Course Outline for CIS 9002

ORACLE: DATABASE DESIGN AND SQL PROGRAMMING

Effective: Spring 2016

I. CATALOG DESCRIPTION:
CIS 9002 — ORACLE: DATABASE DESIGN AND SQL PROGRAMMING — 3.00 units

In Database Design, students learn to analyze business scenarios and create data models, a conceptual representation of an organization's information. In Database Programming with SQL, students implement their database design by creating a physical database using Oracle Structured Query Language (SQL) to create, query, manipulate, and control access to the data in a relational database.. The SQL commands, functions, and operators supported by Oracle as extensions to standard SQL are emphasized. Students learn to create and maintain database objects such as tables, indexes, views, constraints, and sequences. Class is helpful in preparing students for the Oracle Certified Professional (OCP) exam.

2.50 Units Lecture 0.50 Units Lab

Strongly Recommended
CIS 57 - Database Concepts

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: 1

III. PREREQUISITE AND/OR ADVISORY SKILLS:

Before entering this course, it is strongly recommended that the student should be able to:

A. CIS57

IV. MEASURABLE OBJECTIVES:
Upon completion of this course, the student should be able to:
A. Analyze business scenarios and create data models
B. Transform business requirements into an operational database;
C. Create physical relational database tables to implement a database design;
D. Manage a business project that delivers a database design and model for a potential client;
E. Create, maintain, and manipulate database objects;
F. Write SQL SELECT statements that display data from single or multiple tables;
G. Describe the physical and logical storage of the database, and be able to manage space allocation and growth;
H. Create and manage tables views, constraints, synonyms, sequences, and indexes;
I. Restrict, sort, aggregate, and manipulate data using both single and group functions;

V. CONTENT:
A. Database Design
 1. Introduction
  a. Introduction to the Oracle Academy
  b. Data vs Information
  c. History of the Databases
 2. DB Models concepts and terminology
  a. Conceptual and Physical Models
  b. Entities and Instances Attributes and Unique Identifiers
  c. Entity relationship modeling and ERDs
 3. Entity Relationship Diagramming
  a. Identifying Relationships
  b. ER Diagramming Conventions
  c. Drawing Relationships and Speaking ERDish
  d. Supertypes and Subtypes

      e. Documenting Business Rules
      f. Relationship Transferability
      g. Relationship Types
      h. Resolving Many-to-Many Relationships
      i. Normalization and First Normal Form
   4. Unique Identifiers and Normalization
      a. Normalization and First Normal Form
      b. Second Normal Form
      c. Review of Unique Identifiers
      d. Third Normal Form and Identification
      e. Review of Unique Identifiers
      f. Artificial, composite, and secondary UID
   5. DB Modeling
      a. Drawing Conventions for Readability
      b. Generic Modeling
      c. Introduction to Relational Database Concepts
      d. Basic Mapping: The Transformation Process
      e. Relationship Mapping
      f. Subtype Mapping
   6. DB SQL
      a. Intro to Oracle Development Environment (APEX)
      b. SQL Introduction: Querying the Database
      c. Basic Table Modifications
B. Database Programming
   1. Introduction
      a. List the Oracle Database main features
      b. Review Oracle Development Environment (APEX)
      c. Explore DB objects in APEX
   2. Retrieving Data Using the SQL SELECT Statement
      a. Anatomy of SQL statement
      b. Oracle DB environment
      c. SQL syntax
      d. selecting columns with SELECT statement
   3. Restricting Rows, using Functions
      a. Logical comparisons and precedence rules
      b. Sorting rows
      c. Intro to single row functions
      d. Using the WHERE clause to retrieve specific rows
      e. Limit rows selected
      f. Comparison operators
   4. Using Single Row Functions
      a. Coversion functions
      b. NULL functions
      c. Conditional expressions
   5. Using Character, Number, and Date Functions
      a. Case and character manipulation
      b. Number functions
      c. Date function
      d. Use the group functions
   6. Executing Database Joins
      a. Cross joins and natural joins
      b. Join clauses
      c. Inner vs outer joins
      d. Self joins and hierarchial queries
      e. Cartesian product and the JOIN operations
      f. NONEQUIJOINS
      g. OUTER joins
   7. Work with Group Functions
      a. Review of joins
      b. GROUP functions
      c. COUNT, DISTINCT, NVL
   8. Using Comples SQL with Aggregated Data
      a. Using GROUP BY and HAVING clauses
      b. Using ROLLUP and CUBE operations, and GROUPING SETS
      c. Using SET operators
   9. Creating Subqueries
      a. Fundamentals of subqueries
      b. Single row subqueries
      c. Multiple-row subqueries
      d. Correlated subqueries
   10. Constructing DML Statements
      a. INSERT statements
      b. Updating column values and deleting rows
      c. DEFAULT values, MERGE, and multi-table inserts
   11. Working with DDL Statements
      a. reating tables
      b. Using data types
      c. Modifying a table
   12. Creating and Managing Views
      a. Creating Views
      b. DML Operations and Views
      c. Managing Views
      d. Sequences
      e. Indexes and Synonyms
   13. Fundamentals of Database Security
      a. Controlling user access
      b. Creating and revoking object privileges
      c. Regular expressions

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

VII. TYPICAL ASSIGNMENTS:
   A. Research the U.S. Department of Labor Bureau of Labor Statistics Occupational Outlook Handbook for SQL jobs, write a one page summary of your finds, post on discussion board
   B. Hands-on lab assignment, write the SQL program to: 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
   C. Create the Entity Relationship Diagram from the posted business scenerio

VIII. EVALUATION:
   A. **Methods**

      1. Exams/Tests
      2. Quizzes
      3. Class Participation
      4. Lab Activities

   B. **Frequency**

      1. Chapter quizzes, examinations (mid-term, final)
      2. Weekly hands-on lab assignments to reinforce and demonstrate mastery of the various tools
      3. Activate participation on a weekly basis including discussion board and chat

IX. TYPICAL TEXTS:
   1. Dawes, Chip. *OCA/OCP Introduction to Oracle11g SQL Study Guide.*, Sybex, 2013.
   2. Oracle Corporation. *Oracle iLearning.* 2015 ed., Oracle Corporation Curriculum, 2015.

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