Subject card

Subject name and code	Linear algebra, PG_00021020
Field of study	Mathematics

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
			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 -> Faculties of Gdańsk University of Technology

Name and surname of lecturer (lecturers)	Subject supervisor	dr Joanna Cyman
	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	5.0	60.0	125

Subject objectives	Basic notions of linear algebra

Learning outcomes	Course outcome	Subject outcome	Method of verification
	K6_U08	complex numbers, determinants, matrices,	[SU4] Assessment of ability to use methods and tools
	K6_W04	formulates theorems and definitions	[SW1] Assessment of factual knowledge
	K6_U03	proper use of algebraic objects	[SU3] Assessment of ability to use knowledge gained from the subject
	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,	[SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools

Subject contents	Course content – lecture 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	

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.
Practical activites within the subject	Not applicable

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