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Course Outline for CIS 9004

ORACLE: DATABASE ADMINISTRATION

Effective: Fall 2011

I. CATALOG DESCRIPTION:
CIS 9004 — ORACLE: DATABASE ADMINISTRATION — 3.00 units

This course is designed to give students a firm foundation in basic administration of Oracle latest Database. In this class, students learn how to install and maintain Oracle Database. Gain a conceptual understanding of the Oracle database architecture and how its components work and interact with one another. Learn to create an operational database and properly manage the various structures in an effective and efficient manner including performance monitoring, database security, user management, and backup/recovery techniques. The lesson topics are reinforced with structured hands-on practic

2.50 Units Lecture 0.50 Units Lab

Grading Methods:
Letter or P/NP

Discipline:

	MIN
Lecture Hours:	45.00
Lab Hours:	27.00
Total Hours:	72.00

II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: 2

III. PREREQUISITE AND/OR ADVISORY SKILLS:

IV. MEASURABLE OBJECTIVES:

Upon completion of this course, the student should be able to:

A. Describe Oracle Database Architecture
B. Install and configure Oracle Database
C. Configure Oracle Net services
D. Manage the database storage structures
E. Create and administer user accounts
F. Perform basic backup and recovery of a database
G. Manage users and schemas
H. Manage data and concurrency
I. Monitor and administer undo data
J. Back up and recover a database
K. Monitor performance
L. Use the database diagnostic monitor

V. CONTENT:
A. Exploring the Oracle Database Architecture
1. Oracle Database Architecture Overview
2. Interacting with an Oracle Database
3. Process Architecture
4. Database Storage Architecture
5. Logical and Physical Database Structures
6. Tablespaces and Data Files
7. SYSTEM and SYSAUX Tablespaces
8. Segments, Extents, and Blocks
B. Preparing the Database Environment
1. Tasks of an Oracle Database Administrator
2. Tools Used to Administer an Oracle Database
3. Installation: System Requirements
4. Optimal Flexible Architecture (OFA)
5. Setting Environment Variables
6. Oracle Universal Installer (OUI)
7. Database Configuration Options
8. Advanced Installation Options
C. Creating an Oracle Database
1. Planning the Database

2. Configuring the Listener
3. Using the DBCA to Create a Database
4. Password Management
5. Creating a Database Design Template
6. Using the DBCA to Delete a Database
7. Using DBCA For Additional Tasks

D. Managing the Oracle Instance
1. Management Framework
2. Oracle Enterprise Manager
3. Initialization Parameter
4. Database Startup and Shutdown
5. Shutdown Modes
6. Viewing the Alert History
7. Using Trace Files
8. Data Dictionary: Overview

E. Configuring the Oracle Network Environment
1. Oracle Net Services & Listener
2. Establishing Net Connections
3. Tools for Configuring and Managing the Oracle Network
4. Net Services Administration Pages
5. Naming Methods
6. Directory Naming
7. SGA and PGA
8. When Not to Use a Shared Server

F. Managing Database Storage Structures
1. Storage Structures
2. How Table Data Is Stored
3. Anatomy of a Database Block
4. Space Management in Tablespaces
5. Tablespaces in the Preconfigured Database
6. Actions with Tablespaces
7. Oracle Managed Files (OMF)
8. ASM: Concepts

G. Administering User Security
1. Database User Accounts
2. Predefined Accounts: SYS and SYSTEM
3. Administrator Authentication
4. Benefits of Roles
5. Predefined Roles
6. Implementing Password Security Features
7. Assigning Quota to Users

H. Managing Schema Objects
1. What Is a Schema?
2. Accessing Schema Objects
3. Specifying Data Types in Tables
4. Creating and Modifying Tables
5. Understanding Data Integrity
6. Indexes & Views
7. Sequences
8. Temporary Tables

I. Managing Data and Concurrency
1. Manipulating Data Through SQL
2. PL/SQL
3. Administering PL/SQL Objects
4. Functions, Procedures, Packages & Triggers
5. Data Concurrency
6. Enqueue Mechanism
7. Resolving Lock Conflicts Using SQL
8. Deadlocks

