

## Course guide

### 300099 - STCPYTH - Advanced Python Programming

**Last modified:** 04/07/2026

**Unit in charge:** Castelldefels School of Telecommunications and Aerospace Engineering  
**Teaching unit:** **Degree:** MASTER'S DEGREE IN ARTIFICIAL INTELLIGENCE FOR CONNECTED INDUSTRIES (AI4CI) (Syllabus 2025). (Optional subject).

**Academic year:** 2026 **ECTS Credits:** 3.0 **Languages:** English

#### LECTURER

**Coordinating lecturer:** Mario Patetta (CNAM Paris), Eulalie Verhulst (CNAM Paris), Reinhol von Schwerin (Univ. Ulm)

**Others:** Mario Patetta (CNAM Paris), Eulalie Verhulst (CNAM Paris), Reinhol von Schwerin (Univ. Ulm)

#### PRIOR SKILLS

Standard computer science/engineering bachelor's degree bases

#### REQUIREMENTS

Standard computer science/engineering bachelor's degree bases

#### TEACHING METHODOLOGY

Lectures, Assignments, autonomous work, project

#### LEARNING OBJECTIVES OF THE SUBJECT

The aim of the course is to refresh the basics of Python programming (beginner) to then learn how to perform object-oriented programming with Python (advanced) as well as traffic analysis and generation tools in Python. At the end of the course, students would be able to write computer programs in Python using popular packages.

#### STUDY LOAD

| Type              | Hours | Percentage |
|-------------------|-------|------------|
| Self study        | 48,0  | 64.00      |
| Hours large group | 27,0  | 36.00      |

**Total learning time:** 75 h



## CONTENTS

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### Advanced Python Programming

**Description:**

Python programming (beginner): Programming in Python (variables, conditional structures, lists, arrays, loops, etc.). Writing functionalities in the Python environment.

Object-oriented programming (advanced): Principles of object-oriented programming in Python (classes, abstraction, etc.).

Files and data structures in Python: Read and write files using different data formats (csv, json...)

Use of packages: Discover virtual machines and libraries in Python. Realize Data manipulation and data visualization using specialized packages (Pandas, Numpy, Matplotlib).

Writing a report using Jupyter Notebook. Manipulate packets using Scapy.

**Full-or-part-time:** 75h

Theory classes: 27h

Self study : 48h

## GRADING SYSTEM

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Individual project oriented toward AI for connected systems.