GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Propedeutics of Mathematics, PG_00038084		
Field of study	Hydrogen Technologies and Electromobility		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2026/2027
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	4.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Mathematics Center -> Vice-Rector For Education		
Name and surname of lecturer (lecturers)	Subject supervisor	dr Anita Dąbrowicz-Tlałka	
	Teachers	dr Anita Dąbrowicz-Tlałka mgr Monika Jędrzejewska	

Lesson types

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

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	6.0	34.0	100

Subject objectives

Students obtain competence in the range of using methods of mathematical analysis and linear algebra and knowledge to solve simple problems that can be found in the field of engineering.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W01] has knowledge of mathematics – including linear algebra, mathematical analysis, numerical methods – necessary to describe physical and chemical phenomena, as well as the analysis of electrical circuits and automation and robotics systems	Student names basic properties of elementary functions. Student solves equations and inequalities with elementary functions. Student examines monotonicity and boundedness of sequences. Student evaluates the limits of functions. Student explains the concept of limit and continuity of functions. Student gives a graphic interpretation of discontinuity points. Student uses the basic operations on complex numbers. Student performs calculations on complex numbers. Student determines the real and complex roots of polynomial	[SW1] Assessment of factual knowledge
[K6_U02] can work individually and in a team, can communicate using various techniques in a professional environment, as well as document and analyze the results of their work, can estimate the time needed to perform the entrusted task	Student is able to process the acquired information, analyze and interpret it, draw conclusions and reason opinions. Student recognizes the importance of skillful use of basic mathematical apparatus in terms of study in the future. Student recognizes the importance of self-expanding knowledge.	[SU4] Assessment of ability to use methods and tools

<table>
<tr><td>Subject contents</td><td>Course content – lecture
Set of real numbers. The absolute value of real number and its properties. Functions of one variable, basic properties, composite and inverse functions. Overview of elementary functions: linear, quadratic, power, polynomials, rational, exponential, logarithmic, trigonometric, cyclometric, hyperbolic. Equations and inequalities of different types, systems of equations and inequalities.

Infinite sequences - limit of a sequence, arithmetic of limits. Number e. Limits and continuity of functions. Properties of continuous functions.

Complex numbers - algebraic, trigonometric, exponential form, operations, exponentiation (Moivre formula), finding roots of complex numbers.

Elements of analytic geometry - line on the plane, circle, ellipse, parabola, hyperbole. Line and plane in 3-space.

Course content – exercises
Determining the domain of a function. Examples of solving equations and inequalities containing various elementary functions. Referring to the geometric interpretation of equations and inequalities.

Calculating limits of sequences. Linking the existence of a limit of a sequence with its monotonicity and boundedness. Determining limits of functions. Geometric interpretation. Checking the continuity of functions and determining points of discontinuity of functions along with determining their type.
Performing operations on complex numbers in algebraic, trigonometric, and exponential form.
Exponentiation and root extraction of complex numbers. Geometric interpretation of selected operations on complex numbers. Solving equations in the set of complex numbers.
Examples of curves defined by equations and drawing their graphs. Problems involving the mutual position of a line and a plane in R3.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Additional: active participation in classes, passing written tests and exams.</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>Work during tutorials</td><td>0.0%</td><td>10.0%</td></tr>
<tr><td>Midterms</td><td>50.0%</td><td>90.0%</td></tr>
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</td></tr>
<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>1. Praca zbiorowa pod redakcją Wikieł B.: Matematyka. Podstawy z elementami matematyki wyższej. Wyd. PG, Gdańsk, 2009.
2. Jurewicz T. Skoczylas Z.: Algebra liniowa 1. GiS, Wrocław, 2004.
3. Krysicki W., Włodarski L.: Analiza matematyczna w zadaniach, cz.I. PWN, Warszawa, 2006.</td></tr>
<tr><td>Supplementary literature</td><td>1. Jankowska K., Jankowski T.: Zbiór zadań z matematyki. Wyd. PG, Gdańsk, 1998.
2. Jankowska K., Jankowski T.: Zadania z matematyki wyższej. Wyd. PG, Gdańsk, 1999.</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td>1. Solve the equation .
2. Find the domain and the set of values of the function f(x)=... .
3. Sketch the graph of the function f(x)= .
4. Evaluate the limit of a given sequence (an).
5. Check the continuity of the following function f(x)= .</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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