

Python crash course

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Basic Python:

- Control structures
- Data types
- Functions & methods
- Objects & classes

Essential Python libraries:

- Numpy
- SciPy

Basic Python:

- Comments
- Arithmetic and numeric types (float, int, ...)
- Variables
- Expressions
- Strings
- Other data types (lists, tuples, dictionaries)
- Control flow (`if` statements, `for` and `while` loops)
- Functions
- Classes and objects

- login to Karolina
- open terminal and run the following command in your home directory:

```
git clone https://github.com/kosl/python-training.git
```

- open jupyter notebook

Basic Python syntax

- open the file `Python_Basic_Syntax.ipynb` located in
`~/python-training/intro_to_python/`

Essential Python libraries:

- The **Numpy** fast array interface
 - Standard Python is not well suitable for numerical computations. Lists are flexible but slow if used for numerical computation
- Numpy adds a new numpy array data type
 - Static, multidimensional
 - All elements of array have the same type
 - Fixed number of elements in array

Advantages of numpy arrays over Python lists:

- Array operators: `+`, `*`, `/`, `**`
- Vectorization, less `for` loops to write, shorter and better looking code
- Array operations and functions

Numpy acts as a base for writing numerical code in Python. Numpy arrays can be passed to C, C++ or Fortran, thus extending python with C/C++/Fortran

Scipy, numerical library that provides user-friendly and efficient numerical routines for numerical integration, interpolation, optimization, linear algebra and statistics.

Written to use numpy arrays, thus functions take and operate on numpy arrays. For linear algebra it calls the BLAS/LAPACK functions, therefore it is recommended to have an optimised BLAS (ATLAS, MKL, OpenBLAS) installed.

Numpy examples

- **open the file** `numpy_examples.ipynb` **located in**
`~/python-training/intro_to_numpy_scipy/`

Scipy fitting:

- **open the file** `scipy_fitting_function.ipynb` **located in**
`~/python-training/intro_to_numpy_scipy/`

Scipy find minimum:

- **open the file** `scipy_find_minimum.ipynb` **located in**
`~/python-training/intro_to_numpy_scipy/`

Thank you for your attention!

<http://sctrain.eu/>

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