**NB1: Python for physicists, an introduction**

* [Learning objectives](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%201/Notebook%201%20Python%20Basics.ipynb#section_1_0)
* [What is Python? And what are Jupyter Notebooks?](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%201/Notebook%201%20Python%20Basics.ipynb#section_1_1)
  + [The Python kernel has a memory](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%201/Notebook%201%20Python%20Basics.ipynb#sub_section_1_1_1)
  + [Starting and stopping the kernel](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%201/Notebook%201%20Python%20Basics.ipynb#sub_section_1_1_2)
* [Python variable types](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%201/Notebook%201%20Python%20Basics.ipynb#section_1_2)
  + [Lists & Tuples](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%201/Notebook%201%20Python%20Basics.ipynb#sub_section_1_2_1)
  + [Numpy Arrays](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%201/Notebook%201%20Python%20Basics.ipynb#sub_section_1_2_2)
  + [Converting variables between different types](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%201/Notebook%201%20Python%20Basics.ipynb#sub_section_1_2_3)
  + [Names of variables](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%201/Notebook%201%20Python%20Basics.ipynb#sub_section_1_2_4)
* [Python can do math](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%201/Notebook%201%20Python%20Basics.ipynb#section_1_3)
* [Sending data to Python using input()](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%201/Notebook%201%20Python%20Basics.ipynb#section_1_4)
* [Tab completion in Jupyter Notebooks](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%201/Notebook%201%20Python%20Basics.ipynb#section_1_5)
* [Understanding Python Errors](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%201/Notebook%201%20Python%20Basics.ipynb#section_1_6)
* [Solutions to Exercises](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%201/Notebook%201%20Python%20Basics.ipynb#section_1_7)

**NB2: Functions in Python & basics of plotting**

* [Learning objectives](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%202/Notebook%202%20Functions.ipynb#section_2_0)
* [Various functions](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%202/Notebook%202%20Functions.ipynb#section_2_1)
  + [Functions to save typing](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%202/Notebook%202%20Functions.ipynb#sub_section_2_1_1)
  + [Functions with input variables](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%202/Notebook%202%20Functions.ipynb#sub_section_2_1_2)
  + [Functions with multiple inputs](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%202/Notebook%202%20Functions.ipynb#sub_section_2_1_3)
  + [Functions that return a value](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%202/Notebook%202%20Functions.ipynb#sub_section_2_1_4)
  + [Importing functions from libraries](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%202/Notebook%202%20Functions.ipynb#sub_section_2_1_5)
    - [Importing a single function](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%202/Notebook%202%20Functions.ipynb#sub_sub_section_2_1_5_1)
    - [Shift-Tab for getting help](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%202/Notebook%202%20Functions.ipynb#sub_sub_section_2_1_5_2)
* [Global variables, local variables, and variable scope](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%202/Notebook%202%20Functions.ipynb#section_2_2)
* [Plotting data and functions with Matplotlib](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%202/Notebook%202%20Functions.ipynb#section_2_3)
  + [Plotting basics](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%202/Notebook%202%20Functions.ipynb#sub_section_2_3_1)
* [Solutions to Exercises](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%202/Notebook%202%20Functions.ipynb#section_2_4)

**NB3: Program flow control with Conditional Statements and Loops**

* [Learning objectives](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%203/Notebook%203%20Program%20Flow%20Control.ipynb#section_3_1)
* [Conditional statements](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%203/Notebook%203%20Program%20Flow%20Control.ipynb#section_3_2)
  + [The if statement](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%203/Notebook%203%20Program%20Flow%20Control.ipynb#sub_section_3_2_1)
  + [Comparison and test operators](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%203/Notebook%203%20Program%20Flow%20Control.ipynb#sub_section_3_2_2)
  + [Logical operations](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%203/Notebook%203%20Program%20Flow%20Control.ipynb#sub_section_3_2_3)
  + [The elif and else statements](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%203/Notebook%203%20Program%20Flow%20Control.ipynb#sub_section_3_2_4)
* [Loops](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%203/Notebook%203%20Program%20Flow%20Control.ipynb#section_3_3)
  + [The while loop](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%203/Notebook%203%20Program%20Flow%20Control.ipynb#sub_section_3_3_1)
  + [When should I use a while loop?](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%203/Notebook%203%20Program%20Flow%20Control.ipynb#sub_section_3_3_2)
  + [The for loop](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%203/Notebook%203%20Program%20Flow%20Control.ipynb#sub_section_3_3_3)
  + [The range() function](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%203/Notebook%203%20Program%20Flow%20Control.ipynb#sub_section_3_3_4)
  + [Using for loops with things other than ranges of numbers](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%203/Notebook%203%20Program%20Flow%20Control.ipynb#sub_section_3_3_5)
  + [Manually exiting or skipping a loop using break and continue](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%203/Notebook%203%20Program%20Flow%20Control.ipynb#sub_section_3_3_6)
* [Solutions to Exercises](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%203/Notebook%203%20Program%20Flow%20Control.ipynb#section_3_4)

