GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	IT Tools & Programming Languages, PG_00067262		
Field of study	Automatic Control, Cybernetics and Robotics		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2026/2027
Education level	first-cycle studies	Subject group	Obligatory subject group in the field of study 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	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Multimedia Systems -> Faculty of Electronics Telecommunications and Informatics -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Karolina Marciniuk	
	Teachers	dr inż. Karolina Marciniuk	

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	15.0	0.0	0.0	30
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	30	2.0	18.0	50

Subject objectives

This course introduces the fundamentals of digital documentation used in the IT industry. It will present selected programming languages and tools that are useful for programmers. Students will learn to use basic tools to assemble digital documents for printing, prepare data for visualization and analysis, and present information accurately using basic multimedia tools. The course will also discuss digital and multimedia data formats, including assumptions, limitations, and technical requirements, as well as soft skills for technical documentation and the IT product development process.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W04] knows and understands, to an advanced extent, the principles, methods and techniques of programming and the principles of computer software development or programming devices or controllers using microprocessors or programmable elements or systems specific to the field of study, and organisation of systems using computers or such devices	Students will be able to use the skills they have acquired to analyze and interpret data in greater depth, allowing them to better understand complex problems.	[SW3] Assessment of knowledge contained in written work and projects
[K6_U09] can carry out a critical analysis of the functioning of existing technical solutions and assess these solutions, as well as apply experience related to the maintenance of technical systems, devices and facilities typical for the field of studies, gained in the professional engineering environment	The student will be able to apply the skills learned to solve specific problems, such as optimizing processes, maintaining records effectively, analyzing data and creating presentations.	[SU5] Assessment of ability to present the results of task
[K6_U04] can apply knowledge of programming methods and techniques as well as select and apply appropriate programming methods and tools in computer software development or programming devices or controllers using microprocessors or programmable elements or systems specific to the field of study	The student will be able to analyze the advantages and disadvantages of various IT tools and programming languages, considering their application in specific scenarios.	[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment [SU3] Assessment of ability to use knowledge gained from the subject
[K6_U07] can apply methods of process and function support, specific to the field of study	The student will be able to effectively present his/her results and analysis, considering various forms of presentation (e.g., written reports, multimedia presentations).	[SU4] Assessment of ability to use methods and tools

Subject contents

Course content – lecture

Overview of the most popular programming languages - classification, technical aspects and typical areas of application.
Development environments (IDEs) - functionality and methods of personalization.
Digital data and tools for its processing and storage.
Version control systems in source code management.
Process optimization.
Modern project management tools.
Introduction to computer graphics.
Digital audio.
Office tools in the work of a programmer. Visualization and presentation of results.
Artificial intelligence-based tools to support the programmer's work.

Prerequisites and co-requisites

Knowledge of the basics of operating systems (Windows, Linux). Understanding and ability to use basic commands in the terminal.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
	50.0%	40.0%
	60.0%	60.0%

Recommended reading	Basic literature	Downey, Allen, Jeffrey Elkner, and Chris Meyers. How to Think Like a Computer Scientist: Learning with Python. Green Tea Press, 2002. ISBN: 9780971677500 Bogusław Cyganek. Programowanie w języku C++: Wprowadzenie dla inżynierów. 1. wyd. Warszawa: Wydawnictwo Naukowe PWN, 2023. Print. Marek Gągolewski. Programowanie w języku R: Analiza danych, obliczenia, symulacje. 2. wyd. Warszawa: Wydawnictwo Naukowe PWN, 2016. Print. Mertz, David. Lepszy kod w Pythonie. Red. . Warszawa: Promise, 2024, 289 s. ISBN 9788375415452 Aubert, Gilles, and Pierre Kornprobst. Mathematical Problems in Image Processing: Partial Differential Equations and the Calculus of Variations. Second Edition. vol. 147. New York, NY: Springer Science + Business Media, 2006. Web.
	Supplementary literature	International Workshop on Human and Machine Perception, and V Cantoni. Human and Machine Perception 3: Thinking, Deciding and Acting / Edited by Virginio Cantoni [and Three Others]. Ed. by V. Cantoni. 1st ed. 2001. New York, New York State: Kluwer Academic Publishers, 2001. Web.
	eResources addresses	
Example issues/ example questions/ tasks being completed	Python, Java, C++, JavaScript, C3, Ruby, Matlab, R, IDEs, PyCharm, Xcode, Eclipse, version control systems, Git, Bash, PowerlShell, APIs, WAW, LaTeX, Overleaf, ChatGPT, MS Office, Google Doc, vector graphics, raster graphics.	
Practical activites within the subject	Not applicable	

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