

Subject card

Subject name and code	Mathematical Software and Information Technology, PG_00204253						
Field of study	Mathematics						
Date of commencement of studies	October 2026		Academic year of realisation of subject		2027/2028		
Education level	Bachelor's 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		3.0		
Learning profile	academic		Assessment form		credit		
Conducting unit	Division of Real Functions -> Institute of Mathematics -> Faculty of Mathematics, Physics and Informatics -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr Adrian Karpowicz				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	45.0	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		2.0		28.0	75
Subject objectives	• Introduction to using math packages. • Using computer software to solve mathematical problems and analyze data.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[MATL3_W09] knows and understands at an advanced level at least one software package used for symbolic or numerical calculations		The student understands how to solve advanced mathematical and modeling problems in selected mathematical packages for symbolic and numerical calculations.		[SW4] test/exam - oral or written		
	[MATL3_K01] is ready to acquire knowledge in order to solve cognitive and practical problems related to the field of mathematics and to use the opinions and assistance of experts		The student is ready to select and use appropriate computer software to solve selected mathematical problems.		[SK2] presentation/project/paper/report		
	[MATL3_U08] is able to use a known software package or a known programming language to solve selected problems in the learned fields		The student is able to solve selected mathematical and data-analysis problems using computer software.		[SU2] presentation/project/paper/report [SU4] test/exam - oral or written		

Subject contents	1. Processing numerical and textual data in Microsoft Excel spreadsheets using mathematical, logical, financial, statistical, text, and date/time functions, and creating diagrams and charts, including line and surface charts. 2. Examples of implementing numerical algorithms and performing data exploration using Microsoft Excel. 3. Introduction to statistical data analysis in Excel using lookup functions, Power Query, and pivot tables and charts. 4. Presentation of a chosen DGS (Dynamic Geometry Software) package, e.g., GeoGebra, and a CAS (Computer Algebra System) package (e.g., Maxima, Mathematica, SageMath). 5. Using software to solve selected mathematical problems (related, for example, to mathematical analysis, linear algebra, geometry) that require computer assistance. 6. Applying programming techniques and artificial intelligence tools to solve programming and mathematical problems. 7. Basics of using the Linux or Windows (PowerShell) terminal and the LaTeX system.		
Prerequisites and co-requisites	Basic knowledge of calculus, linear algebra and programming obtained in the first year of studies.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Colloquia	51.0%	70.0%
	Project	51.0%	30.0%
	Observation of the student's attitude	51.0%	0.0%
Recommended reading	Basic literature	1. User manuals for software packages selected by the instructor. 2. <i>G. Mount Nowoczesna analiza danych w Excelu, Helion, 2025</i>	
	Supplementary literature	1. P. Zimmermann et al., Computational Mathematics with SageMath, Society for Industrial and Applied Mathematics, 2018. 2. G. V. Bard, Sage for Undergraduates, American Mathematical Society, 2015. 3. H. Zhou, Eksploracja danych za pomocą Excela, Helion, 2024.	
	eResources addresses		
	Example issues/ example questions/ tasks being completed	None	
Work placement	Not applicable		

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