GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Linear algebra, PG_00021020		
Field of study	Mathematics		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2024/2025
Education level	first-cycle studies	Subject group	Obligatory subject group in the field of study Subject group related to scientific research 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	5.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Nonlinear Analysis and Statistics -> Faculty of Applied Physics and Mathematics		
Name and surname of lecturer (lecturers)	Subject supervisor	dr Joanna Cyman	
	Teachers	dr Joanna Cyman	

Lesson types and methods of instruction

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	5.0	60.0	125

Subject objectives

Basic notions of linear algebra

Learning outcomes

Course outcome	Subject outcome	Method of verification
K6_U03	proper use of algebraic objects	[SU3] Assessment of ability to use knowledge gained from the subject
K6_W04	formulates theorems and definitions	[SW1] Assessment of factual knowledge
K6_U08	complex numbers, determinants, matrices,	[SU4] Assessment of ability to use methods and tools
K6_W07	linear properties in calculus and other parts of mathematics	[SW1] Assessment of factual knowledge
K6_U01	proving simple properties of matrices, linear independence of vectors,	[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information

Subject contents	Complex numbers. Operations on complex numbers. Solving algebraic equations in the complex domain. Different forms of a complex number. Geometric interpretation, Gaussian plane. powers of numbers, n-th root. The field of complex numbers. Complex polynomials. Fundamental theorem of algebra. Matrix calculus. Operations on matrices. Determinants. Laplace expansion. Inverse matrix. Matrix order, elementary matrix transformations. Systems of linear equations. Cramer's system of equations. The existence of solutions to a system of linear equations, the Kronecker-Capelli theorem. Gauss Jordan method. Basic algebraic structures. Groups, rings, bodies. Definitions and examples. Vector space. Definition of vector space and subspace. Testing the linear independence of vectors.
Prerequisites and co-requisites	
Assessment methods and criteria	

Subject passing criteria	Passing threshold	Percentage of the final grade
activity	30.0%	20.0%
2 written tests	50.0%	80.0%

Recommended reading	Basic literature	Jurlewicz, Z. Skoczylas, Linear Algebra 1 i 2. Definitions, theorems, formulas, Oficyna Wydawnicza GiS, Wrocław 2012. T. Jurlewicz, Z. Skoczylas, Linear Algebra 1 i 2. Examples and tasks, Oficyna Wydawnicza GiS, Wrocław 2012. J. Topp, Linear Algebra, Wydawnictwo Uniwersytetu Gdańskiego, Gdańsk 2015.
	Supplementary literature	J. Rutkowski,Linear Algebra liniowa in problems, PWN 2008 G. Banaszak, W. Gajda, Elements of linear algebraj, WNT 2002. A. Romanowski, Linear Algebra, Wyd. PG 2003.
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	1. Draw the set $2<\|(3+4i)z+i\|< 3$ 2. Solve the given system of equations: $4x+y+3z-t=5$ $2x-y+3z+2t=2$ $3x+y+2z-t=1$ $5x+y+4z+2t=0$ 3.Define the vector space.	
Work placement	Not applicable	