towards
data science

Follow 576K Followers

A Complete 15 Week Curriculum to Master SQL for Data Science

Learn the most important data science skill in 15 weeks

Terence Shin Aug 28 · 6 min read ★

Introduct

As I work more and more in the corporate world as a data scientist, I am increasingly convinced that mastering SQL is essential to have a successful career. That's why, if you've been following my articles, I've been writing **a lot** about SQL recently.

SQL is not a hard skill to learn (i.e. SELECT FROM WHERE), but it is certainly a hard skill to perfect. One of the reasons I found it so difficult to master SQL was that I had to learn everything on my own — I didn't know what I didn't know, so it was hard to be proactive about potential mistakes when writing SQL code.

That's why I wanted to write this curriculum. This curriculum aims to cover not just the basics, but other very important things that are not talked about as much.

By completing this curriculum, you will have learned the following things:

- How to write simple queries and also advanced queries
- How to apply your SQL skills to real-life business case studies
- Best practices for writing professional SQL code
- Several resources to help you with interview prep

The general structure of this curriculum is as follows:

1. Basic SQL (Weeks 1–3)
2. Intermediate and Advanced SQL (Weeks 4–9)
3. Writing Professional SQL code (Week 10)
4. SQL Practice Problems (Week 11)
5. Business Case Studies (Weeks 12–14)
6. Interview Prep (Week 15)

If you are already familiar with the basics of SQL, feel free to skip weeks 1–3, **but make sure you start at Week 4: SQL Query Order of Execution.**

> *If you find this valuable and want to support me, you can do so here. Thank you so much!*

• • •

Is SQL tha

YES.

SQL is arguably the most important skill to learn for **any data professional**, not just data scientists.

SQL is used to extract specific data from a database, so that you can do things like analyze data, visualize data, model data, etc. Therefore, developing strong SQL skills will allow you to take your analyses, visualizations, and modeling to the next level because you will be able to extract and manipulate the data in advanced ways.

In order to be successful in this curriculum, you should first familiarize yourself with using SQL in Mode and then you'll be able to go through the topics below.

With that said, let's dive into it!

. . .

Week 1: Basic SQL

In the first week, you'll learn all of the building blocks of a query so that you can write the most fundamental SQL queries.

- Introduction to SQL
- SELECT FROM statement
- WHERE statement
- ORDER BY statement
- LIMIT statement
- DISTINCT

Week 2: LOGICAL and COMPARISON Operators

Now that you've learned the basics of SQL, we're going to learn intermediate to advanced concepts over the next few weeks so that you can beef up your queries.

This week, we're going to cover logical operators and comparison operators, which are used to filter data:

- Logical
- Compar

Week 3: AGGREGATES

In week 3, you'll learn about aggregate functions, which are operations that are performed across rows of data to return a single value.

- Aggregate Functions (COUNT, SUM, MIN/MAX, AVG)
- GROUP BY clause
- HAVING clause

Week 4: SQL Query Order of Execution

This is a very important topic that most SQL guides and courses glance over. The order of execution of a SQL query refers to the order in which the clauses of a query are conducted. By understanding this, you'll be able to debug a lot more problems and write more efficient queries.

To learn about the SQL order of execution, **check out this page from SQLBolt**.

Week 5: Conditional Expressions

Similar to IF/THEN/ELSE statements in Python or JavaScript, SQL has its own version of conditional expressions, which we dive into in week 5:

- CASE WHEN
- COALESCE
- IFNULL

Week 6: JOINS and UNIONS

Now that you've learned all of the building blocks for writing basic queries, filtering data, aggregating data, and writing conditional expressions, you'll learn how to combine different tables with each other:

- JOINs
- UNIONs

Week 7: Subqueries and Common Table Expressions

This is one c low you to write compl have a strong unde

- Subqueries
- Common Table Expressions (CTEs)

Week 8: String Manipulations

What makes a good SQL coder is the ability to manipulate data however he/she likes. In order to do this, you must have a strong understanding of string functions, which we'll cover this week:

- String Functions in SQL

Week 9: Date-time manipulation

Similarly to the previous week, it's essential that you learn how to manipulate date-time data, which we'll cover this week:

- EXTRACT
- DATE_ADD()
- DATE_SUB()
- DATE_DIFF()
- *See here for more functions (on the left of the webpage)*

Week 10: Window Functions

Lastly, you're going to learn a more advanced topic called window functions (or analytics functions). Window functions are similar to aggregate functions except that they return the same number of rows as what was inputted.

