2024

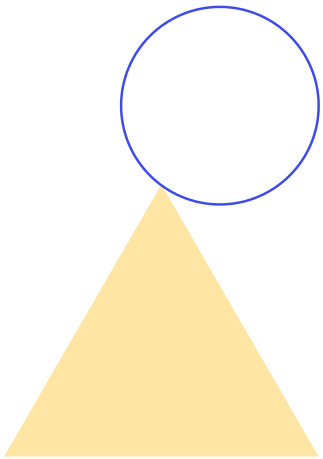
WE ARE A COMMUNITY

Data Science Course Guide

codeop

FULL & PART-TIME

1. About us



CodeOp is an international tech school that teaches women, trans and gender non-conforming students the skills they need to work in technology. We launched CodeOp as a social venture in 2018, and have grown to be an award-winning global team that's passionate about doing meaningful work at the intersection of tech and education.

We offer three courses led by senior-level instructors to support our students across various stages of their tech journey:

- Full Stack Development course for students looking to transition to tech
- Data Analytics for students who are looking to start careers in the analytics industry. The course has the option of switching to the more advanced Data Science course mid-way through
- Data Science course for those with a statistical, technical, or BI background

2. About our Data Science Course

Data Science is the process of inspecting, cleansing, transforming, and modelling data, using database querying, visualisation, statistical analysis and machine learning to discover useful information for company growth. The methods and tools applied by data scientists to test hypotheses, inform conclusions and support decision-making are now considered essential in multiple industries.

During the first part of this course, you'll learn alongside the Data Analytics students learn the different steps of the data analytics lifecycle, from exploring basic statistics, data to modelling and communicating insights using interesting data visualisations. You'll also learn to extract different types of data from relational and non-relational databases using SQL.

Filipa Pelaja, Lead Data Science Instructor
& Lead Data Science Engineer at the Lego Group

In the second part of the course, you will learn the advanced topics on Machine Learning (ML) methods which are specifically aimed for Data Science students. The ML models covered in this course range from basic models such as Regression and Clustering models to more advanced topics such as Natural Language Processing and Neural networks. The course is hands-on and follows an incremental approach, building on the knowledge gained from each previous module.

The course is designed to give students a chance to learn the theoretical foundations- with some key technologies and concepts needed to build a solid technical foundation - with a focus on hands-on-training throughout. In the latter part of the course, students build end-to-end Data Science projects individually as well as in groups.

By the end of the programme, you'll be able to identify which type of questions can be solved with Data Science and how to approach solving them, leveraging the right tool, or combination of tools.

3. What you'll learn

Our three-module system guarantees that our graduates are industry-ready.

Module 1 is focused on the fundamentals. You'll develop problem-solving and concept-retention skills. We teach through scaffolded lectures and activities, live activity reviews, and milestone projects.

Module 2 is focused on projects. You'll work on projects ranging from building datasets to solving real-world problems, resulting in a diversified portfolio.

Module 3 is focused on preparing you to enter the tech industry crhrough data challenges, technical improvisations, pitch-coaching, and mock HR and technical interviews.

Full time	Part time
Week 1	Week 1
Week 1	Week 1 - 3
Week 1	Week 1 - 3
Week 2	Week 4-6
Week 2-3	Week 6-8
Week 3-4	Week 9-10

Dev Environment for Data Scientists

- You'll set up your popular development environment for data scientists.
- Topics you will learn: Shell, Git, GitHub, Python, Jupyter Notebook

Introduction to Programming

- By the end of this module, students will understand what Data Science is, the Data Science lifecycle, and the methods and tools broadly used in Data Science. You will also learn the foundations of programming using the Python language.
- Topics you will learn: variables, functions, conditionals, loops, tuples, dictionaries, modules, JSON, classes.

Introduction to Data using Python

- By the end of this module, students will leverage the use of Python Data Science libraries and learn how to use Jupyter notebooks
- Topics you will learn: Pandas, NumPy, Pytorch, Matplotlib, Jupyter.

