



UDACITY

FOR ENTERPRISE

THE SCHOOL OF DATA SCIENCE

SQL

NANODEGREE SYLLABUS



Overview

This Nanodegree program teaches learners to perform analysis on data stored in relational and non-relational database systems to power strategic decision-making.

You will learn to determine, create, and execute SQL and NoSQL queries that manipulate and dissect large scale datasets. Begin by leveraging the power of SQL commands, functions, and data cleaning methodologies to join, aggregate, and clean tables, as well as complete performance tune analysis to provide strategic business recommendations. Finally, apply relational database management techniques to normalize data schemas in order to build the supporting data structures for a social news aggregator.

You will also learn the basic data-working skills needed to find and use insights gleaned from large repositories of data that have outgrown their current abilities with spreadsheets. In addition, it teaches learners how to harness the full power of relational databases, as well as be aware of other types of databases that exist and know when to choose which type.

The ideal learner has aspirations to develop into a data professional, either in database management (IT) or in analytics (business).

Program Information



TIME

2 months
Study 10 hours/week



LEVEL

Foundational



PREREQUISITES

Basic computer skills and understanding of and ability to write SQL and NoSQL languages. Plus:

- Familiarity with Operating systems (Windows and MacOS)
- Familiarity and comfort using word processing programs (Microsoft Word, Google Docs, PDF)
- Comfort using presentation software (PowerPoint, Keynote, Google Slides)
- Comfort using Spreadsheet programs (Microsoft. Excel, Google Spreadsheets)



HARDWARE/SOFTWARE REQUIRED

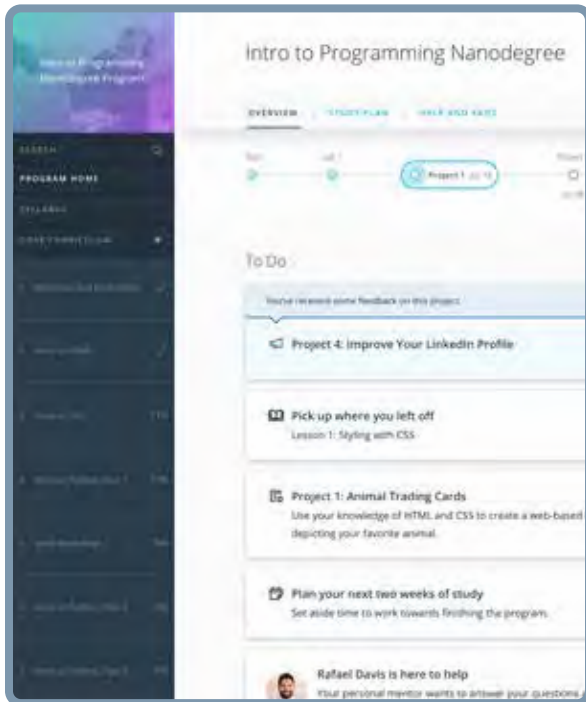
Access to the internet and a 64-bit computer. You will use SQL, NoSQL, Postgres, SQL DDL, and SQL DML.



LEARN MORE ABOUT THIS NANODEGREE

Contact us at enterpriseND@udacity.com.

Our Classroom Experience



REAL-WORLD PROJECTS

Learners build new skills through industry-relevant projects and receive personalized feedback from our network of 900+ project reviewers. Our simple user interface makes it easy to submit projects as often as needed and receive unlimited feedback.

KNOWLEDGE

Answers to most questions can be found with Knowledge, our proprietary wiki. Learners can search questions asked by others and discover in real-time how to solve challenges.

LEARNER HUB

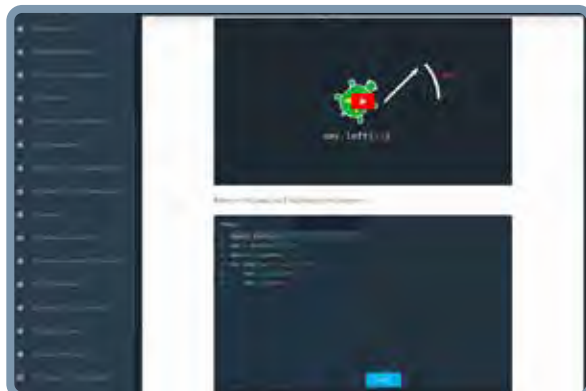
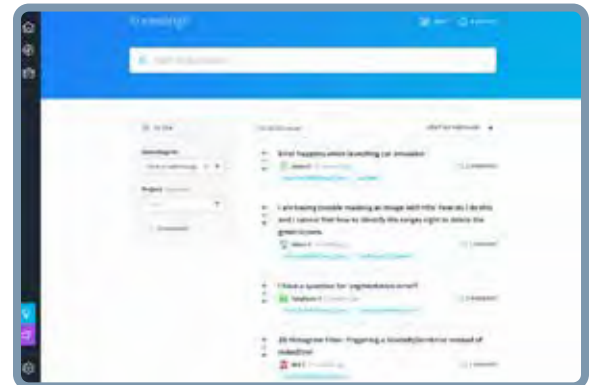
Learners leverage the power of community through a simple, yet powerful chat interface built within the classroom. Learner Hub connects learners with their technical mentor and fellow learners.

