



## Subject card

Subject name and code	Application of numerical methods, PG_00041658						
Field of study	Transport and Logistics, Transport and Logistics						
Date of commencement of studies	October 2020	Academic year of realisation of subject			2021/2022		
Education level	first-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	2	Language of instruction			Polish		
Semester of study	3	ECTS credits			2.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Hydromechanics and Hydroacoustics -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Michał Krężelewski					
	Teachers	mgr inż. Olga Kazimierska dr inż. Joanna Grzelak					
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	5.0		15.0		50
Subject objectives	Getting to know numerical methods using Matlab.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_W04] has a basic knowledge in IT, electronics, automation and control, computer graphics useful to understand the possibilities of their application in transport		Can describe a problem on the basis of knowledge in the field of mathematics with the use of numerical methods to solve it.		[SW3] Assessment of knowledge contained in written work and projects		
	[K6_W01] has a basic knowledge in maths, including algebra, elements of logics, geometry, mathematical analysis, theory of probability necessary to describe and analyse the operation means and systems of transport		Is able to obtain a solution to a problem formulated mathematically with the use of numerical and information methods in Matlab.		[SW3] Assessment of knowledge contained in written work and projects		
Subject contents	Introduction. Interpolation and approximation. Solving systems of algebraic equations. linear. Solving algebraic nonlinear equations. Numerical methods of integration. Solving ordinary differential equations. Numerical optimization methods.						
Prerequisites and co-requisites							
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	colloquium 2 times per semester		50.0%		100.0%		
Recommended reading	Basic literature		1..Zenon Fortuna, Bohdan Macukow, Janusz Wąsowski, Metody numeryczne, WNT, Warszawa 2015				
			2. Germund Dahlquist, Ake Björck, Metody numeryczne, PWN, Warszawa 1983				
	Supplementary literature		1. A. Ralston, Wstęp do analizy numerycznej, Warszawa 1971.				
			2. J. Stoer, R. Bulirsch Wstęp do analizy numerycznej, PWN, Warszawa 1987.				

	eResources addresses	
Example issues/ example questions/ tasks being completed	1. Gaussian elimination method.2. Interpolation by the Chebyshev method.3. Numerical integration using the trapezoidal method.4. Approximate methods of solving nonlinear equations. Chord method.5. Numerical calculating Simpson formula.6. Describe the main principles of using numerical methods.	
Work placement	Not applicable	