

Subject card

Subject name and code	Mathematics - lecture, PG_00054161						
Field of study	Geology						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2025/2026		
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	1		Language of instruction		Polish		
Semester of study	1		ECTS credits		3.0		
Learning profile	academic		Assessment form		exam		
Conducting unit	Division of Geometry -> Institute of Mathematics -> Faculty of Mathematics, Physics and Informatics -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr Michał Jabłonowski				
	Teachers		dr Michał Jabłonowski				
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	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		15.0		45.0	90
Subject objectives	The lecture aims to present the knowledge, skills and mathematical competencies necessary in the further education process in a given field.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[GEOLL3_W06] knows statistical and IT tools as well as the principles of preparing engineering and geological documentation and cartographic materials	The student is able to link a problem in the field of algebra and mathematical analysis and their applications with an appropriate theoretical problem.	[SW4] test/exam - oral or written
	[GEOLL3_U04] is able to use specialized computer software and mathematical and statistical methods in the analysis of geological data	The student is able to use mathematical methods to analyze numerical data, in particular: • expresses the meaning of selected mathematical symbols, • transforms algebraic expressions, • uses basic differential and integral calculus formulas to solve problems, • uses the basic formulas of linear algebra, • justifies his/her conclusions using correct mathematical language.	[SU4] test/exam - oral or written
	[GEOLL3_W02] knows and understands the terminology appropriate in science and natural sciences	The student has extended and deepened knowledge of mathematics useful for formulating and solving tasks/problems appropriate in exact and natural sciences, in particular: • knows basic mathematical symbols, transformations of algebraic expressions, • understands the adopted assumptions, definitions and previously derived results and theorems, • classifies basic elementary functions and lists their properties, • lists the basic formulas of differential and integral calculus, • lists the basic formulas of matrix calculus.	[SW4] test/exam - oral or written
Subject contents	• Properties of functions, including: domain, graph, one-to-one, monotonicity, zero. • Elementary functions, their graphs and properties, including: polynomial, rational, power, exponential, logarithmic and trigonometric. • Limits and continuity of functions. Tangent to graphs and differentiability of functions. • Determining the derivative and its applications. Local extremes and the study of variability of functions. • Indefinite integral and methods of its determination. • Definite integral and its applications. • Basic differential equations. • Complex numbers and their interpretation in the plane. • Matrix calculus, systems of equations and determinants. • Point, line, plane and vector in space. Basic operations in analytical geometry. • Functions of two real variables. Partial derivatives, gradient and their applications.		
Prerequisites and co-requisites	A. Formal requirements: Lack B. Entrance requirements: High-school mathematics		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	exam	51.0%	100.0%
Recommended reading	Basic literature	• 1. Włodarski W., Kryszicki L., Analiza matematyczna w zadaniach, Część I i II, Wyd. Naukowe PWN. • 2. Gewert M., Skoczylas Z., Analiza matematyczna ; definicje, twierdzenia, wzory. Wyd. GiS • 3. Gewert M., Skoczylas Z., Analiza matematyczna ; przykłady i zadania. Wyd. GiS • 4. Jurliewicz T., Skoczylas Z., Algebra liniowa ; definicje, twierdzenia, wzory. Wyd. GiS • 5. Jurliewicz T., Skoczylas Z., Algebra liniowa ; przykłady i zadania, Wyd. GiS	

	Supplementary literature	G. Kwiecińska: Matematyka : kurs akademicki dla studentów nauk stosowanych. Cz. 1, Wybrane zagadnienia algebry liniowej G. Kwiecińska: Matematyka : kurs akademicki dla studentów nauk stosowanych. Cz. 2, Analiza funkcji jednej zmiennej
	eResources addresses	
Example issues/ example questions/ tasks being completed	- Determining the derivative and its applications. Local extremes and the study of variability of functions. - Definite integral and its applications. - Matrix calculus, systems of equations and determinants.	
Work placement	Not applicable	

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