


UE Scientific programming in Python

 ECTS
3 credits

 Component
UFR PhITEM
(physique,
ingénierie, terre,
environnement,
mécanique)

 Semester
Automne

- > **Teaching language(s):** English
- > **Open to exchange students:** Yes
- > **Code d'export Apogée:** PAX7ECAL

Presentation

Description

Using a scientific programming language (e.g., Python) as a tool for modelling and numerical analysis.

Outline:

1. Number representation systems and their precision
2. Data in Python
 1. Basic data structures: scalars, strings, lists, dictionaries, sets, tuples
 2. Matrix representations of numbers: the numpy ndarray (vs matrix), pandas data tables
 3. Read and write data according to the data type (CSV, JSON, pickle, . . .)
3. Array operations:
 1. Unitary operators $MX_0 \rightarrow MX_1$
 2. N-ary operators ($MX_0, \dots, MX_{n-1} \rightarrow MX_n$)
4. Solving equations
 1. Linear matrix equations with applications to interpolation and regression
 2. Differential equations with applications to interpolation and prediction
5. Probability and statistics in Python
 1. Probability laws: distribution families, random variables, realisations

2. Statistical tests

Course parts

UE Scientific programming and machine learning in Python - CM/TD	Lectures (CM) & Teaching Unit (UE)	14h
UE Scientific programming and machine learning in Python - TP	Practical work (TP)	16h

Recommended prerequisites

Mathematical background on probability and statistics, linear algebra and differential equations

Useful info

Campus

› Grenoble - Scientific Polygon