GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Mathematics I, PG_00040551		
Field of study	Engineering Management		
Date of commencement of studies	October 2020	Academic year of realisation of subject	2020/2021
Education level	first-cycle studies	Subject group	Obligatory subject group in the field of study
Mode of study	Full-time studies	Mode of delivery	blended-learning
Year of study	1	Language of instruction	Polish
Semester of study	1	ECTS credits	5.0
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 inż. Natalia Jarzębkowska	
	Teachers	dr inż. Natalia Jarzębkowska dr Lech Kujawski	

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: 30.0

Adresy na platformie eNauczanie:
WZiE - ZI - Matematyka I 2020/2021 (N.Jarzębkowska) - Moodle ID: 6803
https://enauczanie.pg.edu.pl/moodle/course/view.php?id=6803
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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	59.0	125

Subject objectives

The aim of the course is to give students a thorough understanding of basic concepts of calculus and algebra so that they are able to use them at different areas of economics.

After completing the course the student:
1. will be provided with the ability of understanding the concepts of mathematical notions introduced during the lectures;
2. will have developed competent skills and will be able to demonstrate problem solving skills at the areas of economics involving mathematical tools

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W11] has the basic knowledge of mathematics, physics and chemistry necessary to solve technical problems	Student mentions basic properties of elementary functions. Student solves equations and inequalities with elementary functions. Student defines the basic concepts of differential calculus of one variable. Student determines intervals of monotonicity of a given functions and its extrema. Student analyses the properties of functions on the basis of an examination of its first and second derivatives. Student geometrically interprets the results of an examination of a graph of a function using the concept of limit, continuity and derivatives of functions. Student uses methods of mathematical description of phenomena in the economical processes.	[SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge
[K6_U01] interprets and analyses the phenomena and processes taking place in the economy and organisation using basic theoretical knowledge of economics, management and science	Student combines knowledge of mathematics with knowledge from other fields. Student is able to process the acquired information, analyze and interpret it, draw conclusions and reason opinions.	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information

Subject contents

Functions of one variable and their properties. Elementary functions: absolute value, polynomials, rational functions, power functions, exponential and logarithmic functions, trigonometric and inverse trigonometric functions - properties, graphs, solving equations and inequalities.

Infinite sequences - properties, limits. The limit and continuity of a function. Derivatives and differentials of first and higher orders. Rolle, Lagrange, de l'Hospital, Taylor-Maclaurin theorems. Monotonicity and local extrema. Convexity, concavity and inflexion points of a function. Asymptotes.

Matrices, their properties and operations on matrices. Determinants. Systems of linear equations and inequalities. Basic definitions and properties of vectors. Eigenvectors and eigenvalues.

Prerequisites and co-requisites

There is no requirement.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Midterm colloquium	50.0%	40.0%
Class activity	50.0%	10.0%
Exam	50.0%	50.0%

Recommended reading

Basic literature

1. Wikieł B., Matematyka, Podstawy z elementami matematyki wyższej, Wydawnictwo PG, Gdańsk
2. Gurgul H., Suder M., Matematyka dla kierunków ekonomicznych, Oficyna a Wolters Kluwer business, Warszawa
3. Jankowska K., Jankowski T., Zbiór zadań z matematyki, PG Gdańsk

Supplementary literature

1. Bryński M., Dróbka N., Szymański K., Matematyka dla zerowego roku studiów wyższych, Wydawnictwa Naukowo-Techniczne, Warszawa
2. Gewert M., Skoczylas Z., Analiza matematyczna 1, Definicje, twierdzenia wzory, Wydawnictwo GiS, Wrocła
3. Gewert M., Skoczylas Z., Analiza matematyczna 1, Przykłady i zadania, Wydawnictwo GiS, Wrocław
4. Banaś J., Podstawy matematyki dla ekonomistów, Wydawnictwa Naukowo-Techniczne, Warszawa
5. Matłoka M., Wojcieszyn B., Matematyka z elementami zastosowań w ekonomii, Wydawnictwo Wyższej Szkoły Bankowej w Poznaniu
6. Dorosiewicz S., Michalski T., Twardowska K., Matematyka. Podręcznik dla studentów kierunków ekonomicznych, Wydawnictwo C.H. Beck, Warszawa 2008
7. Sozański B., Dziedzic I., Algebra i analiza w zagadnieniach ekonomicznych, Wydawnictwo Bila, Rzeszów

	eResources addresses	Podstawowe http://cnm.pg.edu.pl - x WZiE - ZI - Matematyka I 2020/2021 (N.Jarzębkowska) - Moodle ID: 6803 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=6803 WZiE - ZI - Matematyka I 2020/2021 (N.Jarzębkowska) - Moodle ID: 6803 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=6803 WZiE - ZI - Matematyka I 2020/2021 (N.Jarzębkowska) - Moodle ID: 6803 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=6803
Example issues/ example questions/ tasks being completed	1. Calculate limits $f(x)=((2x-1)/(2x+3))^{2x+2}$ as x tends to infinity $f(x)=(x^3-1)/(x^4-1)$ at the point $x_0=1$ 2. Calculate derivatives or multiple derivatives of the given functions $(\ln(5x)+ \ln(x^2)+\tan(x) \cos(x))'$, $(xe^x)''$. 3. Find the largest and the smallest value of the function f(x)=2/x -2 + x for x in [1,4]. Also discus its monotonicity. 4. Find the inflection points and the intervals of concavity/convexity for $f(x)=-x^4 +12x^3 - 48x^2 + 60x +1$. 5. For which value of k is the vector a= [1;2;3] perpendicular to the vector b= [0;k;2]? 6. Solve the matrix equation (for X) 3X-AX=B if A=[5 6; 7 8], B=[-1 -3; 2 -1]. 7. Solve the system of linear equations using the method of Gaussian elimination. x+2=-6, 3x+y+z=-1, 3x+2 =0 8. Let A=[2 4; 2 1]. Find the eigenvalues of A; A^{-1}; 5A; A^2; A-6I	
Work placement	Not applicable	