

。 GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Methematics, PG_00064173								
Field of study	Transport								
Date of commencement of studies	October 2025		Academic year of realisation of subject			2025/2026			
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	2		ECTS credits		6.0				
Learning profile	general academic profile		Assessment form		assessment				
Conducting unit	Mathematics Center -> Vice-Rector For Education								
Name and surname of lecturer (lecturers)	Subject supervisor		dr Krzysztof Radziszewski						
	Teachers								
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	Seminar	SUM	
	Number of study hours	30.0	30.0	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		15.0		75.0		150	
Subject objectives	Students obtain competence in the range of using methods of mathematical analysis 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_W01] has knowledge of mathematical analysis, algebra, calculus of probability and operational research required for describing and solving transport problems	Student:uses definite integral to solve geometrical tasks, analyses a tasks from analitycal geometry, uses the basic operations on complex numbers, examines functions of several variables, using the concept of limit, continuity and derivatives, calculates double integrals, and explains the substitution method, applies double integrals to solve geometrical problems, demonstrates some techniques for solving ordinary differential equations. Student recognizes the importance of self-expanding knowledge and take the challenge of working with a group to solve a problem.	[SW1] Assessment of factual knowledge			
	[K6_U08] able to carry out simple engineering tasks related to the construction and operation of a selected element of the transport system, select the right methods and tools	Student:uses definite integral to solve geometrical tasks, analyses a tasks from analitycal geometry, uses the basic operations on complex numbers, examines functions of several variables, using the concept of limit, continuity and derivatives, calculates double integrals, and explains the substitution method, applies double integrals to solve geometrical problems, demonstrates some techniques for solving ordinary differential equations. Student recognizes the importance of self-expanding knowledge and take the challenge of working with a group to solve a problem.	[SU3] Assessment of ability to use knowledge gained from the subject			
Subject contents	Integrals of rational functions. Definite Riemann integral. Improper integrals. Applications of integral calculus. Analytic geometry: basic vectors definitions and properties, dot product, cross product, their properties and its applications, the triple scalar product and applications, equations of lines and planes in 3-space, the distance from a point to a plan, angles between planes and lines. Complex numbers: algebraic, trigonometric, exponential form, operations, exponentiation (Moivre formula), finding roots of complex numbers. Functions of several variables. Partial derivatives. Total differential. Maxima and minima of a function of several variables. Ordinary differential equations: separable diff. eq., linear first-order diff. eq., Bernoullis eq., linear diff. eq. with constant coefficients of higher order. Double integrals. Applications of double integrals.					
Prerequisites and co-requisites	There is no requirement.					
Assessment methods	Subject passing criteria	Passing threshold	Percentage of the final grade			
and criteria	Midterm colloquium	50.0%	100.0%			
Recommended reading	Basic literature	 Te 1. K. Jankowska, T. Jankowski, Funkcje wielu zmiennych. Całki wielokrotne. Geometria analityczna, PG, Gdańsk 2005. 2. K. Jankowska, T. Jankowski, Zadania z matematyki wyższej, PG, Gdańsk 1999. 3. M. Gewert, Z. Skoczylas, Analiza matematyczna 1 i 2 Definicje, twierdzenia, wzory, Oficyna Wydawnicza GiS, Wrocław 2003. 4. M. Gewert, Z. Skoczylas, Analiza matematyczna 1 i 2 Przykłady i zadania, Oficyna Wydawnicza GiS, Wrocław 2003. 5. M. Gewert, Z. Skoczylas, Równania różniczkowe zwyczajne , Oficyna Wydawnicza GiS, Wrocław 2001. 				
	Supplementary literature	Ientary literature 6. R. Leitner, Zarys matematyki wyższej I i II, Wydawn Techniczne, Warszawa 2001. 7. R. Leitner, W. Matusz Zadania z matematyki wyższej I i II, Wydawnictwo Nau Techniczne, Warszawa 1999. 8. W. Krysicki, L. Włoda matematyczna w zadaniach I i II, Wydawnictwo Nauko Warszawa 1998.				
	eResources addresses	Adresy na platformie eNauczanie:				

Example issues/ example questions/ tasks being completed	 Sketch the graph of the function f(x,y)=(9-x²-y²)^{1/2}. Identify any local extrema of the function f(x,y)=e^{x-y}(x²-2y²). Find the absolute extrema of the function f(x,y)=xy-x(x+1)-y(y+1) on the set D={(x,y): x²+y²25, y3}. Solve the equation y"+6y'+9y=10sinx. Find the area between the two curves y²=4+x and x+3y=0. Find the distance between lines I: (x-9)/4 =(y+2)/(-3)=z and k: x/(-2)=(y+7)/9=(z-2)/2.
Work placement	Not applicable

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