

。 GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Applied Mathematics, PG_00049642								
Field of study	Space and Satellite Technologies								
Date of commencement of studies	February 2026		Academic year of realisation of subject			2025/2026			
Education level	second-cycle studies		Subject group			Obligatory subject group 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			3.0			
Learning profile	general academic profile		Assessment form			exam			
Conducting unit	Mathematics Center -> Vice-Rector For Education								
Name and surname of lecturer (lecturers)	Subject supervisor		dr Magdalena Musielak						
	Teachers		dr Magdalena Musielak						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	Seminar	SUM	
	Number of study hours	15.0	15.0	0.0	0.0		0.0	30	
	E-learning hours included: 0.0								
Learning activity and number of study hours	Learning activity Participation ir classes includ plan		didactic Participation in ed in study consultation hours		Self-study SUM		SUM		
	Number of study hours	30		10.0		35.0		75	
Subject objectives	Student uses methods of mathematical analysis, differential and integral equations, numerical methods and computational software to solve problems appearing in the area of space and satellite technologies.								
Learning outcomes	Course outcome		Subject outcome			Method of verification			
	[K7_K01] is aware of the constant necessity of improving and broadening their knowledge; can inspire and organise the teaching and learning process.		Student understands the need of lifelong learning. Student is able to inspire others and organize their learning process.			[SK5] Assessment of ability to solve problems that arise in practice			
	[K7_W01] Knows and understands, to an increased extent, selected areas of mathematics, which enables him to solve computational problems and develop research results in the field of technical tasks.		Student defines the holomorphic function, evaluates line integrals of complex functions, is able to solve and analyze ordinary differential equations with the use of computational software, evaluates and applies Laplace, Fourier and other transforms, knows the basic types of integral equations, understands the concept of linear and nonlinear transformation as well as inverse problems, is able to solve and analyze them with the use of computational software.			[SW1] Assessment of factual knowledge			

Subject contents	1) Complex analysis; complex functions of a real and complex variable; analytic functions; derivatives and line integrals of complex function						
	2) Ordinary differential equations: numerical methods of solution in Matlab						
	3) Transforms: Laplace, Z, Fourier, Hilbert; applications; evaluation with the use of Matlab						
	4) Intro to integral equations	ral equations					
	5) Linear and nonlinear transformations of multidimensional space. Inverse problems: solving and analyzing with the use of Matlab						
	6) Probability and statistics in engineering applications						
Prerequisites and co-requisites	Knowledge of mathematical analysis and linear algebra on undergraduate level						
Assessment methods	Subject passing criteria	Passing threshold	Percentage of the final grade				
and criteria	Final exam	50.0%	60.0%				
	Homework assignments	0.0%	20.0%				
	Short tests	0.0%	20.0%				
Recommended reading	Basic literature	 Żakowski, W., Leksiński, W., <i>Podręczniki Akademickie - Matematyka.</i> <i>Część IV</i>, Wydawnictwo Naukowe PWN Hochstadt, H., <i>Integral Equations</i>, A Wiley-Interscience Publications M.Bednarczyk, A.Dąbrowicz-Tlałka, <i>Elementy rachunku prawdopodobieństwa w zadaniach; dla studentów uczelni technicznych</i>, Wyd.PG 					
	Supplementary literature eResources addresses	M.Gewert, Z.Skoczylas, <i>Równania różniczkowe zwyczajne</i> , GiS W.Sradomski, <i>Matlab. Praktyczny podręcznik modelowania,</i> Helion Krasnow, M. L., Kisielew, A. I., Makarenko, G. I., <i>Zadania z równań</i> <i>całkowych</i> , Wydawnictwo Naukowe PWN					
Example issues/	Solve the given differential equa	ation using Laplace transform					
example questions/ tasks being completed	 Use ∠ transform to solve the given difference equation Evaluate the line integrals over complex functions Analyze the frequency of the input signal when its Fourier transform is given. 						
Work placement	Not applicable						

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