

## Subject card

Subject name and code	Applied Mathematics, PG_00049642								
Field of study	Space and Satellite Technologies								
Date of commencement of studies	February 2024		Academic year of realisation of subject			2023/2024			
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	ct 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	30		10.0			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			
		ed areas of it possible to problems and	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			
	K7_U06		Student is able to use their mathematical knowledge in combination with computational software to solve problems from the area of space and satellite technologies.			[SU4] Assessment of ability to use methods and tools			

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2) Ordinary differential equations: numerical methods of solution in Matlab  3) Transforms: Laplaca, 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  Assessment methods and co-requisites  Subject passing criteria  Subject passing criteria  Passing threshold Percentage of the final grade Final exam  50.0%  Homework assignments  0.0%  20.0%  Short tests  0.0%  J.Diugosz, Funkcje zespolone, GIS  Zakowski, W., Leksiński, W., Podręczniki Akademickie - Matematykia. Część IV, Wydawnictwo Naukowe PWN  Hochstadt, H., Integral Equations, A Wiley-Interscience Publications  M.Bednarczyk, A Dąbrowicz-Tiaka. Elementy rachunku prawdopódbieństwa w zadaniach; dla studentów uczelní technicznych WyG PG  Supplementary literature  M.Gewert, Z.Skoczylas, Równania róźniczkowe zwyczajne, GIS  W. Śradomski, Matlab. Praktyczny podręcznik modelowania, Helion Krasnow, M. L., Kisielew, A. I., Makarenko, G. I., Zadania z równań carkowych, Wydawnictwo Naukowe PWN  eResources addresses  Adresy na platformia eNauczania: W.TT. – TKS. — Matematyka stosowana 2023/24 (M.Musielak) - Moodel ID: 39753  WEZAmple Issues/ example questions/ tasks being completed  - Solve the given differential equation using Laplace transform 1 Use Z transform to solve the given difference quation 2 Use Z transform to solve the given difference quation 2 Use Z transform to solve the given difference quation 2 Use Z transform to solve the given difference quation 3 Transform to solve the given difference that the solve the	Subject contents	Complex analysis; complex functions of a real and complex variable; analytic functions; derivatives and							
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 Knowledge of mathematical analysis and linear algebra on undergraduate level and co-requisites Assessment methods and criteria  Subject passing criteria Passing threshold Percentage of the final grade Final exam 50.0% 60.0% Honework assignments 0.0% 20.0% Short tests 0.0% Short tests 0.0% Short tests 0.0% Short tests 0.0% Basic literature J Diugosz, Funkcje zespolone, GIS Zakowski, W., Leksiński, W., Podręczniki Akademickie - Matematyka, Część IV, Wydawnictwo Naukowe PWN Hochstadt, H., Integral Equations, A Wiley-Interscience Publications M, Bednarczyk, A. Dąbrowicz-Tialka, Elementy rachunku prawdopodobeństwa w zadaniach; dia studentów uczelni technicznych Wyd. PG  Supplementary literature M, Gewert, Z. Skoczylas, Równania różniczkowe żwyczajne, GiS W Sradomski, Matlab. Praktyczny podręcznik modelowania, Helion Krasnow, M, L., Kisielew, A, I., Makarenko, G, I., Zadania z równań cafkonych, Wydamructwo Naukowe PWN  eResources addresses Adresy na platformie e Nauczanie: WET1 – TKIS – Matematyka stosowana 2023/24 (M Musielak) - Mocde ID: 36753 https://enauczanie VET1 – TKIS – Matematyka stosowana 2023/24 (M Musielak) - Mocde ID: 36753 https://enauczanie Use Z transform to solve the given difference equation - Evaluate the line integrals over complex functions - Analyze the requency of the final grade for analyze transform is given.		line integrals of complex function							
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Final exam 50.0% 60.0% 120.0% 20.0% Short tests 0.0% 2	Prerequisites and co-requisites	Knowledge of mathematical analysis and linear algebra on undergraduate level							
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	Example issues/ example questions/ tasks being completed	<ul> <li>Use Z transform to solve the given difference equation</li> <li>Evaluate the line integrals over complex functions</li> </ul>							
Work placement Not applicable	Work placement	Not applicable							

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