GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	MATHEMATICS 2, PG_00070813		
Field of study	Economic Analytics		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2026/2027
Education level	first-cycle 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	2	ECTS credits	6.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Mathematics Center -> Vice-Rector For Education		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Renata Zakrzewska	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	45.0	0.0	0.0	0.0	75

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	75	3.0	72.0	150

Subject objectives

Uses the apparatus of linear algebra and mathematical analysis to solve theoretical and practical problems occurring in social sciences

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U04] develops logical solutions to complex or unstructured problems, even under conditions of uncertainty.	integrates the information obtained from solving complex problems, interpreting them, drawing conclusions and formulating and justifying opinions	[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools
[K6_W02] possesses advanced knowledge of methods and techniques that enable precise formulation and effective problem solving.	uses a mathematical apparatus to solve economic problems, combining knowledge of mathematics with knowledge of social sciences	[SW1] Assessment of factual knowledge

Subject contents

Course content – lecture

1. Linear geometry of 3-dimentional space. Vectors. Conics and quadrics.
2. Complex numbers.
3. Vector spaces and subspaces. Linear independence. Basis and dimension. Linear maps. Quadratic forms. Eigenvectors and eigenvalues. Sylvester's criterion. LSM.
4. The process of finding antiderivatives and integration formulas the methods of substitution and integration by parts. Integration of basic families of functions.
5. Fundamental Theorem of Calculus. Methods of evaluations of definite integrals. Integration formulas, the methods of substitution and integration by parts for definite integrals. Improper integrals. Selected applications of definite integrals.
6. Functions of two variables: Partial derivatives. Total differential. Maxima and minima of a function of several variables.
7. Number series.
8. Differenial and difference linear equations.
9. Constrained extrema.

Course content – exercises

1. Three-dimensional geometry. Vectors. Conic sections and quadrics.
2. Complex numbers.
3. Vector spaces and subspaces. Linear independence. Basis and dimension. Linear transformations. Quadratic forms. Eigenvalues and eigenvectors. Sylvesters theorem. Least squares method.
4. Basic methods of integration: integration by parts and substitution, integrals of standard families of functions.
5. Basic computational techniques, substitution and integration by parts for definite integrals. Improper integrals. Selected applications of definite integrals.
6. Functions of several variables: partial derivatives. Total differential. Extrema of multivariable functions.
7. Numerical series.
8. Linear differential equations.
9. Constrained extrema.

Prerequisites and co-requisites

Knowledge of the subject: Mathematics 1.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Exam	50.0%	35.0%
Activity	50.0%	5.0%
Tests	50.0%	60.0%

Recommended reading

Basic literature

- Jankowska, K., Jankowski, T. Zbiór zadań z matematyki. Gdańsk: Wydawnictwo PG,
- Jankowska, K., Jankowski, T., Funkcje wielu zmiennych - Całki wielokrotne - Geometria analityczna. Gdańsk: Wydawnictwo PG,
- Dymkowska, J., Beger, D. (2015). Rachunek całkowy w zadaniach, Gdańsk: Wydawnictwo PG
- Gurgul, H., Suder, M. Matematyka dla kierunków ekonomicznych, Warszawa: Oficyna a Wolters Kluwer business.

Supplementary literature

- Banaś, J., Podstawy matematyki dla ekonomistów. Warszawa: Wydawnictwa Naukowo-Techniczne
- Gewert, M., Skoczylas, Z. Analiza matematyczna 1, Przykłady i zadania. Wrocław: Wydawnictwo GiS.
- Gewert, M., Skoczylas, Z. Analiza matematyczna 2, Definicje, twierdzenia wzory. Wrocław: Wydawnictwo GiS.
- Gewert, M., Skoczylas, Z. Analiza matematyczna 2, Przykłady i zadania. Wrocław: Wydawnictwo GiS.
- Sozański, B., Dziedzic, I. Algebra i analiza w zagadnieniach ekonomicznych. Rzeszów: Wydawnictwo Bila.
- J.Dymkowska, D. Beger; Rachunek całkowy w zadaniach. Gdańsk Wydawnictwo PG
- J.Dymkowska, D. Beger; Rachunek różniczkowy w zadaniach. Gdańsk Wydawnictwo PG

eResources addresses

Example issues/ example questions/ tasks being completed

- Show the series convergence ... and find its sum.
- Check the linear dependence of a given system of vectors.
- Find the integral of the rational function ...
- Find the improper integral ... or demonstrate its divergence.
- Find the local extremes of the function f (x, y) = ...
- Solve the differential equation using the constant variation method.
- Find the general solution of the third order differential equation ... using the prediction

Practical activites within the subject

Not applicable

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