



Subject card

Subject name and code	Mathematics, PG_00048757						
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			at the university		
Year of study	1	Language of instruction			English		
Semester of study	2	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 Hanna Guze				
	Teachers		dr Hanna Guze				
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: 0.0						
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	60		10.0		55.0	125
Subject objectives	Students obtain competence in using methods of mathematical analysis and linear algebra, 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 has basic knowledge of single variable calculus. Student uses the basic operations on complex numbers. Student analyses properties of a given function of two variables using differential calculus of multivariable functions. Student defines the basic concepts of linear algebra. Student evaluates double integrals and explains the method of change variables.			[SW1] Assessment of factual knowledge		
	[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, draw conclusions and reason opinions.			[SK5] Assessment of ability to solve problems that arise in practice		
[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 recognizes the importance of skillful use of basic mathematical apparatus in terms of study in the future. Student uses methods of mathematical description of phenomena in the physical and chemical processes.			[SU4] Assessment of ability to use methods and tools			

Subject contents	<p>Complex Numbers: algebraic and trigonometric form, complex conjugate, modulus, arithmetic operations, roots of complex numbers, solving equations.</p> <p>Elements of Linear Algebra: matrices (definition, types of matrices, operations, inverse matrix), determinants (definition, properties), systems of linear equations (Cramer's rule, Kroneckera - Capelli theorem, Gaussian elimination).</p> <p>Conic sections and graphs of selected surfaces.</p> <p>Multivariable Functions: limits and continuity, partial derivatives with applications.</p> <p>Double integrals: definition, polar coordinates, application in geometry and physics.</p>														
Prerequisites and co-requisites	Working knowledge of the concepts of the first semester of mathematics.														
Assessment methods and criteria	<table border="1" data-bbox="453 613 1485 739"> <thead> <tr> <th data-bbox="453 613 794 645">Subject passing criteria</th> <th data-bbox="794 613 1139 645">Passing threshold</th> <th data-bbox="1139 613 1485 645">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="453 645 794 676">Small tests and activity</td> <td data-bbox="794 645 1139 676">50.0%</td> <td data-bbox="1139 645 1485 676">5.0%</td> </tr> <tr> <td data-bbox="453 676 794 707">Final Exam</td> <td data-bbox="794 676 1139 707">40.0%</td> <td data-bbox="1139 676 1485 707">50.0%</td> </tr> <tr> <td data-bbox="453 707 794 739">Tests</td> <td data-bbox="794 707 1139 739">50.0%</td> <td data-bbox="1139 707 1485 739">45.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Small tests and activity	50.0%	5.0%	Final Exam	40.0%	50.0%	Tests	50.0%	45.0%
Subject passing criteria	Passing threshold	Percentage of the final grade													
Small tests and activity	50.0%	5.0%													
Final Exam	40.0%	50.0%													
Tests	50.0%	45.0%													
Recommended reading	<table border="1" data-bbox="453 759 1485 1579"> <tbody> <tr> <td data-bbox="453 759 794 1350">Basic literature</td> <td colspan="2" data-bbox="794 759 1485 1350"> <p>Sherman K. Stein, Calculus and analytic geometry, McGraw - Hill Book Company, 4th edition, 1987.</p> <p>Howard Anton, Calculus. A new horizon., John Wiley and Sons Publishing Company, 6th edition, 1999.</p> <p>D.J. Hartfiel, Arthur M. Hobbs, Elementary linear algebra, Prindle, Weber &amp; Schmidt, Boston, 1987.</p> <p>T. Jankowski, Linear algebra, Wydawnictwo Politechniki Gdańskiej, Gdańsk, 2001.</p> <p>K. Jankowska, T. Jankowski, "Zbiór zadań z matematyki", cz. 2 i 3, PG Gdańsk.</p> </td> </tr> <tr> <td data-bbox="453 1350 794 1563">Supplementary literature</td> <td colspan="2" data-bbox="794 1350 1485 1563"> <p>M. Gewert, Z. Skoczyła, "Analiza matematyczna II - Definicje, twierdzenia, wzory", Oficyna Wydawnicza GiS.</p> <p>M. Gewert, Z. Skoczyła, "Analiza matematyczna II - Przykłady i zadania", Oficyna Wydawnicza GiS.</p> </td> </tr> <tr> <td data-bbox="453 1563 794 1579">eResources addresses</td> <td colspan="2" data-bbox="794 1563 1485 1579"></td> </tr> </tbody> </table>			Basic literature	<p>Sherman K. Stein, Calculus and analytic geometry, McGraw - Hill Book Company, 4th edition, 1987.</p> <p>Howard Anton, Calculus. A new horizon., John Wiley and Sons Publishing Company, 6th edition, 1999.</p> <p>D.J. Hartfiel, Arthur M. Hobbs, Elementary linear algebra, Prindle, Weber &amp; Schmidt, Boston, 1987.</p> <p>T. Jankowski, Linear algebra, Wydawnictwo Politechniki Gdańskiej, Gdańsk, 2001.</p> <p>K. Jankowska, T. Jankowski, "Zbiór zadań z matematyki", cz. 2 i 3, PG Gdańsk.</p>		Supplementary literature	<p>M. Gewert, Z. Skoczyła, "Analiza matematyczna II - Definicje, twierdzenia, wzory", Oficyna Wydawnicza GiS.</p> <p>M. Gewert, Z. Skoczyła, "Analiza matematyczna II - Przykłady i zadania", Oficyna Wydawnicza GiS.</p>		eResources addresses					
Basic literature	<p>Sherman K. Stein, Calculus and analytic geometry, McGraw - Hill Book Company, 4th edition, 1987.</p> <p>Howard Anton, Calculus. A new horizon., John Wiley and Sons Publishing Company, 6th edition, 1999.</p> <p>D.J. Hartfiel, Arthur M. Hobbs, Elementary linear algebra, Prindle, Weber &amp; Schmidt, Boston, 1987.</p> <p>T. Jankowski, Linear algebra, Wydawnictwo Politechniki Gdańskiej, Gdańsk, 2001.</p> <p>K. Jankowska, T. Jankowski, "Zbiór zadań z matematyki", cz. 2 i 3, PG Gdańsk.</p>														
Supplementary literature	<p>M. Gewert, Z. Skoczyła, "Analiza matematyczna II - Definicje, twierdzenia, wzory", Oficyna Wydawnicza GiS.</p> <p>M. Gewert, Z. Skoczyła, "Analiza matematyczna II - Przykłady i zadania", Oficyna Wydawnicza GiS.</p>														
eResources addresses															
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> <li>1. Find the inverse matrix.</li> <li>2. Solve the given system of linear equations.</li> <li>3. Identify and sketch the graph of the following surface.</li> <li>4. Find the roots of the given complex number.</li> <li>5. Find local extreme values of the following function <math>f(x,y)</math>.</li> <li>6. Describe the following region in polar coordinates and evaluate the following double integral.</li> </ol>														
Work placement	Not applicable														