



## Subject card

Subject name and code	Mathematical software, PG_00036611						
Field of study	Mathematics						
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 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	2	Language of instruction			Polish Laboratory instructions in English are available.		
Semester of study	3	ECTS credits			4.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Division of Nonlinear Analysis -> Institute of Applied Mathematics -> Faculty of Applied Physics and Mathematics						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Magdalena Chmara					
	Teachers	dr inż. Magdalena Chmara dr hab. Sergey Kryzhevich					
Lesson types and methods of instruction	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						
	Adresy na platformie eNauczenie: Pakiety Matematyczne WFTiMS 2024/25 - Moodle ID: 40280 <a href="https://enauczenie.pg.edu.pl/moodle/course/view.php?id=40280">https://enauczenie.pg.edu.pl/moodle/course/view.php?id=40280</a>						
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 aim of the course are: <ul style="list-style-type: none"><li>• to acquaint the student with the program Mathematica and Matlab environment</li><li>• to develop basic skills development in both environments</li><li>• presentation of the possibility of applying learned skills in solving mathematical problems</li></ul>						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K6_U07	Students learn various computational procedures supplied with programs and create their own procedures. They solve mathematical problems and issues using programming skills.			[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment		
	K6_W09	Students use Mathematica, Matlab and R. They perform symbolic and numerical calculations and use programming elements.			[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge		

Subject contents	<p>Introduction to Mathematica: a description of the work environment, the kernel of the program, data entry. Numbers and variables: types of numbers, the approximate number systems, mathematical constants, arithmetic operations, defining variables, the accuracy of the calculations, logical operators, comparison operators. Lists and tables: create lists and basic operations on lists, modification tables with the help of built-in functions. Elements of Programming: conditional statements, iterative loops, defining procedures. Vectors and Matrices: Basic operations on vectors and matrices, solving systems of linear equations. Elements of mathematical analysis: action on polynomials, the definition of functions, solving equations and systems of nonlinear equations, differentiation and integration of functions.</p> <p>Introduction to Matlab environment: a description of the work environment, the kernel of the program, the use of assistance, data entry, the M- script files. Elements of Programming: conditional statements, iterative loops, defining procedures, M- files function, pointers to functions, anonymous functions. Presentation of data: data types, variables display format, write data to the screen and to a file, reading data from a file, graphical presentation. Issues of linear algebra. The package for symbolic computation .</p> <p>Introduction to the R language and the RStudio environment: data types, operations on datasets and files.</p>																	
Prerequisites and co-requisites	There are no prerequisites, the student learns the programs from scratch.																	
Assessment methods and criteria	<table border="1" data-bbox="451 607 1487 779"> <thead> <tr> <th data-bbox="451 607 794 640">Subject passing criteria</th> <th data-bbox="794 607 1137 640">Passing threshold</th> <th data-bbox="1137 607 1487 640">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="451 640 794 674">Project</td> <td data-bbox="794 640 1137 674">50.0%</td> <td data-bbox="1137 640 1487 674">20.0%</td> </tr> <tr> <td data-bbox="451 674 794 707">Lecture Task</td> <td data-bbox="794 674 1137 707">50.0%</td> <td data-bbox="1137 674 1487 707">10.0%</td> </tr> <tr> <td data-bbox="451 707 794 741">Tasks in the classroom</td> <td data-bbox="794 707 1137 741">50.0%</td> <td data-bbox="1137 707 1487 741">20.0%</td> </tr> <tr> <td data-bbox="451 741 794 779">2 Semestral tests</td> <td data-bbox="794 741 1137 779">50.0%</td> <td data-bbox="1137 741 1487 779">50.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Project	50.0%	20.0%	Lecture Task	50.0%	10.0%	Tasks in the classroom	50.0%	20.0%	2 Semestral tests	50.0%	50.0%
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Supplementary literature	none																	
eResources addresses	Podstawowe <a href="https://www.rdocumentation.org/">https://www.rdocumentation.org/</a> - R documentation <a href="https://www.mathworks.com/help/matlab/">https://www.mathworks.com/help/matlab/</a> - Matlab documentation <a href="http://reference.wolfram.com/legacy/v5/TheMathematicaBook/index.html">http://reference.wolfram.com/legacy/v5/TheMathematicaBook/index.html</a> - Mathematica documentation  Pakiety Matematyczne WFTiMS 2024/25 - Moodle ID: 40280 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=40280">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=40280</a>																	
Example issues/ example questions/ tasks being completed	<p>The task of the student will be writing programs solving mathematical problems, such as</p> <ol style="list-style-type: none"> <li>1 Write a program defining the Fibonacci sequence;</li> <li>2 Write a program resolving the differential problem.</li> </ol>																	
Work placement	Not applicable																	

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