GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Programming languages, PG_00058047		
Field of study	Technical Physics		
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	2	ECTS credits	3.0
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 -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Patryk Jasik	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	30.0	0.0	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	25.0	75

Subject objectives

Teaching the student the basics of procedural programming in selected programming languages: C, C++, C#, and Python.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W05] has knowledge of programming methodologies and techniques, as well as the use of selected IT tools in physics and engineering.	The student knows how to create programs in C, C++, C#, or Python using appropriate libraries. The student also understands how to apply this knowledge to solving basic physical problems.	[SW3] Assessment of knowledge contained in written work and projects
[K6_U03] possesses programming skills in a selected language and the ability to use selected software packages.	The student can program in C, C++, C#, or Python.	[SU1] Assessment of task fulfilment
[K6_K01] demonstrates readiness for continuous learning and updating knowledge in physics and related fields, critically evaluating it and recognising its importance in solving practical and theoretical problems.	The student is prepared to continuously update their knowledge and skills in response to technological progress in the field of programming languages.	[SK2] Assessment of progress of work

Subject contents

Course content – lecture
Classification, similarities, and differences among programming languages. Introduction to programming in C, C++, C#, and Python. Programming techniques using procedural programming languages. Classification and description of the basic libraries/packages used during programming in C, C++, C#, and Python. Discussion of lexical units occurring in programming languages. Classification and description of the main control structures used in programming languages. Discussion of the syntax and operation of functions, arrays, and pointers/references. Description of the preprocessor and its basic directives (C and C++). Classification and description of file operations. String manipulation. Discussion of the operation of structures and unions.

Course content – laboratory
The lecture contents are realized in the practical examples.

Prerequisites and co-requisites

Basic knowledge of operating systems Unix / Linux and MS Windows.

<table>
<tr><td>Assessment methods and criteria</td><td colspan="2"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>A written knowledge test of the lecture</td><td>50.0%</td><td>16.0%</td></tr>
<tr><td>Attendance at classes</td><td>73.0%</td><td>18.0%</td></tr>
<tr><td>Two tests of the practical skills of programming</td><td>50.0%</td><td>66.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>B.W. Kernighan, D.M. Ritchie, C Programming Language", Prentice Hall
C.L. Tondo, S.E. Gimpel, The C Answer Book: Solutions to the Exercises in "The C Programming Language", Prentice Hall
I. Sommerville, Software Engineering", Addison Wesley
"C Programming", from Wikibooks, the open-content textbooks collection
Stroustrup Bjarne, "The C++ Programming Language", Pearson Education (US)

Marcelo Guerra Hahn, "Learn C# with Visual Studio 2022", BPB Publications
David Beazley, Brian K. Jones, "Python Cookbook. Recipes for Mastering Python 3.", 3rd Edition, O'Reilly Media</td></tr>
<tr><td>Supplementary literature</td><td>N. Wirth, Algorithms + Data Structures = Programs", Prentice Hall
S. Prata, C Primer Plus", Sams
S. Oaulline, Practical C Programming", O'Reilly Media</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">Lecture:
• What data types are supported by the selected programming language, and what are they used for? Provide examples.
• Describe the for loop. Explain its syntax and give examples of its use.
• What are arrays? What are they used for and how are they applied? Provide examples.
• What are pointers and references? What are they used for and how are they applied? Provide examples.
• What does the keyword struct mean? Describe its syntax, the idea behind it, and the rules for using it, and provide examples.
Computer Laboratory:

• Write a program that finds the least common multiple (LCM) of any two natural numbers.
• Write a program that counts the number of occurrences of each letter from P to W in a given string.
• Write a program (using functions) that computes the total kinetic energy of a set of five particles with masses (m_i) moving at velocities (v_i). Check how this energy changes when the velocity of one particle increases 2× and 10× relative to its initial velocity.
• Write a program (using arrays) that checks whether a given set of three points in a plane forms a right triangle.</td></tr>
<tr><td>Practical activites within the subject</td><td colspan="2">Not applicable</td></tr>
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