COURSE DESCRIPTION CARD - SYLLABUS

Course name

Programming languages and data analysis

Course

Field of study

Aerospace Engineering

Year/Semester

2/3

Area of study (specialization)

Onboard systems and aircraft propulsion

Profile of study

general academic

Level of study

First-cycle studies

Course offered in

polish

Form of study

full-time

Requirements

compulsory

Number of hours

Lecture

30

Laboratory classes

Other (e.g. online)

Tutorials

Projects/seminars

30

Number of credit points

4

Lecturers

Responsible for the course/lecturer:

dr inż. Przemysław Grzymisławski

email:

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tel. tel. 61 665 21 35

Wydział Inżynierii Środowiska i Energetyki

ul. Piotrowo 3A, 60-965 Poznań

Responsible for the course/lecturer:

Prerequisites

Basic computer skills - installing and running programs, navigating in the command line (TUI), running tasks and programs using the command line (TUI).

Course objective

The aim of the course is to provide students with knowledge of the most popular programming languages and to show the differences between them. In terms of data analysis, the aim is to provide information on the tools (programs) used in data analysis. Students gain knowledge in the field of automating tasks using programming languages.

Course-related learning outcomes

Knowledge

1. Has knowledge in mathematics, including algebra, analysis, theory of differential equations, probability studies, analytical geometry necessary to understand and describe basic issues related to aviation engineering

2. Has structured, theoretically founded knowledge of data processing for CFD, optimization of numerical simulations, quantitative and qualitative data analysis, data visualization

3. Has structured, theoretically founded knowledge of mathematics used to analyze results, create mathematical models and their adaptation to a numerical code

Skills

1. Can interact with other people while performing team tasks

2. Has the ability to self-study using modern teaching tools, such as remote lectures, websites and databases, teaching programs, e-books

3. can obtain information from literature, the Internet, databases and other sources. Is able to integrate obtained information, interpret and draw conclusions from them

Social competences

1. Is aware of the importance of maintaining the principles of professional ethics

2. Can properly prioritize the implementation of tasks specified by him or others based on available knowledge

3. Can inspire and organize the learning process of others

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Passing the lecture - test, the minimum required to pass is 50% of the maximum number of points.

Completion of the project - execution of a project (individual or in a group) in the field of programming and / or data analysis.

Programme content

Introduction to programming in C ++ / Python; presentation of the main differences between languages, data types, data input and display, loops, functions, introduction to object programming.

Presentation and discussion of libraries used for data analysis in the Python environment (NumPy, SciPy, Pandas, Matplotlib) - data creation; loading data from external files (file types); operating on external files; operations on lists, maciers, dataframes; filtering the results; charts - types of charts, creating charts, descriptions (using the LaTeX syntax); creating additional elements in charts

Teaching methods

Lectures - a multimedia presentation intertwined with live coding

Project - talks with students, discussing problems during the project implementation in the group forum

Bibliography

Basic

C++ : przewodnik dla początkujących / Alex Allain https://www.python.org/, https://matplotlib.org/, https://www.numpy.org/devdocs/, https://docs.scipy.org/doc/, http://pandas.pydata.org/

Additional

Breakdown of average student's workload

	Hours	ECTS
Total workload	89	4,0
Classes requiring direct contact with the teacher	64	3,0
Student's own work (literature studies, preparing for final test, preparing the project) [1]	25	1,0

[1] delete or add other activities as appropriate