SQL FOR DATA PROFESSIONALS TRACK – 2025 EDITION

" Speak the language of data."

Market Demand Note

SQL is the most widely used language for storing, retrieving, and analyzing structured data. Every industry — from finance to e-commerce — relies on

📘 SQL for Data Professionals Track — 2025 Edition

Table of Contents

SQL for Data Professionals – Table of Contents

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- Aggregate Functions: COUNT, SUM, AVG, MIN, MAX
- GROUP BY, HAVING for Data Summarization
- Window Functions: ROW_NUMBER, RANK, DENSE_RANK, Running Totals
- Introduction to Stored Procedures: Syntax, Parameters, Control Flow
- Hands-on Lab: Sales Summary Reports, Simple SPs for Data Validation
- Advanced Practice: SP for Sales Aggregation and Anomaly Detection
- Assignment: Build and Test Your First Stored Procedure

Week 5: Data Quality, Automation, CI/CD & Stored Procedures Deep Dive

- Stored Procedures Deep Dive: Complex Logic, Error Handling, Transactions
- Automating SQL Workflows: Scheduling with pgAgent/cron, Integration with Python/Airflow
- Data Quality & Validation in SPs
- Version Control & CI/CD: Git for SQL Scripts, Testing with pgTAP
- Cloud Integration: Deploying to AWS RDS/GCP Cloud SQL
- Hands-on Lab: Automate Nightly ETL with SPs, Implement Git Hooks for SQL Linting/Testing
- Assignment: Refactor ETL Logic into SPs and Automate

Week 6: Capstone Project – E-Commerce Analytics Platform

- Project Scope: End-to-End Reporting System for E-Commerce Data
- Complex Queries: Multi-Table Joins, Aggregations, Filtering, Window Functions
- Stored Procedures: Validation, Incremental Loading, Report Generation
- Automation: Schedule ETL/Validation SPs
- Reporting: Generate Summary Tables, Build Dashboards in Superset/Metabase
- Presentation: Demo Solution—Schema, Queries, Automation, Business Insights
- GitHub Portfolio: SQL Scripts, SPs, Documentation, Automation Setup
- Extra Milestone: Integrate with BI Tool for End-to-End Flow
- Assessment: Code Quality, Documentation, Automation, Visualization, Business Storytelling

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Detailed Content

Week 1: Database Foundations & Basic SQL

- What is a Database? Relational vs. NoSQL—concepts, use cases, SQL's role in data pipelines.
- Installing & Configuring PostgreSQL/MySQL: Local setup, cloud options (AWS RDS, GCP Cloud SQL), GUI tools (DBeaver, pgAdmin).
- SQL Basics: SELECT, filtering (WHERE), sorting (ORDER BY), limiting (LIMIT).
- Hands-on Lab: Install database, run first queries, explore GUI tools.
- Market Context: Why PostgreSQL/MySQL dominate Bangalore startups and enterprises.
- Assignment: Write queries on a sample dataset (e.g., HR or sales data).

Week 2: Data Manipulation & Schema Design

- Creating Tables: Data types, constraints (PRIMARY KEY, FOREIGN KEY, NOT NULL, UNIQUE).
- CRUD Operations: INSERT, UPDATE, DELETE—adding, modifying, removing records.
- Working with NULL Values: COALESCE, NULLIF, IS NULL/IS NOT NULL.
- Indexes: Purpose, types, impact on query performance.
- Hands-on Lab: Design a product catalog or library database. Populate, modify, and benchmark with/without indexes.
- Project Integration: Start building your e-commerce analytics schema (tables for products, customers, orders).

Week 3: Advanced Querying, Joins & Set Operations

- Joins: INNER JOIN, LEFT JOIN, RIGHT JOIN, FULL JOIN, self-joins—real business scenarios.
- Subqueries & Derived Tables: Nesting queries for complex analysis.
- Set Operations: UNION, INTERSECT, EXCEPT—combining dataset results.
- Hands-on Lab: Simulate a customer support dashboard—join tickets, users, products. Write analytic queries.
- Market Trend: Joins are the backbone of analytics and reporting roles in Bangalore.

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Week 4: Aggregations, Window Functions & Stored Procedures Introduction

- Aggregate Functions: COUNT, SUM, AVG, MIN, MAX, GROUP BY, HAVING.
- Window Functions: ROW_NUMBER, RANK, DENSE_RANK, running totals, partitions.
- Introduction to Stored Procedures (SPs): Syntax, parameters, variables, control flow (IF/ELSE, loops).
- Hands-on Lab: Build sales summary reports (by product, customer, region). Write a simple SP for data validation (e.g., flag orders below a threshold).
- Advanced Practice: Write a SP that aggregates daily sales and flags anomalies.
- Real-World Relevance: SPs encapsulate business logic, enable modularity, and are used in production ETL.

