SSM
Scuola Superiore Meridionale

Course title:

Introduction to Python programming

Duration: 12 h

PhD Program: MERC

Name and Contact details of unit organizer(s):

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Course Description:

The Unit introduces students to the fundamentals of Python 3 programming. The course covers fundamental notions on the Python language, up to the use of libraries dedicated to mathematical programming and machine learning. After introducing python as a programming language and the main concepts of procedural programming, we will introduce object-oriented programming, giving the technical bases needed to understand what classes are and how to implement inheritance and polymorphism in Python. Next, some key libraries are introduced for the implementation of machine learning algorithms, including numpy, scikit-learn and pandas. Finally, a practical session will take place where the students will employ the concepts learnt to solve a relevant case study.

Syllabus:

- Fundamentals of Python 3: interpreter, data types, reserved keywords, functions and functional programming, control structures, error handling, modules and packages
- Select advanced topics: file I/O, generators, scope, dunder methods, lambda functions, list comprehension)
- Object-Oriented programming: abstraction, encapsulation, inheritance, polymorphism
- Numpy, pandas, scikit-learn
- Practical session

Assessment:

Practical programming assignment

Suggested reading and online resources:

- Course notes.
- *The Python Tutorial*. Python Documentation. Retrieved January 2025, from https://docs.python.org/3/tutorial/index.html
- *Python Tutorial*. Retrieved January 2025, from https://www.w3schools.com/python/
- Boswell, D., & Foucher, T. (2011). *The art of readable code* (First edition). O'Reilly.
- Lutz, M. (2013). *Learning Python* (Fifth edition). O'Reilly. [6th edition coming out early 2025]
- Ramalho, L. (2022). *Fluent Python: Clear, concise, and effective programming* (2nd ed). O'Reilly.