J. Managing Undo Data
1. Data Manipulation
2. Transactions and Undo Data
3. Undo Data Versus Redo Data
4. Configuring Undo Retention
5. Guaranteeing Undo Retention
6. Using the Undo Advisor
7. Viewing System Activity

K. Implementing Oracle Database Security
1. Industry Security Requirements
2. Principle of Least Privilege
3. Monitoring for Compliance
4. Value-Based Auditing
5. Fine-Grained Auditing
6. DBA Auditing
7. Security Updates
8. Applying Security Patches

L. Database Maintenance
1. Introducing Terminology
2. Optimizer Statistics
3. Automatic Workload Repository (AWR)
4. Automatic Database Diagnostic Monitor (ADDM)
5. Advisory Framework
6. Automated Maintenance Tasks
7. Server-Generated Alerts
8. Reacting to Alerts

M. Performance Management
1. Performance Monitoring
2. Managing Memory Components
3. Enabling Automatic Memory Management (AMM)
4. Automatic Shared Memory Advisor

5. Using Memory Advisors
6. Dynamic Performance Statistics
7. Troubleshooting and Tuning Views
8. Invalid and Unusable Objects

N. Backup and Recovery Concepts
1. Part of Your Job
2. Statement Failure
3. User Error
4. Understanding Instance Recovery
5. Phases of Instance Recovery
6. Using the MTTR Advisor
7. Media Failure
8. Archive Log Files

O. Performing Database Backups
1. Backup Solutions: Overview
2. Oracle Secure Backup
3. User-Managed Backup
4. Terminology
5. Recovery Manager (RMAN)
6. Configuring Backup Settings
7. Backing Up the Control File to a Trace File
8. Monitoring the Flash Recovery Area

P. Performing Database Recovery
1. Opening a Database
2. Data Recovery Advisor
3. Loss of a Control File
4. Loss of a Redo Log File
5. Data Recovery Advisor
6. Data Failures
7. Listing Data Failures
8. Data Recovery Advisor Views

Q. Moving Data
1. Moving Data: General Architecture
2. Directory Object: Overview
3. SQL*Loader: Overview
4. Data Pump: Overview
5. Performance Initialization Parameters
6. Using Enterprise Manager to Monitor Data Pump Jobs
7. Data Dictionary

R. Enhancing Database Capabilities
1. Using EM Support Workbench
2. Create a Service Request
3. Package and upload diagnostic data to Oracle Support
4. Track the SR and Implement Repairs
5. Incident Packaging Configuration
6. Working with Oracle Support
7. MetaLink Integration

VI. METHODS OF INSTRUCTION:
A. Chat rooms
B. Discussion boards
C. Lecture and classroom discussion
D. PowerPoint presentations
E. Read text and other supplemental sources (example, Internet sites)
F. Lab experience: hands-on lab assignments and database creation and manipulation
G. Computer demonstrations with overhead display panel

VII. TYPICAL ASSIGNMENTS:
A. Lecture 1. Grant security (e.g., system, object, and role privileges) 2. Grant execute security (e.g., definer and invoker rights) B. Reading 3. Read the chapter on Joins and Subqueries 4. Read the U.S. Department of Labor Bureau of Labor Statistics Occupational Outlook Handbook SQL jobs C. Hands-on lab assignment, write: 1. Display for each employee the employee number, last name, salary, and salary increased by 15% and expressed as a whole number. Label the column New Salary 2. Manage existing workspaces within an Oracle Application Express instance: Deleting a Workspace, Locking a Workspace, Managing Workspace to Schema Assignments

VIII. EVALUATION:
Methods/Frequency

A. Exams/Tests
B. Quizzes
C. Class Participation
D. Lab Activities
E. Other
1. Methods
a. Quizzes, chapter, midterm and final examination
b. Graded hands-on lab assignments
c. Relevant active participation

IX. TYPICAL TEXTS:
1. Dawes, Chip *OCA/OCP Oracle11g DBA Administration Study Guide.*, Sybex, 2009.
2. Oracle *Oracle iLearning.*, Oracle Corporation Curriculum, 2011.

X. OTHER MATERIALS REQUIRED OF STUDENTS:
A. Access to the World Wide Web with any major Web browser