



**IDM TECHPARK**  
GUIDE'S FOR PERFECT CAREER PATHWAY



# SQL Course Syllabus



**N.S.D.C**  
National  
Skill Development  
Corporation



# About Us

IDMTECHPARK global retail & corporate training solutions provider in Coimbatore, Erode, Trichy & Salem that offers a comprehensive range of training and placement services for both fresher's and professionals seeking new opportunities. The company commenced its IT training business in 2016. A pioneer in IT education, over the years, we have trained over 50k students. Idmtechpark has a wide range of courses, maintains education standards & provides placement assistance.

[www.idmtechparkcoimbatore.com](http://www.idmtechparkcoimbatore.com)  
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# About IDMTECHpark Education Quality

IDMTECHPARK is managed and developed by industry specialists with more than 8 years of expertise in the field. IDMTECHPARK offers a staff of highly skilled professional trainers who deliver effective IT training in a friendly setting, concentrating on the needs of each individual to help them succeed in a demanding work world. In the book of career and success, our staff never leaves a page unturned.

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IDMTECHPARK's versatile instructor-led training class rooms and lower-class sizes enable people to engage more easily and absorb knowledge, resulting in remarkable results for both themselves and the organizations for which they work. Our training programmes are adaptable and customizable to ensure that each participant gets the most out of their time with us. IDMTECHPARK focuses in providing hands-on IT training in over 30 different courses.

- We teach in-demand courses
- We provide impactful learning material
- Our teachers are well-selected & trained
- We follow world-class teaching methods
- Our courses include E-Projects
- We conduct technical workshops
- Exams are held and based on Exams providing Certification
- Certificates are recognized the world over
- Our course timings are flexible





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# Our Recent Placement

Idmtechpark assists students in getting job placements on successful completion of their courses. Idmtechpark also provides recruitment assistance to organizations. Idmtechpark students are shortlisted based on the organization's requirement. To make students job-ready, Idmtechpark conducts workshops e.g. How to do Group Discussions, how to behave in a Personal Interview. From time to time, job fairs & campus recruitments are conducted. Workplace skills such as time management, making effective presentations and communication skills are also provided. All this helps students find appropriate jobs in the IT industry while also helping save companies recruitment costs.

**Krishnaveni M**

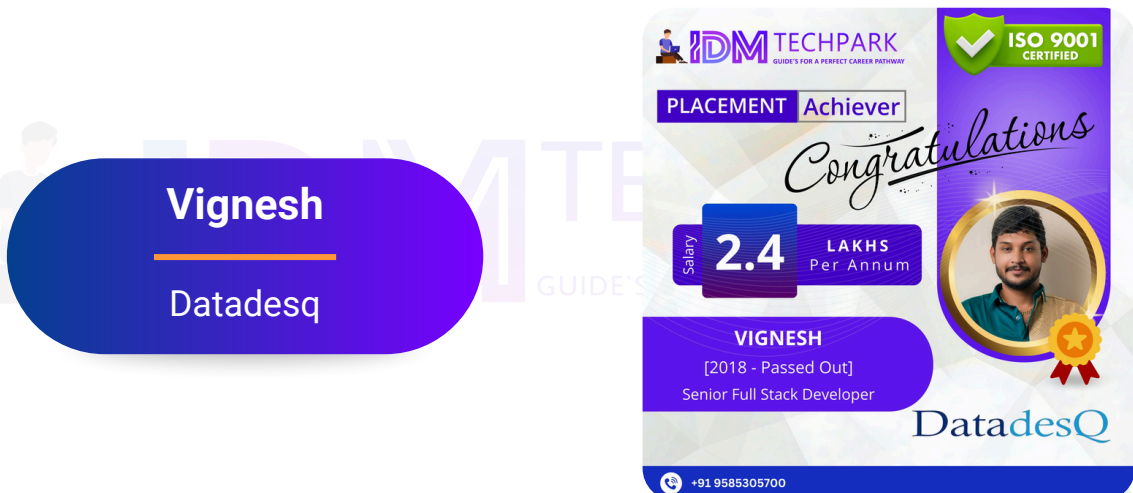
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**Madhumitha**

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**Brindha Boopathi**

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**Gowthami**

Genpact



**Surya**

ZUCI



**Pavithra**

Vel Info Tech



**Poovitha**

Gray Matter



**Ramesh**

TDT

**Siva Sankar**  
ST Cloudspark tech



**Nabeel Hisham**  
VTail

**Kalayarasan**  
Violet Infotech



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# Our Alumni Working At



## MODULE 1

# Introduction to SQL and Databases

- What is SQL? Overview of SQL and its uses
- Introduction to databases (relational vs non-relational)
- Relational Database Management Systems (RDBMS)
- Understanding tables, rows, columns, and relationships
- Overview of database design principles
- Installing and configuring an RDBMS (MySQL, PostgreSQL, SQL Server)
- Creating a database and tables



