

Programming in Python (2019-2020)

Lecturer: Dr Riaz Ahmad **Course Term:** Michaelmas

Duration: 8-hour intensive course.

Motivation:

Python is rapidly becoming the standard in scientific computing, receiving much excitement about the application to areas including finance, data science and machine learning. Its appeal continues to grow in both academic and industry sectors. It is available on multiple platforms. Python is simple to use, easy to maintain, promotes productivity and free to download, with a growing amount of add-on modules.

Lecture format:

A complete Jupyter notebook will be used to deliver the course curriculum.

Prerequisites:

This is a self-contained course and does not require prior knowledge of Python, although some programming experience will be useful. You should have Anaconda (Python 3.7) downloaded to your laptop, from

<https://www.anaconda.com/distribution/>

Course Contents:

1. Data types and data structures – strings, lists, tuples, dictionaries.
2. Flow control – truth and falsehood, loops, conditional statements.
3. Operating system – file management, input/output from/to files.
4. Special libraries - NumPy (numerical computing), matplotlib (graphics), SciPy (scientific algorithms) and pandas (data handling).
5. Numerical recipes in Python – root finding; interpolation; numerical integration; numerical linear algebra; random number generation.
6. Data acquisition - getting data from an API (Alpha Vantage, Quandl, Yahoo! Finance)
7. Sci-kit learn – machine learning in Python

Reference Sources:

- *Yves Hilpisch*, Python for Finance. O' Reilly, 2nd edition, 2019.
- *Christian Hill*, Learning Scientific Programming with Python. CUP, 2016.
- *Jesse Kinder and Philip Nelson*, A student's guide to Python for Physical Modeling: Updated edition. PUP, (2018).