

Subject card

Subject name and code	Mathematics for oceanographers - lecture, PG_00054235						
Field of study	Oceanography						
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						
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		12.0		30.0	72
Subject objectives	The lecture aims to present the knowledge, skills and mathematical competencies necessary in the further education process in a given field. Learning and understanding the most important concepts and tools of mathematical analysis, including the differential and integral calculus of real functions of one real variable, as well as elements of the analysis of multivariate functions and the basics of linear algebra.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	OCEANL3-U05	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
	OCEANL3-W01	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
	OCEANL3-W05	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
Subject contents	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. Probability calculus. 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			
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., Krysiński 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. Jurewicz T., Skoczylas Z., Algebra liniowa ; definicje, twierdzenia, wzory. Wyd. GiS 5. Jurewicz 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	1. The limit of a function and its determination. 2. Derivative function and its definition. 3. Integral and methods of its determination. 4. Determine the tangent equation for the graph of the function at the point. 5. Local extrema function of two variables. 6. Differences between continuity and differentiability. 7. The condition of perpendicularity of vectors in three dimensional space. 8. Formula for the surface area of a solid of revolution.	
Work placement	Not applicable	

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