GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	MATHEMATICS 1, PG_00061159
Field of study	Management

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**	English
Semester of study	1	**ECTS credits**	5.0
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. Magdalena Łapińska
	Teachers	dr inż. Magdalena Łapińska

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	30.0	0.0	0.0	0.0	60
	E-learning hours included: 0.0						
	eNauczanie source addresses: Moodle ID: 20 WZIE - BIM - Mathematics 1 2025/26 (M.Łapińska) https://enauczanie.pg.edu.pl/2025/course/view.php?id=20						

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	12.0	53.0	125

Subject objectives	Uses the tools of linear algebra and mathematical analysis to solve theoretical and practical problems essential for data analysis and business process modeling.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_W02] demonstrates comprehensive preparation in terms of methods, techniques for formulating and solving problems	uses a mathematical apparatus to solve economic problems, combining knowledge of mathematics with knowledge of social sciences	[SW1] Assessment of factual knowledge
	[K6_U04] formulates logical solutions to complex or unstructured problems	integrates the information obtained from solving complex problems, interpreting them, drawing conclusions and formulating and justifying opinions	[SU2] Assessment of ability to analyse information

Subject contents	Matrices (definition, types of matrices, operations on matrices). Properties of matrices and operations on matrices. Determinants and their properties. Inverse matrix of a non-singular matrix. Methods of determining the inverse matrix. Systems of linear equations. Cramer's theorem. Rank of a matrix. Kronecker-Capelli theorem. Gauss-Jordan elimination method. Application of matrix calculus in economics.
	Coordinate system on the plane. Basic definitions and properties of vectors. Scalar product, vector product, and their applications. Angle between lines. Vectors in three-dimensional and n-dimensional space. Equations of a line and a plane in space.
	Real functions of one variable: Functions and their properties: composite function, inverse function, inverse functions of elementary functions. Number sequences, limits of sequences, basic theorems. Methods of calculating limits. Limit of a function, one-sided limits, properties of limits. Continuous functions and their properties. Points of discontinuity, examples. Derivatives: Existence of a derivative, rules for determining derivatives, derivative of composite and inverse functions. Derivatives of elementary functions. Higher-order derivatives. Taylor series for a function of one variable. Applications of derivatives: L'Hopital's rule, indeterminate forms. Asymptotes. Intervals of monotonicity, local and global extrema.

Prerequisites and co-requisites	

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Final exam	50.0%	50.0%
	Midterm colloquium	50.0%	50.0%

Recommended reading	Basic literature	Martin Anthony, Norman Biggs, Mathematics for Economics and Finance Methods and Modelling, Cambridge University Press ISBN: 0521559138 Hoffmann Laurence D., Bradley Gerald, Calculus for business, economics and the social and life sciences,New York, McGraw-Hill Company, 1986, ISBN 978-0077292737 T. Jankowski, Linear Algebra, Wydawnictwo Politechniki Gdańskiej, Gdańsk 2001, ISBN 83-88007-87-4
	Supplementary literature	.
	eResources addresses	

Example issues/ example questions/ tasks being completed	• Determine the number of solutions of the given equations. • Calculate the limif of the given sequence. • Investigate the continuity of the function at the given points. • Examine the monotonocity of the function and find the asymptotes. • Find the local extrema of the function.

Work placement	Not applicable

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