



Subject card

Subject name and code	Propedeutics of Mathematics, PG_00038084						
Field of study	Automation, Robotics and Control Systems						
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-Tłałka					
	Teachers	dr Anita Dąbrowicz-Tłałka mgr Dorota Grott					
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_K02] can work in a group taking on different roles in it	Student recognizes the importance of self-expanding knowledge and takes the challenge of working with a group to solve a problem. Student understands the need of lifelong learning. Student is able to inspire others and organize their learning process.	[SK2] Assessment of progress of work [SK1] Assessment of group work skills
	[K6_U01] can obtain information from literature, databases and other sources; integrate the information obtained, interpret it and draw conclusions, formulate and justify opinions	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.	[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] has basic knowledge in the field of mathematics including algebra, geometry, mathematical analysis, probabilistics, numerical methods - necessary to describe and analyze 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.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
Subject contents	<p>Course content – lecture</p> <p>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.</p> <p>Infinite sequences - limit of a sequence, arithmetic of limits. Arithmetic and geometric sequence. Number e. Limits and continuity of functions. Properties of continuous functions.</p> <p>Complex numbers - algebraic, trigonometric, exponential form, operations, exponentiation (Moivre formula), finding roots of complex numbers.</p> <p>Elements of analytic geometry - line on the plane, circle, ellipse, parabola, hyperbole. Line and plane in 3-space.</p> <p>Course content – exercises</p> <p>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 sequence limit 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.</p>		
Prerequisites and co-requisites	Active participation in tutorials - passing written tests and colloquiums		

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
		Midterm written and oral colloquium	50.0%
Recommended reading	Basic literature	1. Praca zbiorowa pod redakcją Wkieleł 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.	
	Supplementary literature	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.	
	eResources addresses		
Example issues/ example questions/ tasks being completed	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 (a_n) . 5. Check the continuity of the following function $f(x)=$.		
Practical activities within the subject	Not applicable		

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