University of Gdańsk

Subject card

Subject name and code	Mathematics for Oceanographers - lecture, PG_00205207		
Field of study	Oceanography		
Date of commencement of studies	October 2027	Academic year of realisation of subject	2027/2028
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 Marek Hałenda	
	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	2.0	43.0	75

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] is able to use general-purpose and specialized software, as well as mathematical and statistical methods, in data analysis and the presentation of results	The student is able to use mathematical methods to analyze numerical data.	[SU4] test/exam - oral or written
[OCEANL3-W01] has an advanced knowledge and understanding of the terminology used in oceanography and related exact and natural sciences (in Polish and a selected foreign language)	The student has extended and deepened knowledge of mathematics useful for formulating and solving tasks/problems appropriate in exact and natural sciences.	[SW4] test/exam - oral or written
[OCEANL3-W05] has an advanced knowledge of techniques, research methods, and tools (mathematical, statistical, and computational) used by oceanographers to describe and interpret processes and phenomena occurring in the marine environment	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

<table>
<tr><td>Subject contents</td><td>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.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td></td></tr>
<tr><td>Assessment methods and criteria</td><td><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>exam</td><td>51.0%</td><td>100.0%</td></tr></table></td></tr>
<tr><td>Recommended reading</td><td><table><tr><td>Basic literature</td><td>• 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</td></tr><tr><td>Supplementary literature</td><td>• 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</td></tr><tr><td>eResources addresses</td><td></td></tr></table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>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.</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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