PYTHON CHARMERS

PYTHON FOR FINANCE

COURSE GUIDE: JULY – DECEMBER 2019

Python for Finance

An intensive hands-on course

Audience: This is a course for financial analysts, traders, risk analysts, fund managers, quants, data scientists, statisticians, and software developers.

Context: Python is now the language of choice for data science and machine learning in the financial services industry, useful in both research (modelling) and production systems.

Overview: This intensive, hands-on, practical training course will teach you how to use powerful Python-based tools for processing, modelling, and visualising data, with a focus on financial time series.

Days 1-2: You will learn the fundamentals of Python's powerful data types and how to manipulate tabular data with ease in a variety of formats, including SQL databases, CSV, Excel spreadsheets, JSON, API endpoints, and time-series.

Days 3-4: You will learn all about machine learning (ML) and how to perform each stage of a machine learning project: data prep, feature selection, model selection, training, validation, model refinement, production deployment. You will apply powerful ML algorithms for classification, regression, and clustering, in useful practical settings on small and medium-sized data sets.

Day 5: You will learn in depth about munging, modelling, and visualization of financial time-series data.

Format: Each topic is a mixture of expert instruction, worked examples, and hands-on exercises.

Expert instructors: See bios below.

Venues: modern computer-based training facilities (CBD locations).

Dates and locations, 2019:
Sydney: 26-30 August 2019
Melbourne: 18-22 November 2019
Other locations: on request

Duration: 5 days

Price: $3,500 (excl GST)

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Topic outline

Day 1: Python basics

Day 1 covers how to use Python for basic scripting and automation tasks, including tips and tricks for making this easy:

- Why Python? What's possible?
- The *Jupyter* notebook for rapid prototyping
- Modules and packages
- Python concepts: an introduction through examples
- Essential data types: strings, tuples, lists, dicts
- Worked example: fetching and ranking real-time data from a web API
- Raising and handling exceptions

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Topic outline

Day 2: Handling, analyzing, and presenting data in Python

Python offers amazingly productive tools like *Pandas* for working with different kinds of data. Day 2 gives a thorough introduction to analyzing and visualizing data easily. You will learn how to slice, dice, merge, aggregate, pivot, clean, munge, resample, and plot data with ease:

- Reading and writing essential data formats:
  CSV, Excel, SQL, JSON, time-series (others on request)
- Indexing and selecting data in *Pandas*
- Data fusion: joining & merging datasets
- Summarization with "group by" operations; pivot tables
- Visualization and statistical graphics with *Seaborn*

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Topic outline

Day 3: Time-series, simulation, inference and modelling

Day 3 demonstrates more advanced features of *Pandas* for working with data, including time-series data. It then describes Monte Carlo simulation methods and walks you through using powerful methods of inference and modelling for different kinds of data in Python:

- Time-series analysis: parsing dates, resampling
- Introduction to *NumPy* for manipulating vector and matrix data: data types, powerful indexing, reshaping, *ufuncs*
- Classical statistics: Monte Carlo simulation and linear regression with *scipy.stats* and *statsmodels*
- Density estimation with *scikit-learn*
- Dimensionality reduction with *PCA*

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Topic outline

Day 4: Machine learning

Day 4 introduces a more automated approach to modelling real-world data with several powerful machine learning algorithms using *scikit-learn*. The datasets are selected from a range of industries: financial, geospatial, medical, and social sciences:

- Concepts of machine learning (ML)
- Overview of the ML package ecosystem in Python
- Classification with *scikit-learn*:
  Naive Bayes, logistic regression, *SVMs*, random forests
  Application to diagnosis, AI systems, and time-series prediction
- Nonlinear regression, with application to forecasting
- Clustering data with *DBScan*, with application to outlier detection
- Validation and model selection
- Deploying machine learning models in production

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Topic outline

Day 5: Financial time-series in-depth

Day 5 teaches you in-depth about munging, modelling, and visualization of financial time-series data in Python:

- Secret weapons in *Pandas*:
  handling time-zones, hierarchical indices, unstack, styles
- Common time-series models in Python: *AR, ARIMA*
- Simulation examples: Monte Carlo risk analysis; Black-Scholes pricing
- Handling missing data and outliers; outlier detection (clustering / *PyOD*)
- Visualizing time-series data interactively with *Altair*
- 2-way integration of *Python* with *Excel* using *xlwings*

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Supplemental materials

We will provide you with printed course notes, cheat sheets, and a USB stick containing kitchen-sink Python installers for multiple platforms, solutions to the programming exercises, several written tutorials, and reference documentation on Python and the third-party packages covered in the course.

