, RIGHT OUTER JOIN, FULL OUTER JOIN)
7. Write SQL queries to perform AGGREGATE OPERATIONS (i.e. SUM, COUNT, AVG, MIN, MAX).
8. Write SQL queries to perform ORACLE BUILT-IN FUNCTIONS (i.e. DATE, TIME).
9. Write SQL queries to perform KEY CONSTRAINTS (i.e. PRIMARY KEY, FOREIGN KEY, UNIQUE NOT NULL, CHECK, DEFAULT).
10. Write a PL/SQL program for calculating the factorial of a given number.
11. Write a PL/SQL program for finding the given number is prime number or not.
12. Write a PL/SQL program for displaying the Fibonacci series up to an integer.
13. Write PL/SQL program to implement Stored Procedure on table.
14. Write PL/SQL program to implement Stored Function on table.
15. Write PL/SQL program to implement Trigger on table.
16. Write PL/SQL program to implement Cursor on table.

Reference Books:

1. "Database System Concepts", 6th Edition by Abraham Silberschatz, Henry F. Korth, S. Sudarshan, McGraw-Hill, 2013.
2. "OraclePL/SQL Programming", 6th Edition by Steven Feuerstein. O'REILLY, 2014.