WORKSPACES

Learners can check the output and quality of their code by testing it on interactive workspaces that are integrated into the classroom.

QUIZZES

Understanding concepts learned during lessons is made simple with auto-graded quizzes. Learners can easily go back and brush up on concepts at anytime during the course.



CUSTOM STUDY PLANS

Mentors create a custom study plan tailored to learners' needs. This plan keeps track of progress toward learner goals.

PROGRESS TRACKER

Personalized milestone reminders help learners stay on track and focused as they work to complete their Nanodegree program.

Learn with the Best



Malavica Sridhar

PRODUCT MANAGER AT WAYMO

Mal Sridhar is currently a Product Manager at Waymo. Prior to her current role, she was a Senior Product Manager at CircleUp. Mal started her career as a management consultant at McKinsey & Company and is passionate about leveraging data to transform industries.



Ziad Saab

SOFTWARE DEVELOPER

Ziad is a seasoned software developer who loves mentoring and teaching. Currently working as an independent contractor, he previously co-founded and taught full-stack web development at DecodeMTL, Montreal's first web development bootcamp.



Derek Steer

CEO & CO-FOUNDER, MODE

Derek will introduce you to the SQL language and how to use SQL queries to analyze data in relational databases. Derek is the Co-Founder and CEO of Mode Analytics. He has worked as a data analyst in various companies, including Microsoft, Yammer, and Facebook.



Course 1: Introduction to SQL

When it comes to extracting insights from stored data, SQL is one of the most versatile tools available. Learn how to execute core SQL commands to define, select, manipulate, control access, aggregate and join data and data tables. Understand when and how to use subqueries, several window functions, as well as partitions to complete complex tasks. Clean data, optimize SQL queries, and write select advanced JOINS to enhance analysis performance. Explain which cases you would want to use particular SQL commands, and apply the results from queries to address business problems.

Project

Deforestation Exploration

SQL is most commonly used to manipulate and analyze data to inform decision making. In this project, you will act as a data analyst for an organization on a mission to reduce deforestation around the world and to raise awareness about this important environmental topic. First, you'll clean any erroneous values in a table, join that table to another lookup table to bring in a new categorical and quantitative variable, and return a new view of all categories greater than a reference value. Then, you will create and execute SQL queries to perform calculations using variables from those disparate data sets to answer questions for stakeholders. Your analysis will help you better understand which countries and regions around the world seem to have forests that have been shrinking in size, and also which countries and regions have the most significant forest area. Lastly, you will compile your answers and summarize your analysis into a report that can be shared with a leadership team.

LESSON TITLE

LEARNING OUTCOME

BASIC SQL

- Write common SQL commands including SELECT, FROM, and WHERE.
- Use logical operators like LIKE, AND, and OR.

SQL JOINS

- Write JOINS in SQL to combine data from multiple sources to answer more complex business questions.
- Understand different types of JOINS and when to use each type.

SQL AGGREGATIONS

- Write common aggregations in SQL including COUNT, SUM, MIN, and MAX.
- Write CASE and DATE functions, as well as work with NULLs.

Nanodegree Program Overview

Course 1: Introduction to SQL, cont.

LESSON TITLE	LEARNING OUTCOME
SQL SUBQUERIES & TEMPORARY TABLES	<ul style="list-style-type: none">• Write subqueries to run multiple queries together.• Learn the types of subquery placement and formatting.• Use temp tables to access a table with more than one query.
SQL DATA CLEANING	<ul style="list-style-type: none">• Learn and apply the basics of data cleaning strategies in SQL to normalize or create a column from existing data.• Perform the appropriate data cleaning methodology based on goals for further analysis.
SQL WINDOW FUNCTIONS	<ul style="list-style-type: none">• Apply core window functions to tackle analysis tasks that require further targeting or segmentation.• Use other window functions including RANK, NTILE, LAG, LEAD new functions along with partitions to complete complex tasks.
SQL ADVANCED JOINS AND PERFORMANCE TUNING	<ul style="list-style-type: none">• Learn how and when to use advanced joins (e.g., self joins) to write queries that run quickly across giant datasets.• Learn the high-level tradeoffs with queries, including performance and what you can do to optimize them.
PROJECT: DEFORESTATION EXPLORATION	<ul style="list-style-type: none">• Apply basic and advanced query techniques to compile strategic recommendations from a large dataset.





Course 2: Management of Relational & Non-Relational Databases

Databases need to be structured properly to enable efficient and effective querying and analysis of data. Build normalized, consistent, and performant relational data models. Use SQL Database Definition Language (DDL) to create the data schemas designed in Postgres and apply SQL Database Manipulation Language (DML) to migrate data from a denormalized schema to a normalized one. Understand the tradeoffs between relational databases and their non-relational counterparts, and justify which one is best for different scenarios. With a radical shift of paradigms, learn about MongoDB and Redis to get an understanding of the differences in behaviors and requirements for non-relational databases.

