



SQL essentials

unlocking the secrets of Structured Query Language

Instructor: Péter Fülöp

Course overview

COURSE LEVEL

Beginner

This course is designed with beginners in mind, specifically catering to those who are new to the field. It covers fundamental concepts while also touching on a selection of [intermediate topics](#) to provide a comprehensive introduction to the subject matter.

COURSE FORMAT

10 sessions

The structure of the course encompasses ten sessions in total. **8** of these are [instructional modules](#), lasting for 2 hours each, combining theoretical learning with hands-on practical exercises. The remaining **2 sessions** are devoted to [mentor-guided learning](#) and to the planning, preparation, and presentation of capstone projects.

PREREQUISITES

No previous experience with databases or SQL is necessary.

FORM OF KNOWLEDGE TEST

Assignments (homework), capstone project

DATABASE PLATFORMS

Hands-on practices will involve the utilization of PostgreSQL.

IN-PERSON ATTENDANCE

While it is not mandatory to be physically present for the instructional sessions, [it is highly encouraged](#) for optimal learning experience. However, the capstone project presentation necessitates in-person participation.

SUGGESTED NUMBER OF PARTICIPANTS

A [maximum of 8 individuals](#) is recommended for the course, as the sessions include in-person guidance and hands-on coding exercises.

RECOMMENDED STUDY TIME

8 instructional session x 2 hours
8 homework x 60 minutes
1 capstone project x 4-6 hours

LANGUAGE

The course language will be either English or Hungarian, depending on the preferences of participants.

Invitation

Hey Starschema crew!

We are super excited to invite you all to our upcoming "**SQL Essentials**" course. It's packed with essential SQL - from understanding the basic syntax and SQL commands like SELECT, INSERT, UPDATE, and DELETE to getting hands-on experience with filtering results, working with different JOIN types, and even creating database tables!

We'll also delve into advanced concepts like ACID properties, transactions, subqueries, and set theory. And to wrap it all up, we'll engage with a comprehensive capstone project involving a real-world relational database.

This SQL course is all set to boost your knowledge, regardless of your starting point. Even if you've never used SQL before, we'll guide you through the basics and beyond. You're invited to join us and learn at your own pace. Excited to get started with you all!

Best,
the Starschema mentor team

The detailed presentation of the “SQL essentials” course can be downloaded from:
<https://e.pcloud.link/publink/show?code=XZ2cdUZ9i6qNkVWWlbdyARgbj2Gw5xAvNT7>

Course description

Welcome to "SQL Essentials," a comprehensive course designed to introduce you to the world of SQL (Structured Query Language).

In the contemporary digital age, data has become a crucial asset. We generate vast amounts of data every day, and this data provides valuable insights that drive decision-making in all types of organizations, from global corporations to small startups. To navigate this data-driven landscape effectively, you need to understand and manipulate data, and SQL is a cornerstone in this process.

SQL is a universal language used for interacting with databases. It's employed to manage and manipulate data, allowing us to access, modify, and analyze vast quantities of information with ease. Learning SQL equips you with the skills to communicate with databases, understand their structure, and fetch relevant data according to your needs.

No matter your role or industry, mastering SQL provides a significant advantage. If you're an analyst, being proficient in SQL allows you to delve deep into data and derive meaningful insights. If you're a developer, it's a crucial tool for building and managing applications that work with data. In broader terms, SQL proficiency enhances your data literacy and opens up a wealth of opportunities in the tech industry.

This course, "SQL Essentials," requires no prior database or SQL experience. It's designed to take you from the ground up, from understanding the basics of the relational model to being able to construct and manipulate your own databases using SQL commands.

We will be working hands-on with **PostgreSQL**, one of the most prominent and popular database systems. This database system is in-line with current industry trends, ensuring that the skills you learn here will be directly applicable in the professional world.

Course description

The course covers a wide range of topics, starting with basic SQL syntax and types of commands, then progressing to querying data with the SELECT statement, filtering results, ordering data, and joining different data tables. Additionally, the course dives into creating database tables. It also touches on intermediate topics like subqueries implementation and set theory.

By the end of this course, you'll have a solid foundation in SQL and be able to confidently work with databases, a skillset that is in high demand across many industries. We look forward to embarking on this journey with you!



