

Wave Techtronics

Address: 219 Indira Nagar Near Asian School Dehradun, Dehradun Uttarakhand, Bharat-248001
Contact: 9720335341, 8755999176 **Email:** wavetechtronics.co@gmail.com , **Web:** www.wavetechtronics.in

Course Title: Introduction to SQL

Course Overview:

This course provides an introduction to Structured Query Language (SQL), focusing on database concepts, querying data, and database management using SQL. It covers fundamental SQL operations, data manipulation, database design principles, and practical applications.

Prerequisites:

- Basic understanding of databases and data management concepts.
- Familiarity with fundamental programming concepts (variables, loops, functions).

Course Outline:

Module 1: Introduction to Databases and SQL

1.1. Overview of Databases

- Introduction to database management systems (DBMS)
- Types of databases (relational, NoSQL, etc.)
- Importance of data management

1.2. Introduction to SQL

- What is SQL?
- History and evolution of SQL
- SQL standards and implementations

1.3. SQL Data Types

- Common data types in SQL (integer, varchar, date, etc.)
- Data type constraints
- Choosing appropriate data types

Module 2: SQL Basics

2.1. SQL Syntax and Queries

- Basic SQL syntax rules
- SELECT statement: Retrieving data from tables
- Filtering data using WHERE clause

2.2. Sorting and Filtering Data

- Sorting data using ORDER BY clause
- Filtering data using comparison operators
- Using logical operators (AND, OR, NOT)

2.3. Aggregate Functions

- Introduction to aggregate functions (SUM, AVG, COUNT, etc.)
- Grouping data using GROUP BY clause
- Filtering grouped data with HAVING clause

Module 3: Data Manipulation with SQL

3.1. Data Manipulation Language (DML)

- INSERT statement: Inserting records into tables

- UPDATE statement: Updating existing records
- DELETE statement: Deleting records from tables
- TRUNCATE statement: Removing all records from a table

3.2. Inserting, Updating, and Deleting Data

- Inserting records into tables
- Updating existing records
- Deleting records from tables
- Truncating tables

3.3. Modifying Table Structure

- Data Definition Language (DDL)
- ALTER TABLE statement: Adding, modifying, and dropping columns
- RENAME statement: Renaming tables and columns
- CONSTRAINT statement: Defining data integrity constraints

Module 4: Database Design and Management

4.1. Database Design Principles

- Entity-relationship model (ER model)
- Normalization techniques
- Data integrity constraints

4.2. Creating and Managing Databases

- CREATE DATABASE statement: Creating databases
- CREATE TABLE statement: Creating tables
- Managing database objects (indexes, views, sequences)
- Backup and restore operations

4.3. Transactions and Concurrency Control

- Understanding transactions
- Transaction properties (ACID)
- Concurrency control mechanisms

Module 5: Advanced SQL Concepts

5.1. Joins and Subqueries

- Types of joins (INNER, OUTER, CROSS, SELF)
- Writing subqueries for complex queries
- Combining multiple queries with UNION and UNION ALL

5.2. Views and Stored Procedures

- Creating and managing views
- Benefits of using stored procedures
- Writing and executing stored procedures

5.3. SQL Best Practices and Optimization

- Writing efficient queries
- Indexing strategies
- Performance tuning techniques