GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Mathematics, PG_00044302		
Field of study	Civil Engineering		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2024/2025
Education level	second-cycle studies	Subject group	Obligatory subject group in the field of study
Mode of study	Part-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	exam
Conducting unit	Mathematics Center -> Vice-Rector for Education		
Name and surname of lecturer (lecturers)	Subject supervisor	dr Stanisław Domachowski	
	Teachers		

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	10.0	0.0	0.0	0.0	25

E-learning hours included: 0.0

Adresy na platformie eNauczanie:

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	25	7.0	43.0	75

Subject objectives

The aim of this subject is to obtain the student's competence in the range of using the basic methods of mathematical analysis and linear algebra. Furthermore, the student is able to use this knowledge to solve simple theoretical and practical problems that can be found in the field of engineering.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_U06] is able to choose proper tools (measuring, analytical or numerical) to solve engineering problems, to acquire, filtrate, proces and analyse data	Student defines the concepts of the basis of a vector space . Student defines the concepts of the linear mapping, the matrix of a linear mapping. Student defines the concepts of the eigenvalues and eigenvector of the linear mapping. Student gives the definition of notions from tensor calculus. Student gives the definition of basic notions of variational calculus. Student determines extrema of a functional. Student determines a Fourier series for a given function.	[SU4] Assessment of ability to use methods and tools
[K7_W01] has knowledge of higher mathematics, physics and chemistry, which is a base of subjects, such as construction theory and advanced material technology	Student defines the concepts of the basis of a vector space . Student defines the concepts of the linear mapping, the matrix of a linear mapping. Student defines the concepts of the eigenvalues and eigenvector of the linear mapping. Student gives the definition of notions from tensor calculus. Student gives the definition of basic notions of variational calculus. Student determines extrema of a functional. Student determines a Fourier series for a given function.	[SW1] Assessment of factual knowledge

<table>
<tr><td>Subject contents</td><td colspan="2">A vector space, a basis of a vector space, linear mappings, the matrix of a linear mapping. Eigenvalues, eigenvectors of a linear mapping. Tensor calculus. The basic notions of variational calculus. Extrema of a functional. Fourier series.</td></tr>
<tr><td>Prerequisites
and co-requisites</td><td colspan="2">Completed undergraduate.</td></tr>
<tr><td>Assessment methods
and criteria</td><td colspan="2"><table><tr><td>Subject passing criteria</td><td>Passing threshold</td><td>Percentage of the final grade</td></tr><tr><td>written exam , 90 minutes</td><td>50.0%</td><td>100.0%</td></tr></table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>F.Leja, Rachunek różniczkowy i całkowy, Państwowe wydawnictwo naukowe, Warszawa 1978, W. Kołodziej, Wybrane rozdziały analizy matematycznej, Państwowe Wydawnictwo Naukowe, 1970. Wyd. 1, Jacek Komorowski, Od liczb zespolonych do tensorów, spinorów, algebr Liego i kwadryk, Państwowe Wydawnictwo Naukowe, Warszawa 1978.
Uzupełniająca lista</td></tr>
<tr><td>Supplementary literature</td><td>Brak zaleceń</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
<tr><td>Example issues/
example questions/
tasks being completed</td><td colspan="2">1. Show that the vectors1, 1+x, 1+x+x2, 1+x+x2+x3 form a basis of the vector space consisting of all polynomials of deegree at most 3.
2. Find the eigenvalues and the eigenvectors of the linear mapping T([x, y, z]) =]2x+2z, 4y, 2x+2z], find the matrix of this linear mapping in the basis of eigenvectors.
3.Find extrema of the functional J[y]= 1∫2 (y')3 dx with the conditions y(1)=0, y(2)=1.
4. Find the Fourier series for the function f(x)=-x , -π≤ x ≤0, f(x)=x, 0≤ x ≤π.</td></tr>
<tr><td>Work placement</td><td colspan="2">Not applicable</td></tr>
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