## MODULE 2

# Basic SQL Syntax

- Introduction to SQL syntax and conventions
- Writing simple SQL queries
- SELECT statement and retrieving data
- Filtering data using the WHERE clause
- Sorting results with ORDER BY
- Limiting results using LIMIT and TOP
- SQL data types (INT, VARCHAR, DATE, etc.)

## MODULE 3

# SQL Operators and Expressions

- Arithmetic operators (+, -, \*, /)
- Comparison operators (=, !=, <>, <, >, <=, >=)
- Logical operators (AND, OR, NOT)
- BETWEEN, IN, LIKE, and IS NULL operators
- Working with NULL values and handling them in SQL
- Using the CASE statement for conditional logic

## MODULE 4

# Advanced SELECT Queries

- Using DISTINCT to remove duplicate rows
- Using aggregate functions (COUNT, SUM, AVG, MIN, MAX)
- Grouping data with GROUP BY
- Filtering groups with HAVING
- Multiple conditions in WHERE, HAVING, and SELECT clauses
- Combining aggregate functions with GROUP BY

## MODULE 5

# Joining Tables

- Introduction to joins and table relationships
- INNER JOIN: Combining rows from two tables
- LEFT JOIN (OUTER JOIN): Retrieving unmatched rows from the left table
- RIGHT JOIN (OUTER JOIN): Retrieving unmatched rows from the right table
- FULL JOIN: Retrieving unmatched rows from both tables
- SELF JOIN: Joining a table to itself
- Using JOIN with multiple tables



## MODULE 6

# Subqueries

- Introduction to subqueries
- Using subqueries in SELECT, WHERE, and FROM clauses
- Correlated vs non-correlated subqueries
- Subqueries in SELECT (retrieving a column value)
- Subqueries in WHERE (filtering based on another query)
- Subqueries in INSERT, UPDATE, and DELETE statements
- Performance implications of subqueries

## MODULE 7

# Data Manipulation with SQL

- Inserting data with the INSERT INTO statement
- Updating data using the UPDATE statement
- Deleting data using the DELETE statement
- Understanding data constraints (NOT NULL, UNIQUE, CHECK)
- Using the INSERT INTO SELECT statement
- Using the UPDATE with JOIN
- Using DELETE with conditions

## MODULE 8

# Constraints and Indexing

- Introduction to constraints (PRIMARY KEY, FOREIGN KEY, UNIQUE, NOT NULL)
- Defining primary keys and foreign keys
- Referential integrity and cascading updates/deletes
- Creating and using indexes to speed up queries
- Unique indexes and composite indexes
- Index performance considerations and best practices

## MODULE 9

# Transactions and Concurrency

- Introduction to transactions in SQL
- ACID properties (Atomicity, Consistency, Isolation, Durability)
- COMMIT and ROLLBACK commands
- Managing transactions with SAVEPOINT
- Isolation levels and their impact on concurrency (READ COMMITTED, SERIALIZABLE)
- Handling deadlocks in SQL
- Locking mechanisms and transaction control



## MODULE 10

# Views and Stored Procedures

- Introduction to Views in SQL
- Creating and using views (SELECT, INSERT, UPDATE, DELETE with views)
- Advantages and disadvantages of views
- Stored Procedures: Definition, creation, and execution
- Passing parameters to stored procedures
- Modifying data inside a stored procedure
- Using stored procedures for complex business logic

## MODULE 11

# Functions and Triggers

- Introduction to SQL functions (Scalar and Aggregate)
- Creating and using functions in SQL
- Built-in SQL functions: String, Date/Time, Mathematical functions
- Using triggers to automate actions (BEFORE, AFTER, INSTEAD OF triggers)
- Creating triggers for INSERT, UPDATE, DELETE operations
- Using triggers for auditing and data validation

## MODULE 12

# Normalization and Database Design

- Introduction to database normalization
- The different normal forms (1NF, 2NF, 3NF, BCNF)
- Denormalization and when to use it
- Identifying functional dependencies in relational models
- Designing a normalized relational schema
- Dealing with anomalies (update, insert, delete anomalies)
- Example of database normalization process

