

Subject card

Subject name and code	Software for mathematics education, PG_00155428						
Field of study	Mathematics						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2027/2028		
Education level	Bachelor's studies		Subject group		Obligatory subject group in the field of study Optional subject group		
Mode of study	full-time studies		Mode of delivery		at the university		
Year of study	3		Language of instruction		Polish		
Semester of study	6		ECTS credits		6.0		
Learning profile	academic		Assessment form		exam		
Conducting unit	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	30.0	0.0	30.0	0.0	0.0	60
	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	60		10.0		80.0	150
Subject objectives	The aim of the classes is to familiarize students with selected programs supporting mathematics teaching and to prepare them to conduct lessons and other activities using educational programs such as GeoGebra, Scratch and Python.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[MATL3_K01] is ready to accept the limitations of his/her own knowledge and understands the need for further education		He is willing to acknowledge the limitations of his own knowledge and is willing to pursue further education.		[SK8] observation of student's independent or team work		
	[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		Is ready to understand and appreciate the importance of intellectual honesty in one's own and other people's actions; ethical conduct		[SK8] observation of student's independent or team work		
	[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		Is able to apply the learned programs in the process of solving mathematical tasks at various educational levels Can write simple procedures in known programs that allow to illustrate selected concepts and mathematical theorems		[SU2] presentation/project/paper/report [SU5] implementation of a problem task		
	[MATL3_W10] knows and understands the basics of computational and programming techniques supporting the work of a mathematician and understands their limitations		Knows at least two software packages for symbolic calculations, for learning programming and for geometry Knows the theoretical foundations of computational methods and IT techniques used to solve mathematical problems in the known software packages		[SW4] test/exam - oral or written [SW5] implementation of a problem task		

Subject contents	1. Application of DGS (e.g. GeoGebra program) in the field of learning and teaching mathematics in primary,secondary and higher schools. In particular: creating dynamic presentations of definitions, theorems and mathematical proofs, formulating mathematical hypotheses and their justification and generalization, creating geometric structures, solving tasks in an experimental (dynamic) way in the field of geometry, algebra and mathematicalanalysis and developing their mathematical solutions, creating animations and computer simulations,2. Using programming languages (e.g. Scratch or Python) and spreadsheets in learning and teachingmathematics in primary, secondary and higher education. Especially for algorithmizing simple mathematical problems and presenting mathematical content, to study the properties of natural numbers (including comparison of different algorithms solving thesame problem), for solving selected probabilistic and statistical problems and data analysis.3. The use of selected multimedia content in learning and teaching mathematics, e.g. Corinth applications,selected Khan Academy resources4. The use of artificial intelligence tools in learning and teaching mathematics.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	observation of the student's attitude	51.0%	0.0%
	test	51.0%	35.0%
	projects	51.0%	20.0%
	problem test	51.0%	35.0%
	activity	51.0%	10.0%
Recommended reading	Basic literature	Winkowska Nowak Katarzyna , Pobiega Edyta i in. ABC GeoGebry . Poradnik dla początkujących, OEKP, 2016. Farrell Peter, Matematyczne przygody z Pythonem, PWN, 2021	
	Supplementary literature	none	
	eResources addresses		
Example issues/ example questions/ tasks being completed	none		
Work placement	Not applicable		

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