

## TRAINING TERMS

2025-05-23 | 1 day | Virtual Classroom

## TRAINING GOALS:

**Python** is an interpreted language; Python source code is translated into portable byte code. This concept in combination with other design principles of Python makes many of its advantages as compared to other languages possible. As a drawback the execution speed may be considerably slower for certain kinds of applications than with compiled languages. Optimization can often increase the performance of Python programs substantially.

## CONSPECT:

- Guidelines for optimization.
  - Optimization strategies - Python benchmarking concept, CPU usage profiling with cProfile, memory measuring with Guppy\_PE Framework. Participants are encouraged to bring their own programs for profiling to the course.
- Algorithms and anti-patterns
  - Examples of algorithms that are especially slow or fast in Python.
- The right data structure
  - Comparison of built-in data structures: lists, sets, deque and defaultdict.
  - Big-O notation will be exemplified.
- Caching
  - Deterministic and non-deterministic look on caching.
  - Developing decorators for caching purposes.
- The example - we will use a computationally demanding example and implement it first in pure Python. Then we look at some algorithmic improvements to speed up the computation.
- Testing speed - solution to measuring how fast a program really runs in Python.
- Pyco - 'just-in-time-compiler' (JIT), allowing to translate parts of the byte code to machine code. Examples are used to show different possibilities of using Pyco.
- Numerical calculations with Numpy - basic possibilities of NumPy covered.
- Using multiple CPUs with multiprocessing/multiprocessing.
- Combination of optimization strategies.

- Overview of extensions to Python with other languages.

## REQUIREMENTS:

- Basic knowledge of **Python** language.

## Difficulty level



## CERTIFICATE:

The participants will obtain certificates signed by Python Academy.

## TRAINER:

Authorized Python Academy Trainer.