University of Gdańsk

Subject card

Subject name and code	Mathematics for oceanographers - lecture, PG_00054235		
Field of study	Oceanography		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2024/2025
Education level	undergraduate 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 polish
Semester of study	1	ECTS credits	3.0
Learning profile	academic	Assessment form	
Conducting unit			
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	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

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

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., 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	Adresy na platformie eNauczanie:
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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