

CTR-505 SQL

About This Course

This SQL course provides a comprehensive understanding of SQL (Structured Query Language), which is used for managing and manipulating relational databases. The course covers fundamental concepts, advanced topics, and practical applications to equip students with the skills required to work with SQL in real-world scenarios.

Audience Profile

This course is designed for beginners who are new to SQL as well as professionals looking to refresh or deepen their knowledge. It is ideal for aspiring database administrators, developers, data analysts, and anyone interested in working with databases.

Course Details

Module 1: Introduction to SQL

- Overview of Databases
- Understanding Relational Databases
- Introduction to SQL and its uses
- SQL Syntax and Structure
- Basic SQL Commands: SELECT, FROM, WHERE

Module 2: Advanced SQL Queries

- Sorting and Filtering Data (ORDER BY, DISTINCT, LIMIT)
- Using Joins to Combine Tables (INNER JOIN, LEFT JOIN, RIGHT JOIN)
- Subqueries and Nested Queries
- Using UNION and UNION ALL
- Handling Null Values

Module 3: SQL Functions and Aggregations

- Aggregate Functions: COUNT, SUM, AVG, MIN, MAX
- Grouping Data with GROUP BY

- Filtering Groups with HAVING
- Date and String Functions
- Mathematical Functions

Module 4: Data Modification

- Inserting Data into Tables (INSERT INTO)
- Updating Existing Data (UPDATE)
- Deleting Data (DELETE)
- Using Transactions for Data Integrity
- Understanding and Handling Locks

Module 5: Database Design and Normalization

- Principles of Database Design
- Understanding Primary Keys and Foreign Keys
- Normalization and Denormalization
- Creating and Modifying Tables
- Indexing for Performance

Module 6: Advanced Topics

- Views: Creating and Using Views
- Stored Procedures and Functions
- Triggers: Definition and Use Cases
- Error Handling and Exception Management
- Dynamic SQL

Module 7: SQL Performance Tuning

- Analyzing Query Performance
- Using Execution Plans
- Optimizing SQL Queries
- Index Tuning and Maintenance
- Best Practices for SQL Performance

Module 8: Working with Different SQL Databases

- Overview of Popular SQL Databases (MySQL, PostgreSQL, SQL Server, Oracle)

- Differences and Specific Features
- Connecting to Different Databases
- Cross-Database Queries
- Migration Between Databases

Module 9: Practical Applications and Project

- Case Studies and Real-World Scenarios
- Practical Exercises and Challenges
- Final Project: Designing and Implementing a Database Solution
- Presentation and Review of Projects
- Q&A and Wrap-Up

Prerequisites

- Basic understanding of computer operations
- Familiarity with any programming language is helpful but not required