GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Mathematics 2, PG_00067931		
Field of study	Economics		
Date of commencement of studies	October 2025	Academic year of realisation of subject	2025/2026
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	dr inż. Renata Zakrzewska mgr Dorota Grott	

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

eNauczanie source addresses:

Moodle ID: 4033 WZiE – Ekonomia - Matematyka II 2025/2026 (R.Zakrzewska/D.Grott)
https://enauczanie.pg.edu.pl/2025/course/view.php?id=4033

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	5.0	70.0	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, as well as drawing conclusions and formulating and justifying opinions	[SU1] Assessment of task fulfilment [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 mathematical apparatus to solve economic problems, combining knowledge of mathematics with knowledge of social sciences	[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation

Subject contents

Course content – lecture
Matrix algebra.
Geometry of n-space, vectors, length and angle.
Vector spaces, subspaces and spanning sets.
Linear independence, basis and dimension.
Eigenvalues and eigenvectors.
Quadratic forms.
Integral calculus of one variable functions - antiderivatives.
Fundamental rules of integration, substitution method, integration by parts.
Integration of rational, trigonometric and irrational functions.
Riemann definite integral,
Newton-Leibniz theorem.
Fundamental methods of definite integration.
Improper integrals.
Number and power series.
Extrema of functions of two and several variables, constrained extrema.
Differential linear equations.

Course content – exercises
Matrix algebra.
Geometry of n-space, vectors, length and angle.
Vector spaces, subspaces and spanning sets.
Linear independence, basis and dimension.
Eigenvalues and eigenvectors.
Quadratic forms.
Integral calculus of one variable functions - antiderivatives.
Fundamental rules of integration, substitution method, integration by parts.
Integration of rational, trigonometric and irrational functions.
Riemann definite integral,
Newton-Leibniz theorem.
Fundamental methods of definite integration.
Improper integrals.
Number and power series.
Extrema of functions of two and several variables, constrained extrema.
Differential linear equations.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Written exam	50.0%	35.0%
Aktivity during exercises	50.0%	5.0%
Midterm colloquium	50.0%	60.0%

Recommended reading

Basic literature

Batóg B., Bieszk-Stolorz B., Foryś I., Guzowska M., Heberlein K., (2016). Matematyka dla kierunków ekonomicznych, Teoria, przykłady, zadania, Warszawa: Wydawnictwo Difin
OZE - Open AGH e-podręczniki, (2021). Matematyka, Kraków: Wydawnictwo: AGH
Jankowska K., Jankowski T., (2008). Zbiór zadań z matematyki, Gdańsk: Wydawnictwo PG

Supplementary literature

Fragmentarily:

Jankowska K., Jankowski T., (2008). Zadania z matematyki wyższej, Gdańsk: Wydawnictwo PG
Jurlewicz T., Skoczylas Z., (2013). Algebra liniowa 1, 2, Definicje, twierdzenia wzory, Wrocław: Wydawnictwo GiS,
Jurlewicz T., Skoczylas Z., (2014) Algebra i geometria analityczna, Wrocław: Wydawnictwo GiS,
Gewert M., Skoczylas Z., (2015) Analiza matematyczna 1, 2, Przykłady, zadania, Wrocław: Wydawnictwo GiS,
Dymkowska J., Beger D., (2018) Rachunek całkowy w zadaniach, Gdańsk: Wydawnictwo PG

Dymkowska J., Beger D., (2018) Rachunek różniczkowy w zadaniach, Gdańsk: Wydawnictwo PG

eResources addresses

Example issues/ example questions/ tasks being completed	Discuss the relation between the line l and the plane S. Check linear depedence of given system of vectors. Find eigenvalues and eigenvectors of symmetric matrix A. Solve the overdetermined system applying the least square method. Determine definiteness of quadratic form Q(x). Evaluate the indefinite integral of the given rational function. Find the area between the two curves y= and y= from x= to x=. Calculate definite integrals of the following functions using methods of integration by parts or by substitution. Identify any local extremes of function of two/three variables. Find the absolute extrema of the function f(x,y) on the compact set D. Check whether the given series is convergent using the ratio test, the root test, the comparison test or the integral test. Determine radius and domain of convergence of a power series. Determine global extrema of functions of two / three variables on a convex set D. Solve the initial problem for linear differential equation of second order.
Practical activites within the subject	Not applicable

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