GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Mathematics I, PG_00060447		
Field of study	Mechanical and Naval 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	Part-time studies	Mode of delivery	blended-learning
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 Anita Dąbrowicz-Tlałka	
	Teachers		

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	27.0	36.0	0.0	0.0	0.0	63

E-learning hours included: 27.0

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	63	17.0	170.0	250

Subject objectives

Students obtain competence in the range of using methods of mathematical analysis and 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] is able to acquire information from specialized literary sources, databases and other resources, essential for solving engineering tasks; is able to compile the obtained information pieces and to interpret them, additionally is able to form conclusions and present justified opinion	Student uses gained knowledge in basic mathematics to analyse results of experiments and justify solutions to engineering problems.	[SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment
[K6_W01] possesses mathematical knowledge within the range of linear algebra and mathematical analysis useful in characterising and interpreting mechanical systems, technological processes and operational properties of devices	Student mentions basic properties of elementary functions. Student solves equations and inequalities with elementary functions. Student uses the basic operations on complex numbers. Student defines basic notions of matrix calculus. Student uses basic notions and formulas of matrix calculus in solving systems of linear equations. Student gives the definition of basic notions of differential calculus. Student uses basic notions and formulas of differential calculus. Student determines intervals of monotonicity of a given functions and its extrema. Students calculates antiderivatives using the substitution method of integration and integration by parts. Student applies definite integrals to solving geometrical problems.	[SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge

Subject contents	Functions of one variable: • definitions, graphs, properties • absolute value, equations and inequalities • polynomials, rational functions, power functions, trigonometric and inverse trigonomertic functions, exponential and logarithmic functions • equations and inequalities involving these functions Complex numbers Elements of linear algebra: • mmtrices, their properties and operations on matrices • determinants. Inverse of a square non-singular matrix • dot product, cross product, their properties and its applications • the triple scalar product and applications. Systems of linear equations. • Cramer patterns • the rank of the main and completed matrix • Kronecker-Capelli theorem. Single variable calculus - derivative: • first order derivative • Rolle's and Lagrange's theorems and their applications • L'Hospital's Rule • monotonicity and local/global extrema (optimization problems) • higher order derivatives • concavity, inflection points • applications of single variable differential calculus Single variable calculus - integral • definite and indefinite integral, Fundamental Theorem of Calculus • basic integration formulas • integration by substitution, by parts, by partial fractions • applications of integral calculus t
Prerequisites and co-requisites	
Assessment methods and criteria	

Subject passing criteria	Passing threshold	Percentage of the final grade
Aktywność na zajęciach	0.0%	19.0%
Exam	50.0%	50.0%
Active learning during lectures	0.0%	7.0%
Tests	0.0%	24.0%

Recommended reading	Basic literature	- E. Mieloszyk : Macierze, wyznaczniki i układy równań, Wydawnictwo PG, 2000 - K. Jankowska, T. Jankowski : Zadania z matematyki wyższej, Wydawnictwo PG, 2010 - K. Jankowska, T. Jankowski : Zbiór zadań z matematyki, Wydawnictwo PG, 2010.

	Supplementary literature	- R. Leitner : Zarys matematyki wyższej I i II, Wydawnictwo Naukowo-Techniczne Warszawa 1999 - W. Krysicki, L. Włodarski : Analiza matematyczna w zadaniach, Wydawnictwo Naukowe PWN - W. Stankiewicz : Zadania z matematyki dla wyższych uczelni technicznych, Wydawnictwo Naukowe PWN
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	1. . Find the domian and the set of values of the function f(x) =.... 2. Find solutions of the equation ... in the set of complex numbers. 3. Determine the matrix inverse to the matrix... 4. Discuss the solvability of the given system of equations ... . 5. Find the derivative of f(x)= 6. dentify any local extrema and points of inflection of the function f(x)= .... 7. Use the definite integral to determine the volume of the solid formed by the rotation of the curve ... around the axis oX.	
Work placement	Not applicable	