

# Course : Python, introduction to data processing

Getting started with Python and its calculation and analysis libraries

*Practical course - 3d - 21h00 - Ref. PYK*

*Price : 1940 CHF E.T.*

★★★★☆ 4,4 / 5

In just a few years, Python has become the leading programming language for all those involved in numerical calculations and data analysis. It has become so powerful that no scientific discipline seems to be able, or even willing, to escape it. So get started with Python!

## Teaching objectives

At the end of the training, the participant will be able to:

- ✓ Programming with the Python language
- ✓ Get an overview of Python's scientific ecosystem
- ✓ Learn about the essential scientific libraries for data science

## Intended audience

Engineers, developers, researchers, data scientists, data analysts and anyone wanting to learn about the scientific world of Python.

## Prerequisites

Proficiency in a programming language or knowledge of algorithms.

## Practical details

### Exercise

Numerous exercises are used to illustrate the topics.

### Teaching methods

Active pedagogy, with demonstrations provided by the trainer to enable participants to put the training into practice more quickly.

## Course schedule

### PARTICIPANTS

Engineers, developers, researchers, data scientists, data analysts and anyone wanting to learn about the scientific world of Python.

### PREREQUISITES

Proficiency in a programming language or knowledge of algorithms.

### TRAINER QUALIFICATIONS

The experts leading the training are specialists in the covered subjects. They have been approved by our instructional teams for both their professional knowledge and their teaching ability, for each course they teach. They have at least five to ten years of experience in their field and hold (or have held) decision-making positions in companies.

### ASSESSMENT TERMS

The trainer evaluates each participant's academic progress throughout the training using multiple choice, scenarios, hands-on work and more. Participants also complete a placement test before and after the course to measure the skills they've developed.

## 1 Introduction to the Python language

- Python/Anaconda development environment.
- The main data types: strings, Booleans, numbers, lists, tuples and dictionaries.
- Control structures: for and while loops, if/elif/else tests.
- Functions: creation, parameter passing, default values, variable arguments.
- Create and use libraries.
- Python's main pitfalls: mutable and immutable types, assignment by reference/address.

### Hands-on work

Handling Python with the Anaconda distribution, using an IDE, short algorithmic exercises to get to grips with the language. Date manipulation.

## 2 Further information on language

- Understand object-oriented syntax.
- Create a class: class and instance attributes, methods, special functions.
- Read and write files in text format.
- Use standard libraries: relational databases and regular expressions.

### Hands-on work

Connection to a relational database and log analysis using regular expressions, to create a CSV file for use by scientific libraries.

## 3 Introduction to the scientific Python ecosystem

- Overview of Python's scientific ecosystem: must-have libraries.
- Know where to find new bookstores and assess their sustainability.
- The main open source tools and software for data science.
- Why use a scientific distribution like Anaconda.
- Understand the benefits of a virtual environment and know how to use it.
- The iPython interpreter and the Jupyter server.
- Best practices for getting your data science project off to a good start with Python.
- Scientific file formats and libraries for manipulating them.

### Hands-on work

Setting up the development environment. Create a virtual environment, export and duplicate an environment, use Jupyter notebooks.

### TEACHING AIDS AND TECHNICAL RESOURCES

- The main teaching aids and instructional methods used in the training are audiovisual aids, documentation and course material, hands-on application exercises and corrected exercises for practical training courses, case studies and coverage of real cases for training seminars.
- At the end of each course or seminar, ORSYS provides participants with a course evaluation questionnaire that is analysed by our instructional teams.
- A check-in sheet for each half-day of attendance is provided at the end of the training, along with a course completion certificate if the trainee attended the entire session.

### TERMS AND DEADLINES

Registration must be completed 24 hours before the start of the training.

### ACCESSIBILITY FOR PEOPLE WITH DISABILITIES

Do you need special accessibility accommodations? Contact Mrs. Fosse, Disability Manager, at [psh-accueil@orsys.fr](mailto:psh-accueil@orsys.fr) to review your request and its feasibility.

## 4 The SciPy Stack

- Pandas: tabular data analysis (CSV, Excel...), statistics, pivots, filters, search...
- Matplotlib: the essential data visualization library to get you started.
- The SciPy Stack is the foundation of the essential scientific libraries on which all the others are based.
- Numpy: numerical calculation and linear algebra (vectors, matrices, images).
- Scipy, based on Numpy for: statistics, functional and geospatial analysis, signal processing...

### Hands-on work

Image processing with Numpy. First plots. Statistical analysis of CSV files.  
First mapping elements. Fourier transforms.

## Dates and locations

### REMOTE CLASS

2026 : 8 June, 5 Aug., 14 Oct., 25 Nov.