

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	<p>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 for differentiability. 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 real functions. Function sequences of holomorphic functions.</p>						
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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