



## Subject card

Subject name and code	Precalculus, PG_00045351						
Field of study	Data Engineering						
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		
Mode of study	Full-time studies	Mode of delivery			at the university		
Year of study	1	Language of instruction			English		
Semester of study	1	ECTS credits			3.0		
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 Magdalena Musielak					
	Teachers	dr Magdalena Musielak dr Ewa Kozłowska-Walania					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	15.0	0.0	0.0	0.0	30
	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	30	5.0		40.0		75
Subject objectives	Student obtains knowledge in elementary mathematics necessary to understand calculus						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_U05] Uses matrix calculus in the theory of systems of linear equations, uses differential, integer and vector calculus, performs operations on complex numbers and determines polynomial elements.	Student names the properties of elementary functions and plots their graphs. Solves equations and inequalities with elementary functions. Finds the inverse functions of exponential, logarithmic, and trigonometric functions. Solves problems connected to sequences.			[SU4] Assessment of ability to use methods and tools		
	[K6_K01] is aware of quickly changing trends and the resulting need for further education and self-improvement in the area of the performed profession of an engineer with IT and economic-financial skills.	Student recognizes the importance of skillful use of basic mathematical apparatus in the context of engineering studies.			[SK2] Assessment of progress of work		
	[K6_W01] has basic knowledge in the field of mathematics, including mathematical analysis, algebra, geometry, probability calculus, statistics and numerical methods, necessary to formulate and solve simple tasks in the field of IT	Student uses methods of precalculus to formulate and solve simple problems from other areas of mathematics.			[SW1] Assessment of factual knowledge		

Subject contents	<ul style="list-style-type: none"> <li>• Review of polynomials, rational and power functions.</li> <li>• Exponential functions. Exponential equation and inequalities. Logarithmic function. Logarithms and their properties. Logarithmic equations and inequalities.</li> <li>• Trigonometric functions of any angle. Graphs of trig functions. Trig identities. Trigonometric equations and inequalities. Inverse trig functions.</li> <li>• Number sequences. Monotonicity, boundedness, limits. Properties of convergent sequences. Squeeze theorem.</li> </ul>									
Prerequisites and co-requisites	No requirements									
Assessment methods and criteria	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Subject passing criteria</th> <th style="width: 25%;">Passing threshold</th> <th style="width: 25%;">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td>Class participation</td> <td>0.0%</td> <td>10.0%</td> </tr> <tr> <td>Final comprehensive test</td> <td>50.0%</td> <td>90.0%</td> </tr> </tbody> </table>	Subject passing criteria	Passing threshold	Percentage of the final grade	Class participation	0.0%	10.0%	Final comprehensive test	50.0%	90.0%
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Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> <li>1. Solve the inequality <math>(x^4+x^2-10x) / (1-\sin 2x) &lt; 0</math>.</li> <li>2. Solve the equations <math>9\log_3 \sin x - 4\frac{1}{2} + \log_2 \cos x - \log_2 0,5 = 0</math>.</li> <li>3. Find the domain and range of the function and sketch its graph <math>f(x) = +\frac{1}{2} \arcsin(1-2x)</math>. Find the inverse function of f.</li> <li>4. Evaluate <math>\operatorname{tg}(\arccos(2/3)) + \cos(\operatorname{arctg}(2/3))</math>.</li> <li>5. Let <math>a_n = (3n)! / n^{3n}</math>. Find <math>\lim_{n \rightarrow \infty} (a_{n+1} / a_n)</math>.</li> <li>6. Use the squeeze theorem to find the limit of the sequence <math>x_n = \frac{2}{(n+2)} + \frac{4}{(n+4)} + \frac{6}{(n+6)} + \dots + \frac{2n}{(n+2n)}</math></li> </ol>									
Work placement	Not applicable									