



Subject card

Subject name and code	Precalculus, PG_00045351						
Field of study	Data Engineering						
Date of commencement of studies	October 2023	Academic year of realisation of subject				2023/2024	
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 Ewa Kozłowska-Walania				
	Teachers		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_W01] has advanced 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	
	[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_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	

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	Subject passing criteria	Passing threshold	Percentage of the final grade
	Final comprehensive test	50.0%	90.0%
	Class participation	0.0%	10.0%
Recommended reading	Basic literature	<ul style="list-style-type: none"> <li>• B.Sikora, E.Łobos, <i>A first course in calculus</i>, Wydawnictwo Politechniki Śląskiej, 2010</li> <li>• K.Binmore, J.Davies, <i>Calculus</i>, Cambridge University Press, 2007</li> <li>• Portal Mathematics, <a href="https://cnm.pg.edu.pl/mathematics/precalculus">https://cnm.pg.edu.pl/mathematics/precalculus</a></li> </ul>	
	Supplementary literature	<ul style="list-style-type: none"> <li>• <i>Matematyka. Podstawy z elementami matematyki wyższej</i>, pod red. B.Wikieł, Wydawnictwo Politechniki Gdańskiej</li> <li>• K.Jankowska, T.Jankowski, <i>Zbiór zadań z matematyki</i>, Wydawnictwo PG, 2010</li> <li>• W.Żakowski, <i>Algebra i analiza matematyczna dla licealistów i kandydatów na wyższe uczelnie</i>, WNT, Warszawa 1999</li> <li>• M.Gewert, Z.Skoczylas, <i>Analiza matematyczna 1</i>, Oficyna wydawnicza GiS.</li> </ul>	
	eResources addresses	Adresy na platformie eNauczenie:	
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		

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