

PHOT 110: Introduction to programming

Study guide: references to online materials

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Where to learn Python?

Obviously, I hope that you will learn Python during our PHOT 110 course:

- Please ask me, Metin, and Hazan any questions about Python which you might have. This can be during class, or you can send us messages on MS-Teams, via email, or both. If I do not immediately respond, this just means I didn't see it yet.
- Tell me if anything is missing: course material which is not clear, mistakes in the slides, topics that are not covered sufficiently, etc.

However, there is also a lot of Python documentation to be found online, which can further help you to learn Python. Since Python has been around for a while, maybe even too much documentation. I listed below some of the online references, which are, in my opinion, good starting materials.

- (1) The book we are following: “A Primer on Scientific Programming with Python”, 5th edition by Hans Petter Langtangen. Although a lot to read, it gives you a thorough introduction to scientific computations. The emphasis is less on programming itself and more on implementing numerical methods using Python.
- (2) There are great tutorials if you want to rehearse the basics of Python programming: especially <https://www.learnpython.org/> is a gentle (and **interactive**) introduction.

- (3) The [tutorial](#) at the official [Python website](#) gives more background and details but still builds up from scratch (I suggest starting from Chapter 3 in case you want to see code immediately).
- (4) The websites of specialized libraries for plotting, numerical methods, data science, often offer very good documentation about the library:
 - [Numpy](#), and their [tutorial for beginners](#)
 - [Matplotlib](#) is the plotting library that we use, their website provides good documentation and tutorials.
 - [Pandas](#) is a library which provides functions to handle large tables of data (tables with millions of rows and or hundreds of columns). We will see Pandas towards the end of the semester.
 - [Scipy](#): A library which overlaps partially with Numpy, but has some extended functionality. This is for more advanced usage when Numpy is not given the optimal results.
 - [Scikit-Learn](#): This library is on machine learning, a topic which we will not see here in the course. I added it here to the list since their user guide is a great resource if you ever come into contact with machine learning.
- (5) Aurelien Geron, the author of the book “Hands-On Machine Learning with Scikit-Learn Keras & Tensorflow”, has nice tutorials on Matplotlib, Numpy, Pandas, and linear algebra using Numpy:
 - [Aurelien Geron’s Matplotlib tutorial on Google Colab](#)
 - [Aurelien Geron’s Numpy tutorial on Google Colab](#)
 - [Aurelien Geron’s Pandas tutorial on Google Colab](#)
 - [Aurelien Geron’s Linear Algebra tutorial on Google Colab](#)