GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Mathematics 1, PG_00055796		
Field of study	Transport and Logistics		
Date of commencement of studies	October 2022	Academic year of realisation of subject	2022/2023
Education level	first-cycle 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	10.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Mathematics Center -> Vice-Rector for Education		
Name and surname of lecturer (lecturers)	Subject supervisor	dr Katarzyna Pączkowska	
	Teachers	mgr Dorota Grott dr Katarzyna Pączkowska	

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	45.0	60.0	0.0	0.0	0.0	105
	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	105	20.0	125.0	250

Subject objectives	Students obtain competence in the range of using methods of mathematical analysis and linear algebra and knowledge how to solve simple problems that can be found in the field of engineering.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U02] can work individually and in a team, communicate through various techniques in professional environment and also record, analyse, and present the results of work, can estimate the time needed to complete a given task	Student recognizes the importance of self-expanding knowledge and takes the challenge of working with a group to solve a problem. Student understands the need of lifelong learning. Student is able to inspire others and organize their learning process. Student is able to process the acquired information, analyze and interpret it, draw conclusions and reason opinions. Student recognizes the importance of skillful use of basic mathematical apparatus in terms of study in the future.	[SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment
[K6_W01] has a basic knowledge in maths, including algebra, elements of logics, geometry, mathematical analysis, theory of probability necessary to describe and analyse the operation means and systems of transport	Student names basic properties of elementary functions. Student solves equations and inequalities with elementary functions. Student evaluates the limits of sequences. Student evaluates the limits of functions. Student gives a graphic interpretation of discontinuity points. Student uses the basic operations on complex numbers. Student defines the basic concepts of differential calculus of one variable function. Student uses the first and second derivatives of a function to analyze its properties. Student determines intervals of monotonicity of a given function and its extrema. Student applies the basic rules and techniques of integration to calculate indefinite integrals. Student lists geometrical applications of definite integrals. Student uses definite integral to solve geometrical problems. Student distinguishes between the types of improper integrals. Student explains the definition of the cross product. Student uses the triple scalar product to give the volume of solids.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge

Subject contents

The absolute value function definition, solving equations and inequalities with absolute value. Functions of one variable and their properties: linear functions, quadratic functions, power functions, polynomials, rational functions, exponential functions, logarithmic functions, trigonometric functions, cyclometric functions equations and inequalities. Operations on complex numbers, trigonometric form of a complex number, de Moivres formula, roots of complex numbers. Limit of a sequence, convergent and divergent sequences, the number e. Limits and continuity of a function. Differential calculus of functions of one variable. Differentiation of elementary functions. Differentiation of composite functions. Derivatives of higher orders. Extrema of a function. Points of inflexion. Indeterminate forms and de lHospitals Rule. Integral calculus of functions of one variable. Formula for the integration by parts. Formula for the integration by substitution. Integration of rational, irrational and trigonometric functions. Definite integral. Newton- Leibniz formula. Geometric application of definite integrals. Improper integrals. Vectors in three- dimensional space. The dot product of vectors, the cross product, the scalar triple product of vectors, geometric interpretation.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Midterm written and oral colloquium	50.0%	50.0%
Written and oral exam	50.0%	50.0%

<table>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>1. Praca zbiorowa pod redakcją Wikieł B.: Matematyka. Podstawy z elementami matematyki wyższej. Wyd. PG, Gdańsk, 2009.
2. Gewert M., Skoczylas Z.: Analiza matematyczna 1. GiS, Wrocław, 2004.
3. Jurewicz T., Skoczylas Z.: Algebra liniowa 1. GiS, Wrocław, 2004.
4. Krysicki W., Włodarski L.: Analiza matematyczna w zadaniach, cz.I. PWN, Warszawa 2006.
5. Leksiński W., Nabiałek I., Żakowski W.: Matematyka. Definicje, twierdzenia, przykłady, zadania. WNT, Warszawa, 2003.</td></tr>
<tr><td>Supplementary literature</td><td>1. Jankowska K., Jankowski T.: Zbiór zadań z matematyki. Wyd. PG, Gdańsk, 1998.
2. Jankowska K., Jankowski T.: Zadania z matematyki wyższej. Wyd. PG, Gdańsk, 1999.</td></tr>
<tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:
WIMiO - TiL - Matematyka - 2022/23 (K.Pączkowska) - Moodle ID: 23560
https://enauczanie.pg.edu.pl/moodle/course/view.php?id=23560</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">1. Solve the equation ...
2. Find the domain and range of the function f(x)=... .
3. Evaluate the limit of the given sequence (a_n).
4. Evaluate the limit of the given function f(x)= at the point x_0= ... .
5. Analyse the continuity of the following function f(x)= .
6. Using the rules of differentiation find the derivative of the following function f(x)= .
7. Find local extremes and intervals of monotonicity of the function f(x)= .
8. Determine indefinite integrals of the following functions using the method of integration by parts or the method of substitution .
9. Give three applications of the definite integral with appropriate formulas.
10. Find the area of the region bounded by y=, y= , x= and x= .</td></tr>
<tr><td>Work placement</td><td colspan="2">Not applicable</td></tr>
</table>

Document generated electronically. Does not require a seal or signature.