Syllabus

Chapter 1: Introduction

Understanding The Relational Model

Chapter 2: Understanding Basic SQL Syntax

Types of SQL Commands

SELECT

INSERT

UPDATE

DELETE

Chapter 3: Querying Data with the SELECT Statement

The SELECT list

SELECT list wildcard (*)

The FROM clause

How to constrain the result set

DISTINCT and NOT DISTINCT

Chapter 4: Filtering Results with the WHERE Clause

The WHERE clause

Boolean operators

The AND keyword

The OR keyword

Other Boolean operators

BETWEEN

IN

IS

IS NOT

String functions

Date/Time functions and operators

Syllabus

Chapter 5: Ordering results with ORDER BY

- Introduction to ORDER BY
- Syntax of ORDER BY and the sort directions
- Sorting by Multiple Columns
- Ordering by Numeric, Date/Time and Text Values
- Ordering by Computed Columns
- Ordering NULL Values

Chapter 6: Exploring JOIN types

- Introduction
- CROSS JOIN
- INNER JOIN
- OUTER JOINS
- LEFT OUTER JOIN
- RIGHT OUTER JOIN
- FULL OUTER JOIN
- SELF JOIN

Chapter 7: Aggregating Functions

- Overview
- Aggregate Functions
- Aggregate Functions in Action
- Filtering Aggregate Results

Chapter 8: Adding, Changing, and Removing Data

- Introduction
- INSERT
- BULK INSERT
- UPDATE
- DELETE

Syllabus

Chapter 9: Understanding ACID Properties and Transactions

ACID Properties(Atomicity, Consistency, Isolation, Durability)

Introduction to Transactions

Implementing Transactions

BEGIN, COMMIT, and ROLLBACK commands

Chapter 10 : Creating Database Tables

Introduction

The CREATE DATABASE statement

The CREATE TABLE statement

Handling NULL Values

Declaring PRIMARY KEY

Working with CONSTRAINTs

Modifying and dropping tables (ALTER TABLE, DROP TABLE)

Chapter 11: Introduction to Indexes

Understanding Indexes

The Importance of Indexes

When to Use Indexes

Creating and Dropping Indexes

Chapter 12: Subqueries

Defining and Implementing Subqueries

Subqueries and Joins

Chapter 13: Introducing Set Theory Overview

Concept of Set Theory

Unions

Intersections

Exceptions

Syllabus

Final chapter: Capstone project

Our "SQL Essentials" course is completed with an in-depth capstone project. In this assignment, we will provide you with a pre-structured relational database containing 6-10 tables, all of which are associated with a real-world process or activity.

A list of 10-15 questions will be provided to you. Constructing queries to address these questions is the base requirement for the successful completion of the project. It's also encouraged for you to generate your own questions and create corresponding queries to demonstrate the depth of your understanding.



Course Completion

Requirements for Course Completion

Each educational session is accompanied by homework assignments that correspond to the topics covered in class. You have one week to complete the homework and it should be submitted prior to the next session.

To earn **1 point**, your submitted homework must have correct answers for at least 3/4 of the questions. Partially solved homework tasks can earn a fraction of a point. Moreover, for creative, outstanding, and innovative solutions, you have the opportunity to earn an additional point for each assignment.

During the introductory part of the classes, we will review the solutions to the previous homework assignments together as a group.

To qualify for a final project assignment, you must accumulate a minimum of 6 points through the completion of homework assignments.

If someone prepares a presentation for the final project and delivers it, providing correct answers to at least half of the questions asked, they will receive a certificate confirming the successful **completion of the "SQL essentials" course.**

About the instructor



Péter Fülöp, a devoted software and database professional with substantial industry exposure, is keen to share his insights in the "[SQL Essentials](#)" course. He brings significant expertise in the realm of software and database development and design, guided by a strong object-oriented methodology. His longstanding practice in SQL development enriches his professional portfolio.

Since joining the Starschema team in September 2022, Péter has been fulfilling his role as a Data Engineer within the CO1 unit. His work and professional curiosity encompass areas like Azure, Python, Snowflake, ETL (Dagster) and AWS.

His area of expertise lies in database design, testing, and enhancing the efficiency of ETL processes and data retrieval systems. He also demonstrates proficiency in creating high-performance data processing solutions, showcasing his in-depth understanding of database operations from end-to-end.

Péter's passion for teaching, in addition to his industry experience, is a defining characteristic of his professional persona. He has spent five years lecturing at Sapientia, the Hungarian University of Transilvania, covering a diverse range of subjects. His syllabus extended from relational database systems, data structures, and algorithms, to web technologies and graph theory.

With the "[SQL Essentials](#)" course, Péter is eager to share his professional insights and expertise. His goal is to help his colleagues at Starschema strengthen their SQL skills and effectively navigate the intricacies of database management.

And always remember, if you have any queries or doubts about the course, don't hesitate to reach out to Péter. You can drop him a message on Slack (username: peterfulop) or send an email to peteristvan.fulop@hcl.com. He's always ready to assist with any course-related questions you might have.