



## Subject card

Subject name and code	Applied IT in Engineering, PG_00067188						
Field of study	Smart Renewable Energy Engineering						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2025/2026		
Education level	second-cycle studies		Subject group		Optional subject group Subject group related to scientific research in the field of study		
Mode of study	Full-time studies		Mode of delivery		at the university		
Year of study	1		Language of instruction		Polish		
Semester of study	1		ECTS credits		6.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Division of Theoretical Physics and Quantum Informaton -> Institute of Physics and Applied Computer Science -> Faculty of Applied Physics and Mathematics -> Wydziały Politechniki Gdańskiej						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Patryk Jasik				
	Teachers		dr inż. Patryk Jasik				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	45.0	15.0	0.0	75
	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	75		9.0		66.0	150
Subject objectives	Familiarizing students with Python programming fundamentals, relevant tools and development environments, and the basics of working in cloud computing in the context of solving practical engineering, design, and research problems.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_U01] is able to apply analytical thinking and solve technical problems related to renewable energy systems, including wind power, using engineering methodologies		The student knows how to create Python code to solve practical engineering, design, and research problems.		[SU1] Assessment of task fulfilment		
	[K7_K01] is prepared to evaluate projects and operations in wind energy systems, demonstrating competencies in designing and optimizing renewable energy systems, including wind power		The student can use Python and dedicated programming environments and tools to carry out a project and produce a summary report of its results.		[SK5] Assessment of ability to solve problems that arise in practice		
	[K7_W101] is able to make an in-depth identification of key objects and phenomena related to the field of study, as well as theories that describe them and applicable analytical and design methods		The student recognizes the need to use Python and its packages to write code that enables the solution of analytical, design, and research tasks.		[SW3] Assessment of knowledge contained in written work and projects		
Subject contents	Introduction to Git. Basic principles of code repositories. Creating, configuring, and managing development environments using Python with the Anaconda distribution. Creating, configuring, and managing virtual environments. Introduction to development tools: Jupyter Notebook, Microsoft Visual Studio, VS Code, PyCharm, and Google Colab. Introduction to Python: data types and control structures. Python as an object-oriented language. Selected Python packages: NumPy, Pandas, Matplotlib, SciPy, SymPy, and Scikit-learn. Introduction to cloud-based computing using Google Colab as an example. Exploratory data analysis in Python. Introduction to machine learning.						
Prerequisites and co-requisites							

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Individual project realization	60.0%	50.0%
	Two tests assessing practical programming skills.	60.0%	50.0%
Recommended reading	Basic literature	1. James R. Parker,Python. An Introduction to Python Programming, Mercury Learning and Information 2. Krishna Kumar Mohbey, Brijesh Bakariya, An Introduction to Python Programming: A Practical Approach, BPB Publications 3. Wes McKinney, Python for Data Analysis. 3rd Edition, O'Reilly Media	
	Supplementary literature	1. Jake VanderPlas, Python Data Science Handbook. 2nd Edition, O'Reilly Media 2. Andreas C. MÅžller, Sarah Guido, Introduction to Machine Learning with Python. A Guide for Data Scientists, O'Reilly Media	
	eResources addresses		
Example issues/ example questions/ tasks being completed	Example tasks for the practical programming skills tests: Numerically and symbolically compute the given integral. Solve the given differential equation using selected methods. Write a program to check whether 2x2 matrices form a linear vector space over the field (K, +, *). Plot the graph of a given function. Solve the given system of equations. Calculate the descriptive statistics for a chosen dataset. Fill in missing data in a selected dataset. Perform linear regression on a chosen dataset and evaluate its effectiveness. Examine the characteristics of a chosen time series and change its sampling frequency. Conduct a Fourier analysis of a chosen time series.  Guidelines for creating the project report: Report title Introduction motivation, objectives Description of the data structure of the datasets, description of variables, data origin Description of the data preparation process sequential steps Exploratory data analysis assumptions adopted, a brief description of methods and chosen methodology Data visualization tables, charts, graphs Results, conclusions, and discussion The report and all codes should be placed in a selected repository (e.g., GitLab, GitHub).		
Work placement	Not applicable		

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