



Subject card

Subject name and code		Mathematical Analysis I, PG_00072269						
Field of study		Technical Physics						
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		1	ECTS credits			10.0		
Learning profile		general academic profile	Assessment form			exam		
Conducting unit		Division of Electron Collisions Physics -> Institute of Physics and Applied Computer Science -> Faculty of Applied Physics and Mathematics -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)		Subject supervisor		dr Maciej Kuna				
		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		Endowment of student to mathematical knowledge helping technical subjects						
Learning outcomes		Course outcome	Subject outcome		Method of verification			
		[K6_U01] demonstrates the ability for lifelong independent learning, including acquiring information from literature, databases and other appropriate sources.	The student appreciates the importance of independently expanding knowledge. He or she can independently complete exercises to consolidate knowledge based on literature and appropriate databases.		[SU3] Assessment of ability to use knowledge gained from the subject			
		[K6_U02] is able to analyse and solve complex and non-standard scientific and technical problems using appropriate analytical, computational, numerical, simulation or experimental methods.	The student is able to analyze in a specific case what integration scheme should be used, based on knowledge of integration methods for various classes of functions.		[SU4] Assessment of ability to use methods and tools			
		[K6_W03] possesses structured knowledge of higher mathematics, including algebra, analysis, probability and numerical methods, sufficient to describe, understand and model complex physical phenomena and selected technical processes.	The student knows how to calculate limits of numerical sequences and functions. The student knows how to determine monotonicity intervals and extrema of a given function. The student knows the basic concepts of differential calculus for functions of one variable. The student knows how to calculate indefinite integrals using integration by substitution and integration by parts. The student understands mathematical theorems and applies them to solve problems.		[SW1] Assessment of factual knowledge			

Subject contents

Course content – lecture
Elements of logic and set theory.

Functions and relationships

Numerical sets

Introduction to metric spaces

Sequences and Series

Metric spaces

Limit and continuity of function

Properties of continuous functions

Derivative of a function of one variable

Mean value theorems and their applications

Derivatives of functions of many variables

Function extremes

The inverse function theorem and its applications

Integrals

Course content – exercises
Logic Problems

Set Calculus Problems

Function Problems

Mathematical Induction Problems

Real Number Problems

Sequence Problems

Series Problems

Limits of Functions Continuity of Functions Problems

Derivatives of Functions Problems

Analysis of Function Properties Problems

Indefinite Integrals Problems

	Definite Integrals Problems		
Prerequisites and co-requisites	Student knows basic mathematical notions		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Examination	50.0%	50.0%
	Exercise	50.0%	50.0%
Recommended reading	Basic literature	R. Rudnicki "Wykłady z analizy matematycznej" PWN Warszawa 2020 D.A. McQuarrie "Matematyka dla przyrodników i inżynierów" Tom 1, PWN, Warszawa 2012 K.A. Stroud, D.J. Booth "Matematyka od zera dla inżyniera" Pętla 2021 W. Krysicki, L. Włodarski "Analiza matematyczna w zadaniach" Tom I, PWN Warszawa 2023	
	Supplementary literature	L. Górniewicz, R.S. Ingarden "Analiza matematyczna dla fizyków" Tom 1, PWN Warszawa 1981 K. Maurin "Analiza część 1" PWN Warszawa 2010 K. Jankowska, T. Jankowski, Zbiór zadań z matematyki. Wydawnictwo Politechniki Gdańskiej, 2009	
	eResources addresses		
Example issues/ example questions/ tasks being completed	Find extremum of given function $f(x)$ Find the limit of given function $f(x)$ Calculate the integral of given function $f(x)$ Calculate the derivative of given function $f(x)$ Expand of given function $f(x)$ in series		
Practical activities within the subject	Not applicable		

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