**NB4: Scientific Computing in Python with Numpy**

* [Learning objectives](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%204/Notebook%204%20Scientific%20Computing%20with%20Numpy.ipynb#section_4_0)
* [Numpy arrays](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%204/Notebook%204%20Scientific%20Computing%20with%20Numpy.ipynb#section_4_1)
  + [Indexing arrays](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%204/Notebook%204%20Scientific%20Computing%20with%20Numpy.ipynb#sub_section_4_1_1)
  + [Slicing numpy arrays](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%204/Notebook%204%20Scientific%20Computing%20with%20Numpy.ipynb#sub_section_4_1_2)
  + [Mathematical operations on arrays](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%204/Notebook%204%20Scientific%20Computing%20with%20Numpy.ipynb#sub_section_4_1_3)
* [Functions for creating numpy arrays](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%204/Notebook%204%20Scientific%20Computing%20with%20Numpy.ipynb#section_4_2)
  + [np.linspace()](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%204/Notebook%204%20Scientific%20Computing%20with%20Numpy.ipynb#sub_section_4_2_1)
  + [np.arange()](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%204/Notebook%204%20Scientific%20Computing%20with%20Numpy.ipynb#sub_section_4_2_2)
  + [Random numbers](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%204/Notebook%204%20Scientific%20Computing%20with%20Numpy.ipynb#sub_section_4_2_3)
  + [Multidimensional arrays (matrices)](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%204/Notebook%204%20Scientific%20Computing%20with%20Numpy.ipynb#sub_section_4_2_4)
* [Numpy functions](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%204/Notebook%204%20Scientific%20Computing%20with%20Numpy.ipynb#section_4_3)
  + [Vectorisation" and fast code with numpy functions](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%204/Notebook%204%20Scientific%20Computing%20with%20Numpy.ipynb#sub_section_4_3_1)
* [Monte Carlo Simulation](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%204/Notebook%204%20Scientific%20Computing%20with%20Numpy.ipynb#section_4_4)
* [Solutions to exercises](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%204/Notebook%204%20Scientific%20Computing%20with%20Numpy.ipynb#section_4_5)

**NB5: Data in Python: Loading, Plotting, and Fitting**

* [Learning objectives](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%205/Notebook%205%20Data%20in%20Python.ipynb#section_5_0)
* [Data management](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%205/Notebook%205%20Data%20in%20Python.ipynb#section_5_1)
  + [Loading data with Numpy](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%205/Notebook%205%20Data%20in%20Python.ipynb#sub_section_5_1_1)
  + [Saving data with Numpy](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%205/Notebook%205%20Data%20in%20Python.ipynb#sub_section_5_1_2)
* [Plotting data and functions with Matplotlib](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%205/Notebook%205%20Data%20in%20Python.ipynb#section_5_2)
* [Fitting](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%205/Notebook%205%20Data%20in%20Python.ipynb#section_5_3)
  + [Fitting by hand](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%205/Notebook%205%20Data%20in%20Python.ipynb#sub_section_5_3_1)
  + [Least squares fitting](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%205/Notebook%205%20Data%20in%20Python.ipynb#sub_section_5_3_2)
  + [Test array and some ideas for plotting](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%205/Notebook%205%20Data%20in%20Python.ipynb#sub_section_5_3_3)
  + [Initial guesses](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%205/Notebook%205%20Data%20in%20Python.ipynb#sub_section_5_3_4)
  + [Residuals](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%205/Notebook%205%20Data%20in%20Python.ipynb#sub_section_5_3_5)
  + [Uncertainty in the parameters](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%205/Notebook%205%20Data%20in%20Python.ipynb#sub_section_5_3_6)
* [Making interactive plots using Bokeh](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%205/Notebook%205%20Data%20in%20Python.ipynb#section_5_4)
* [Solutions to Exercises](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%205/Notebook%205%20Data%20in%20Python.ipynb#section_5_5)

**NB6: Measurements and their uncertainty**

* [Learning objectives](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%206/Notebook%206%20Measurement%20uncertainty.ipynb#section_6_0)
* [Mean, standard deviation and standard uncertainty of repeated readings](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%206/Notebook%206%20Measurement%20uncertainty.ipynb#section_6_1)
* [Normal distribution](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%206/Notebook%206%20Measurement%20uncertainty.ipynb#section_6_2)
* [Agreement analysis](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%206/Notebook%206%20Measurement%20uncertainty.ipynb#section_6_3)
* [Outliers: Chauvenet's criterium](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%206/Notebook%206%20Measurement%20uncertainty.ipynb#section_6_4)
* [Poisson distribution](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%206/Notebook%206%20Measurement%20uncertainty.ipynb#section_6_5)
* [Solutions to Exercise](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%206/Notebook%206%20Measurement%20uncertainty.ipynb#section_6_6)

**NB7: Errorpropagation**

* [Learning objectives](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%207/Notebook%207%20Errorpropagation.ipynb#section_1_0)
* [Error propagation](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%207/Notebook%207%20Errorpropagation.ipynb#section_7_1)
* [Gaussian fit](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%207/Notebook%207%20Errorpropagation.ipynb#section_7_2)
* [Solutions to Exercises](http://localhost:8888/lab/tree/Users/fpols/surfdrive/Onderwijs/1e%20jaars%20practicum/Python/Course%20files/Notebook%207/Notebook%207%20Errorpropagation.ipynb#section_7_3)