

Subject card

Subject name and code	Mathematical software, PG_00155406						
Field of study	Mathematics						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2026/2027		
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 The course may be conducted in English.		
Semester of study	3		ECTS credits		2.0		
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 Michał Banacki				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	30.0	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		5.0		15.0	50
Subject objectives	• Introduction to using math packages. • Using math packages to solve math problems.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[MATL3_W12] knows and understands the principles of occupational health and safety	The student knows the basic principles of occupational health and safety while working in a computer laboratory.	[SW1] oral statement/ conversation/discussion
	[MATL3_K03] is ready to work in a team; understands the need for systematic work on all projects that have a long-term character	The student is able to work in a team and understands the importance for systematic work on mathematical problems.	[SK2] presentation/project/paper/ report [SK4] test/exam - oral or written
	[MATL3_U10] is able to use the known software package or programming language to solve selected issues from the acquired fields, in particular mathematical analysis, linear algebra and statistics	The student is able to use a given package for symbolic calculations in selected issues related to the learned theory.	[SU2] presentation/project/paper/ report [SU4] test/exam - oral or written
	[MATL3_U12] knows how to arrange and analyse an algorithm in accordance with the specification and save it in the selected programming language	The student is able to create simple algorithms for solving selected mathematical problems.	[SU2] presentation/project/paper/ report [SU4] test/exam - oral or written
	[MATL3_K01] is ready to accept the limitations of his/her own knowledge and understands the need for further education	The student is aware of the scope of his/her own knowledge regarding the introduced mathematical software package and understands the need for further education in this area.	[SK8] observation of student's independent or team work
	[MATL3_W10] knows and understands the basics of computational and programming techniques supporting the work of a mathematician and understands their limitations	The student knows the basics of computational and programming techniques associated with a given mathematical software package and is aware of their limitations.	[SW4] test/exam - oral or written [SW2] presentation/project/paper/ report
	[MATL3_K04] is ready to understand and appreciate the importance of intellectual honesty in one's own and other people's actions; is willing to act ethically	The student understands and appreciates the importance of intellectual honesty in scientific work.	[SK8] observation of student's independent or team work
[MATL3_W11] knows and understands at least one software package used for symbolic calculations	The student knows at a basic level at least one mathematical software package.	[SW4] test/exam - oral or written [SW2] presentation/project/paper/ report	
Subject contents	1. Presentation of a CAS package selected by the lecturer (e.g. Maxima, Mathematica, SageMath). 2. Discuss the limitations of this type of software packages. 3. Using software to solve selected mathematical problems (related to e.g. mathematical analysis and linear algebra) requiring the use of a computer. 4. Using programming techniques to solve mathematical problems. 5. Presentation of subject-related nomenclature in English.		
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 and/or projects	51.0%	100.0%
	Observation of the student's attitude	51.0%	0.0%
Recommended reading	Basic literature	User manuals for software packages selected by the instructor.	
	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.	
	eResources addresses	Supplementary https://doc.sagemath.org/html/en/index.html - SageMath package documentation.	
Example issues/ example questions/ tasks being completed	None		
Work placement	Not applicable		

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