Check out the links below to learn more about them:

- Windows Functions (ROW_NUMBER(), RANK(), DENSE_RANK(), LAG, LEAD, SUM, COUNT, AVG)
- *See here for advanced window functions.*

Week 11: Writing Professional SQL Code

It's one thin ting clean
and profess ta analysts
and junior c to write
good code. Check out the article below:

Five Best Practices for Writing Clean and Professional SQL Code

Level up your SQL code with these five tips!

towardsdatascience.com

Week 12: SQL Practice Problems

Now it's time to put your SQL knowledge to the test.

Leetcode and Hackerrank are great resources that host an array of practice problems for various programming languages, including SQL! These will be great resources for you to practice what you've learned so far.

Here are some good questions that you can try out below:

1. Find Duplicate Emails
2. Rank Scores
3. Employees Earning More Than Their Managers
4. Rising Temperature
5. Trips and Users

Week 13–15: Case Studies

Case studies are the best way to simulate real-life problems as a data scientist. Below are three SQL case studies that are representative of problems that you would have to solve in a corporate setting:

To open Mode's SQL editor, go to this link and click on the hyperlink where it says 'Open another window to Mode'.

Week 11: Case Study 1 — Investigating a Drop in User Engagement

Link to the case.

For this case nt for
Yammer's p here.

Check out how I approached this case study here if you'd like guidance.

Week 12: Case Study 2 — Understanding Search Functionality

Link to the case.

This case is more focused on product analytics. Your goal is to determine whether the user experience is good or bad. What makes this case interesting is that it's up to you to determine what 'good' and 'bad' mean and how the user experience will be evaluated.

Week 13: Case Study 3 — Validating A/B Test Results

Link to the case.

One of the most widely applied data science applications in the business world is performing A/B tests. In this case study, your goal is to validate or invalidate the results of an A/B test where there was a 50% difference between the control and treatment groups.

What's Next?

If you made it to the end, congrats! Committing to learning a new skill for 15 weeks is no easy feat. Don't undermine your accomplishment, you should feel proud of yourself and confident in your SQL ability!

Next, take a look at the following two articles and make sure that you have a strong understanding of these concepts:

Ten SQL Concepts You Should Know for Data Science Interviews

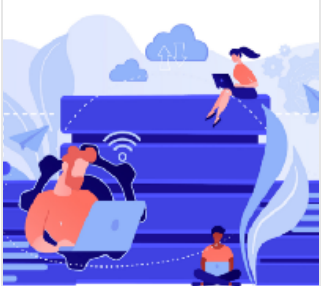
Study smart, not hard.

towardsdatascience.com

Ten Advanced SQL Concepts You Should Know for Data Science Interviews

Take your SQL skills to the next level

towardsdatascience.com



If you still w esources to learn advanced SQL.

6 Incredible Resources to Learn Advanced SQL

How to take your SQL skills from beginner to advanced

towardsdatascience.com

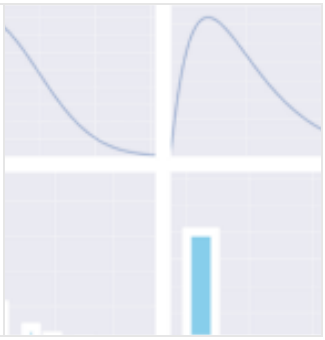
Thanks for Reading!

If you enjoyed this, I would greatly appreciate it if you gave this a follow! As always, I wish you the best in your learning endeavors :)

Not sure what to read next? I've picked another article for you:

All Probability Distributions Explained in Six Minutes

towardsdatascience.com



and another one!

OVER 100 Data Scientist Interview Questions and Answers!

Interview Questions from Amazon, Google, Facebook, Microsoft, and more!

towardsdatascience.com

Terence Shin

- *If you enjoyed this, follow me on Medium for more*
- *Interested in collaborating? Let's connect on LinkedIn*

Sign up

By Towards

Every Thur tutorials and cutting-edge research to original features you don't want to miss. Take a look.

Get this newsletter

Data Science | Machine Learning | Programming | Education | Artificial Intelligence