GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Mathematical Analysis, PG_00021031						
Field of study	Mathematics						
Date of commencement of studies	October 2026		Academic year of realisation of subject		2026/2027		
Education level	first-cycle studies		Subject group		Obligatory subject group in the field of study		
					Subject group related to scientific research in the field of study		
Mode of study	Full-time studies		Mode of delivery		at the university		
Year of study	1		Language of instruction		Polish		
Semester of study	2		ECTS credits		10.0		
Learning profile	general academic profile		Assessment form		exam		
Conducting unit	Divison of Differential Equations and Applications of Mathematics -> Institute of Applied Mathematics -> Faculty of Applied Physics and Mathematics -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr Agnieszka Bartłomiejczyk				
	Teachers						

Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	60.0	60.0	0.0	0.0	0.0	120
	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	120	5.0	125.0	250

Subject objectives	To familiarize students with basic tools of mathematical analysis. Part II.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	K6_W04	A student knows the basic theorems of integral calculus for functions of one variable and differential calculus for functions of several variables.	[SW1] Assessment of factual knowledge
	K6_U06	A student calculates integrals of functions of one variable.	[SU4] Assessment of ability to use methods and tools
	K6_U03	A student uses the language of set theory on the basis of mathematical analysis.	[SU3] Assessment of ability to use knowledge gained from the subject
	K6_U04	A student knows an axiomatic theory of real numbers.	[SU3] Assessment of ability to use knowledge gained from the subject
	K6_W07	A student is familiar with the concepts of partial of multivariable functions, the directional derivatives, the gradient, and the Fréchet derivative.	[SW1] Assessment of factual knowledge

Subject contents	Course content – lecture 1. Integral calculus of functions of one variable. 2. Euclidean spaces. 3. Limits and continuity of functions of several variables. 4. Differentiability of functions of several variables. 5. Extremes of functions of several variables.
	Course content – exercises 1. Integral calculus of functions of one variable. 2. Euclidean spaces. 3. Limits and continuity of functions of several variables. 4. Differentiability of functions of several variables. 5. Extremes of functions of several variables.

Prerequisites and co-requisites	Mathematical analysis of functions of one variable.

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Three tests and activity in the classes	50.0%	60.0%
	Written exam	50.0%	30.0%
	Oral exam	40.0%	10.0%

Recommended reading	Basic literature	1. G. M. Fichtenholz, Rachunek różniczkowy i całkowy, t.1, PWN, Warszawa, 2007. 2. L. Górniewicz, R.S. Ingarden, Analiza matematyczna dla fizyków, Wydawnictwo Naukowe UMK, 2012. 3. W. Kołodziej, Analiza matematyczna, PWN, Warszawa, 2009. 4. F. Leja, Rachunek różniczkowy i całkowy, PWN, Warszawa, 2008. 5. W. Rudin, Podstawy analizy matematycznej, PWN, Warszawa, 2009. 6. M. Spivak, Analiza na rozmaitościach, PWN, Warszawa, 2005.
	Supplementary literature	1. J. Banaś, S. Węedrychowicz, Zbiór zadań z analizy matematycznej, PWN, Warszawa, 2020. 2. A. Birkholc, Analiza matematyczn. Funkcje wielu zmiennych, PWN, Warszawa, 2002. 3. J. Jost, Postmodern Analysis, Universitext, Springer, Berlin, 2005. 4. W. Krysicki, L. Włodarski, Analiza matematyczna w zadaniach 1 i 2, PWN,Warszawa, 2004. 5. Z. Skoczylas, M. Gewert, Analiza matematyczna 2, Oficyna Wydawnicza GiS, 2023. 6. W. Żakowski, W. Kołodziej, Matematyka część 2. Analiza matematyczna, Wydawnictwo WNT, Warszawa, 2017.
	eResources addresses	

Example issues/ example questions/ tasks being completed	• Calculate limits of functions of several variables. • Examine the continuity of functions of several variables. • Determine the Fréchet derivative of a function. • Calculate partial derivatives of functions of several variables. • Determine extremes of functions of several variables.
Practical activites within the subject	Not applicable

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