University of Gdańsk

Subject card

Subject name and code	Mathematics I, PG_00178047		
Field of study	Informatics and Econometrics		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2026/2027
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	6.0
Learning profile	academic	Assessment form	credit
Conducting unit	Department of Statistics -> Faculty of Management -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Beata Jackowska	
	Teachers		

Lesson types

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

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	4.0	86.0	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
[IiEL3_W02] To an advanced degree, the student knows and understands selected theoretical and practical issues in informatics, statistics or econometrics necessary for understanding economic and social phenomena.	The student knows and understands 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
[IiEL3_U02] Students can select or construct econometrics, informatics or statistics tools and apply them to describe and solve economic and social problems.	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

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. Bażańska T., Nykowska M., *Matematyka w zadaniach dla wyższych zawodowych uczelni ekonomicznych*, Wydawnictwo Branta 2003
2. Matłoka M. (red), *Matematyka dla ekonomistów*, Wydawnictwo AE w Poznaniu, Poznań 2000
3. Sadowski M, Spanily T., *Matematyka w zadaniach dla studentów kierunków ekonomicznych*, Wydawnictwo UG, Gdańsk, 1999

Supplementary literature

1. Bednarski T., *Elementy matematyki w naukach ekonomicznych*, Oficyna Ekonomiczna, Kraków 2004
2. Chiang A. C., *Podstawy ekonomii matematycznej*, PWN, Warszawa 1994
3. Krysicki W., Włodarski L., *Analiza matematyczna w zadaniach*, część I i II, PWN, Warszawa 2003
4. Piszczała J., *Matematyka i jej zastosowanie w naukach ekonomicznych*, Wydawnictwo AE w Poznaniu, Poznań 1998
5. Piszczała J., Piszczała M., Wojcieszyn B., *Matematyka z zadaniami* , PWN, Warszawa 1981

eResources addresses

Example issues/ example questions/ tasks being completed	
Work placement	Not applicable

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