University of Gdańsk

Subject card

Subject name and code	Analytic functions I, PG_00100975		
Field of study	Mathematics		
Date of commencement of studies	October 2023	Academic year of realisation of subject	2025/2026
Education level	Bachelor's studies	Subject group	
Mode of study	full-time studies	Mode of delivery	at the university
Year of study	3	Language of instruction	Polish
Semester of study	5	ECTS credits	6.0
Learning profile	academic	Assessment form	exam
Conducting unit	Institute of Mathematics -> Faculty of Mathematics, Physics and Informatics -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	dr Szymon Myga	
	Teachers	dr Szymon Myga dr Adrian Karpowicz	

Lesson types

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	0.0	0.0	60

Subject objectives

Introduction of basic concepts regarding the complex plane and the analysis of complex functions of onevariable. Proving the most important theorems regarding analytical functions. Applications.

Learning outcomes

Course outcome	Subject outcome	Method of verification

Subject contents

Reminder of the basic algebraic and topological properties of the set of complex numbers.Power series and their convergence.Complex functions of a real variable, exponential functions, trigonometric functions, Euler's formula.Complex logarithm and power of a complex number.Differentiable functions, derivatives and their basic properties.Holomorphic function. Cauchy-Riemann equations, sufficient and necessary conditions fordifferentiability.Linear integral of a complex function, basic properties.Cauchy's theorem and theorem about the existence of a primary function.Cauchy's integral formula.Holomorphic function as a power series, Morera's theorem.Zeros of the holomorphic function.The principle of maximum.Liouville's theorem. Laurent series, expansion of the holomorphic function into the Laurent series.Isolated singular points.Residuum of functions, residual theorem and its application to computing improper integrals of realfunctions.Function sequences of holomorphic functions.

Prerequisites and co-requisites

None.

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Observation of the student's attitude	51.0%	0.0%
	tests	51.0%	45.0%
	exam	51.0%	55.0%
Recommended reading	Basic literature	1. F. Leja, Teoria funkcji analitycznych, PWN 2. J. Długosz, Funkcje zespolone. Teoria, przykłady, zadania	
	Supplementary literature	1. W. Rudin, Analiza rzeczywista i zespolona 2. J. Krzyż, Zbiór zadań z funkcji analitycznych 3. J. Chądzyński, Wstęp do analizy zespolonej w zadaniach	
	eResources addresses		
Example issues/ example questions/ tasks being completed	none		
Work placement	Not applicable		

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