# **Database Administration**

**Course Title:** Database Administration **Course No:** CSC414 **Nature of the Course:** Theory + Lab **Semester:** VII **Full Marks:** 60 + 20 + 20 **Pass Marks:** 24 + 8 + 8 **Credit Hrs:** 3

## **Course Description:**

This course familiarizes students with different concepts of database administration including DBA Roles and responsibilities, tablespace and storage management, DB backup, restoration and recovery, security, multitenant, and performance tuning.

## **Course Objective:**

The main objective of this course is to provide knowledge of different concepts of database administration so that the students will be able handle

- Install DBMS Software
- Create and manage databases
- Manage backup and recovery
- Control user security
- Managing database performance and multitenant architecture

#### **Course Contents:**

## **Unit 1: Introduction (5 Hrs.)**

DBA Roles and Responsibilities; Database Architecture; ORACLE logical and physical database structure; Memory and Process Structure, SQLPLUS Overview, creating a database;

#### **Unit 2: Tablespace and Storage management (5 Hrs.)**

Working with Tablespaces and Data Files, Creating and adding tablespace and datafiles, Managing Control Files, Online Redo Logs and Archive logs; Multiplexing;

#### Unit 3: Managing Database Objects (8 Hrs.)

Working with Tables and Constraints; Working with Indexes, Views, Synonyms, and Sequences; Partitioning and Materialized Views, Introduction of PLSQL, Stored Procedure, Functions, Trigger, package.

#### Unit 4: Database Backup, Restore, and Recovery (10 Hrs.)

Backup and Recovery Overview, Database backup, restoration and recovery, defining a backup and recovery strategy, Backup and Recovery options; Data Dump; User-Managed Backup and Recovery; Configuring RMAN; RMAN Backups, Restore and Recovery; High Availability Features; Oracle Data Guard; Flashback operations.

# Unit 5: Database Security and Auditing (7 Hrs.)

Database Security and Auditing; Database Authentication Methods; Database Authorization Methods; Data Encryption Techniques, Virtual Private Database; Managing Users and Security: Profiles, managing users, managing privileges, managing roles,

## **Unit 6: Multitenant Database Architecture (5 Hrs.)**

Understanding the Multitenant Architecture, Pluggable Architecture; Creating CDB; Administrating Root Container; Creating Pluggable Databases (PDBs) within a CDB; Administrating Pluggable Databases; Backup and Recovery in multitenant Environment; Databases in the Cloud

## Unit 7: Database Tuning (5 Hrs.)

Tuning Application Design; Tuning Memory Usage; Tuning Data Access; Tuning Data Manipulation; Reducing Network Traffic; Using Automatic Workload Repository(AWR); Automatic Database Diagnostic Monitor(ADDM), Tuning SQL; SQL Tuning Advisor, Performance Tuning in a Multitenant Environment; Distributed Databases and Networking Tool

#### Laboratory Works:

The laboratory work should include all the concepts mentioned in the course using any appropriate DBMS system.

## **Recommended Books:**

- 1. Pro Oracle Database 18c Administration: Manage and Safeguard Your Organization's Data, Michelle Malcher and Darl Kuhn, Third Edition.
- 2. Oracle Database 12c DBA Handbook, Manage a Scalable, Secure Oracle Enterprise Database Environment, Bob Bryla.
- 3. Oracle DBA Mentor: Succeding as an Oracle Database Administrator, Brian Peasland.