University of Gdańsk

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_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
[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

<table>
<tr><td>Subject contents</td><td>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.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Basic knowledge of calculus, linear algebra and programming obtained in the first year of studies.</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>Project</td><td>51.0%</td><td>30.0%</td></tr>
<tr><td>Observation of the student's attitude</td><td>51.0%</td><td>0.0%</td></tr>
<tr><td>Colloquia</td><td>51.0%</td><td>70.0%</td></tr>
</table></td></tr>
<tr><td>Recommended reading</td><td><table>
<tr><td>Basic literature</td><td>1. User manuals for software packages selected by the instructor.

2. G. Mount Nowoczesna analiza danych w Excelu, Helion, 2025</td></tr>
<tr><td>Supplementary literature</td><td>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.</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
</table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>None</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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