

Subject card

Subject name and code	Mathematics I, PG_00156718						
Field of study	Information Science and Econometrics						
Date of commencement of studies	October 2024		Academic year of realisation of subject		2024/2025		
Education level	undergraduate 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	academic		Assessment form				
Conducting unit	Katedra Statystyki -> Faculty of Management						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Beata Jackowska				
	Teachers		dr hab. Beata Jackowska dr Agnieszka Pobłocka dr Anna Gierusz-Matkowska				
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	20.0	20.0	0.0	0.0	0.0	40
	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	40		25.0		85.0	150
Subject objectives	Equalizing the level of students' knowledge, and then developing the knowledge of mathematical methods necessary for further education. To learn about the possibilities of applying mathematical methods in economics.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[liEL3_U07] The student can build formal models of complex economic phenomena and processes, estimate them, carry out their verification, and apply them to modelling, forecasting and optimization of the resources of low-complexity economic institutions, their structure and the course of processes in them.	The student is able to present selected economic issues in the matrix form and perform basic operations on these matrices. The student can use differential calculus and integral calculus in selected economic issues.	[SU3] text preparation/written work [SU4] test/exam - oral or written
	[liEL3_W04] The student has advanced knowledge of mathematical, statistical, econometric and computer methods of obtaining, processing and analysing data depicting the functioning and development of the national economy and its elements, as well as the phenomena and processes occurring in their environment.	The student knows the methods of linear algebra and mathematical analysis necessary for further education in all fields of study at the Faculty of Management of the University of Gdańsk. The student knows the possibilities of applying mathematical methods in economics.	[SW4] test/exam - oral or written [SW3] text preparation/written work
	[liEL3_K01] The student understands the need to constantly supplement and deepen acquired knowledge; is open to new ideas and teaching methods.	The student understands the need to deepen knowledge and acquire skills in the field of applications of mathematics in economics. The student is able to supplement and improve the acquired knowledge and skills. The student can work systematically and independently.	[SK3] text preparation/written work [SK4] test/exam - oral or written
	[liEL3_K02] The student can communicate with the public on computer science and econometrics topics in and outside the workplace, communicate his knowledge and share his skills through various media.	The student can present a solution to a problem in a way that is understandable to others using mathematical methods and is not afraid to ask questions.	[SK3] text preparation/written work [SK4] test/exam - oral or written
Subject contents	Elements of linear algebra 1. Matrices: the term of matrix, types of matrices, matrix operations and their properties, determinant of a square matrix and its properties, elementary operations on a matrix, computing an inverse matrix. Examples of matrices in economic problems. 2. Systems of linear equations: matrix form of a system of linear equations, solving systems of linear equations. Examples of systems of linear equations in economic problems. Elements of mathematical analysis 1. The numerical sequences: monotonicity, arithmetic and geometric sequences, limits of sequences, convergent and divergent sequences, convergent sequences up to the number e. Sequences of payments in financial mathematics. 2. Functions of the one variable: definition of a function, the function limit, continuity of a function. Examples of functional relationships in economics. 3. Differentiation of function of the one variable: difference quotient, derivative of function at a point, geometric interpretation of the derivative, properties of the derivative, Lagrange's theorem, derivatives of the higher order, de L'Hospital's rule. 4. The use of derivatives to study the properties of functions: monotonicity and the sign of the derivative, a necessary and sufficient condition for the existence of a local extremum, the greatest and the smallest value of a function. Examples of the use of differential calculus in economics. 5. Functions of several variables: the function limit, continuity of a function, partial derivatives, local extrema, conditional extrema, the greatest and the smallest value of a function. Examples in economics. 6. Integral calculus: indefinite integral, properties of indefinite integral, methods of integration: integration by parts and integration by substitution, definite integral, geometric interpretation of definite integral, properties of definite integral, calculation of areas bounded by curves, improper integrals. Examples of the use of integral calculus in economics.		
Prerequisites and co-requisites	The student should have basic mathematical knowledge of secondary school.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Assessment on the basis of two written colloquia covering solving exercises from tutorial and lecture.	51.0%	100.0%
Recommended reading	Basic literature	1. Bazańska T., Nykowska M., <i>Matematyka w zadaniach dla wyższych zawodowych uczelni ekonomicznych</i>, Wydawnictwo Branta 2003 2. Matłoka M. (red), <i>Matematyka dla ekonomistów</i>, Wydawnictwo AE w Poznaniu, Poznań 2000 3. Sadowski M., Spaniły T., <i>Matematyka w zadaniach dla studentów kierunków ekonomicznych</i>, Wydawnictwo UG, Gdańsk, 1999	

	Supplementary literature	1. Bednarski T., <i>Elementy matematyki w naukach ekonomicznych</i>, Oficyna Ekonomiczna, Kraków 2004 2. Chiang A. C., <i>Podstawy ekonomii matematycznej</i>, PWN, Warszawa 1994 3. Krywicki W., Włodarski L., <i>Analiza matematyczna w zadaniach</i>, część I i II, PWN, Warszawa 2003 4. Piszczala J., <i>Matematyka i jej zastosowanie w naukach ekonomicznych</i>, Wydawnictwo AE w Poznaniu, Poznań 1998 5. Piszczala J., Piszczala M., Wojcieszyn B., <i>Matematyka z zadaniami</i>, PWN, Warszawa 1981
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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