COURSE NAME:	Oracle Database Foundation
TOTAL DURATION:	45 Hrs
MODE OF DELIVERY	Virtual Instructor led by Industry Experts + Physical Session facilitated by FDP faculty
TRAINER TO STUDENT RATIO:	1:50
TOTAL MARKS:	75

Table 1	
OVERALL COURSE OBJECTIVE:	1. Evaluate the principles of relational database management systems (RDBMS) and their applications in organizing and managing large datasets. 2. Develop skills to construct and manipulate structured database objects using SQL, ensuring data accuracy and integrity. 3. Design and execute advanced SQL queries for data retrieval, aggregation, and analysis to support decision-making processes. 4. Implement advanced database features like indexing, partitioning, and recovery tools to optimize performance and scalability. 5. Create efficient, secure, and scalable database solutions tailored to real-world organizational needs.

LEARNING OUTCOME:	1. **Categorize database components and features, demonstrating their roles in relational data structures and management.** 2. **Construct efficient SQL queries for retrieving and manipulating data across multiple tables and conditions.** 3. **Design and execute database schemas, ensuring proper application of constraints, relationships, and data integrity measures.** 4. **Implement advanced features, such as indexing, LOBs, and partitioned tables, to enhance database performance and scalability.** **5. Evaluate complex datasets using advanced queries and tools, translating data into actionable insights for organizational goals.**

TABLE 2: MODULE WISE COURSE CONTENT AND OUTCOME				
SL.NO	**MODULE NAME**	**MODULE CONTENT**	**MODULE LEARNING OUTCOME**	**DURATION (HRS)**
1	Introduction to Oracle SQL and Database Concepts	- Basics of relational databases - Oracle database architecture overview - Understanding SQL types - Oracle SQL Developer interface - Setting up and accessing Oracle Database	Categorize the components of Oracle Database architecture and outline the fundamental concepts of relational databases.	8
2	Data Retrieval and Filtering Techniques	- SELECT statements - WHERE clause filters - Sorting with ORDER BY - SQL functions (single-row) - Fetching data with joins	Construct accurate queries using SELECT and WHERE clauses, and evaluate joins and functions to manipulate data for specific use cases.	11
3	Data Definition and Manipulation with Oracle SQL	- DDL commands (CREATE, ALTER, DROP) - Managing tables and constraints - DML commands (INSERT, UPDATE, DELETE) - Managing transactions - Creating and using sequences	Design and develop structured database tables, apply constraints, and formulate efficient DML commands to manage and manipulate data.	10

4	Data Aggregation, Grouping, and Complex Queries	- GROUP BY and HAVING clauses - Subqueries - Set operators (UNION, INTERSECT, MINUS) - Creating and managing views	Organize complex queries using GROUP BY, HAVING, and subqueries to justify aggregation logic and data views.	9
5	Advanced SQL Concepts and Oracle Features	- Analytical and aggregate SQL functions - Working with Large Objects (LOBs) - Partitioned tables and indexes - Virtual and invisible columns - Oracle Flashback features	Create advanced database features like LOBs and partitioned tables, defend their use cases, and innovate recovery mechanisms using Oracle Flashback.	7

TABLE 3: OVERALL COURSE LEARNING OUTCOME ASSESSMENT CRITERIA AND USE CASES			
LEARNING OUTCOME	**ASSESSMENT CRITERIA**	**Performance Criteria**	**USE CASES**
Evaluate Relational database principles	Evaluate foundational database concepts.	Demonstrates an understanding of relational tables, keys, and relationships.	Design a relational database for a retail company to track customers, orders, and inventory.
Construct SQL queries for data retrieval	Assess the ability to retrieve and filter data.	Writes efficient SELECT statements and applies WERE and ORDER BY clauses effectively.	Retrieve customer purchase histories from a relational database for trend analysis.
Design and manipulate structured database objects	Evaluate knowledge of DDL and DML commands.	Successfully designs tables, applies constraints, and performs INSERT, UPDATE, and DELETE operations.	Create tables for a hospital management system to store patient and staff data, enforcing unique constraints and relationships.
Implement advanced queries and database optimizations	Test the use of advanced SQL queries.	Combines multiple tables and aggregates data using GROUP BY, subqueries, and set operators efficiently.	Generate monthly financial reports by aggregating data across sales and expense tables.
Develop advanced database features	Assess the ability to apply Oracle-specific features like LOBs and indexes.	Implements LOBs, partitioned tables, and indexes, improving database performance and scalability.	Create an indexing strategy for a large e-commerce database to speed up product

			searches and order retrieval.

