University of Gdańsk

Subject card

Subject name and code	Mathematical Applications in Economics and Management, PG_00174004		
Field of study	Mathematical Applications in Economics and Management (Ćw. audytoryjne)		
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 Subject group related to scientific research 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	1	ECTS credits	2.0
Learning profile	academic	Assessment form	credit
Conducting unit			
Name and surname of lecturer (lecturers)	Subject supervisor	dr Elżbieta Babula	
	Teachers	dr Elżbieta Babula	

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	0.0	30.0	0.0	0.0	0.0	30

E-learning hours included: 0.0

eNauczanie source addresses:

Moodle ID: 13077 WE-LM-(2025/2026) L&M Mathematical applications
https://mdl.ug.edu.pl/course/view.php?id=13077

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	30	10.0	10.0	50

Subject objectives

To familiarize students with the elements of higher mathematics and its applications in economics and management.
Using academic English language, references and vocabulary.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[LML3_K04] is ready to think and act in an entrepreneurial manner; adapts to new situations and conditions, takes on the challenges of creative thinking, is resilient to failure, knows how to identify threats and assess the risk of their occurrence	A student is able to take initiative in solving mathematical and analytical problems in the context of economics and management, acting in an entrepreneurial and flexible manner in response to changing data analysis conditions and market environments.	[SK4] test/egzamin - ustny lub pisemny
[LML3_U02] is able to use its theoretical knowledge and acquire data to analyze specific logistics and mobility processes and systems, and to analyze these processes and systems using methods developed in economics, finance, management science, logistics and mobility	A student is able to acquire, process and analyze data related to economic processes and management systems using mathematical tools applied in economics, logistics and management sciences.	[SU4] test/egzamin - ustny lub pisemny [SU5] realizacja zadania problemowego
[LML3_W06] knows to an advanced degree selected methods and tools, including statistical techniques, to describe and model logistics and mobility processes and systems	A student knows selected mathematical methods enabling the modelling of economic processes and management systems, particularly in the context of logistics and mobility. The student is ready to participate in the office hours to verify his ability of solve tasks, as well as in discussions on the applications of selected methods.	[SW4] test/egzamin - ustny lub pisemny [SW1] wypowiedź ustna/rozmowa/ dyskusja [SW5] realizacja zadania problemowego

Subject contents

1. Matrix algebra: matrix operations, basic properties of determinants, finding the inverse matrix, Cramer's formula, application to market model
2. Sequences and series: Concept of a numerical sequence, arithmetic and geometric sequences, convergence of a sequence, limits of sequences, sum of a series, application to the calculation of the present value of cash flows
3. Functions of one and many variables: basic elementary functions, applications of logarithm
4. Elements of differential calculus: rules of differentiation for functions of one variable, local extrema of functions of one variable, elasticity of functions, marginal calculus, profit maximization, rules of differentiation for functions of many variables, optimization of functions of many variables
5. Integral calculus: primary function, definite and indefinite integral, method of integration by parts, method of integration by substitution, applications in marginal calculus

Prerequisites and co-requisites

Recommended knowledge in mathematics: functions of one variable, functions of many variables, basics of differential calculus, solving systems of linear equations.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Computer-based group work	51.0%	10.0%
Tests and discussion	51.0%	90.0%

Recommended reading

Basic literature

1. Babula E., Czerwonka L. (ed.), Zastosowanie matematyki w ekonomii i zarządzaniu-Mathematical Applications in Economics and Management, University of Gdańsk Publishing House, Gdańsk 2015.
2. Bradley T., Essential mathematics for economics and business, Wiley, 2013.
3. Wisniewski M., Mathematics for economics, Palgrave Macmillan, 2013.
4. Barnett R.A., Ziegler M.R., Byleen K.E., College Mathematics for Business, Economics, Life Sciences, and Social Sciences, Pearson Prentice Hall, Upper Saddle River, New Jersey 2008.
5. Werner F., Sotskov Y., Mathematics of Economics and Business, Routledge, Abingdon 2006

	Supplementary literature	1. Czerwonka L., Mathematical Models of Mergers: Conditions of Application and Conclusions [in:] Market Concentration and Economy, Series of Monographs, Vol. 7, Macro & Microeconomics Case Studies, T. Bernat (ed.), Publishing House Volumina.pl Daniel Krzanowski, Szczecin 2010, pp. 206-219.
	eResources addresses	
Example issues/ example questions/ tasks being completed	The determinant of the matrix obtained from the square matrix Aij as a result of removing the i-th row and j-th column is called...	
Work placement	Not applicable	

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