Instructor bio

Dr Edward Schofield

Ed has consulted to or trained over 2000 people from dozens of organisations in Python, including Atlassian, Barclays, Cisco, CSIRO, Dolby, Harvard University, IMC, Singtel Optus, Oracle, Shell, Telstra, Toyota, Verizon, and Westpac. He is well-known in the Python community as a former release manager of *SciPy* and the author of the widely used *future* package. He regularly presents at conferences in data analytics and Python in Australia and internationally.

Ed holds a PhD in machine learning from Imperial College London. He also holds BA and MA (Hons) degrees in mathematics and computer science from Trinity College, University of Cambridge. He has 20+ years of experience in programming, teaching, and public speaking.

Instructor bio

Dr Robert Layton

Robert is the author of the book "Data Mining in Python", published by O'Reilly. He provides analysis, consultancy, research and development work to businesses, primarily using Python. Robert has worked with government, financial and security sectors, in both a consultancy and academic role. He is also a Research Fellow at the Internet Commerce Security Laboratory, investigating cybercrime analytics and data-mining algorithms for attribution and profiling.

Robert is a contributor to the Python-based *scikit-learn* open source project for machine learning and writes regularly on data mining for a number of outlets. He is also the author of the website "LearningTensorflow.com". He has presented regularly at a number of international conferences in Python, data analysis, and its applications.

Instructor bio

Henry Walshaw

Henry has almost 15 years of experience in Python application development and has trained hundreds of people in how to use Python from organisations including AGL, the Bureau of Meteorology, ESRI, the NSW Department of Finance, National Australia Bank, and Telstra.

Henry's core technical expertise relates to the development and analysis of large scale spatial datasets (primarily using Python), and communicating this understanding to both subject matter experts and the general public.

Before joining Python Charmers, Henry worked in both government and industry — at Geoscience Australia, the Victorian Department of Sustainability and Environment, and the Environmental Protection Agency (EPA); as a consultant with Sinclair Knight Merz (SKM), a manager at we-do-IT, and as CTO of a startup. He holds a Bachelors in Computational Science.

Instructor bio

Janis Lesinskis

Janis is a software developer who has been using Python since 2005. He has worked on several high-end Python projects across a variety of software industry sub-sectors, including: mathematical optimization engines for logistics, a game theory solver, a variety of backend web apps with *Django* and *Flask*, and as a scalability consultant improving Python performance.

Janis loves open source and is the author of several open source Python projects on GitHub. He is involved in education in several ways: in an in-house capacity as a Python consultant, as a regular blogger, as a volunteer for events like Django Girls and Python community workshops, and as a frequent presenter about Python at local meetup events.

Janis is a co-founder of the Custom Programming Solutions consulting group and joined Python Charmers as a trainer in 2018.

Other information

Computer: A computer will be provided for you during the course.

Exercises: There will be practical programming exercises throughout the course. These will be challenging and fun, and the solutions will be discussed after each exercise and provided as source code. During the exercises, the trainer(s) will offer individual help and suggestions.

Timing: The course will run from 9:00 to roughly 17:00 each day, with breaks of 50 minutes for lunch and 20 minutes each for morning and afternoon tea.

Personal help: Your trainer(s) will be available after each day for you to ask any one-on-one questions you like — whether about the course content and exercises or about specific problems you face in your work and how to use Python to solve them. We encourage you to have your own data sets ready to discuss if you wish.

Venue: our partner training facilities (CBD locations)

Food and drink: We will provide lunch, morning and afternoon tea, and drinks.

Certificate of completion: We will provide you a certificate if you complete the course and successfully answer the majority of the exercise questions.

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About Python Charmers

Python Charmers is the leading provider of Python training in the Asia-Pacific region, based in Australia and Singapore. Since 2010, Python Charmers has given over 300 training courses and bootcamps to over 3000 delighted people from organizations such as AGL, Atlassian, Barclays, CSIRO, Cisco, Deloitte, Dolby, IMC, pwc, Singtel Optus, Shell, Sportsbet, Telstra, Toyota, Verizon, Westpac, and Woolworths. Python Charmers specializes in teaching programming and data science to scientists, engineers, data analysts, quants, and computer scientists in the Python language.

Python Charmers' trainers boast years of Python experience and deep roots in the open source community, as both speakers at events and contributors to well-known open source projects, including *NumPy*, *SciPy*, *Scikit-Learn*, *Pandas*, and *Python-Future*.

Testimonials: Testimonials from past participants of similar bootcamps and training courses are available at

https://pythoncharmers.com/testimonials/

Questions: We would be happy to hear from you. Please let us know if you have any questions.

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