INSTITUTE	FACULTY OF TECHNOLOGY
PROGRAM	BACHELOR OF TECHNOLOGY (COMPUTER ENGINEERING)
SEMESTER	3
COURSE TITLE	DATABASE MANAGEMENT SYSTEM
COURSE CODE	01CE2302
COURSE CREDITS	4

Objective:

1 Students should be able to understand and Design Database for any real time application. They will be thorough with SQL queries and its execution. They should learn different types of database systems and their applications in different scenarios.

Course Outcomes: After completion of this course, student will be able to:

1 Student will be able to use Relational Database and different models of Database.

2 Student will be able to design ER Model for an Application.

3 Student will be able to apply Concepts of normalization with functional dependency to construct Data dictionary.

4 Student will be able to implement Structured Query Language (SQL) and evaluate query expression.

5 Student will be able to differentiate and Execute transactional Concepts and locking mechanism.

Pre-requisite of course: NA

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
3	0	2	50	30	20	25	25

Contents : Unit	Topics	Contact Hours
1	**Introductory concepts of DBMS** Introduction and applications of DBMS,, Purpose of data base, Data Models, Schemas and instances,, Data Independence, Database System architecture- levels Mappings,, Database, users and DBA	4
2	**Database Models:** E-R Model, Attributes,, relationships and constraints,, weak entity sets, extended E-R features, generalization, specialization, aggregation,, reduction to E-R database schema,, keys: Primary Key, foreign key, candidate key, unique key, super key,, relational algebra – fundamental operators and syntax,, relational algebra queries.	7

Contents : Unit	Topics	Contact Hours
3	**Functional dependencies and Normalization:** Functional Dependency definition,, trivial and non-trivial FD,, Closure of FD set, Closure of attributes,, Irreducible set of FD, Normalization, 1Nf, 2NF, 3NF, Decomposition using FD-dependency preservation,, BCNF, 4NF, Multi- valued dependency, Join dependency, definition of 5NF, lossless join decomposition	7
4	**Transaction Management:** Transaction concepts, Properties of transactions,, Serializability of transaction and testing for serializability,, System recovery - Two-Phase Commit protocol,, Recovery and Atomicity, Log-based recovery,, Concurrent executions of transactions,, Concepts of dead lock using locking mechanism,, locking mechanism, two-phase locking protocol,, Timestamp based protocol	10
5	**Data Storage and Query Processing:** File Structure,, Indexing,, Query Processing and Query Optimization	3
6	**SQL Concepts:** Introduction to SQL: DDL,, DML, DCL, DQL,, Implementing constraints : Keys, NULL, NOT NULL, UNIQUE, IN, Aggregate functions,, Query, Sub queries,, co related sub queries , Joins, Order by, group by, having, TCL Commands, Sequences, Index	7
7	**PL/SQL Concepts:** PL/SQL blocks,, PL/SQL data types, Conditional statements and looping,, SQL within PL/SQL,, Error Handling Cursors,, Stored Procedures and Stored Function,, Database Triggers	7
Total Hours		**45**

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	**Practical 1** Introduction to RDBMS and APEX Login.	2
2	**Practical 2** DDL Commands and Table Creation	2
3	**Practical 3** DML Commands and and Queries	2
4	**Practical 4** DML Commands and and Related Queries	2
5	**Practical 5** Constraint Based DML Commands	2
6	**Practical 6** Functions and Queries	2
7	**Practical 7** Implement operator, null and special operator based queries	2

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
8	**Practical 8** Implement Constraint based and Group by related queries.	2
9	**Practical 9** Range Function and Operator based Queries	2
10	**Practical 10** Join based Queries having Functions and Joins	2
11	**Practical 11** Understand and implement Conditions and looping in PL/SQL	2
12	**Practical 12** Implement a PL/SQL Block	2
13	**Practical 13** Implement a Procedure and Function for given Statement	2
14	**Practical 14** Understand and Implement Triggers	2
Total Hours		**28**

Textbook :

1 Database System Concepts, Silverschatz A., Korth F. H. and Sudarshan S., Tata McGraw Hill, 2019

References:

1 Fundamentals of Database Systems, Fundamentals of Database Systems, Elmasri R. and Navathe B. S., Pearson, 2016

2 SQL, PL/SQL the Programming Language of Oracle, SQL, PL/SQL the Programming Language of Oracle, Bayross I., BPB Publications, 2009

3 ORACLE: the complete reference, ORACLE: the complete reference, Koch, G. and Loney K, McGraw-Hill, 2013

4 Understanding SQL, Understanding SQL, Gruber, M., Singapore: Tech Publications, 1990

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as 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 / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking
10.00	30.00	40.00	10.00	5.00	5.00

Instructional Method:

1 The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

Instructional Method:

2 The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.

3 Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

4 Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory.

Supplementary Resources:

1 https://apex.oracle.com/en/

2 https://onlinecourses.nptel.ac.in/noc22_cs57/preview

3 http://vlabs.iitb.ac.in/vlabs-dev/labs/dblab/labs/index.php

4 https://www.w3schools.com/sql/

5 https://www.oracle.com/in/database/