University of Gdańsk

Subject card

Subject name and code	Software for Mathematics Education, PG_00204266		
Field of study	Mathematics		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2028/2029
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	5.0
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	3.0	62.0	125

Subject objectives

The aim of the classes is to familiarize students with selected programs supporting mathematics teachingand 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_U08] is able to use a known software package or a known programming language to solve selected problems in the learned fields	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_W09] knows and understands at an advanced level at least one software package used for symbolic or numerical calculations	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

<table>
<tr><td>Subject contents</td><td>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.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td></td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>observation of the student's attitude</td><td>51.0%</td><td>0.0%</td></tr>
<tr><td>problem test</td><td>51.0%</td><td>35.0%</td></tr>
<tr><td>projects</td><td>51.0%</td><td>20.0%</td></tr>
<tr><td>test</td><td>51.0%</td><td>35.0%</td></tr>
<tr><td>activity</td><td>51.0%</td><td>10.0%</td></tr>
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</td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>Winkowska Nowak Katarzyna , Pobiega Edyta i in. ABC GeoGebry . Poradnik dla początkujących, OEKP, 2016. Farrell Peter, Matematyczne przygody z Pythonem, PWN, 2021</td></tr>
<tr><td>Supplementary literature</td><td>none</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">none</td></tr>
<tr><td>Work placement</td><td colspan="2">Not applicable</td></tr>
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