

# Data Engineering Nanodegree Syllabus

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## Contact Info

While going through the program, if you have questions about anything, you can reach us at [support@udacity.com](mailto:support@udacity.com). For help from Udacity Mentors and your peers visit the Udacity Classroom.

## Nanodegree Program Info

### Prerequisite Skills

A well-prepared learner is able to:

- Intermediate Python programming knowledge, of the sort gained through the Programming for Data Science Nanodegree program, other introductory programming courses or programs, or additional real-world software development experience.
- Strings, numbers, and variables; statements, operators, and expressions;
- Lists, tuples, and dictionaries; Conditions, loops;
- Procedures, objects, modules, and libraries;
- Troubleshooting and debugging; Research & documentation;
- Problem solving; Algorithms and data structures
- Intermediate SQL knowledge and linear algebra mastery, addressed in the Programming for Data Science Nanodegree program
- Joins, Aggregations, and Subqueries
- Table definition and manipulation (Create, Update, Insert, Alter)

### Required Software

- Python 3.6
- Anaconda 4.7 or latest
- Jupyter Notebook 6.01 or latest
- GIT Bash 2.23 or latest
- Apache Cassandra, pip, Pandas, Numpy 3.0 or latest
- AWS Regular Account with CC

**Version:** 2.0.0

**Length of Program:** 136 Days\*

\* This is a self-paced program and the length is an estimation of total hours the average student may take to complete all required coursework, including lecture and project time. Actual hours may vary.

# Part 1: Welcome to the Nanodegree Program

## Part 2: Data Modeling

Learn to create relational and NoSQL data models to fit the diverse needs of data consumers. Use ETL to build databases in PostgreSQL and Apache Cassandra.

### Project: Data Modeling with Postgres

Students will model user activity data to create a database and ETL pipeline in Postgres for a music streaming app. They will define Fact and Dimension tables and insert data into new tables.

#### Supporting Lessons

Lesson	Summary
<b>Introduction to Data Modeling</b>	In this lesson, students will learn the basic difference between relational and non-relational databases, and how each type of database fits the diverse needs of data consumers.
<b>Relational Data Models</b>	In this lesson, students understand the purpose of data modeling, the strengths and weaknesses of relational databases, and create schemas and tables in Postgres

### Project: Data Modeling with Apache Cassandra

Students will model event data to create a non-relational database and ETL pipeline for a music streaming app. They will define queries and tables for a database built using Apache Cassandra.

#### Supporting Lessons

Lesson	Summary
<b>NoSQL Data Models</b>	Students will understand when to use non-relational databases based on the data business needs, their strengths and weaknesses, and how to creates tables in Apache Cassandra.

## Part 3: Cloud Data Warehouses

### Project: Data Warehouse

Students will build an ETL pipeline that extracts data from S3, stages them in Redshift, and transforms data into a set of dimensional tables for their analytics team.

## Part 4: Data Lakes with Spark

### **Project: Data Lake**

Students will build a data lake and an ETL pipeline in Spark that loads data from S3, processes the data into analytics tables, and loads them back into S3.

### **Project: Optimize Your GitHub Profile**

Other professionals are collaborating on GitHub and growing their network. Submit your profile to ensure your profile is on par with leaders in your field.

## Part 5: Data Pipelines with Airflow

### **Project: Data Pipelines**

Students continue to work on the music streaming company's data infrastructure by creating and automating a set of data pipelines with Airflow, monitoring and debugging production pipelines

### **Project: Improve Your LinkedIn Profile**

Find your next job or connect with industry peers on LinkedIn. Ensure your profile attracts relevant leads that will grow your professional network.

## Part 6: Capstone Project

### **Project: Data Engineering Capstone Project**

In this Capstone project, students will define the scope of the project and the data they will be working with to demonstrate what they have learned in this Data Engineering Nanodegree.



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