

# Python for Finance with Intro to Data Science

## Overview

### What this Course Is

This is a beginner's Python course for students from a financial background. It does not require any previous programming knowledge. The goal of this course is to instill a practical understanding of Python in the context of how it is used in the financial industry; students can expect to come out with the ability to read, understand, and write code in Python for their first day on the job. The examples and case study are geared towards finance; specifically, loan and asset-backed security modeling.

This is a practically-oriented course. It teaches Python programming at a high level, without going into any deep Computer Science theory. Therefore, the lectures will often gloss over the deeper language details.

The primary focus of the course is practical Python. The necessary finance/mathematics information will be introduced as necessary to complete the exercises. Additionally, the finance examples may often be over-simplified, beyond real-life situations, to suit the purpose of the course.

This course also offers a very useful introduction to Data Science. It introduces students to data sources/packages, data cleaning, bootstrapping, analysis, visualization, and a very high level into to Machine Learning in Python.

### What this Course Is Not

This is not a theoretical or academically-oriented Python course. It does not contain any Computer Science theory and will not give a deep understanding of the mechanics of Python.

This is not a finance or structured-finance course. As the primary focus is on practical Python programming, the finance applications will be introduced as they become necessary. In some cases, you may need to 'accept' certain financial concepts and just focus on implementing the concept into your code.

This is not a complete Data Science or Machine Learning course. The course focuses on the core concepts and packages that would be a prerequisite to any full ML course.

## Prerequisites

### Required

- Basic finance
- College mathematics
- Know your way around the computer

### Recommended

- Bond pricing knowledge
- Excel

# Syllabus

## LEVEL 0: INTRODUCTION

- 0.1: IDE
- 0.2: SYLLABUS/BACKGROUND

## LEVEL 1: PYTHON SYNTAX 101

- 1.1: VARIABLES/CONDITIONALS
- 1.2: LISTS/LOOPS
- 1.3: FUNCTIONS
- 1.4: BUILT-IN FUNCTIONS
- 1.5: SETS/DICTIONARIES
- 1.6: PACKAGES

## LEVEL 2: OOP

- 2.1: CLASSES 101
- 2.2: INTERMEDIATE CLASSES

## LEVEL 3: INTERMEDIATE PYTHON SYNTAX

- 3.1: ADVANCED FUNCTIONS
- 3.2: GENERATORS 101
- 3.3: EXCEPTION HANDLING
- 3.4: CONTEXT MANAGERS

## LEVEL 4: I/O AND STRING MANIPULATION

- 4.1: PYTHON STRINGS
- 4.2: LOGGING
- 4.3: FILE I/O

## LEVEL 5: ADVANCED PYTHON SYNTAX

- 5.1: DATE/TIME
- 5.2: DECORATORS

## LEVEL 6: MONTE CARLO IN PYTHON

- 6.1: RANDOM NUMBER GENERATION
- 6.2: CONCURRENCY

## LEVEL 7: ASSET BACKED SECURITIES

- CASE STUDY

## LEVEL 8: INTRO TO DATA SCIENCE IN PYTHON

- 8.0: ANACONDA/JUPYTER
- 8.1: NUMERICAL METHODS WITH NUMPY
- 8.2: DATA ANALYSIS WITH PANDAS

## LEVEL 9: VISUALIZING DATA

- 9.1: PLOTTING WITH PANDAS
- 9.2: PLOTTING WITH MATPLOTLIB
- 9.3: INTERACTIVE PLOTTING WITH PLOTLY
- 9.4: IPYWIDGETS

## LEVEL 10: DATA RESEARCH (VERY HIGH-LEVEL INTRO TO ML)

- 10.1: DATA PREPARATION (CLEANING, BOOTSTRAPPING)
- 10.2: DATA PREDICTIONS (CLASSIFICATION, REGRESSION)