GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Linear Algebra, PG_00047356		
Field of study	Biomedical Engineering, Biomedical Engineering, Biomedical Engineering		
Date of commencement of studies	October 2022	Academic year of realisation of subject	2022/2023
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 Wikieł	
	Teachers	mgr inż. Wojciech Dąbrowski dr Barbara Wikieł	

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	1. Długosz J., ,,Funkcje zespolone. Teoria, przykłady, zadania, Oficyna Wydawnicza GiS 2. Jurlewicz T., Skoczylas Z., Algebra i geometria analityczna. Definicje, twierdzenia, wzory, Oficyna Wydawnicza GiS 3. Jurlewicz T., Skoczylas Z., Algebra i geometria analityczna. Przykłady i zadania, Oficyna Wydawnicza GiS 4. Jurlewicz T., Skoczylas Z., Algebra i geometria analityczna. Kolokwia i egzaminy, Oficyna Wydawnicza GiS
	Supplementary literature	1. Jankowska K., Jankowski T., Zbiór zadań z matematyki, Wydawnictwo Politechniki Gdańskiej 2. Kajetanowicz P., Wierzejewski J., ,,Algebra z geometrią analityczną", Wydawnictwo Naukowe PWN
	eResources addresses	Adresy na platformie eNauczanie: WETI - ACiR, IBM sem. 1 - Matematyka 2022/2023 (B.Wikieł) - Moodle ID: 22018 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=22018 WETI - IBM - Liczby zespolone 2022/2023 (B.Wikieł) - Moodle ID: 23927 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=23927 WETI - IBM - Elementy Algebry Liniowej 2022/2023 (B.Wikieł) - Moodle ID: 23925 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=23925
Example issues/ example questions/ tasks being completed	1. Solve the matrix equation $AX=B$, where A and B are given matrices. 2. Using the Cramer formula find the unknown x from the system of equations: $2x+y+3z+2t=3,\ 3x+z=1,\ 5y-2x+z=1,\ -5x+4y+2z=1$. 3. Find the roots of the equation $z^4+16i=0$. Give their algebraic form. 4. Finf the general equation of the plane passing through the point $A(-1,2,4)$ and perpendicular to the line $2(x-1)=y+2=-3z$.	
Work placement	Not applicable	

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