

Subject card

Subject name and code	Mathematics for oceanographers - auditory exercises, PG_00044103						
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		5.0		
Learning profile	academic		Assessment form		credit		
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	0.0	60.0	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		10.0		60.0	130
Subject objectives	Learning and understanding the most important concepts and tools of mathematical analysis, in the field of differential and integral calculus of real functions of one real variable, as well as elements of analysis of functions of several variables and the basics of linear algebra. The exercise 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
	OCEANL3-W05	knows and understands the concepts of: derivative and integral of a function of one variable, probability, vector, matrix, partial derivative, gradient	[SW4] test/exam - oral or written
	[OCEANL3-K04] is willing to constantly deepen knowledge in the field of oceanography and improve professional qualifications, supported by the knowledge of experts	is ready to learn mathematical methods independently, based on effective assessment of one's own abilities	[SK6] demonstration of practical skills [SK8] observation of student's independent or team work
	OCEANL3-U01	can describe phenomena and processes occurring in the sea using mathematical language	[SU4] test/exam - oral or written [SU6] demonstration of practical skills
	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-K03] is ready to exercise caution and criticism in accepting information from scientific literature, the Internet and other media relating to natural sciences	is ready to be cautious and critical in accepting mathematical knowledge contained in books of various substantive levels and in Internet sources	[SK6] demonstration of practical skills
	OCEANL3-U04	is able to solve calculation and problem tasks formulated in English with mathematical symbols	[SU6] demonstration of practical skills
	OCEANL3-U05	uses the basic concepts of probability theory, which form the basis of the statistical description of natural phenomena	[SU4] test/exam - oral or written

Subject contents	• Equations and inequalities of elementary functions of one variable. • Limits and continuity of functions. • Formulas for the derivative of a function, the equation of a tangent to a graph. • Monotonicity intervals and local extrema of functions. • Integral calculus and determining areas bounded by curves. • Elements of probability calculus. • Elements of matrix calculus used in systems of equations. • Elements of analytical geometry and vector calculus. Equations and inequalities of elementary functions of one variable. Limits and continuity of functions. Formulas for the derivative of a function, the equation of a tangent to a graph. Monotonicity intervals and local extrema of functions. Integral calculus and determining areas bounded by curves. Operations on complex numbers, canonical and trigonometric forms. Elements of matrix calculus used in systems of equations. Elements of analytical geometry and vector calculus.		
Prerequisites and co-requisites	Basic secondary school level mathematics skills (algebra and geometry); advanced level skills are desirable but not essential.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	tests	51.0%	100.0%
Recommended reading	Basic literature	• 1. Włodarski W., Krysicki 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. Jurlewicz T., Skoczylas Z., Algebra liniowa ; definicje, twierdzenia, wzory. Wyd. GiS • 5. Jurlewicz 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	Calculate the limit of a function. Calculate the derivative of a function. Determine the equation of the tangent to the graph of a function at a point. Give the local extrema of a function of two variables. Solve the given system of equations using Cramer's formulas.		
Work placement	Not applicable		

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