



Subject card

Subject name and code	Linear algebra, PG_00021020						
Field of study	Mathematics						
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 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	Divison Of Dynamical Systems -> Institute Of Applied Mathematics -> Faculty Of Applied Physics And Mathematics -> Wydziały Politechniki Gdańskiej						
Name and surname of lecturer (lecturers)	Subject supervisor		dr Joanna Cyman				
	Teachers		mgr inż. Tomasz Gzella 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_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	
	K6_W07		linear properties in calculus and other parts of mathematics			[SW1] Assessment of factual knowledge	
	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	

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
	2 written tests	50.0%	80.0%
	activity	30.0%	20.0%
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:		
	$\begin{aligned} 4x+y+3z-t&=5 \\ 2x-y+3z+2t&=2 \\ 3x+y+2z-t&=1 \\ 5x+y+4z+2t&=0 \end{aligned}$		
	3. Define the vector space.		
Work placement	Not applicable		

Document generated electronically. Does not require a seal or signature.