GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Mathematics I, PG_00055040						
Field of study	Management and Production Engineering						
Date of commencement of studies	October 2025		Academic year of realisation of subject	2025/2026			
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	8.0			
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						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	60.0	0.0	0.0	0.0	90
	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	90	11.0	99.0	200

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. 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
[K6_U05] is able to prepare and present a presentation on the results of analysis of the tasks in the area of production engineering, is able to plan and carry out experiments, measurements, computer simulations and analyses and interpret the results and draw conclusions is able to use analytical methods, simulation and experiments for formulating and solving problems associated with production engineering	The student is able to apply the learned mathematical methods for analysis to solve problems in the field of production management.	[SU3] Assessment of ability to use knowledge gained from the subject
[K6_K03] is aware of the social role of a graduate of a technical university, understands the importance of non-technical aspects and effects of engineering activities including their impact on the environment and responsibility for decisions, sees the need to formulate and provide the public with information and opinions on the achievements of technology, correctly identifies and resolves dilemmas associated with thejob of an engineer	Student recognizes the importance of self-expanding knowledge and takes the challenge of working with a group to solve a problem.	[SK3] Assessment of ability to organize work
[K6_W01] has knowledge of linear algebra, differential equations, analysis and mathematical statistics useful for modelling and interpreting mechanical systems, manufacturing processes and operating properties of devices, has structured knowledge of physics including classical mechanics, optics, electricity and magnetism, demonstrates knowledge of elements of quantum physics	Student applies the basic properties of derivatives. Student analyzes the properties of functions with the use of its first and second derivatives. Student applies basic formulas and techniques of integration to calculate indefinite integrals. Student uses basic operations on complex numbers.	[SW1] Assessment of factual knowledge

Subject contents

- Functions of one variable and their properties: absolute value - definition, solving equations and inequalities, graphs. Power functions, rational, exponential, logarithmic, trigonometric - equations and inequalities, graphs.
- Sequences of numbers and continuity of functions: definitions, properties, theorems.
- Complex numbers.
- Elements of linear algebra: matrices, determinants, systems of linear equations.
- Vector calculus in three-dimensional space: definitions and properties of vectors, scalar, vector, mixed product and their applications.
- A line and a plane in space: definitions, the distance of a point from a plane, the angle between planes and lines.
- Differential calculus of functions of one variable: definition of derivative and differential, higher order derivatives and differentials. Applications - monotonicity and extremes of functions, concavity, convexity, inflection points, theorem de l'Hospital, asymptotes of a function.

Prerequisites and co-requisites

No recomendations

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Midterms	0.0%	50.0%
Final exam	50.0%	50.0%

Recommended reading	Basic literature	B.Wikieł, Matematyka, Podstawy z elementami matematyki wyższej, Wydawnictwo Politechniki Gdańskiej Gdańsk 2009, Jurkiewicz T., Skoczylas Z., Algebra liniowa 1, GiS, Wrocław 2006 K.Jankowska, J.Jankowski, Zbiór zadań z matematyki, Wydawnictwo Politechniki Gdańskiej Gdańsk 2003, W. Krysicki, L. Włodarski Analiza matematyczna w zadaniach część I, PWN, Warszawa 1986. G.M. Fichtenholz, Rachunek różniczkowy i całkowy,Tom 1, Wydawnictwo Naukowe PWN, Warszawa 2002 ,
	Supplementary literature	M.Gewert, Z.Skoczylas, Analiza matematyczna 1, GiS, Wrocław 2000, R.Leitner, W.Matuszewski, Z.Rojek, Zadania z matematyki wyższej, cz. 1, WNT,Warszawa 1992, W.Żakowski, Ćwiczenia problemowe dla politechnik, WNT, Warszawa, 1991.
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	1. Prove that this sequence is monotonic a_n=(n^2+1)/n!. 2. Evaluate the limit of a given sequence $a_n=(3n^2+6n)^{½}-3^{½}n$. 3. Find the limit of the function f(x)= x sin(1/x) in the zero point. 4. Solve a system of equations 5. Analyze the monotonicity of a function and finds its extreme values.	
Work placement	Not applicable	

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