



## Subject card

Subject name and code	Basics of programming, PG_00061909						
Field of study	Materials Engineering						
Date of commencement of studies	October 2023		Academic year of realisation of subject		2024/2025		
Education level	first-cycle studies		Subject group		Obligatory subject group in the field of study		
Mode of study	Full-time studies		Mode of delivery		at the university		
Year of study	2		Language of instruction		Polish		
Semester of study	3		ECTS credits		4.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Division of Electrochemistry and Surface Physical Chemistry -> Institute of Nanotechnology and Materials Engineering -> Faculty of Applied Physics and Mathematics						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Mateusz Cieřlik				
	Teachers		dr inż. Mateusz Cieřlik				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	30.0	15.0	0.0	45
	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	45		5.0		50.0	100
Subject objectives	The goal of the course is to introduce students to the world of programming by teaching the fundamentals of Python. Students will acquire skills in writing, analyzing, and running simple programs, as well as solving algorithmic problems. The course aims to develop logical thinking skills, understanding of program structure, and practical usage of Python's popular libraries.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_W05] Has the knowledge of mechanics, technology and electrical engineering, including engineering graphics and using computer aid, the use of databases in the design of technological processes.		The student examines and solves fundamental programming issues. They use high-level programming language constructs that are correct both syntactically and semantically. The student writes and modifies programs in this language, identifies and resolves program errors, and can explain and apply basic programming techniques.		[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge		
	[K6_U05] can learn independently		After mastering the basics of programming, the student will independently carry out a project using widely available programming knowledge.		[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject		
	[K6_U04] Can use information and communication techniques used for the execution of typical engineering tasks, can apply learnt methods and mathematical and physical models to describe and explain chemical phenomena and processes.		The student writes simple programs that assist in solving problems related to the field of study.		[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject		

Subject contents	The course is designed to introduce students to the basics of Python programming with an emphasis on data science applications. The program covers the basics of the Python language, data manipulation, and the basics of data analysis. Students will be introduced to the basics of Python, starting with an introduction to the language, learning the basic components of the language, such as data types (numbers, text, lists, dictionaries, tuples) and operators and basic operations. They will also learn about control structures, including conditionals and loops, and functions, including their definition, arguments, and return values. Students will be introduced to libraries such as Numpy and Pandas, and learn basic operations on arrays and DataFrame and Series data structures. The next classes will focus on data manipulation, including loading and saving data (CSV, Excel) and data operations such as filtering, sorting, and grouping. The course will conclude with the basics of data visualization, including creating graphs with Matplotlib and advanced visualizations with Seaborn.		
Prerequisites and co-requisites	Computer literacy.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Project	60.0%	50.0%
	Laboratory	60.0%	50.0%
Recommended reading	Basic literature	[1] Python : podstawy nauki o danych, Alberto Boschetti, Luca Massaron, Helion, Gliwice 2017  [2] Python for Data Analysis, William McKinney, Helion, Gliwice 2018	
	Supplementary literature	There are no requirements	
	eResources addresses	Adresy na platformie eNauczanie: Podstawy programowania - Moodle ID: 41444 <a href="https://enauczenie.pg.edu.pl/moodle/course/view.php?id=41444">https://enauczenie.pg.edu.pl/moodle/course/view.php?id=41444</a>	
Example issues/ example questions/ tasks being completed	1. Write a simple calculator2. Write a program using the matplotlib library to present measurement data3. Write a program to analyze environmental data based on data available online		
Work placement	Not applicable		

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