Week 5: Data Quality, Automation, CI/CD & Stored Procedures Deep Dive

- Stored Procedures Deep Dive: Complex logic, error handling (TRANSACTION, BEGIN/COMMIT/ROLLBACK), logging.
- Automating SQL Workflows: Schedule SPs with pgAgent/cron, integrate with Python/Airflow.
- Data Quality & Validation: Implement checks in SPs (e.g., reject invalid sales, enforce business rules).
- Version Control & CI/CD: Manage SQL scripts and SPs with Git. Set up linting and testing (e.g., pgTAP for PostgreSQL).
- Cloud Integration: Deploy your database to AWS RDS/GCP Cloud SQL, connect from local/remote tools.
- Hands-on Lab: Automate a nightly ETL job (SP + scheduler), add Git hooks for SQL testing.
- Market Relevance: CI/CD for SQL is now expected in Bangalore data engineering teams.

Week 6: Capstone Project – E-Commerce Analytics Platform

- Project Scope: Build a reporting system for an e-commerce dataset (real or synthetic Bangalore data).
- Complex Queries: Multi-table joins, aggregations, filtering, window functions.
- Stored Procedures: Use SPs for data validation, incremental loading, and report generation.

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- Automation: Schedule your ETL/validation SPs to run nightly.
- Reporting: Generate summary tables, build dashboards in Superset/Metabase.
- Presentation: Demo your solution—explain schema design, query logic, automation, and business insights.
- GitHub Portfolio: Share SQL scripts, SPs, documentation, and automation setup.
- Extra Mile: Integrate with a BI tool, show end-to-end flow.
- Assessment: Code quality, documentation, automation, and business impact.

Hands-On Lab & Project Ideas

- Lab 1: Install PostgreSQL/MySQL, create your first database, write SELECT queries on sample HR/sales data.
- Lab 2: Design a product catalog database, practice CRUD operations, benchmark queries with/without indexes.
- Lab 3: Simulate a customer support dashboard—join tickets, users, products; answer business questions.
- Lab 4: Build sales summary reports, write a validation SP, experiment with window functions.
- Lab 5: Automate ETL with SPs, integrate Git and testing, deploy to cloud.
- Final Project: End-to-end e-commerce analytics—schema design, ETL, validation, reporting, automation, visualization, presentation.

Toolstack

Category	Tools	Why It Matters
Database	PostgreSQL, MySQL	Industry standard, cloud-ready, open source
GUI	DBeaver, pgAdmin	Cross-platform, feature-rich
Automation	cron, pgAgent, Airflow	Production ETL, CI/CD
Version Control	Git, GitHub	Collaboration, change tracking, CI/CD

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Category	Tools	Why It Matters
Testing	pgTAP (PostgreSQL), dbunit	Data quality, reliability
Cloud	AWS RDS, GCP Cloud SQL, Azure Database	Scalable, managed, in-demand for jobs
BI/Visualization	Superset, Metabase	Open-source dashboards, easy integration

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Market Relevance & Career Outcomes

- SQL is Table Stakes: Every data engineer, analyst, and backend dev role in Bangalore requires SQL.
- Stored Procedures & Automation: Differentiators for junior/mid-level data roles. Companies want candidates who can write, test, and automate SPs.
- Open Source & Cloud: PostgreSQL/MySQL and cloud deployments are standard. Show you can work in both local and cloud environments.
- CI/CD & Testing: Modern data teams expect scripts to be version controlled, tested, and deployed automatically.
- Portfolio Projects: Capstone work on GitHub—with schema diagrams, SQL scripts, SPs, automation, and dashboards—will get you interviews.

Sample Capstone Project: E-Commerce Sales Insights

Goal:
Analyze sales, customers, and products—find trends, anomalies, opportunities.

Tasks:

- Design schema for e-commerce data.
- Load and validate data using SPs.
- Query for top products, customer segments, sales trends, seasonality.
- Automate nightly ETL and validation.

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- Visualize key metrics in Superset/Metabase.
- Present findings—what would you recommend to the business?

Deliverables:

- GitHub repo with SQL, SPs, automation, documentation.
- Screenshots of dashboards.
- Short video/presentation explaining your work.

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