



Subject card

Subject name and code	Applied Mathematics, PG_00049642						
Field of study	Space and Satellite Technologies						
Date of commencement of studies	February 2025	Academic year of realisation of subject			2024/2025		
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	Project	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 in didactic classes included in study plan	Participation in consultation hours		Self-study	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_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		
	[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		

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 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 and criteria	<table border="1" data-bbox="448 665 1487 801"> <thead> <tr> <th data-bbox="448 665 794 701">Subject passing criteria</th> <th data-bbox="794 665 1141 701">Passing threshold</th> <th data-bbox="1141 665 1487 701">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="448 701 794 736">Short tests</td> <td data-bbox="794 701 1141 736">0.0%</td> <td data-bbox="1141 701 1487 736">20.0%</td> </tr> <tr> <td data-bbox="448 736 794 772">Homework assignments</td> <td data-bbox="794 736 1141 772">0.0%</td> <td data-bbox="1141 736 1487 772">20.0%</td> </tr> <tr> <td data-bbox="448 772 794 801">Final exam</td> <td data-bbox="794 772 1141 801">50.0%</td> <td data-bbox="1141 772 1487 801">60.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Short tests	0.0%	20.0%	Homework assignments	0.0%	20.0%	Final exam	50.0%	60.0%
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Example issues/ example questions/ tasks being completed	<ul data-bbox="448 1514 1487 1615" style="list-style-type: none"> • Solve the given differential equation using Laplace transform • Use Z 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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