# Foundations of Data Science

What you'll learn:

* Understand common careers and industries that use advanced data analytics
* Investigate the impact data analysis can have on decision-making
* Explain how data professionals preserve data privacy and ethics
* Develop a project plan considering roles and responsibilities of team members

## Introduction to data science concepts

You’ll begin with an introduction to the Google Advanced Data Analytics Certificate. Then, you'll explore the history of data science and ways that data science helps solve problems today.

**Learning Objectives:**

* Understand program plans and expectations
* Explore defining details of a data professional career
* Describe the key concepts to be shared in the program, including learning outcomes

## The impact of data today

Now that you’re more familiar with the history of data science, you’re ready to explore today’s data career space. You’ll learn more about how data professionals manage and analyze their data, as well as how data-driven insights can help organizations.

**Learning Objectives:**

* Determine the priorities of data stewardship and ethical concerns for data analytics professionals
* Classify distinctions between the technical and strategic skills that span different careers in the data career space
* Define the types of organizations that employ data professionals; describe how data professionals make a positive impact across different industries

## Your career as a data professional

You’ll identify the skills data professionals use to analyze data. You'll also explore how data professionals collaborate with teammates.

**Learning Objectives**

* Distinguish existing career resources to prepare for job search
* Identify the ethical implications of data-focused work; understand the responsibilities of a data professional
* Describe the role of DA within an organization and the typical work that data professionals perform; recognize high demand skills in data professional roles across industries

## Data applications and workflow

You’ll learn about the PACE (Plan, Analyze, Construct, Execute) project workflow and how to organize a data project. You’ll also learn how to communicate effectively with teammates and stakeholders.

**Learning Objectives**

* Apply the principles of communication to data project scenarios
* Analyze the importance of communication and how it drives the PACE workflow
* Examine the PACE workflow and categorize tasks of a data project for each stage

## End-of-course project

You’ll complete an end-of-course project, gaining an opportunity to apply your new data skills and knowledge from Course 1 to a workplace scenario, and practice solving a business problem.

**Learning Objectives**

* Describe key findings for a relevant audience member
* Design a project plan for a data science project including questions, details and action items for each project stage
* Apply the PACE workflow to a data science project

# Get Started with Python

What you'll learn:

* Explain how Python is used by data professionals
* Explore basic Python building blocks, including syntax and semantics
* Understand loops, control statements, and string manipulation
* Use data structures to store and organize data

## Hello, Python

You’ll begin by exploring the basics of Python programming and why Python is such a powerful tool for data analysis. You’ll learn about Jupyter Notebooks, an interactive environment for coding and data work. You’ll investigate how to use variables and data types to store and organize your data; and, you'll begin practicing important coding skills.

Learning Objectives

* Explain how to convert data types in Python
* Define fundamental data types such as integer, float, and string
* Interpret the naming conventions and restrictions for variables in Python
* Describe the purpose and procedure of assigning variables
* Define fundamental concepts of object-oriented programming such as object, class, method, and attribute
* Recognize the uses and benefits of Jupyter Notebook for data work
* Identify the basic features and capabilities of the Python programming language
* Explain how to import modules in Python scripts using import
* Introduce Jupyter notebook as a python environment
* Perform arithmetic operations
* Use built-in functions and keywords to explore data
* Understand why Python is relevant to data science
* Understand packages and interpreter options for Python
* Identify the concept of algorithms in python
* Identify the value of Python competency for data careers
* Define Python and what syntax means

## Functions and conditional statements

Next, you’ll discover how to call functions to perform useful actions on your data. You’ll also learn how to write conditional statements to tell the computer how to make decisions based on your instructions. And you’ll practice writing clean code that can be easily understood and reused by other data professionals.

**Learning Objectives**

* Explain the purpose and logic of conditional statements such as if, else, and elif
* Use comparators and logical operators to compare values
* List the benefits of commenting on code
* Identify best practices for writing clean code such as reusability, modularity, and refactoring
* Describe how to define Python functions using the def and return keywords
* Compare values using quality operators and logical operators
* Write comments and break code into blocks to reduce complexity
* Refactor code to enhance code readability and reuse
* Define and call functions utilizing parameters and return data
* Use data type conversions
* Differentiate and convert between different data types using variable expressions and built-in functions
* Define variables, expressions, operators
* Introduce basic python syntax

## Loops and strings

Here, you’ll learn how to use iterative statements, or loops, to automate repetitive tasks. You’ll also learn how to manipulate strings using slicing, indexing, and formatting.

**Learning Objectives**

* Describe how to manipulate strings using techniques such as concatenating, indexing, slicing, and formatting
* Summarize the syntax of the range() function
* Explain the purpose and logic of iterative statements such as for loops and while loops
* Format strings
* Manipulate strings using indexing, slicing, and formatting
* Introduce strings
* Know when to use for and when to use while loops
* Analyze nested for loops
* Use the range() function to control for loops
* Utilize for loops to iterate over sets of data, integers, strings and more
* Use loops within functions
* Identify common errors in loops
* Initialize variables
* Implement logical operators in while loops
* Define loops
* Define iteration

## Data structures in Python

Now, you’ll explore fundamental data structures such as lists, tuples, dictionaries, sets, and arrays. Lastly, you’ll learn about two of the most widely used and important Python tools for advanced data analysis: NumPy and pandas.

**Learning Objectives**

* Explain how to manipulate dataframes using techniques such as selecting and indexing, boolean masking, grouping and aggregating, and merging and joining
* Describe the main features and methods of core pandas data structures such as dataframes
* Describe the main features and methods of core NumPy data structures such as arrays and series
* Define Python tools such as libraries, packages, modules, and global variables
* Describe the main features and methods of built-in Python data structures such as lists, tuples, dictionaries, and sets

## End-of-course project