Course Title: **Database Management System (3 Cr.)**
Course Code: **CACS255**
Year/Semester: **II/IV**
Class Load: **6 Hrs. / Week (Theory: 3 Hrs, Tutorial: 1 Hr., Practical: 2 Hrs.)**

Course Description

This course offers both theoretical as well as practical knowledge of database management system so that students can handle back end of software while developing any types of application packages.

Course Objectives

The general objectives of this subject are to provide the basic concept, theory and practices in design and implementation of DBMS. Students will also be good for handling different type of data transaction by using SQL commands.

Course Contents

Unit 1 Introduction to DBMS **3 Hrs.**

Introduction of Database Management System, Objective of Database Management System, Importance of DBMS, Merit and Demerit of DBMS. Application of DBMS.

Unit 2 Database Design, Architecture and Model **6 Hrs.**

Overview of The Database Designing Process and View of Data, Structure of Database Management System, Level Database Architecture and Data Independence, Database Languages: DDL, DML, QBE; Data Models: Hierarchical, Network, Relational, E-R Model, Object Base Data Model; E-R Diagram: Concepts, Relationship, Entity Relationship Diagram, Weak Entity Sets, Strong Entity Set, Aggregation, Generalization, Converting ER Diagrams to Tables.

Unit 3 Relational Database Model **4 Hrs.**

Structure of RDBMS and Terminology, Database Schema and Schema Diagram, Keys: Super, Candidates, Primary, Foreign, Composite etc. and Relationship; Introduction to Relational Algebra, Relational Algebra Operations: Select, Project, Cartesian Product, Union, Set Difference, Natural Join, Outer Join.

Unit 4 Database Normalization **4 Hrs.**

Definition and Importance of Normalization, Functional Dependencies, Normalization: 1NF, 2NF, 3NF, BCNF and 4NF.

Unit 5 Creating and Altering Database and Tables(SQL) **6 Hrs.**

Introduction to SQL, Creating Database with Different Type of Arguments and Alter Database, Creating Normal Tables and Complex Tables with Different

Type of Constraints(Key, Check, Default); Alter Tables : Adding and Dropping Attributes and Other Constraints; Drop Statement: Table, Database.

Unit 6 Manipulating and Querying Data **8 Hrs.**

Adding Data with *INSERT* Statement, Retrieving Data with SELECT Statement and FROM Clause and Filter Data with WHERE Clause; Order and Grouping Data with ORDER and GROUP by Clause and Summarizing the Select Statement; Retrieving Data from Different Tables using: INNER JOINS, OUTER JOIN and CROSS JOIN; Building Nested Queries, Manipulate Data Using UPDATE Statement and Removing Rows Using DELETE Statement; Creating and Altering View.

Unit 7 Developing Stored Procedures, DML Triggers and indexing **5 Hrs.**

Managing Stored Procedures, Create, Alter, Drop, Execute Stored Procedure ,Encryption, Passing Data To Stored Procedures , Parameter Default, Returning Data From Stored Procedure Output Parameter Using The Return Statement; Transaction Flow, Creating Triggers, Triggers Limitation, Disabling Trigger, Developing Multi Row Enabled Triggers; Basic Concept of Indexing, Ordered Indices, Type of Indexing, Multiple Key Access, Creating And Dropping Index.

Unit 8 Query Processing and Security **5 Hrs.**

Overview of Query Processing, Measuring of Query Cost, Selection Operation, Sorting, Joining Evaluation of Expression, Query Optimization; Database Administrator: DBA Roles and Responsibilities, Database Security Issues, Types of Security, Access Protection, User Accounts and Database Audits, Discretionary Access Control, Mandatory Access Control; Data Encryption And Decryptions.

Unit 9 Transaction and Concurrency Control **4 Hrs.**

Transaction Concept, Simple Transaction Model, Atomicity and Durability, Transaction Isolation, Serializability, Transaction Isolation and Atomicity and Transaction Isolation Levels; Introduction, Lock-Based Protocol, Dead-Lock Handling, Multiple Granularity, Time-Based Protocol.

Laboratory Works

Lab works should be done covering all the topics listed above using Oracle and a small project work should be carried out using the concept learnt in this course. Project should be assigned on Individual Basis.

Teaching Methods

The general teaching pedagogy includes class lectures, group discussions, case studies, guest lectures, research work, project work, assignments (theoretical and

practical), and examinations (written and verbal), depending upon the nature of the topics. The teaching faculty will determine the choice of teaching pedagogy as per the need of the topics.

Evaluation

Examination Scheme				
Internal Assessment		External Assessment		Total
Theory	Practical	Theory	Practical	Total
20	20 (3 Hrs.)	60 (3 Hrs.)	-	100

Text Book

1. Abraham Silberscatz, "*Database System Concept*", 6th Edition, McGraw Hill.

Reference Books

1. Elmasri – Navathe, "*Fundamental of Database System*", 5th Edition, Pearson.
2. James R. Groff and Paul N. Weinberg, "*The complete Reference SQL*", 3rd Edition.
3. Jason Price, "*Oracle Database 11g SQL*", McGraw Hill, 2007
4. Robert Vieria, "*Microsoft SQL Server 2008 Programming*", Wiley India