(Big) Data Management

- By the end of this module, students will learn how to use SQL and NoSQL databases, and how to interact with them using Python. You will also learn how to use Docker to abstract from infrastructure details and extend the development infrastructure using cloud providers.
- Topics: SQL, PostgreSQL, MongoDB, Docker, AWS.

Exploratory Data Analysis

- By the end of this module, students will review basic statistics laying the foundation for applied data analysis and how to use it for processing data. You will also learn how to use version control to collaborate with others in a team
- Topics you will learn: basic statistics, exploratory data analysis, version control using Github

Data Visualization

- By the end of this module, students will learn to Implement data visualisation techniques and plots using Python libraries. You will also learn to create and design interactive visualisations and dashboards
- Topics you will learn: Charts and interactive plots, dashboards, storytelling through data visualisations

Full time	Part time
Week 4	Week 11-12
Week 4-7	Week 12-21
Week 8-10	Week 22-28
Week 11	Week 29-30

Decision Science
Experimental Design and Causal Inference

- You'll learn how to answer causal (a.k.a. "why") questions.
- Topics you will learn: Controlled experiments, A/B Testing, and more

Machine learning

- By the end of this module, students will learn the fundamentals of machine learning models as well as advanced machine learning methods dealing with data types more complex than tables of numbers (e.g.: text, time-series, image data).
- Topics you will learn: Supervised machine learning, Unsupervised machine learning, Natural Language Processing, time-series analysis, Neural networks.

Data Science Projects

- Project 1: During this module, students will apply the knowledge gathered in the previous modules to a real use-case. Students should cover all stages of the Data Science lifecycle, in a proof of concept individual project. The project will culminate with a presentation for a mixed, technical and non-technical audience.
- Topics you learn: Data acquisition, pre-processing, programming, infrastructure, ML, Advanced Data Analysis, task prioritization, story-telling.
- Project 2: By the end of this module, students will show an understanding of how-to work collaboratively, by implementing a data project.
- Topics you will learn: Collaboration in distributed teams, deployment, advanced Github techniques, project management, pair programming.

Career Prep

- Career Preparation: By the end of this module, students will be prepared to enter the job market with a finished resume and strategies for interviewing.
- Topics: resume development, online portfolio, whiteboarding, technical challenges, take-home data project, interviewing strategies.

*Note that the schedule and topic are subject to change

4. How you'll learn

"The instructor is always available and has this way of commenting on your solution that opens up a totally new way of thinking."

CodeOp Bootcamp Student, 2022

Theoretical Phase

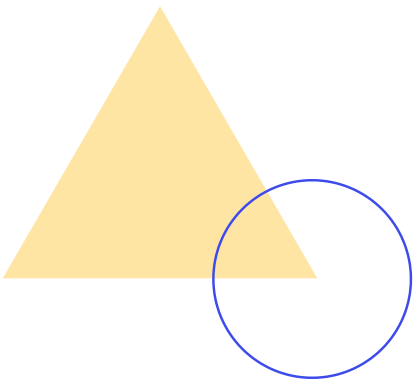
Lectures

Lecture slides focus on topics (e.g. SQL, data visualisation, machine learning, etc.) and are shared with students.
These slides are concise for two reasons:

- Encourage the lecture to be as interactive as possible
- Encourage students to use the Internet as their primary source of information.

Activities

Activities consist of exercises or tasks that are related to the lecture content and reinforce what was covered in class. They allow students to get some hands-on learning and to practice in their own time.



Live Activity Review

The instructor goes over ways in which the activity could be approached, explaining their thinking and the steps they would take to complete a task. Time is set aside to answer any student questions and to go over the different approaches that students took.

Milestone Activity / Assessment

The purpose of the assessment is to target student problem-solving abilities and concept retention, as well as any weaknesses in learning the curriculum. Students are assigned supplementary work based on their results. This can involve redoing past assignments, doing a new assignment, and fixing or finishing their assessment.

Mini Industry Lectures

Students participate in lectures from senior-level professionals from within the local tech community (these may be broader than data science– e.g. data engineering, D3.js, agile methodologies, product development)

Project Phase

For the final projects, students have the choice of proposing their own idea, or working on one of the challenges proposed in the class (e.g. advanced regression techniques applied to house prices, building a textual analysis of social media data, and so on).