Project

Udiddit, A Social News Aggregator

Many of today's most popular web applications have supporting database structures that allow them to customize and aggregate information within seconds. In this project, you will build the supporting data structures for Udiddit, a social media news aggregator site. First, you'll investigate the provided data model for potential errors such as lack of normalization, consistency rules, and proper indexing. Then, you will create a new, normalized database using DDL based on the denormalized one that is provided. Lastly, you will write DML queries to migrate the data from the denormalized schema to their normalized schema.

LESSON TITLE

LEARNING OUTCOME

NORMALIZING DATA

- Organize data in a format suitable for relational databases.
- Get a grasp on database normal forms.

DATA DEFINITION LANGUAGE (DDL)

- Write common SQL commands with CREATE TABLE and ALTER TABLE.
- Use different data types to model real-world situations.

DATA MANIPULATION LANGUAGE (DML)

- Write common SQL commands with INSERT, UPDATE, and DELETE.
- Use SQL functions to manipulate numbers, strings, and dates.

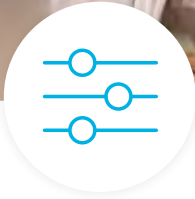
Nanodegree Program Overview

Course 2: Management of Relational & Non-Relational Databases, cont.

LESSON TITLE	LEARNING OUTCOME
CONSISTENCY WITH CONSTRAINTS	<ul style="list-style-type: none">• Implement business rules at the database level using SQL commands with CONSTRAINT, UNIQUE, PRIMARY KEY, and CHECK.• Formalize the relations between tables using SQL FOREIGN KEY and its variations.
PERFORMANCE WITH INDEXES	<ul style="list-style-type: none">• Fix some slow SQL queries by introducing database indexes with the SQL command CREATE INDEX.• Introspect SQL queries through the query planner with EXPLAIN and EXPLAIN ANALYZE.• Assess whether a use-case is a good candidate for indexing.
INTRO TO NON-RELATIONAL DATABASES	<ul style="list-style-type: none">• Articulate why non-relational databases were created, and what are their tradeoffs compared to relational databases.• Add, modify, and query data in a MongoDB database.• Use the right MongoDB design patterns for various real-life situations• Add, modify, and query data in a Redis database.• Use Redis as a standalone database to build the data part of a small application.



Our Nanodegree Programs Include:



Pre-Assessments

Our in-depth workforce assessments identify your team's current level of knowledge in key areas. Results are used to generate custom learning paths designed to equip your workforce with the most applicable skill sets.



Dashboard & Progress Reports

Our interactive dashboard (enterprise management console) allows administrators to manage employee onboarding, track course progress, perform bulk enrollments and more.



Industry Validation & Reviews

Learners' progress and subject knowledge is tested and validated by industry experts and leaders from our advisory board. These in-depth reviews ensure your teams have achieved competency.



Real World Hands-on Projects

Through a series of rigorous, real-world projects, your employees learn and apply new techniques, analyze results, and produce actionable insights. Project portfolios demonstrate learners' growing proficiency and subject mastery.

Our Review Process

Real-life Reviewers for Real-life Projects

Real-world projects are at the core of our Nanodegree programs because hands-on learning is the best way to master a new skill. Receiving relevant feedback from an industry expert is a critical part of that learning process, and infinitely more useful than that from peers or automated grading systems. Udacity has a network of over 900 experienced project reviewers who provide personalized and timely feedback to help all learners succeed.



Vaibhav
UDACITY LEARNER

"I never felt overwhelmed while pursuing the Nanodegree program due to the valuable support of the reviewers, and now I am more confident in converting my ideas to reality."

now at
CODING VISIONS INFOTECH

All learners benefit from:



Line-by-line feedback for coding projects



Industry tips and best practices



Advice on additional resources to research



Unlimited submissions and feedback loops

How it Works

Real-world projects are integrated within the classroom experience, making for a seamless review process flow.

- Go through the lessons and work on the projects that follow
- Get help from your technical mentor, if needed
- Submit your project work
- Receive personalized feedback from the reviewer
- If the submission is not satisfactory, resubmit your project
- Continue submitting and receiving feedback from the reviewer until you successfully complete your project

About our Project Reviewers

Our expert project reviewers are evaluated against the highest standards and graded based on learners' progress. Here's how they measure up to ensure your success.

900+

Expert Project Reviewers

Are hand-picked to provide detailed feedback on your project submissions.

1.8M

Projects Reviewed

Our reviewers have extensive experience in guiding learners through their course projects.

3

Hours Average Turnaround

You can resubmit your project on the same day for additional feedback.

4.85 /5

Average Reviewer Rating

Our learners love the quality of the feedback they receive from our experienced reviewers.



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For more information visit: www.udacity.com/enterprise