COURSE DESCRIPTION CARD - SYLLABUS

Course name
Programming in data analysis [N2EPiO1>JP]

Course

Field of study
Industrial and Renewable Energy Systems

Year/Semester
1/1

Area of study (specialization)
Gas Technology and Renewable Energy

Profile of study
general academic

Level of study
second-cycle

Course offered in
Polish

Form of study
part-time

Requirements
compulsory

Number of hours

Lecture
0

Laboratory classes
18

Other
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 data analysis and programs and tools used in data analysis. Students acquire knowledge and skills in creating programs (scripts) that automate data analysis.

Course-related learning outcomes

Knowledge:
student has expanded knowledge about programming in python, methods of data analysis
student has extended and deep knowledge in the field of gas engines student has deep knowledge of

operational parameters impact on the efficiency of gas turbine and functioning of energy systems
knows the main development trends in the field of gas turbine power plants .
knows the main materials and construction types of gt used in power and electricity generation.

Skills:
is able to use his knowledge and skills to use the right methods and tools (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 experience gained in an environment professionally engaged in engineering activities

Social competences:
is ready to critically assess knowledge and received content
is ready to recognize the importance of knowledge in solving cognitive and practical problems and to seek expert opinions in the event of difficulties in solving the problem yourself
is ready to perform responsible professional roles, taking into account changing social needs, including:
− developing the profession"s achievements,
− maintaining the ethos of the profession,
− compliance with and development of the principles of professional ethics and actions to comply with these principles

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
Practical assesment based on knowledge from lectures and laboratories. Student has to solve a given problem with a Python script. Minimum requirements to pass - program has to give a proper result with a test data set.

Programme content

Introduction to programming in the Python environment; presentation and discussion of the main libraries for data analysis (NumPy, SciPy, Pandas, Matplotlib); data types; functions - creation, arguments, universality, using own functions in external files; types of input files and their loading; filtering results; operations on lists, matrices, dataframes; charts - data selection, chart creation, chart description, chart types, selection of the right type for the data

Course topics

A presentation of general programming concepts and the differences between scripting and compilable languages. A presentation of the basics of the Python language, analysis and visualization libraries, and problem-solving exercises.

Teaching methods

Laboratory exercises: multimedia presentation and performance of tasks given by the teacher - practical exercises on the computer.

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/, https://www.paraview.org/

Breakdown of average student's workload

	Hours	ECTS
Total workload	60	2,00
Classes requiring direct contact with the teacher	20	0,70
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	40	1,30