

Subject card

Subject name and code	Mathematics, PG_00156122						
Field of study	Sport Management						
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	full-time studies		Mode of delivery		at the university		
Year of study	1		Language of instruction		Polish		
Semester of study	1		ECTS credits		3.0		
Learning profile	academic		Assessment form		credit		
Conducting unit	Department of Econometrics -> Faculty of Management -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr Lech Kujawski				
	Teachers						
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						
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		9.0		36.0	75
Subject objectives	The aim of the course is to equalize the level of students' knowledge and then to develop their understanding of mathematical methods necessary for further education. The course will present the possibilities of applying mathematical methods in economics and management.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[ZSSML3_W13] The student knows advanced methods, techniques of management analysis to support the process of economic decision-making, as well as sources of data and information from various fields of social sciences.		Is able to independently perform operations on matrices.		[SW4] test/exam - oral or written		
	[ZSSML3_K01] The student is aware of the depreciation of knowledge over time and understands the need for lifelong learning and deepening of knowledge in both academic and non-academic modes.		Is able to independently formulate and solve systems of equations.		[SK4] test/exam - oral or written		
	[ZSSML3_U05] The student can correctly select and apply methods and tools used in management and quality sciences.		Understands the concept of a derivative of a function and is able to use it to analyze the monotonicity of functions.		[SU4] test/exam - oral or written		

Subject contents	Matrices: concept of a matrix, types of matrices, operations on matrices and their properties, determinant of a square matrix, elementary operations on a matrix, finding the inverse matrix. Examples of applications of matrices in economic problems. Systems of linear equations: matrix form of a system of linear equations, solving systems of linear equations and inequalities. Examples of applications of systems of equations and inequalities in economics. Functions of a single variable: concept of a function, limit of a function. Examples of the use of functions in economics. Differential calculus of functions of a single variable: derivative of a function at a point, geometric interpretation of the derivative, properties of the derivative, higher-order derivatives, L'Hôpitals rule. Applications of derivatives to analyze function properties: monotonicity of functions and the sign of the derivative, necessary and sufficient conditions for the existence of local extrema of a function. Examples of using differential calculus in economics. Functions of several variables: form of functions of several variables, partial derivatives, local extrema, conditional extrema, maximum and minimum values of a function. Examples of using differential calculus for functions of several variables in economics. Integral calculus: concept of an indefinite integral, methods of integration: integration by parts and by substitution, concept of a definite integral, geometric interpretation of a definite integral, properties of a definite integral, calculating areas bounded by curves. Examples of using integral calculus in economics.		
Prerequisites and co-requisites	None		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	2 to 3 written tests during the semester	51.0%	100.0%
Recommended reading	Basic literature	Bazańska T., M. Nykowska, <i>Matematyka w zadaniach dla wyższych zawodowych uczelni ekonomicznych</i> , Wydawnictwo Branta 2003 Piszczała J., <i>Matematyka i jej zastosowanie w naukach ekonomicznych</i> , Wydawnictwo AE w Poznaniu, Poznań 1998	
	Supplementary literature	Foryś I., Batóg B., Bieszk-Stolorz B., Guzowska M., Heberlein K., <i>Matematyka dla studentów ekonomii, finansów i zarządzania</i> , Wydawnictwo Difin 2020 Krysicki W., Włodarski L., <i>Analiza matematyczna w zadaniach</i> , część I i II, PWN, Warszawa 2003 Piszczała J., Piszczała M., Wojcieszyn B., <i>Matematyka z zadaniami</i> , PWN, Warszawa 1981 Matłoka M. (red), <i>Matematyka dla ekonomistów</i> , Wydawnictwo AE w Poznaniu, Poznań 2000	
	eResources addresses		
Example issues/ example questions/ tasks being completed	Any tasks from the textbook: Bazańska T., M. Nykowska, <i>Matematyka w zadaniach dla wyższych zawodowych uczelni ekonomicznych</i>, Wydawnictwo Branta 2003 1. Solve the matrix equation... 2. Solve the system of equations... 3. Calculate the limit of the sequence... 4. Calculate the limits of the function... 5. Determine the intervals of monotonicity of the function... 6. Calculate the area of the curvilinear trapezoid bounded by the curves...		
Work placement	Not applicable		

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