GDAŃSK UNIVERSITY OF TECHNOLOGY

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

<table>
<tr><td>Subject contents</td><td>

- Review of polynomials, rational and power functions.
- Exponential functions. Exponential equation and inequalities. Logarithmic function. Logarithms and their properties. Logarithmic equations and inequalities.
- Trigonometric functions of any angle. Graphs of trig functions. Trig identities. Trigonometric equations and inequalities. Inverse trig functions.
- Number sequences. Monotonicity, boundedness, limits. Properties of convergent sequences. Squeeze theorem.

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<tr><td>Prerequisites and co-requisites</td><td>No requirements</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>Final comprehensive test</td><td>50.0%</td><td>90.0%</td></tr>
<tr><td>Class participation</td><td>0.0%</td><td>10.0%</td></tr>
</table>
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<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>

- B.Sikora, E.Łobos, *A first course in calculus*, Wydawnictwo Politechniki Śląskiej, 2010
- K.Binmore, J.Davies, *Clculus*, Cambridge University Press, 2007
- Portal Mathematics, *https://cnm.pg.edu.pl/mathematics/precalculus*

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<tr><td>Supplementary literature</td><td>

- *Matematyka. Podstawy z elementami matematyki wyższej*, pod red. B.Wikieł, Wydawnictwo Politechniki Gdańskiej
- K.Jankowska, T.Jankowski, *Zbiór zadań z matematyki*, Wydawnictwo PG, 2010
- W.Żakowski, *Algebra i analiza matematyczna dla licealistów i kandydatów na wyższe uczelnie,* WNT, Warszawa 1999
- M.Gewert, Z.Skoczylas, *Analiza matematyczna 1*, Oficyna wydawnicza GiS.

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<tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:</td></tr>
</table>
</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>

1. Solve the inequality (x4+x2-10x) / (1-sin 2 x)<0.
2. Solve the equations 9log3sin x - 41/2+\log2cos x - log2 0,5=0.
3. Find the domain and range of the function and sketch its graph f(x)=+1/2 arcsin(1-2x). Find the inverse function of f.
4. Evaluate tg(\arccos(2/3)+cos(arctg(2/3).
5. Let an=(3n)!/n3n . Find limn(an+1/an).
6. Use the squeeze theorem to find the limit of the sequence
   xn= 2/(n4+2)+4/(n4+4)+6/(n4+6)+... +2n/(n4+2n)

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<tr><td>Work placement</td><td>Not applicable</td></tr>
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