

African Institute for Mathematical Sciences - Senegal

Academic Program (2025-2026)

Syllabus Skill Courses: Programming with Python

Skill Block n° 1

October 06 - October 24

Course II: Programming with Python

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Title of the course: **Programming with Python**

Description:

This course gives an introduction to basic programming using the programming language Python. Emphasis will be on computational thinking and problem-solving skills rather than a focus on the programming language itself. Our goal is to equip students with an approach (computational problem-solving skills) together with a tool (python programming language) so that they can tackle broad scientific problem-solving. Therefore, students are assumed to have limited exposure to computers and the concept of programming. However, we expect students to have a fair background in mathematics.

Content:

- Overview and applications
- Control structure
- The if instruction to manage several conditions
- Loops
- The while loop to repeat instructions as long as a condition is true
- The for loop to traverse elements of a sequence
- Using loops to solve a problem
- Lists
- Creating a dictionary
- Dictionaries, Introduction to Dictionaries and Their Key-Value structure
- Scientific and Statistical Libraries,
- Introduction to libraries
- Presentation of NumPy as a library for manipulating multidimensional
- Creating multidimensional tables
- Statistics and linear algebra functions
- Introduction to Matplotlib
- Presentation of Matplotlib as a library for creating graphics and visualizations
- Creating simple graphs with matplotlib
- Personalization of graphics
- Introduction of pandas
- Projects works