COURSE DESCRIPTION CARD - SYLLABUS

Course name
Data analysis and visualisation [S2ZE1E>ADiW]

Course

Field of study
Green Energy

Year/Semester
1/2

Area of study (specialization)
–

Profile of study
general academic

Level of study
second-cycle

Course offered in
english

Form of study
full-time

Requirements
elective

Number of hours

Lecture
0

Laboratory classes
30

Other (e.g. online)
0

Tutorials
0

Projects/seminars
0

Number of credit points

2,00

Coordinators

dr inż. Przemysław Grzymisławski
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Lecturers

Prerequisites

KNOWLEDGE: The student has basic knowledge of the basics of computer science, data analysis and Python environment SKILLS: Student is able to deal with specific problems that arise when writing scripts for data analysis; can find information on the internet and use it to solve his problem SOCIAL COMPETENCIES: The student is able to define priorities that are important in solving the tasks set before him. The student demonstrates independence in solving problems, acquiring and improving his knowledge and skills.

Course objective

The aim of the course is to provide students with information on the methods used to analyze and visualize data from various sources. Students gain knowledge and skills in the field of creating scripts (programs) that automate data analysis and visualization.

Course-related learning outcomes

Knowledge:
Has extended knowledge necessary to understand the profile subjects as well as specialist knowledge in the field of programming and data analysis in the area of production, operation, economic, social and

environmental impact
Has in-depth knowledge of the methods of linear measurements, measurements of temperature, pressure, humidity, fluid streams, velocity and automation systems as well as modern digital interfaces used in control systems and analyzing the received data.
Knows and understands the fundamental aspects related to the design, programming, construction, implementation and maintenance of industrial energy systems and devices

Skills:
Is able to use the knowledge and skills to use appropriate methods, tools and algorithms (including specialized software) to solve problems and perform tasks related to engineering activities
Is able to solve research and engineering tasks requiring the use of engineering standards and norms and the use of technologies appropriate for industrial and renewable energy, using the experience gained in an environment professionally involved in engineering activities
Can use a foreign language at the B2 + level of the European Language Education Description System and specialist terminology related to the broadly understood energy and programming

Social competences:
He is ready to critically evaluate his knowledge and received content
Is ready to recognize the importance of knowledge in solving cognitive and practical problems in programming and data analysis
Is ready to fulfill professional roles responsibly, taking into account changing social needs, including:
- developing professional achievements,
- maintaining the ethos of the profession,
- observing and developing the principles of professional ethics and acting towards the observance of these principles

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Practical laboratory pass - writing a script that automates the analysis and visualization of a sample data set

Programme content

Introduction to Python programming; presentation and discussion of the main libraries for data analysis (NumPy, SciPy, Pandas, Matplotlib); data types; functions - creating, arguments, universality, using own functions in external files; types of input files and their loading; filtering the results; operations on lists, matrices, dataframes; charts - selecting data, creating a chart, chart description, chart types, choosing the right type for the data; operations on graphic files - file comparison, joining, selecting and tracking a point; creating interactive charts;

Teaching methods

Laboratory - multimedia presentations, blackboard examples, tasks for self-completion

Bibliography

Basic:
https://www.python.org/, https://matplotlib.org/, https://www.numpy.org/devdocs/, https://docs.scipy.org/doc/, http://pandas.pydata.org/

Additional:
https://pillow.readthedocs.io/en/stable/, https://bokeh.pydata.org/en/latest/

Breakdown of average student's workload

	Hours	ECTS
Total workload	55	2,00
Classes requiring direct contact with the teacher	30	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	25	1,00