Students are encouraged to think about both projects in the brainstorming class, as the proof of concept can serve as a stepping stone to the collaborative project.

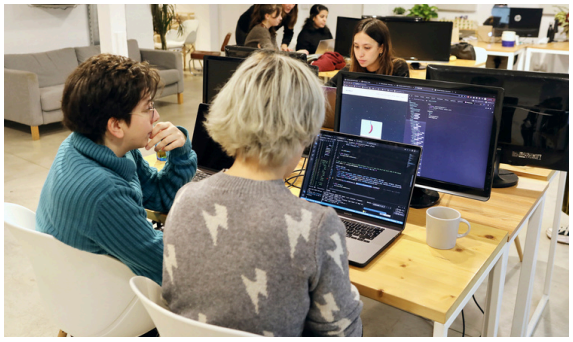
During this phase, the instructor meets regularly with students throughout the project phase, helping them to prioritise tasks and offering technical suggestions.

Objective:
Apply the learnings of data science methods and tools acquired during the lecture phase to work on a use case. In this phase, students learn how to work both independently and collaboratively.

The projects can cover one or more of the advanced topics covered during the course (e.g. NLP, A/B testing, or deep learning).

The projects should follow the 5 steps of the data science lifecycle:

- Discovery
- Data Preparation
- Model Building
- Repeat (the above)
- Communicating Results



The results are communicated at the end of the project with a presentation, which should include a slide deck or an interactive dashboard. This presentation should communicate the main insights to a non-technical audience, as well as more in depth technical information (e.g. tech stack, used algorithms). Students should be ready to defend their technical choices.

Individual Proof of Concept (PoC):
This is the first of the two projects and has a shorter timeline. It could be a self-contained project, or a building block for the collaborative project. The project ends with a presentation to communicate the results.

Collaborative Project:
The collaborative project can be more ambitious than the PoC, as it has a longer timeline and more contributors. In this project, students experience working collaboratively, which is an important skill to show tech employers. In addition to the final presentation communicating project results, students also provide a report as part of the project completion.

Career Prep Phase

CodeOp helps you reach and expand your career goals with lifelong career support. Through workshops and focused 1-to-1 career coaching sessions, we ensure you discover all the options out there, and guide you on how to draw the dots between your previous career and a career in tech.

Example Technical workshops & presentations

- Agile workshop: A crash course introduction to Agile methodologies including working in iterations and cross-functional teams
- Big Data: An overview of the role of a Data Engineer and learning about the concept of ETL (extract, transform & load data)
- Contributing to Open Source projects: An introductory flash lecture on the Open Source world
- Privacy and ethics: Focus on algorithmic bias on machine learning and ways to mitigate this
- #IamRemarkable: A Google initiative empowering women and underrepresented groups to celebrate their achievements in the workplace and beyond.

