GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Mathematics I, PG_00055861						
Field of study	Power Engineering, Power Engineering, Power Engineering						
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			
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	10.0			
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 Magdalena Musielak					
	Teachers	mgr Danuta Beger dr Magdalena Musielak					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	45.0	60.0	0.0	0.0	0.0	105
	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	105		24.0	121.0		250
Subject objectives	Obtaining competences by a student in using the apparatus of mathematical analysis and equations and applying the acquired knowledge to solve simple problems occurring in engineering fields						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U02] is able to apply the learned mathematical methods to the analysis and design of elements, systems and energy systems	The student joins the knowledge in mathematics with knowledge from others fields.	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information
[K6_K01] is aware of the need for training and self-improvement in the profession of energy and the possibility of further education; can think and act in a creative and entrepreneurial manner; can define priorities for the implementation of an individual or group task	Student can use a computer program to calculate the needed values. He knows what mathematical methods are used in programs for technical calculations.	[SK2] Assessment of progress of work
[K6_W01] has basic knowledge of mathematics necessary to describe the phenomena related to the processes of energy conversion and transfer; uses information technology to solve mathematical problems	Student: Can name the basic properties of elementary functions. Solves the equations and inequalities containing elementary functions. Computes the limits of sequences and functions by definition. He knows the definition of a derivative and its applications, finds monotonicity intervals of functions and its extremes. Analyzes properties of a functions based on its first and second derivative. Applies the basic techniques of integration to calculate indefinite an definite integrals Examines the convergence of improper integrals. The student defines the basic the concepts of linear algebra. Defines the basic concepts of matrix calculus. Detetmines the position of the straight lines and planes in space. Uses packages mathematical to carry out calculations and visualization of mathematical concepts.	[SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge

Subject contents

Elements of linear algebra. Matrices and determinants. Operations on matrices. Inverse of a matrix. System of linear equations.

Elementary functions and their properties: polynomial, rational, power, exponential, logarithmic, trigonometric, cyclometric.

Sequences. Definition. Monotonicity and boundedness. Limits.

Limits and continuity of functions.

Differential calculus and its applications.

Integral calculus and its applications.

Complex numbers.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Exam	50.0%	50.0%
Tests during the semeter	0.0%	50.0%

Recommended reading	Basic literature	1. Jurkiewicz T., Skoczylas Z., Algebra liniowa 1, GiS, Wrocław 2006 2. Leja F., Rachunek różniczkowy i całkowy, PWN, Warszawa 1965 3. Mostowski A., Stark M., Elementy algebry wyższej, PWN,Warszawa 1968 4. Jankowska K., Jankowski T., Zbiór zadań z matematyki,Wydawnictwo PG, Gdańsk 1998 5. Wikieł B., Podstawy z elementami matematyki wyższej,Wydawnictwo PG, Gdańsk 2007
	Supplementary literature	1. Fichtencholtz G. M., Rachunek różniczkowy i całkowy, t. 1-2,PWN, Warszawa 1962 2. Jankowska K., Jankowski T., Zbiór zadań z matematyk wyższej,Wydawnictwo PG, Gdańsk 2004 3. Krysicki W., Włodarski W., Analiza matematyczna w zadaniach, cz.1, PWN, Warszawa 1994 4. Krysicki W., Włodarski W., Analiza matematyczna w zadaniach, cz.2, PWN, Warszawa 1994
	eResources addresses	Adresy na platformie eNauczanie: Energetyka - Matematyka 2023/24 (M.Musielak, D.Beger) - Moodle ID: 32157 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=32157
Example issues/ example questions/ tasks being completed	1. Solve a system of equations. 2. Find the inverse matrix. 3. Solve the matrix equation eg. np. 3X-AX=B jeżeli A=[5 6; 7 8], B=[-1 -3; 2 -1]. 4 Compute limits of sequecncies. 5, Check by definition that a given sequence has limit. 6. Compute limits of functions, 7. Find asymptotes of a given function. 8. Calculate derivatives (using formulas). 9. Examine the intervals of monotonicity and extremes of a function. 10 Find tangent line to the graph, approximate value of eg. sqrt(14) 11. optimalizating exercise 12. Calculate antiderivative (eg of a rational function, trigonometric f-tion).13. Calculate the improper integral. 14. Calculate definiteve integral (find area or center of mass and such).	
Work placement	Not applicable	

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