Scripting languages in data analysis - course description

General information

Course name	Scripting languages in data analysis
Course ID	13.2-WF-FizD-SLDA-S17
Faculty	Faculty of Physics and Astronomy
Field of study	Physics
Education profile	academic
Level of studies	First-cycle studies leading to Bachelor's degree
Beginning semester	winter term 2018/2019

Course information

Semester	5
ECTS credits to win	3
Course type	obligatory
Teaching language	english
Author of syllabus	• dr hab. Krzysztof Dudek

Classes forms

The class form	Hours per semester (full-time)	Hours per week (full-time)	Hours per semester (part-time)	Hours per week (part-time)	Form of assignment
Laboratory	30	2	-	-	Credit with grade

Aim of the course

The primary language is the Python programming language and by using it students should acquire the ability to analyze data related to specific science-oriented problems. Students should also be able to apply their knowledge to an arbitrary project involving the data analysis.

Prerequisites

It is assumed that students have elementary programming skills in any programming language, and knowledge of basic mathematical methods of data analysis.

Scope

- Introduction to programming in Python.
- Python libraries: NumPy, matplotlib, SciPy.
- Basic use of NumPy (data processing using arrays, mathematical and statistical methods, the ability to read and save data on the disk in the binary binary format or as a plain text).
- Basic use of Matplotlib: data plots, visualization.
- Statistical analysis.

Teaching methods

Laboratory exercises, individual work and group work, exchange of ideas, work with documentation, self-knowledge acquisition, project.

Learning outcomes and methods of theirs verification

Outcome description	Outcome symbols	Methods of verification	The class form
Student knows the information technology used to solve common problems in the field of physical sciences and understands their limitations.	• K1A_W04	• a preparation of a project • a written assignment • activity during the classes • an ongoing monitoring during classes • an oral response	• Laboratory
Student understands the complexity of the issues relating to access to the data, the appropriate analysis of data and data storage. Based on empirical data, student can build simple mathematical models adequate to physical problems.	• K1A_U03 • K1A_U05	• a preparation of a project • a written assignment • activity during the classes • an ongoing monitoring during classes • an oral response	• Laboratory
Student is able to work effectively in a group assuming different roles according to the situation.	• K1A_K02	• a preparation of a project • a written assignment • activity during the classes • an ongoing monitoring during classes • an oral response	• Laboratory

Assignment conditions

Recommended reading

[1] Allen Downey, Think Python. How to Think Like a Computer Scientist, 2013. Green Tea Press, Needham, Massachusetts.

[2] Wes McKinney, Python for Data Analysis, O'Reilly Media Inc. (2013)

Further reading

[1] Internet

Notes

Modified by dr hab. Maria Przybylska, prof. UZ (last modification: 29-09-2020 19:40)