



## Subject card

Subject name and code	Basic Math, PG_00047522						
Field of study	Automatic Control, Cybernetics and Robotics						
Date of commencement of studies	October 2022	Academic year of realisation of subject			2022/2023		
Education level	first-cycle studies	Subject group			Obligatory subject group in the field of study Subject group related to scientific research 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			3.0		
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 Barbara Wikieł					
	Teachers	mgr Anetta Brękwicz-Sieg dr Barbara Wikieł dr Robert Fidytek					
Lesson types and methods of instruction	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	3.0		12.0		75
Subject objectives	Students obtain competence in the range of using methods of basic mathematics.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_W01] knows and understands, to an advanced extent, mathematics necessary to formulate and solve simple issues related to the field of study	Student mentions basic properties of elementary functions. Student defines the basic concepts of differential calculus of one variable. Student analyses the properties of functions on the basis of an examination of its first and second derivatives.			[SW1] Assessment of factual knowledge		
	[K6_U01] can apply mathematical knowledge to formulate and solve complex and non-typical problems related to the field of study and perform tasks, in an innovative way, in not entirely predictable conditions, by:n- appropriate selection of sources and information obtained from them, assessment, critical analysis and synthesis of this information,n- selection and application of appropriate methods and toolsn	Student solves equations and inequalities with elementary functions. Student solves exercises involving arhythmic and geometric sequences. Student geometrically interprets the results of an examination of a graph of a function using the concept of limit, continuity and derivatives of functions.			[SU4] Assessment of ability to use methods and tools		

Subject contents	Number sets. Absolute value of a real number. Exponentiation. Rational powers. Factorial. Binomial. Functions and their properties. Polynomials. Calculus with polynomials. Rational functions. Rational equations and inequalities. Power functions. Roots equations and inequalities. Exponential functions. Exponential equations and inequalities. Hyperbolic functions. Logarithms of numbers and their properties. Logarithmic functions. Logarithmic equations and inequalities. Trygonometric functions. Trigonometric formulas and identities. Trygonometric equations and inequalities. Cyclometric functions. Number sequences and their properties. The arithmetic and the geometric sequence. Limit of a sequence. Euler's number. Proper and improper limit of a function. Continuity. Derivatives. Differentiation rules. Derivatives and differentials of higher order. Applications of Taylor and Maclaurin formula. Increasing and decreasing functions. Maximum and minimum values. Concavity and points of inflection. Indeterminate forms and De l'Hospital rule. Asymptotes of function. Applications of differential calculus to studying properties of one variable functions.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Final exam	50.0%	80.0%
	Activity	0.0%	20.0%
Recommended reading	Basic literature	Wikieł B. (red), „Matematyka. Podstawy z elementami matematyki wyższej”, Wydawnictwo Politechniki Gdańskiej	
	Supplementary literature	M.Bryński, N.Dróbka, K.Szymański, „Matematyka dla zerowego roku studiów wyższych. Elementy analizy matematycznej”, Wydawnictwa Naukowo-Techniczne	
	eResources addresses	Adresy na platformie eNauczenie: WETI - ACiR, IBM sem. 1 - Matematyka 2022/2023 (B.Wikieł) - Moodle ID: 22018 <a href="https://enauczenie.pg.edu.pl/moodle/course/view.php?id=22018">https://enauczenie.pg.edu.pl/moodle/course/view.php?id=22018</a>	
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> <li>1. Solve the equation <math> x-3 ^2 - 4 x-3  - 12 = 0</math>.</li> <li>2. Find the domain and the set of values of the function <math>f(x) = \pi - 2 \arcsin(3-x)</math>. Determine the inverse function of <math>f</math>.</li> <li>3. Find the derivative of <math>f(x) = (\ln x)^x</math>.</li> <li>4. Evaluate the limit of a given sequence <math>a_n = n (\ln(2n-1) - \ln(2n+1))</math>.</li> <li>5. Find local extremes and intervals of monotonicity of the function <math>f(x) = x - \arctg 2x</math>.</li> </ol>		
Work placement	Not applicable		