GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Linear Algebra, PG_00021032		
Field of study	Mathematics		
Date of commencement of studies	October 2023	Academic year of realisation of subject	2023/2024
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	2	ECTS credits	5.0
Learning profile	general academic profile	Assessment form	exam
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 dr Maryna Shcholokova	

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

Address on the e-learning platform: https://enauczanie.pg.edu.pl/moodle/course/view.php?id=36758
Adresy na platformie eNauczanie:
Algebra liniowa II 2023/2024 - Moodle ID: 36758
https://enauczanie.pg.edu.pl/moodle/course/view.php?id=36758

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

Learning of elements of linear algebra

Learning outcomes

Course outcome	Subject outcome	Method of verification
K6_W07	linear properties in calculus and other parts of mathematics	[SW1] Assessment of factual knowledge
K6_U08	complex numbers, determinants, matrices, eigenvalues	[SU4] Assessment of ability to use methods and tools
K6_U03	proper use of algebraic objects	[SU3] Assessment of ability to use knowledge gained from the subject
K6_U01	proving simple properties of matrices, linear independence or orthogonality of vectors	[SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools
K6_W02	formulates and proves basic theorems	[SW1] Assessment of factual knowledge

<table>
<tr><td>Subject contents</td><td>Vector space. Basis and dimension of vector space. Coordinates of a vector in the vector space basis. The change-of-basis matrix.

Linear maps. Kernel and image. Matrix of a linear map. Operations on maps.

Euclidean spaces. Scalar product, orthogonality of vectors, orthogonal and orthonormal basis. GramSchmidt process.

Eigenvalues and eigenvectors. Eigenvalues and eigenvectors of matrices and mappings. Cayley-Hamilton theorem.

Quadratic form. Real quadratic form. Quadratic form in canonical form.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>linear algebra I</td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>colloquia</td><td>50.0%</td><td>50.0%</td></tr>
<tr><td>exam</td><td>50.0%</td><td>40.0%</td></tr>
<tr><td>activity</td><td>0.0%</td><td>10.0%</td></tr>
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</td></tr>
<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>T. Jurlewicz, Z. Skoczylas, Linear Algebra 1 and 2. Definitions, theorems, formulas, Oficyna Wydawnicza GiS, Wrocław 2012.

T. Jurlewicz, Z. Skoczylas, Linear Algebra 1 and 2. Examples and tasks, Oficyna Wydawnicza GiS, Wrocław 2012.

J. Topp, Linear algebra, University of Gdańsk Publishing House, Gdańsk 2015.</td></tr>
<tr><td>Supplementary literature</td><td>A. Romanowski, Linear algebra, Ed. PG 2003.

J. Rutkowski, Linear algebra in tasks, PWN 2008

G. Banaszak, W. Gajda, Elements of linear algebra, WNT 2002.</td></tr>
<tr><td>eResources addresses</td><td>Podstawowe
https://enauczanie.pg.edu.pl/moodle/course/view.php?id=36758 -
Algebra liniowa II 2023/2024 - Moodle ID: 36758
https://enauczanie.pg.edu.pl/moodle/course/view.php?id=36758</td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td>Find eigenvalues and diagonal form of a given matrix A.</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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