



Subject card

Subject name and code	MATHEMATICS 1, PG_00071700						
Field of study	Management						
Date of commencement of studies	October 2026	Academic year of realisation of subject			2026/2027		
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			English		
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 inż. Renata Zakrzewska				
	Teachers						
Lesson types	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						
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		3.0		72.0	150
Subject objectives	Uses the apparatus of linear algebra and mathematical analysis to solve theoretical and practical problems occurring in social sciences						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_W02] possesses advanced knowledge of methods and techniques that enable precise formulation and effective problem solving.		uses a mathematical apparatus to solve economic problems, combining knowledge of mathematics with knowledge of social sciences		[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation		
	[K6_U04] develops logical solutions to complex or unstructured problems, even under conditions of uncertainty.		integrates the information obtained from solving complex problems, interpreting them, drawing conclusions and formulating and justifying opinions		[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools		

Subject contents	Course content – lecture		
	<ol style="list-style-type: none"> 1. Functions of one variable and their properties. 2. Elementary functions: absolute value, polynomials, rational functions, power functions, exponential and logarithmic functions, trigonometric and inverse trigonometric functions - properties, graphs, solving equations and inequalities. 3. Infinite sequences - properties, limits. 4. The limit and continuity of a function. 5. Derivatives and differentials of first and higher orders. 6. Rolle, Lagrange, de l'Hospital, Taylor-Maclaurin theorems. 7. Monotonicity and local extrema. 8. Convexity, concavity and inflexion points of a function. 9. Asymptotes. 10. Matrices, their properties and operations on matrices. 11. Determinants. 12. Systems of linear equations. 		
	Course content – exercises		
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Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria		Passing threshold
	Class tests		50.0%
	Midterm colloquium		50.0%
	Class activity		50.0%
Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. Martin Anthony, Norman Biggs, Mathematics for Economics and Finance Methods and Modelling, Cambridge University Press ISBN: 0521559138 2. Hoffmann Laurence D., Bradley Gerald, Calculus for business, economics and the social and life sciences, New York, McGraw-Hill Company, 1986, ISBN 978-0077292737 	
	Supplementary literature	T. Jankowski, Linear Algebra, Wydawnictwo Politechniki Gdańskiej, Gdańsk 2001, ISBN 83-88007-87-	
	eResources addresses		
Example issues/ example questions/ tasks being completed	<ul style="list-style-type: none"> • Find the derivatives of the following functions. • Find local extremes and intervals of monotonicity of the following function $f(x)=$. • Sketch the graph of the function $f(x)$. • Identify any local extrema and points of inflection. • Find the rank of the matrix A. • Solve the systems of linear equations using the back substitution method. • Solve the systems of linear equations by Cramer rule. • Formulate the Kronecker-Capelli theorem. 		
Practical activities within the subject	Not applicable		

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