



## Subject card

Subject name and code	Mathematics I, PG_00055114						
Field of study	Mechanical Engineering						
Date of commencement of studies	October 2021		Academic year of realisation of subject		2021/2022		
Education level	first-cycle studies		Subject group		Obligatory subject group in the field of study		
Mode of study	Part-time studies		Mode of delivery		at the university		
Year of study	1		Language of instruction		Polish		
Semester of study	1		ECTS credits		6.0		
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 Leszek Ziemczonek				
	Teachers		dr Leszek Ziemczonek				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	45.0	0.0	0.0	0.0	75
	E-learning hours included: 0.0						
	Adresy na platformie eNauczanie: WIMiO - MiBM n.stac. - Matematyka I 2021/22 (L.Ziemczonek) - Moodle ID: 16488 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=16488">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=16488</a>						
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	75		9.0		66.0	150
Subject objectives	The aim of this subject is to obtain the student's competence in the range of using the basic methods of mathematical analysis and linear algebra. Furthermore, the student is able to use this knowledge to solve simple theoretical and practical problems that can be found in the field of engineering.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_U01] is able to acquire information from specialized literary sources, databases and other resources, essential for solving engineering tasks; is able to compile the obtained information pieces and to interpret them, additionally is able to form conclusions and present justified opinion		Student is able to process the acquired information, analyze and interpret it, draw conclusions and reason opinions.		[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject		
	[K6_W01] possesses mathematical knowledge within the range of linear algebra and mathematical analysis useful in characterising and interpreting mechanical systems, technological processes and operational properties of devices		Student recognizes the importance of skillful use of basic mathematical apparatus in terms of study in the future.		[SW2] Assessment of knowledge contained in presentation [SW3] Assessment of knowledge contained in written work and projects		

Subject contents	Fundamental definitions of a limit of a sequence, convergence and divergence, limit theorems.		
	Fundamental definitions of a limit and continuity of a function, limit properties and useful theorems.		
	Definition of a first derivative and differential.		
	Roll's and Lagrange's theorems.		
	Monotonicity and local extrema.		
	Convexity, concavity and inflexion points of a function.		
	De l'Hospital's Theorem.		
	Asymptotes.		
	Applying differential calculus to studying the properties of one variable functions.		
	Basic vectors definitions and properties.		
	Dot product, cross product, triple scalar product, their properties and their applications.		
	Line and plane in three – dimensional space.		
	Matrices, determinants and their properties.		
Systems of linear equations. Cramer's theorem. Rank of matrix. Kronecker – Capelly theorem.			
Prerequisites and co-requisites	No requirements.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	written exam	50.0%	50.0%
	midterm colloquiums	50.0%	50.0%
Recommended reading	Basic literature	1) Matematyka. Podstawy z elementami matematyki wyższej, red. Wikieł B., Gdańsk, 2009.  2) Jankowska K., Jankowski T., Zbiór zadań z matematyki, Gdańsk, 2009.  3) Gewert M., Skoczylas Z., Analiza matematyczna 1. Przykłady i zadania, Wrocław, 2003.	
	Supplementary literature	1) Kryszicki W., Włodarski L., Analiza matematyczna w zadaniach. Część I, Warszawa, 1997.  2) Gewert M., Skoczylas Z., Analiza matematyczna 1. Definicje, twierdzenia, wzory, Wrocław, 2003.  3) Fichtenholz G. M.: Rachunek Różniczkowy i całkowy. PWN, Warszawa, 1995.	
	eResources addresses	WIMiO - MiBM n.stac. - Matematyka I 2021/22 (L.Ziemczonek) - Moodle ID: 16488 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=16488">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=16488</a>	

Example issues/ example questions/ tasks being completed	<p>1) Find the limit of the sequence <math>a_n = \dots</math></p> <p>2) Assign local extrema of function <math>f(x) = \dots</math></p> <p>3) Find, if there are, solutions to the system of equations ...</p> <p>4) Find the puncture point of the plane <math>\Pi \dots</math> through the line <math>l \dots</math></p> <p>5) Using the function differential, find the approximate value of the expression ...</p>
Work placement	Not applicable