



Subject card

Subject name and code	Linear Algebra, PG_00047356						
Field of study	Biomedical Engineering						
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		
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		3.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Mathematics Center -> Vice-Rector for Education						
Name and surname of lecturer (lecturers)	Subject supervisor		dr Barbara Wikeł				
	Teachers		dr Barbara Wikeł				
			mgr inż. Wojciech Dąbrowski				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	15.0	0.0	0.0	0.0	30
	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	30		3.0		42.0	75
Subject objectives	Students obtain competence in the range of using methods of linear algebra and knowledge how to solve simple problems that can be found in the field of engineering.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_U01] can apply mathematical knowledge to formulate and solve complex and non-typical problems related to the field of study and perform tasks, in an innovative way, in not entirely predictable conditions, by:n- appropriate selection of sources and information obtained from them, assessment, critical analysis and synthesis of this information,n- selection and application of appropriate methods and toolsn		Student uses basic notions and formulas of matrix and vector calculus. Student analyses a given problem from analitic geometry. Student uses complex numbers.		[SU4] Assessment of ability to use methods and tools		
	[K6_W01] knows and understands, to an advanced extent, mathematics necessary to formulate and solve simple issues related to the field of study		Student defines the basic concepts of linear algebra and analitic geometry necessary to solve simple engineering problems in the domain of education.		[SW1] Assessment of factual knowledge		
	[K6_K02] is ready to critically assess possessed knowledge and acknowledge the importance of knowledge in solving cognitive and practical problems		Student recognizes the importance of skillful use of basic mathematical apparatus in terms of study in the future.		[SK4] Assessment of communication skills, including language correctness		
Subject contents	Calculus of vectors. Basis vectors. Matrices. Calculus of matrixes. Determinants and their properties. Inverse matrix. Rank of a matrix. Eigenvalues and eigenvectors of a square matrix. Systems of linear equations. Line and plane in space. Complex numbers. Operations on complex numbers.						
Prerequisites and co-requisites							
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	Final test		58.0%		100.0%		

Recommended reading	Basic literature	<p>1. Długosz J., „Funkcje zespolone. Teoria, przykłady, zadania, Oficyna Wydawnicza GiS</p> <p>2. Jurlewicz T., Skoczylas Z., Algebra i geometria analityczna. Definicje, twierdzenia, wzory, Oficyna Wydawnicza GiS</p> <p>3. Jurlewicz T., Skoczylas Z., Algebra i geometria analityczna. Przykłady i zadania, Oficyna Wydawnicza GiS</p> <p>4. Jurlewicz T., Skoczylas Z., Algebra i geometria analityczna. Kolokwia i egzaminy, Oficyna Wydawnicza GiS</p>
	Supplementary literature	<p>1. Jankowska K., Jankowski T., Zbiór zadań z matematyki, Wydawnictwo Politechniki Gdańskiej</p> <p>2. Kajetanowicz P., Wierzejewski J., „Algebra z geometrią analityczną”, Wydawnictwo Naukowe PWN</p>
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	<p>1. Solve the matrix equation $AX=B$, where A and B are given matrices.</p> <p>2. Using the Cramer formula find the unknown x from the system of equations: $2x+y+3z+2t=3$, $3x+z=1$, $5y-2x+z=1$, $-5x+4y+2z=1$.</p> <p>3. Find the roots of the equation $z^4 + 16i=0$. Give their algebraic form.</p> <p>4. Find the general equation of the plane passing through the point $A(-1,2,4)$ and perpendicular to the line $2(x-1)=y+2=-3z$.</p>	
Work placement	Not applicable	