

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: Succeeding as an Oracle Database Administrator, Brian Peasland.