## MODULE 13

# Advanced Joins and Set Operations

- Advanced JOIN techniques (Multiple JOINS, Nested JOINS)
- Using JOINS with GROUP BY and HAVING
- Set operations: UNION, UNION ALL, INTERSECT, EXCEPT
- Differences between UNION and UNION ALL
- Using joins with subqueries
- Handling NULLs in joins and set operations

## MODULE 14

# Working with Temporary Tables

- Introduction to temporary tables in SQL
- Creating and using local and global temporary tables
- Benefits of using temporary tables in queries
- Storing intermediate results in temporary tables
- Dropping temporary tables
- When to use temporary tables for performance optimization

## MODULE 15

# Full-Text Search

- Introduction to full-text search in databases
- Implementing full-text search in SQL Server, MySQL, and PostgreSQL
- Creating full-text indexes
- Performing full-text searches using MATCH() and AGAINST() (MySQL) or tsvector (PostgreSQL)
- Fine-tuning and optimizing full-text search queries
- Using full-text search for complex search operations



## MODULE 16

# Window Functions and Analytics

- Introduction to window functions in SQL
- Using window functions for ranking (ROW\_NUMBER, RANK, DENSE\_RANK)
- Using window functions for aggregation (SUM, AVG, COUNT, etc.)
- OVER() clause and partitioning data
- Using LEAD and LAG for working with previous/next rows
- Examples of complex window functions in SQL

## MODULE 17

# Error Handling and Debugging in SQL

- Handling errors in SQL queries
- Using TRY...CATCH for error handling in SQL Server
- Using EXCEPTION handling in PostgreSQL
- Understanding SQL execution plans and query optimization
- Debugging complex queries using SQL logs
- Identifying and resolving common SQL performance issues

## MODULE 18

# Data Import and Export

- Importing data into SQL from CSV, Excel, and other formats
- Exporting data from SQL to CSV, Excel, and other formats
- Using the LOAD DATA command in MySQL
- Using COPY command in PostgreSQL
- Data conversion and formatting during import/export
- Automating data import/export with SQL scripts and batch jobs

## MODULE 19

# Performance Tuning and Query Optimization

- Introduction to query performance tuning
- Using EXPLAIN and EXPLAIN ANALYZE to understand query execution plans
- Optimizing SELECT queries (indexes, avoiding subqueries)
- Indexing strategies for better performance
- Query rewriting for better performance
- Optimizing joins, aggregations, and subqueries
- Caching results and optimizing I/O operations

## MODULE 20

# Advanced Database Security

- Database security principles and best practices
- Using encryption for data storage and communication
- Managing user roles and permissions (GRANT, REVOKE)
- Using least privilege principle for database access control
- Auditing and monitoring SQL databases
- Preventing SQL injection attacks
- Securing backup and restoration processes



## MODULE 21

# Database Backup and Recovery

- Introduction to database backup strategies
- Types of backups: Full, Incremental, Differential
- Automating backups using SQL scripts
- Restoring data from backups (full and point-in-time recovery)
- Using transaction logs for point-in-time recovery
- Backup strategies for high-availability systems
- Disaster recovery planning and testing

## MODULE 22

# Database Migration and Version Control

- Introduction to database migration
- Managing schema changes using migration tools
- Using database version control tools (Flyway, Liquibase)
- Handling database versioning with SQL scripts
- Rolling back database migrations and changes
- Deploying changes to production databases safely
- Schema comparison and synchronization

## MODULE 23

# Distributed SQL Databases and Clustering

- Introduction to distributed SQL databases
- Database clustering and replication techniques
- Master-slave replication in MySQL and PostgreSQL
- High availability and fault tolerance in SQL databases
- Load balancing for SQL databases
- Partitioning data in distributed SQL systems
- Choosing the right distributed SQL database

## MODULE 24

# Advanced SQL Features

- Recursive queries using Common Table Expressions (CTEs)
- Working with hierarchical data in SQL
- Using PIVOT and UNPIVOT for data transformation
- Advanced indexing techniques (Spatial Indexes, Full-text Indexes)
- Using JSON data type in SQL (PostgreSQL, MySQL)
- Advanced date/time operations in SQL
- Temporal tables in SQL Server and PostgreSQL

## MODULE 25

# SQL in Cloud Databases

- Introduction to cloud databases (AWS RDS, Azure SQL Database, Google Cloud SQL)
- Managing databases in the cloud
- Configuring high availability and backup in cloud databases
- Integrating SQL databases with cloud services
- Scaling SQL databases in the cloud
- Monitoring and troubleshooting cloud SQL databases
- Cloud database security considerations

# Thank You

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