



Subject card

Subject name and code	Mathematics, PG_00048797						
Field of study	Green Technologies						
Date of commencement of studies	October 2021	Academic year of realisation of subject			2021/2022		
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			10.0		
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 Hanna Guze				
	Teachers		dr Hanna Guze				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	45.0	45.0	0.0	0.0	0.0	90
	E-learning hours included: 45.0						
Adresy na platformie eNauczenie:							
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	90		10.0		150.0	250
Subject objectives	Students obtain competence in using methods of mathematical analysis (single variable calculus) and knowledge how to solve simple problems that are found in the field of engineering, in particular connected to green technologies and environment protection.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_W01] has a basic knowledge from some branches of mathematics and physics useful for formulating and solving simple problems in the field of environmental technologies and modern analytical methods		Student explains the concept of limit and continuity of functions and gives a graphic interpretation of discontinuity points. Student uses the first and second derivative of a function to analyze its properties. Student uses definite integral to solve geometrical problems. Student recognizes the importance of skillful use of basic mathematical apparatus in terms of study in the future.		[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation		
	[K6_U03] is able to use information and communication technologies relevant to the common tasks of engineering, is able to use known methods and mathematical-physical models to describe and explain phenomena and chemical processes		Student combines knowledge of mathematics with knowledge from other fields. Student uses methods of mathematical description of phenomena in the physical and chemical processes.		[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject		
	[K6_K01] understands the need for learning throughout life, can inspire and organize the learning process of others. Is aware of his/her own limitations and knows when to ask the experts, can properly identify priorities for implementation, critically evaluate his knowledge		Student recognizes the importance of self-expanding knowledge and takes the challenge of working with a group to solve a problem. Student is able to process the acquired information, analyze and interpret it, is able to draw conclusions and reason opinions.		[SK5] Assessment of ability to solve problems that arise in practice [SK1] Assessment of group work skills [SK2] Assessment of progress of work		

Subject contents	<p>The sets of numbers and set notation. Basic mathematics symbols.</p> <p>IFunctions of one variable:</p> <ul style="list-style-type: none"> • definitions, graphs, properties, continuity, limits • absolute value, equations and inequalities • polynomials, rational functions, power functions, trigonometric and inverse trigonometric functions, exponential and logarithmic functions • equations and inequalities involving these functions • applications to mathematical modeling <p>Infinite number sequences</p> <ul style="list-style-type: none"> • arithmetic and geometric • explicit and recursive formulas • boundedness, monotonicity, limits <p>Single variable calculus:</p> <ul style="list-style-type: none"> • definition of the derivative • Rolle's and Lagrange's theorems and their applications • L'Hospital's Rule • monotonicity and local/global extrema (optimization problems) • higher order derivatives • concavity, inflection points • applications of single variable differential calculus to curve sketching, related rates and approximation problems • applications of differential calculus to other fields (e.g. chemistry, physics, biology) • definite and indefinite integral, Fundamental Theorem of Calculus • basic integration formulas • integration by substitution, by parts, by partial fractions • applications of integral calculus to other fields 																	
Prerequisites and co-requisites																		
Assessment methods and criteria	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;">Subject passing criteria</th> <th style="width: 30%;">Passing threshold</th> <th style="width: 30%;">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td>Written exam</td> <td>50.0%</td> <td>50.0%</td> </tr> <tr> <td>Tests and Activity</td> <td>50.0%</td> <td>6.0%</td> </tr> <tr> <td>e-Test</td> <td>50.0%</td> <td>5.0%</td> </tr> <tr> <td>Midterm colloquium</td> <td>50.0%</td> <td>39.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Written exam	50.0%	50.0%	Tests and Activity	50.0%	6.0%	e-Test	50.0%	5.0%	Midterm colloquium	50.0%	39.0%
Subject passing criteria	Passing threshold	Percentage of the final grade																
Written exam	50.0%	50.0%																
Tests and Activity	50.0%	6.0%																
e-Test	50.0%	5.0%																
Midterm colloquium	50.0%	39.0%																
Recommended reading	<table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td style="width: 40%;">Basic literature</td> <td colspan="2" data-bbox="802 1113 1477 1335"> <ul style="list-style-type: none"> • "Matematyka - Podstawy z elementami matematyki wyższej" pod redakcją Barbary Wiekł, Wydawnictwo PG, Gdańsk 2009 • K. Jankowska, T. Jankowski, "Zbiór zadań z matematyki", cz. 1, PG Gdańsk • M. Gewert, Z. Skoczyła, "Analiza matematyczna I - Definicje, twierdzenia, wzory", Oficyna Wydawnicza GiS • M. Gewert, Z. Skoczyła, "Analiza matematyczna I - Przykłady i zadania", Oficyna Wydawnicza GiS </td> </tr> <tr> <td>Supplementary literature</td> <td colspan="2" data-bbox="802 1341 1477 1413"> <ul style="list-style-type: none"> • R. Leitner, "Zarys matematyki wyższej I i II", WNT • W. Krywicki, L. Włodarski, "Analiza matematyczna w zadaniach I", PWN </td> </tr> <tr> <td>eResources addresses</td> <td colspan="2" data-bbox="802 1420 1477 1447"></td> </tr> </tbody> </table>			Basic literature	<ul style="list-style-type: none"> • "Matematyka - Podstawy z elementami matematyki wyższej" pod redakcją Barbary Wiekł, Wydawnictwo PG, Gdańsk 2009 • K. Jankowska, T. Jankowski, "Zbiór zadań z matematyki", cz. 1, PG Gdańsk • M. Gewert, Z. Skoczyła, "Analiza matematyczna I - Definicje, twierdzenia, wzory", Oficyna Wydawnicza GiS • M. Gewert, Z. Skoczyła, "Analiza matematyczna I - Przykłady i zadania", Oficyna Wydawnicza GiS 		Supplementary literature	<ul style="list-style-type: none"> • R. Leitner, "Zarys matematyki wyższej I i II", WNT • W. Krywicki, L. Włodarski, "Analiza matematyczna w zadaniach I", PWN 		eResources addresses								
Basic literature	<ul style="list-style-type: none"> • "Matematyka - Podstawy z elementami matematyki wyższej" pod redakcją Barbary Wiekł, Wydawnictwo PG, Gdańsk 2009 • K. Jankowska, T. Jankowski, "Zbiór zadań z matematyki", cz. 1, PG Gdańsk • M. Gewert, Z. Skoczyła, "Analiza matematyczna I - Definicje, twierdzenia, wzory", Oficyna Wydawnicza GiS • M. Gewert, Z. Skoczyła, "Analiza matematyczna I - Przykłady i zadania", Oficyna Wydawnicza GiS 																	
Supplementary literature	<ul style="list-style-type: none"> • R. Leitner, "Zarys matematyki wyższej I i II", WNT • W. Krywicki, L. Włodarski, "Analiza matematyczna w zadaniach I", PWN 																	
eResources addresses																		
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> 1. Find the domain and the set of values of the function $f(x) = \dots$ 2. Find the derivative of $f(x) = \dots$ 3. Sketch the graph of the function $f(x) = \dots$. Identify any local extrema and points of inflection. 4. Find the absolute extrema of $f(x) = \dots$ on the interval \dots 5. Calculate $\int \dots dx$. 																	
Work placement	Not applicable																	