

Subject card

Subject name and code	Mathematical Applications in Economics and Management, PG_00172162						
Field of study	International Economic Relations						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2025/2026		
Education level	Bachelor's 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		4.0		
Learning profile	academic		Assessment form				
Conducting unit	Department of Microeconomics -> Faculty of Economics -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr Marcin Brycz				
	Teachers		dr Marcin Brycz				
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	20.0	0.0	0.0	0.0	20
	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	20		7.0		73.0	100
Subject objectives	To familiarize students with the basics of higher mathematics and its applications in economics and management.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[MSGL3_W10] knows selected methods and tools, including IT tools and data acquisition techniques, which make it possible to describe and analyse economic entities operating on the international market; knows the processes and phenomena occurring in them and between them, and processes supporting decision-making	The student has knowledge of selected methods and tools, including IT tools, data acquisition techniques and mathematical methods that enable the description and analysis of economic entities operating on the international market. He also knows the processes and phenomena occurring in these entities and between them, as well as the mechanisms supporting the decision-making process.	[SW5] implementation of a problem task
	[MSGL3_U04] uses the acquired theoretical knowledge in economics to analyse and evaluate the operation of economic entities on the international market, with particular emphasis on the European Union market	A student combines economic knowledge with mathematical skills to analyze and evaluate the performance of companies in the global market, with a particular focus on the European Union.	[SU4] test/exam - oral or written
	[MSGL3_W01] has an advanced knowledge of economic sciences, in particular of economics and its place in the system of sciences, including within related disciplines	The student has advanced knowledge in the field of economic sciences, with particular emphasis on economics and its role in the system of sciences. He also understands the connections between economics and related scientific disciplines and its close relationship with mathematics.	[SW4] test/exam - oral or written
	[MSGL3_K05] correctly identifies, diagnoses and solves dilemmas and various options of solutions related to the profession	The student effectively identifies, analyses and solves dilemmas and various variants of professional problems, using knowledge and skills in the field of mathematical methods.	[SK4] test/exam - oral or written
	[MSGL3_U02] can assess economic and social phenomena occurring in an open economy, interpret necessary statistical data and economic indicators, as well as forecast economic phenomena and processes, using standard methods and tools applied in economic sciences	The student has the ability to analyze and evaluate economic and social phenomena occurring in an open economy. He can interpret appropriate statistical data and economic indicators, as well as forecast economic processes and phenomena, using standard methods and tools used in economic sciences, taking into account knowledge of mathematical methods.	[SU4] test/exam - oral or written
Subject contents	1. Subject: Matrix Algebra Operations on matrices, basic properties of determinants, finding the inverse matrix, Cramer's rule, application to market and national income models (matrix notation and model solution) 2. Subject: Elements of differential calculus - Rules of differentiation for functions of one variable, local extrema of functions of one variable, monotonicity of functions, graph of functions, inflection point of functions, elasticity of functions, marginal calculus, maximization of economic result, rules of differentiation of functions of many variables, optimization of functions of many variables, conditional extremum, minimization of costs using the method of Lagrange multipliers. Production optimization 3. Integral calculus concept of antiderivative function, definite and indefinite integral, method of integration by parts, method of integration by substitution, calculation of area under the graph of a function, applications in marginal calculus and financial mathematics Any doubts arising during the task solving stage can also be discussed during consultations.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Activity	51.0%	10.0%
	Matrix in Excel	51.0%	10.0%
	Test	51.0%	80.0%

Recommended reading	Basic literature	1. Babula E., Czerwonka L. (red.), Zastosowanie matematyki w ekonomii i zarządzaniu, Wydawnictwo Uniwersytetu Gdańskiego, Gdańsk 2015. 2. Blajer-Gołębiewska, L. Czerwonka, E. Pankau, M. Zielenkiewicz, Ekonomia matematyczna w zadaniach, red. T. Kamińska, Wyd. UG, Gdańsk 2010.
	Supplementary literature	1. Chiang A.C., Podstawy ekonomii matematycznej, PWE, Warszawa 1994. 2. Piszczala J., Matematyka i jej zastosowanie w naukach ekonomicznych, Wydawnictwo AE w Poznaniu, Poznań 2008.
	eResources addresses	
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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