

Subject card

Subject name and code	Data Analysis Tools, PG_00208667						
Field of study	Mathematics						
Date of commencement of studies	October 2024		Academic year of realisation of subject		2026/2027		
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	30.0	0.0	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		0.0		0.0	60
Subject objectives	The main objective of the course is to equip students with skills in modern data processing, modeling, and data exploration.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[MATL3_U09] is able to plan how to solve a specific problem and prepare a correct record of this solution, providing strict and precise justification for the correctness of his reasoning	The student analyzes numerical data rigorously, selects appropriate algorithms, and critically evaluates the results obtained.	[SU4] test/exam - oral or written
	[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 appreciates the importance of intellectual integrity in their own work and in the work of others.	[SK1] oral statement/conversation/discussion [SK8] observation of student's independent or team work
	[MATL3_K06] is ready to formulate opinions on basic mathematical issues	The student is able to formulate and express opinions on data analysis.	[SK1] oral statement/conversation/discussion
	[MATL3_K02] is ready to precisely formulate questions to deepen his/her own understanding of a given topic or to find missing elements of reasoning	The student formulates precise questions concerning the analyzed data and critically evaluates the obtained results.	[SK1] oral statement/conversation/discussion [SK4] test/exam - oral or written
	[MATL3_W09] knows and understands the role and importance of proof in mathematics, as well as the concept of the importance of assumptions	The student rigorously justifies the conclusions drawn from the analyzed data.	[SW4] test/exam - oral or written
	[MATL3_U08] is able to formulate definitions and theorems in an understandable way, both orally and in writing, and present correct mathematical reasoning regarding the acquired issues	The student formulates data analysis algorithms in a clear and understandable manner and justifies their correctness.	[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 able to recognize the limits of their own knowledge and is willing to continue learning.	[SK1] oral statement/conversation/discussion	
Subject contents	• Methods of data cleaning and transformation using Power Query creating and formatting tables, defining headers, data profiling, and operations on rows and columns. • Data modeling and analysis using Power Pivot building relational data models, defining relationships between tables, creating measures and KPI indicators using DAX, and time-based analysis. • Modern analytical tools in Excel: array formulas, advanced search, sorting and filtering techniques, as well as integration with Python and the use of artificial intelligence tools. • Introduction to Power BI a set of tools for combining, transforming, and visualizing data from various sources (e.g., Excel, SQL, the cloud) in interactive reports and dashboards. • Introduction to automating work in Excel by writing macros in VBA.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Exam	51.0%	45.0%
	Colloquium	51.0%	45.0%
	Class participation	51.0%	10.0%
Recommended reading	Basic literature	George Mount, Nowoczesna analiza danych w Excelu. Power Query, Power Pivot i inne narzędzia, Helion, Gliwice, 2025.	
	Supplementary literature	Felix Zumstein, Python i Excel. Nowoczesne środowisko do automatyzacji i analizy danych, Helion, Gliwice, 2022.	
	eResources addresses		
Example issues/ example questions/ tasks being completed	not included		
Work placement	Not applicable		

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