COURSE SYLLABUS

SQL Course

Learn to extract information from databases by writing SQL queries, joining tables, aggregating data, and filtering results. You'll learn PostgreSQL in this class, but the concepts apply equally to other databases such as SQL Server and MySQL.

> Group classes (NYC) and onsite training are available for this course. For more information, email onsite@graduateschool.edu or visit: https://www.graduateschool.edu/courses/sql-course-nyc



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Course Outline

Foundations of SQL & Databases

SQL Fundamental Concepts

- What is SQL & why is it used?
- Flavors of SQL: Postgres vs SQL Server, etc.
- Database Tables, Rows, & Columns
- Using ER (Entity Relationship) Diagrams to visualize what's in a database

Exploring Databases & Writing SQL Statements (using the free DBeaver app)

- Connecting to a Database
- Database Navigator
- SQL Query Editor
- Using Code Hints
- Viewing the Results of your SQL query
- Setting Preferences

Writing SQL Queries

Writing SELECT Statements

- Syntax of a SELECT statement
- Selecting all columns or specific columns from a table
- Limiting the number of results using LIMIT
- Ordering the results using ORDER BY
- Returning only DISTINCT records (eliminating duplicates)

Filtering Results

- Data Types (Strings vs Numbers)

- Comparison Operators: equal to, greater or less than, not equal to, etc.
- Filtering results using WHERE, AND, OR, IN, and NOT
- Pattern Matching: Wildcard Filters
- Case Sensitivity

Using Joins to Combine Data from Multiple Tables

Understanding Table Relationships

- What are Primary vs Foreign Keys
- Database Relations: One-to-One, One-to-Many, & Many-to-Many

Inner Joins

- The difference between Inner & Outer Joins
- Inner Joins
- Column & Table Aliases

Outer Joins & Finding NULLs

- Left Join
- Right Join
- Full Join
- Find NULL values

Manipulating, Aggregating, & Filtering Data

Using CAST to Change Data Types

Why and how to use CAST to make a data type fit your query's needs

Aggregate Functions

- Using Aggregate Functions to perform common statistical calculations
- Using SUM, COUNT, AVG, MAX & MIN

Working with Dates & Time

- Date Functions: Getting the desired part of a date/time (Year, Month, Day, etc.)
- Formatting dates, including the day of the week (Sunday, Monday, etc.)
- Calculating the difference between 2 dates

Grouping Data & Filtering Grouped Data

Grouping Data with Aggregate Functions

- Using GROUP BY to organize results into categories
- Applying Aggregate Functions to groups

Filtering Grouped Data with HAVING

- Using HAVING to filter the results of a GROUP BY
- HAVING vs WHERE

Advanced Query Techniques

Subqueries

- Subqueries: Queries within queries
- Single-Value vs Multi-Value vs Table-Value Subqueries

Aggregate Window Functions

Using OVER and PARTITION BY to apply Aggregate Functions

Conditionals with CASE

- Adding If-Else Logic with CASE
- Simple CASE vs Searched CASE

String Functions

- Manipulating text using string functions
- Using SUBSTRING, SPLIT_PART, UPPER, etc.

Self Join

- How a Self Join is different from other types of joins
- Using a Self Join

Views & User-Defined Functions

Views

- What are Views?
- The Advantages & Disadvantages of using Views
- How to Use & Query a View

Materialized Views

The difference between regular Views and Materialized Views

User-Defined Functions

- Using Scalar-Value (Single-Value) Functions
- Using Table-Value Functions