GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Basics of Engineering Programming, PG_00060328		
Field of study	Civil Engineering		
Date of commencement of studies	October 2023	Academic year of realisation of subject	2023/2024
Education level	first-cycle studies	Subject group	
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	1	Language of instruction	Polish
Semester of study	2	ECTS credits	1.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Katedra Wytrzymałości Materiałów -> Faculty of Civil and Environmental Engineering		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Łukasz Pachocki	
	Teachers		

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	0.0	0.0	0.0	0.0	0.0	0

E-learning hours included: 0.0

Learning activity and number of study hours

Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours	Self-study	SUM
Number of study hours	0	0.0	0.0	0

Subject objectives

- learning the basics of engineering programming in MATLAB and Python
- learning to use MATLAB and Python to solve basic data analysis problems
- presentation of the basic capabilities of Ms Excel sheets for data analysis

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W05] Demonstrate knowledge and understanding of research methods (obtaining information, simulations, experimental methods) in the field of civil engineering.	The student is able to define and initialize variables and is able to distinguish between their types. The student is able to use mathematical operators and perform matrix operations in MATLAB and Python. The student knows the basics of logic in programming and is able to write conditional "if" statements. The student can use the "while" and "for" loops. The student is able to use the built-in functions of the environment and is able to write his own functions. The student is able to use external files and calculate basic statistical quantities. The student knows the basics of drawing graphs and two basic numerical methods: trapezoid integration and linear approximation.	[SW3] Assessment of knowledge contained in written work and projects
[K6_U05] Conducts research (obtaining information, simulations, experimental methods) in the field of construction in order to solve specific tasks and report research results.	The student is able to solve engineering problems related to the basic principles of physics and the processing of experimental data.	[SU5] Assessment of ability to present the results of task [SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment

Subject contents	1. Installation and configuration of the environment. Basic information on its operation.2. Presentation of the basic types of variables and mathematical operators. Vectors and matrix operations.3. Logic in MATLAB and Python. Presentation of logical operators and conditional if statement. Using while and for loops.4. Functions in MATLAB and Python.5. Basics of data analysis - presentation of basic statistical values. Loading data from external files and drawing charts. Two basic numerical methods: trapezoid integration and linear approximation.
Prerequisites and co-requisites	Mathematics, Physics

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
	50.0%	50.0%
	50.0%	50.0%

Recommended reading	Basic literature	https://www.mathworks.com/help/matlab/ https://www.mathworks.com/help/matlab/ref/format.html https://www.anaconda.com/products/distribution https://www.python.org/ https://support.microsoft.com/pl-pl/excel

Supplementary literature	https://www.mathworks.com/help/matlab/ref/double.html https://www.mathworks.com/help/matlab/matlab_prog/operator-precedence.html https://www.mathworks.com/help/matlab/characters-and-strings.html https://www.mathworks.com/help/matlab/learn_matlab/matrices-and-arrays.html https://www.mathworks.com/help/matlab/dictionary.html https://www.mathworks.com/help/matlab/trigonometry.html https://www.mathworks.com/help/matlab/random-number-generation.html https://www.mathworks.com/help/matlab/ref/if.html https://www.mathworks.com/help/matlab/ref/while.html https://www.mathworks.com/help/matlab/ref/for.html https://www.mathworks.com/help/matlab/ref/function.html https://www.mathworks.com/help/matlab/ref/load.html https://www.mathworks.com/help/matlab/ref/readmatrix.html https://www.mathworks.com/help/matlab/ref/readtable.html https://www.mathworks.com/help/matlab/ref/plot.html https://www.mathworks.com/help/matlab/ref/fill.html https://www.mathworks.com/help/matlab/ref/matlab.graphics.chart.primitive.histogram.html https://www.mathworks.com/help/matlab/ref/scatter.html https://www.mathworks.com/help/matlab/ref/trapz.html https://www.mathworks.com/help/curvefit/fit.html https://docs.python.org/3/library/stdtypes.html https://medium.com/@thoashook/operations-in-python-69bbbef781a4 https://docs.python.org/3/tutorial/introduction.html https://docs.python.org/3/tutorial/controlflow.html

		https://docs.python.org/3/tutorial/datastructures.html https://docs.python.org/3/library/math.html?highlight=math#module-math https://docs.python.org/3/library/random.html?highlight=random#module-random https://numpy.org/ https://pandas.pydata.org/ https://matplotlib.org/
	eResources addresses	Adresy na platformie eNauczanie: Podstawy Programowania Inżynierskiego 2024 - Moodle ID: 31958 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=31958
Example issues/ example questions/ tasks being completed	• Write a function that calculates the trajectory of a bungee jumper. • Make a linear approximation of a given set of points. • Calculate basic statistics for a given dataset.	
Work placement	Not applicable	