Subject Code: 01CT0407

Subject Name: Database Management System

B. Tech. Year – II (Semester IV)

Objective:
To know how huge data is managed by each and every application is modern technologies. To store and retrieve data in efficient manner, how query language is useful will be helpful. This course will give deep knowledge about data storage and querying functionalities used in real life applications.

Credits Earned: 04 Credits

Course Outcomes: After completion of this course, student will be able to:
1. Understand the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra, normalization and SQL
2. Solve the given problem using Relational Algebra, Relational Calculus, SQL and PL/SQL
3. Analyze basic data storage schemes and real-life database applications
4. Apply efficient query optimization techniques to solve different problems
5. Perform PL/SQL programming using concept of Cursor Management, Error Handling, Package and Triggers

Pre-requisite of course:
The proper understanding of data structures and algorithms will help you to understand the DBMS quickly.

Teaching and Examination Scheme:

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial / Practical Marks		Total Marks
				E	I		V	T	
Theory	Tutorial	Practical		ESE	IA	CSE	Viva	Term Work	
03	00	02	04	50	30	20	25	25	150

Contents:

Unit	Topics	Hours
1	**Introduction to DBMS** Introduction to Database System, Purpose of Database Systems, View of Data, Introduction to Database Languages and Database Design, Database and Application Architecture, Database Users and Administrators	04
2	**Database Design and E-R Model** Overview of the Design Process, The Entity-Relationship Model, Complex Attributes, Mapping Cardinalities, Primary Key, Reducing E-R Diagrams to Relational Schemas, Extended E-R Features, and Entity-Relationship Design Issues	06
3	**Introduction to RDBMS & SQL** Structure of Relational Databases, Database Schema, Keys, Schema Diagrams, Relational Query Languages, The Relational Algebra Overview of the SQL Query Language, SQL Data Definition. Basic Structure of SQL Queries, Additional Basic Operations, Set Operations, Null Values, Aggregate Functions, Nested Subqueries, Modification of the Database	08
4	**Advanced SQL** Join Expressions, Views, Integrity Constraints, SQL Data Types and Schemas, Index Definition in SQL, Accessing SQL from a Programming Language, Functions and Procedures, Triggers, Recursive Queries	08
5	**Functional Dependencies & Normalization** Theoretical overview of types of functional dependencies: Trivial and Non-trivial, Multilevel dependencies, Algorithms for decomposition using multilevel dependencies. Purpose of normalization, Introduction and definition of normalization, Normalization techniques: 1NF, 2NF, 3NF, 4NF and BCNF	08
6	**Concurrency and Recovery in Transactional DBMS** Introduction to transaction, ACID properties of Transaction, Locking mechanism, solution to concurrency related problems, deadlock, two-phase locking protocol, Deadlock, Concurrency handling protocols and schemes, Transactional Recovery Algorithms, System recovery, Two- Phase Commit protocol, Recovery and Log-based recovery	08
		42

Suggested Text books / Reference books:
1. Database System Concepts, Abraham Silberschatz, Henry F. Korth & S. Sudarshan, McGraw Hill.
2. An introduction to Database Systems, C J Date, Addition-Wesley.
3. Understanding SQL by Martin Gruber, BPB
4. Oracle – The complete reference – TMH /oracle press
5. SQL – PL/SQL by Ivan Bayross

Suggested Theory distribution:

The suggested theory distribution as per Bloom's taxonomy is as per follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process.

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyze	Evaluate	Create
15%	15%	40%	10%	10%	10%

Suggested List of Experiments:

Minimum 12 experiments to be performed during the semester

1. Introduction to MySQL Workbench and MySQL server
2. Use of Create and Alter command in SQL
3. Use of Drop and Truncate command in SQL
4. Implementation and use of Constraints in SQL
5. Use of insert, select and delete command in SQL
6. Use of in-built and aggregate functions in SQL
7. Use of relational, like and in operator in SQL
8. Implementation & use of nested queries in SQL.
9. Implementation and use of keys in SQL
10. Implementation of various join operations in SQL.
11. Implementation and use of Views in SQL
12. Implementation & use of procedures in SQL.
13. Implementation & use of functions in SQL.
14. Implementation & use of triggers in SQL.

Supplementary Resources:

1. https://www.geeksforgeeks.org/dbms
2. http://nptel.iitm.ac.in/video.php?subjectId=106106093
3. http://holowczak.com/oracle-sqlplus-tutorial
4. http://www.roseindia.net/programming-tutorial/Database- Tutorialsiv.
5. http://www.w3schools.com/sql
6. http://beginner-sql-tutorial.com/sql.htm