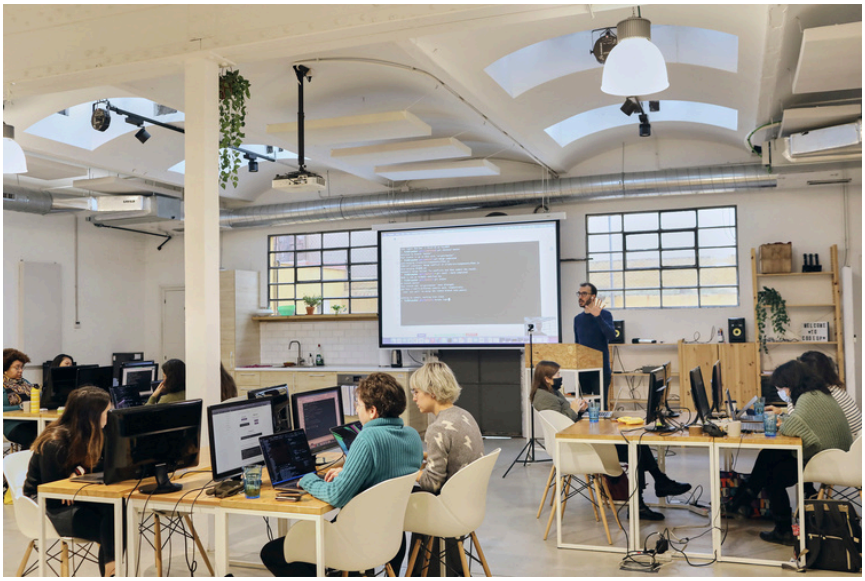
Example Career coaching workshops

- Tech Manager tips & Q&A: Presentation and Q&A with a technical manager to learn about best practices when searching for a job and what it takes to stand out from the crowd.
- Building your job search strategy: An interactive workshop to help think outside the box when approaching recruiters
- CV Strategy workshop: Presentation on how to make your CV stand out from the crowd
- Strategies for approaching technical challenges: How to approach the technical challenges and whiteboarding
- Whiteboarding challenge: SQL & Python
- Elevator Pitch workshop: Interactive session to make sure you can nail that 'Tell me about yourself' question in less than one minute
- Interview preparation: Practice interviews to help prepare you for job interviews and build your overall confidence

5. How we teach

"There's decades of research about instructional strategies that show things like scaffolding, modeling, and reflection are far more important to comprehending new concepts."

Krista Moroder,
AKA the Momma of our Pedagogy

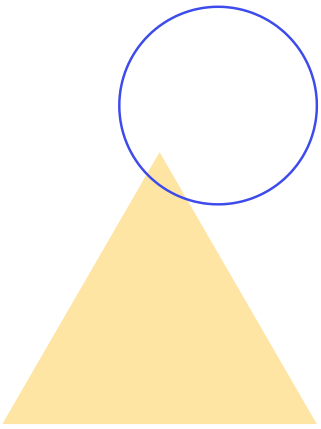


We're serious about giving you access not only to the best resources and instructors, but also the best teaching practices to help you comprehend new concepts.

The instructional design and curriculum for the Data Science course was built in collaboration with a collection of individuals working in both industry and academia. Some of the primary pedagogical choices are detailed in depth below.

Scaffolding Strategies

Students entering the workforce will be expected to know and understand how to find artefacts, resources, and environments in which they can gain new knowledge as the tools and technologies they use continue to evolve. Because of this, CodeOp's model doesn't just include scaffolding of content, but scaffolding of information literacy skills: being able to identify, locate, evaluate, and effectively use data to solve a problem.



Formative Feedback Strategies

The importance of ongoing, targeted feedback for student learning can't be understated. Our model incorporates this feedback in multiple ways: regular assessments, solution lectures, and activity reviews.

Mentoring Strategies

Several studies have focused exclusively on women in mentoring relationships. According to "Women and Mentoring: A Review and Research Agenda", women who had one or more mentors reported greater job success and job satisfaction. Because of this, CodeOp has created a deliberate focus on providing mentorship as part of the educational experience, including career coaching sessions and guest lectures from senior professionals.

Individual Completion of Activities

A learner-centred classroom that uses formative feedback and response to intervention strategies is considered the most impactful teaching strategy for learning. CodeOp differentiates itself from other programming schools in this way: the classes are small, the focus is on the learner, and the interventions are flexible to the context of the current group of learners in the classroom.

6. Funding your bootcamp

We believe in removing barriers to tech for women, transgender, and nonbinary individuals. That's why we offer payment plans for everyone, no matter your situation.

Data Science Tuition Cost

7800€

Payment Options

We offer three different payment options as well as scholarship options

Pay upfront, interest free

1000€ discount when paid upfront, total would be €6800.

Income Share Agreement

Depending on your country of residence, you may be eligible to pay only part of the course now (€600) and pay the remaining amount once your bootcamp is completed and you've started working.

Deferred Tuition Payment

Break up the cost of tuition into smaller monthly payments. You can choose to pay for your bootcamp in 12, 24 or 36 months, depending on your needs and geographic location.

Apply now