GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Mathematics, PG_00036264					
Field of study	Green Technologies					
Date of commencement of studies	October 2021		Academic year of realisation of subject		2022/2023	
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	2		Language of instruction		Polish	
Semester of study	3		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 Anna Niewulis			
	Teachers					

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						

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	5.0	60.0	125

Subject objectives	Students obtain competence in using methods of mathematical analysis (multivariable 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 evaluates the limits of sequences, radius and interval of convergence of a power series. Student is able to determine the type of convergence of a number series. Student evaluates double and triple integrals and explains the methods of change of variables.	[SW1] Assessment of factual knowledge
	[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.	[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 skillful use of basic mathematical apparatus in terms of engineering studies. Student understands the need of lifelong learning and improving their engineering knowldege. Student recognizes the importance of self-expanding knowledge and takes the challenge of working with a group to solve a problem.	[SK5] Assessment of ability to solve problems that arise in practice [SK1] Assessment of group work skills

Subject contents	Infinite number sequences: • arithmetic and geometric • explicit and recursive formulas • boundedness, monotonicity, limits Infinite number series: • necessary condition for convergence • criteria for convergence • absolute convergence • alternating series and conditional convergence Power Series; Taylor and McLaurin Analytic Geometry • vectors; dot product, cross product, mixed product, and their applications • equations of lines and planes • relative position of lines and planes Multivariable functions • double and triple integrals with applications Probability and Statistics • discrete and continuous random variable • probability distribution • expected value and variation of a random variable • distribution functions • elements of statistics.
Prerequisites and co-requisites	Working knowledge of the concepts of the second semester of matematics.

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	W. Krysicki, L. Włodarski, Analiza matematyczna w zadaniach 1, Wydawnictwo Naukowe PWN, Warszawa 2008 W. Krysicki, L. Włodarski, Analiza matematyczna w zadaniach 2, Wydawnictwo Naukowe PWN, Warszawa 2008 M. Gewert, Z. Skoczylas, Analiza matematyczna 1. Definicje. Twierdzenia. Wzory. Oficyna Wydawnicza GIS, Wrocław 2008 M. Gewert, Z. Skoczylas, Analiza matematyczna 2. Definicje. Twierdzenia. Wzory. Oficyna Wydawnicza GIS, Wrocław 2008 M. Gewert, Z. Skoczylas, Analiza matematyczna 1. Przykłady i zadania. Oficyna Wydawnicza GIS, Wrocław 2008
Supplementary literature	T. Jurlewicz, Z. Skoczylas - Algebra i geometria analityczna. Definicje, twierdzenia i wzory., Oficyna wydawnicza GiS, 2006; T. Jurlewicz, Z. Skoczylas - Algebra i geometria analityczna. Przykłady i zadania., Oficyna wydawnicza GiS, 2006
eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	1. Determine whether the sequence is bounded/monotone. 2. Evaluate the limit of a sequence. 3. Determine convergence of the series. 4. Find Taylor expansion of the given function. 5. Determine the relative position of two lines/planes. 6. Find all local extremes of the given function of two variables. 7. Evaluate the doulbe/triple integral.
Work placement	Not applicable