TABLE 4: LIST OF FINAL PROJECTS (PROJECTS THAT COMPREHENSIVELY COVER ALL THE LEARNING OUTCOME)

SL.NO	FINAL PROJECT
1	Building a Comprehensive Relational Database Management System with Advanced SQL Queries
2	AI-Driven Data Analysis Platform Using Advanced SQL Queries for Real-Time Reporting
3	Designing a High-Performance Database Schema with Normalization Techniques for Scalable Systems
4	Implementing SQL-Based User Access Control and Security Measures for Sensitive Data
5	Creating a Multi-Tier Database Architecture with Views, Indexes, and Stored Procedures for Optimized Queries
6	Advanced SQL Query Optimization for Large-Scale Data Analytics Systems
7	Automated Data Security System Using SQL Commands for User Permissions and Role Management
8	Implementing Database Normalization and Denormalization Strategies for Performance Enhancement
9	Designing and Managing Complex SQL Views for Business Intelligence and Reporting
10	Building a Custom SQL Query Tool for Real-Time Data Insights and Decision Support
11	SQL-Driven Data Governance Framework for Database Security and Integrity

12	Advanced Data Aggregation Techniques Using SQL for Predictive Analytics and Reporting
13	Implementing Data Access Layers with Stored Procedures for Secure Data Manipulation
14	Building a Real-Time Query Execution Engine for Large Data Sets Using SQL Optimization
15	Developing a Database Maintenance Automation Tool Using SQL Scripts and Stored Procedures
16	SQL-Based Data Encryption and Masking Techniques for Enhancing Database Security
17	Implementing a Role-Based Access Control System Using SQL Commands for Secure Data Management
18	Designing a Data Archiving and Cleanup Strategy Using SQL for Efficient Data Storage Management
19	Building a Data Quality Assurance System Using SQL for Validation and Auditing
20	Advanced Reporting System with Custom SQL Queries and Stored Procedures for Dynamic Data Visualization

TABLE 5: COURSE ASSESSMENT RUBRICS (TOTAL MARKS: 75)					
ASSESSMENT CRITERIA	**Learning Outcome**	**Fair (1–5)**	**Good (6–10)**	**Excellent (11–15)**	**TOTAL MARKS**
Relational Database Concepts	Evaluate relational database principles.	Demonstrates limited knowledge of database concepts and relationships.	Shows a good grasp of database principles with effective examples of relationships and data structures.	Exhibits deep understanding, with the ability to categorize and structure complex database models.	15
SQL Query Construction	Construct SQL queries for data retrieval.	Writes basic queries but lacks precision in filtering and sorting data.	Produces accurate and functional SQL queries with some complexity in filtering and joins.	Develops highly efficient queries with advanced filtering, sorting, and data manipulation techniques.	15
Database Object Design	Design and manipulate structured database objects.	Designs basic tables but shows gaps in applying constraints and maintaining data integrity.	Creates structured tables with appropriate constraints and efficient data manipulation.	Develops highly optimized tables and constraints, ensuring superior data integrity and usability.	15

Advanced SQL Techniques	Implement advanced queries and database optimizations.	Applies basic aggregation and subqueries with limited efficiency.	Develops functional queries using aggregation, set operators, and subqueries effectively.	Creates optimized queries for complex data retrieval and aggregation, justifying advanced database techniques.	15
Advanced Database Features	Develop advanced database features for scalability.	Implements basic features like indexes with minimal impact on performance.	Effectively uses advanced features, demonstrating improved performance and scalability.	Innovates with advanced features like LOBs, partitioned tables, and Flashback, ensuring comprehensive optimization.	15