



Subject card

Subject name and code	Mathematics, PG_00048757						
Field of study	Green Technologies						
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		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: WCh - GT - Mathematics2 2020/21 (H.Guze) - Moodle ID: 8826 https://enauczenie.pg.edu.pl/moodle/course/view.php?id=8826 WCh - GT - Mathematics2 2020/21 (H.Guze) - Moodle ID: 8826 https://enauczenie.pg.edu.pl/moodle/course/view.php?id=8826						
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 gives the graphic interpretation of definite integral. 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.		[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	Definite Integral of a function of one variable: definition, geometrical applications, applications to other disciplines. Improper Integrals. Complex Numbers: algebraic and trigonometric form, complex conjugate, modulus, arithmetic operations, roots of complex numbers, solving equations. 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). Conic sections and graphs of selected surfaces. Multivariable Functions: limits and continuity, partial derivatives with applications.		
Prerequisites and co-requisites	Working knowledge of the concepts of the first semester of mathematics.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Final Exam	50.0%	50.0%
	Tests	50.0%	50.0%
Recommended reading	Basic literature	Sherman K. Stein, Calculus and analytic geometry, McGraw - Hill Book Company, 4th edition, 1987. Howard Anton, Calculus. A new horizon., John Wiley and Sons Publishing Company, 6th edition, 1999. D.J. Hartfiel, Arthur M. Hobbs, Elementary linear algebra, Prindle, Weber & Schmidt, Boston, 1987. T. Jankowski, Linear algebra, Wydawnictwo Politechniki Gdańskiej, Gdańsk, 2001. K. Jankowska, T. Jankowski, "Zbiór zadań z matematyki", cz. 2 i 3, PG Gdańsk.	
	Supplementary literature	M. Gewert, Z. Skoczylas,"Analiza matematyczna II - Definicje, twierdzenia, wzory", Oficyna Wydawnicza GiS. M. Gewert, Z. Skoczylas,"Analiza matematyczna II - Przykłady i zadania", Oficyna Wydawnicza GiS.	
	eResources addresses	WCh - GT - Mathematics2 2020/21 (H.Guze) - Moodle ID: 8826 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=8826 WCh - GT - Mathematics2 2020/21 (H.Guze) - Moodle ID: 8826 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=8826	
Example issues/ example questions/ tasks being completed	1. Evaluate an improper integral. 2. Find the length of the curve on the given interval. 3. Find the inverse matrix. 4. Solve the given system of linear equations. 5. Sketch the graph of the following surface. 6. Find the roots of the given complex number. 7. Find local extreme values of the function $f(x,y)=\dots$		
Work placement	Not applicable		