GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Complex functions, PG_00023761
Field of study	Mathematics

Date of commencement of studies	October 2024	Academic year of realisation of subject	2025/2026
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	2	Language of instruction	Polish
Semester of study	4	ECTS credits	5.0
Learning profile	general academic profile	Assessment form	exam

Conducting unit	Faculty of Applied Physics and Mathematics

Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Piotr Bartłomiejczyk
	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						
	Adresy na platformie eNauczanie:						

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	Gaining basic knowledge of complex functions and ability to apply known concepts.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	K6_W04	Student knows the Cauchy integral theorem. Student knows the fundamental theorems for sequences and series of complex numbers.	[SW1] Assessment of factual knowledge
	K6_U01	Student knows the definition of the derivative of a function of a complex variable. Student knows the necessary and sufficient condition for the existence of the derivative.	[SU4] Assessment of ability to use methods and tools
	K6_U04	Student is able to use criteria to test the convergence of the series. Student calculates the limits of sequences of complex numbers.	[SU4] Assessment of ability to use methods and tools
	K6_W07	Student calculates the logarithm of a complex number, calculates the power of the complex number. Student determines the real and imaginary parts of a complex variable functions.	[SW1] Assessment of factual knowledge

Subject contents	1. Preliminaries 2. Complex plane 3. Complex functions 4. Power series 5. Derivative of a complex function 6. Cauchy-Riemann equations 7. Holomorfic functions 8. Analitic functions 9. The Cauchy integral theorem 10. The Cauchy integral formula 11. Holomorfic functions and power series 12. The Morera theorem 13. Cauchy inequalities 14. Entire functions and the Liouville theorem 15. Maximum principle and the Schwarz lemma		
Prerequisites and co-requisites	Mathematical Analysis, Linear Algebra, Analytical geometry,		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Written exam -theory	50.0%	50.0%
	Test 1,2	50.0%	50.0%
Recommended reading	Basic literature	F. Leja, Analitic functions, PWN 1968	
	Supplementary literature	B. W. Shabat, Introduction to complex analysis, AMS.1992	
	eResources addresses		
Example issues/ example questions/ tasks being completed	Calculate the limit of a sequence . Examine the convergence of the series, Give a definition of limit of a sequence . Determine the real and imaginary part of a function. Calculate a complex integral Formulate the Cauchy integral formula		
Work placement	Not applicable		