

Data Science Syllabus

High School - One Semester (85 hours)

Course Overview and Goals

Industries of all types are hiring data scientists to analyze and highlight the hidden patterns in data. This course equips students with the essential skills of a data scientist which include data collection, cleanup, transformation, analysis, and visualization. Students will write algorithms and build statistical models. They will also use the same tools that data scientists use to draw meaningful insights and solve organizational problems.

Learning Environment

This course utilizes a blended classroom approach. The content is fully web-based, with students writing and running code in the browser. Each module of the course is broken down into lessons. Lessons consist of video tutorials, short quizzes, example programs to explore, and written programming exercises.

Programming Environment

Students write and run Python programs in the browser using the CodeHS editor.

Quizzes

Each lesson includes at least one formative short multiple-choice quiz. At the end of each module, students take a summative multiple choice quiz that assesses their knowledge of the concepts covered in the module.

Prerequisites

The Data Science course is designed for intermediate computer science students with at least some knowledge of programming (not language specific) and an interest in computer science. The course is highly visual, dynamic, and interactive, and engaging.

More Information

Browse the content of this course at <https://codehs.com/course/12135>

Course Breakdown

Module 1: Data Wrangling (3 weeks/15 hours)

Students will learn and apply the process of collecting or obtaining reliable raw data and structuring it into the desired format for better decision-making.

Browse the full content of this module at <https://codehs.com/library/course/12135/module/17421>

Objectives / Topics Covered	<ul style="list-style-type: none">● What is Data Science?● Gathering Data<ul style="list-style-type: none">○ Quantitative/Qualitative● Exploring Data Using Python● Modules and Libraries
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	<ul style="list-style-type: none"> ● Pandas <ul style="list-style-type: none"> ○ Series <ul style="list-style-type: none"> ■ Measures of Central Tendency ■ Measures of Spread ○ DataFrames ● What is Big Data? <ul style="list-style-type: none"> ○ Cognitive Bias ● Importing and Filtering <ul style="list-style-type: none"> ○ loc ○ iloc ● Presenting Your Findings
Example Assignments / Labs	<ul style="list-style-type: none"> ● Create a “lookup”, a “compute”, and a “relate” question about the dataset shown. ● Mini-Project: Students will go through the first two steps of the data cycle. <ul style="list-style-type: none"> ○ Ask Questions: Formulate a statistical question that can be answered with data. ○ Consider Data: Collect or find data that will aid in answering your question. ● Mini-Project: Students will plan ahead for analysis. <ul style="list-style-type: none"> ○ What columns will you need to use to answer your question? How will you use them? ○ What visualization (like a chart or graph) might be able to help? Why would it be helpful? ● Exploring Python Libraries: Students will explore the Wikipedia documentation and library. <ul style="list-style-type: none"> ○ Perform a search for ‘turtles’ and print out the results. ○ Choose one of the search results and print out the first two sentences of its Wikipedia page. ● Students will critique findings to ensure the proper use of measures of central tendency and measures of spread.

Module 2: Project: Data Storytelling (1 week/5 hours)

Students will apply what they have learned, expand their knowledge of the data science cycle, and draw conclusions by finding and presenting a data story.

Browse the full content of this module at <https://codehs.com/library/course/12135/module/17424>

Objectives / Topics Covered	<ul style="list-style-type: none"> ● Defining a Problem Statement ● Decomposing a Problem ● Data Storytelling ● Drawing Conclusions
Example Assignments / Labs	<ul style="list-style-type: none"> ● Coming Soon!

Module 3: Data Displays (3 weeks/15 hours)

Students will learn how to create a graphical representation of information and data. By using visual elements like charts, graphs, and maps, data visualization tools provide an accessible way to see and understand trends, outliers, and patterns in data.

Browse the full content of this module at <https://codehs.com/library/course/12135/module/17422>

Objectives / Topics Covered	<ul style="list-style-type: none"> ● Types of Data Visualizations ● Categorical Charts <ul style="list-style-type: none"> ○ Pie Chart ○ Bar Chart ● Displaying Numerical Data <ul style="list-style-type: none"> ○ Line Graphs ○ Scatterplot ○ Histogram ● Trends and Correlations
Example Assignments / Labs	<ul style="list-style-type: none"> ● Coming Soon!

Module 4: Project (2 weeks/10 hours)

Coming Soon!

Browse the full content of this module at <https://codehs.com/library/course/12135/module/17425>

Objectives / Topics Covered	<ul style="list-style-type: none"> ● Coming Soon!
Example Assignments / Labs	<ul style="list-style-type: none"> ● Coming Soon!

Module 5: Analyzing Data (3 weeks/15 hours)

Students will learn and apply the process of inspecting, cleaning, transforming, and modeling data with the goal of discovering useful information, informing conclusions, and supporting decision-making.

Browse the full content of this module at <https://codehs.com/library/course/12135/module/17423>

Objectives / Topics Covered	<ul style="list-style-type: none"> ● Aggregating Data <ul style="list-style-type: none"> ○ Grouping ● Sorting Data ● Data Cleaning <ul style="list-style-type: none"> ○ fillna ○ Replacing Values ○ Removing Values ● Python Conditionals ● Functions
Example Assignments / Labs	<ul style="list-style-type: none"> ● Coming Soon!

Module 6: Project (2 weeks/10 hours)

Coming Soon!

Browse the full content of this module at <https://codehs.com/library/course/12135/module/17426>

Objectives / Topics	<ul style="list-style-type: none"> ● Coming Soon!
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Covered	
Example Assignments / Labs	<ul style="list-style-type: none"> • Coming Soon!

Module 7: Final Project (2 weeks/10 hours)

Coming Soon!

Browse the full content of this module at <https://codehs.com/library/course/12135/module/17427>

Objectives / Topics Covered	<ul style="list-style-type: none"> • Coming Soon!
Example Assignments / Labs	<ul style="list-style-type: none"> • Coming Soon!

Module 8: What's Next? (1 week/5 hours)

Students will explore the next chapter in learning about data science and the careers that are available and growing.

Browse the full content of this module at <https://codehs.com/library/course/12135/module/17952>

Objectives / Topics Covered	<ul style="list-style-type: none"> • Coming Soon!
Example Assignments / Labs	<ul style="list-style-type: none"> • Coming Soon!

Supplementary Unit Guide

These units can be used during the course for added practice or after the course has been completed for further review.

Supplementary Unit	Prerequisite/Recommended Unit(s)	# of activities
SQL - Coming Soon!	No prerequisites	62
SQL Part II: The SQL - Filtering - Ordering - Renaming - Joining	SQL	35
Python Practice/Review - Coming Soon!	No prerequisites	75
Final		1