In this class, students will learn how to create, retrieve, and manipulate objects in Oracle® 10g Structured Query Language (SQL). Students will also be introduced to Oracle 10g database features and tools. Students will go on to develop deeper insight into relational database design and RDBMS operation, learn concepts and specific SQL syntax for extended Oracle datatypes, learn analysis and tuning techniques to increase SQL performance, and master advanced features of Oracle SQL for large data sets and data warehouses.

**Audience:** Application developers, database administrators, system administrators and users who write applications and procedures that access an Oracle 10g database.

**Prerequisites:** None.

**Number of Days:** 5 days

<table>
<thead>
<tr>
<th>1. Relational Database and SQL Overview</th>
<th>4. Scalar Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review of Relational Database</td>
<td>IN and BETWEEN</td>
</tr>
<tr>
<td>Terminology</td>
<td>The LIKE Operator</td>
</tr>
<tr>
<td>Relational Database Management Systems</td>
<td>Creating Some Order</td>
</tr>
<tr>
<td>Introduction to SQL</td>
<td>5. SQL Queries - Joins</td>
</tr>
<tr>
<td>Oracle Versioning and History</td>
<td>Selecting from Multiple Tables</td>
</tr>
<tr>
<td>Logical and Physical Storage Structures</td>
<td>Joining Tables</td>
</tr>
<tr>
<td>Connecting to a SQL Database</td>
<td>Self Joins</td>
</tr>
<tr>
<td>Datatypes</td>
<td>Outer Joins</td>
</tr>
<tr>
<td>Sample Database</td>
<td>Types of Outer Joins</td>
</tr>
</tbody>
</table>

| 2. Using Oracle SQL*Plus              | 6. Aggregate Functions and Advanced Techniques |
| SQL*Plus                              | Subqueries          |
| The SQL Buffer                        | Correlated Subqueries|
| Buffer Manipulation Commands          | The EXISTS Operator |
| Running SQL*Plus Scripts              | The Aggregate Functions|
| Tailoring Your SQL*Plus Environment   | Grouping Rows       |
| Viewing Table Characteristics         | Combining SELECT Statements |
| SQL*Plus Substitution Variables      | 7. Data Manipulation and Transactions |
| Interactive SQL*Plus Scripts         | The INSERT Statement |
| Using iSQL*Plus                       | The UPDATE Statement|

| 3. SQL Queries - The SELECT Statement | |
| The SELECT Statement                 | The DELETE Statement |
| The CASE...WHEN Statement            | |
| Choosing Rows with the WHERE Clause  | |
| NULL Values                          | |
| Compound Expressions                 | |
Transaction Management
Concurrency
Explicit Locking
Data Inconsistencies
Loading Tables From External Sources

8. Data Definition and Control
   Statements
   Standard Datatypes
   Defining Tables
   Constraints
   Inline Constraints
   Modifying Table Definitions
   Deleting a Table Definition
   Controlling Access to Your Tables

9. Other Database Objects
   Views
   Creating Views
   Updateable Views
   Sequences
   Synonyms

10. Database Design Concepts
    Relational Databases
    The Relational Model
    Relational Operations
    The Database Design Process
    Normalization
    Second and Third Normal Forms
    Other Normal Forms
    Applications for Relational Databases

11. SQL Subqueries
    Overview Of Subqueries
    Inline Views
    Correlated Subqueries
    EXISTS Clause vs. IN Clause
    Group Comparisons: ANY and ALL
    Scalar Subquery Expression
    Subqueries and DML Statements
    Subquery Factoring: The WITH Clause
    Top-N and Bottom-N analysis
    CREATE TABLE and Subqueries

12. Hierarchical Queries
    Hierarchical Data
    Hierarchical Terminology
    Hierarchical Query
    Hierarchical Pseudocolumns
    SYS_CONNECT_BY_PATH
    Processing Hierarchical Queries

13. Object Types
    Object-Oriented Programming
    Oracle's Object Relational Model
    Creating Object Types
    Querying Object Types
    DML with Object Types
    Object Methods
    Object Views
    VARRAY's
    Nested Tables

14. Times, Dates, and Strings
    Datetime Fields
    Dates and Timestamps
    Intervals
    Date and Interval Literals
    Date Arithmetic
    Date Functions
    Character Types
    Session and Database Parameters
    REGEXP Functions
    Regular Expressions Supported by REGEXP
    Applying REGEXP Functions

15. Temporary Tables
    Undo and Redo
    Temporary Tables Defined
    Data Lifetime — Transaction vs. Session
    Creating Temporary Tables
    Managing Temporary Tables
    Storage of Temporary Tables
    Effects of DML and TRUNCATE

16. SQL Tuning Tools
    Automated Statistics Gathering
    The DBMS_STATS Package
    SQL Tuning Advisor
    SQL Tuning Sets
    SQL Access Advisor
    Retrieving Execution Plans
    EXPLAIN PLAN
    Using DBMS_XPLAN
    Interpreting Explain Plan Results
    SQL Trace
    TKPROF

17. SQL Tuning
    Tuning Goals
    The Optimizer
    Optimizer Statistics
Identifying SQL to Tune
Optimizer Hints
Optimizer Goal Hints
Access Path Hints
Join Hints
Additional Hints
Plan Stability
Creating Stored Outlines

18. **Indexes**
Indexes
B-tree and Composite Indexes
Reverse Key and Unique Indexes
Function-Based Indexes
Bitmap Indexes
Index-Organized Tables
Managing Indexes

19. **Oracle Analytic Functions**
Analytic Functions
OVER, PARTITION BY, and ORDER BY
Windowing
ROLLUP
CUBE
Grouping Sets
RANK
Modeling
Model Clauses

20. **Data Warehouse Features**
Partitioned Tables
Partitioning Methods
Partition Pruning and Partition-wise Joins
Bitmap Indexes
Materialized Views
Creating Materialized Views
Refreshing Materialized Views
The MERGE Statement
Multi-table INSERT Statements
Parallel Statements

21. **Formatting Reports with SQL*Plus**
Page Formatting
Computations
SQL*Plus Options for Formatting
Saving the Output
Data Extraction with SQL*Plus

22. **Appendix A - The Data Dictionary**
Introducing the Data Dictionary

© ITCourseware, LLC
Oracle® 10g SQL Programming 3