

# Introduction to Data Analysis with Python

GoSkills online course syllabus

Wednesday, April 16, 2025

**Skill level**

Beginner

**Lessons**

44

**Accredited by**

CPD

**Pre-requisites**

None

**Video duration**

3h 10m

**Estimated study time**

22h for all materials

**Instructor**

John Elder

## Development Environment Setup

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### Introduction - What to Expect From the Course

A quick rundown of what to expect from this course, how we're going to move forward, and the roadmap we'll follow as we progress through the course.

2

### Installing Python

Let's start downloading the tools we need for the course, including downloading Python itself.

3

### Installing The Git Bash Terminal

We need one more major tool to do data analysis with Python: the Git Bash Terminal. In this video, I'll show you how to download and install it.

4

### Setting up a Virtual Environment

A virtual environment is a helpful tool that allows us to install programs and try out code without affecting the rest of our computer. In this video, you'll learn how to set up your own virtual environment.

5

### Installing and Using Jupyter Notebooks

We're going to use Jupyter Notebooks throughout the rest of the course to do all our coding, so in this video, let's install and start using it.

## Numpy

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### Pip Installing and Importing Numpy

In this video, we'll download and use our first data analysis tool: Numpy, which stands for Numerical Python.

7

### Numpy Overview - What is It Used for

Before we start coding with Numpy, let's discuss what it does and how it works. This video will help you understand why Numpy is so important for data analysis.

8

## Numpy Arrays

In this video, we discuss how Numpy arrays work, including how they are much, much faster to work with than regular Python arrays.

9

## Numpy Operations

Let's discuss mathematical operations we can use in Numpy, including scalars.

10

## Numpy Universal Functions

Numpy has universal functions built into it that we can play with and use. In this video, we'll discuss square roots, absolute values, exponents, and more.

# Pandas

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11

## Installing Pandas and Overview - What is It Used for

Pandas is a powerful Python data analysis toolkit. In this video, we'll discuss what it does and how it works.

12

## Pandas Series

Pandas series is one of the main "workhorses" of Pandas. We'll discuss how series work and some of the helpful ways you can use them.

13

## Pandas DataFrames

DataFrames are like spreadsheets, and in this video, we start building and using them.

14

## Selecting Columns and Multiple Columns

We discuss how to select individual and multiple columns within a data frame.

15

## Creating New Columns

In this video, we cover how to add a new column to your data frame.

16

## Removing Columns

Let's discuss how to use the drop function to remove a column from your data frame.

17

## Deleting Rows

Deleting a row in a data frame is very similar to deleting a column - but with one small difference.

18

## Selecting Rows

In this video, we'll discuss two different ways to select a row within a data frame, including the loc function.

19

## Selecting Subsets of Rows and Columns

Let's discuss how to select specific points within your data frames, such as the intersection of a row and column, or multiple points within different rows and columns.

- 20 **Conditional Selection of DataFrames**  
Selecting data based on conditionals - such as greater than, less than, equal to, not equal to - is an essential part of data analysis. We'll discuss that in this video.
- 21 **Multiple Conditions**  
In this video, we'll explain how to select data based on multiple conditional statements.
- 22 **Changing Indexes**  
There are times when you may need to reset your index within a data frame, so we'll explain how that works in this video.
- 23 **Selecting Specific Cells From Multi-Index**  
Let's discuss multi-indexes: what they are, how they work, and how to select data from them.
- 24 **Dealing With Missing Data**  
You may encounter missing data while doing analysis. What should you do? In this video, we'll discuss some helpful alternatives.
- 25 **Groupby Grouping Data**  
The groupby function allows us to group different pieces of data together. We'll discuss the function in this video.
- 26 **Concatenating, Merging, and Joining Part 1**  
There are different ways to combine various pieces of data within your data frame. In this video, we'll discuss concatenating.
- 27 **Concatenating, Merging, and Joining Part 2**  
We discuss how to merge and join data frames together in this video.
- 28 **Operations: Unique Values and Value Counts**  
In this video, we discuss how to find unique values within a column and how to find value counts as well.
- 29 **Operations: Apply Method**  
The apply method allows us to create our own functions and apply them to the data in our columns.
- 30 **Operations: Sorting, Ordering, and Finding Nulls**  
In this video, we discuss how to sort and order your data.

## Pandas Visualization

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- 31 **Plotting Histograms**  
In this video, we begin discussing data visualization, and install matplotlib to help us create histograms.

- 32** **Plotting Area Plots**  
We discuss how to create another type of data visualization: area plots.
- 33** **Plotting Bar Plots**  
In this video, we explain how to create bar plots using your data.
- 34** **Plotting Line Plots**  
Let's create line plots and discuss some of the options you can use to change their appearance.
- 35** **Plotting Scatter Plots**  
Scatter plots are a bit more complicated, but can be helpful ways to visualize your data.
- 36** **Plotting Box Plots**  
In this video, we discuss how to create your own box plots.
- 37** **Plotting HexPlots**  
In this video, we explain what a hexplot is and how to create your own.
- 38** **Plotting Density Plots**  
In this video, we discuss density plots, kernel density estimation (KDE) plots, and how to create them.

## Linear Regression With SciKitLearn

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- 39** **What Is Linear Regression - Least Squares Method**  
Let's start talking about machine learning. In this video, we introduce linear regression and the least squares method.
- 40** **Linear Regression Installation**  
We need to install some more elements to do a linear regression, so we'll discuss what we need in this video.
- 41** **Split Data into Training and Testing Set**  
As we begin to set up our linear regression model, we must define testing and training splits.
- 42** **Train a Linear Regression Model and Fit the Model**  
In this video, learn how to train a linear regression model and how easy it is to fit the model.
- 43** **Explore the Coefficients and Intercepts**  
We'll take a look at the coefficients and intercepts we discovered at the end of the last video and explain what they mean.

# 44

## Make Predictions and Analyze Results

In this video, we'll learn how to make predictions and analyze results based on the data analysis we've performed so far.

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