

GDAŃSK UNIVERSITY

Subject card

Subject name and code	, PG_00057625								
Field of study	Mathematics								
Date of commencement of studies	October 2022		Academic year of realisation of subject			2023/2024			
Education level	second-cycle studies		Subject group			Optional subject group 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			3.0			
Learning profile	general academic profile		Assessment form			assessment			
Conducting unit	Zakład Analizy Nielini	akład Analizy Nieliniowej -> Instytut Matematyki Stosowanej -> Faculty of Applied Physics and Mathematics							
Name and surname	Subject supervisor		dr hab. Karol Dziedziul						
of lecturer (lecturers)	Teachers		dr hab. Karol Dziedziul						
			Kazimierz Na	jmajer					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	Seminar	SUM	
	Number of study hours	30.0	0.0	0.0	0.0		30.0	60	
	E-learning hours included: 0.0								
Learning activity and number of study hours	Learning activity	Participation in classes includ	I didactic Participation in consultation hours		Self-study		SUM		
	Number of study hours	60		0.0	0			60	
Subject objectives	the aim of the course is to enrich the statistical approach with optimization methods. This gives you another machine learning method. all this is immersed in modern analytical methods, such as frames, the Kadison Singer hypothesis								
Learning outcomes	Course outcome		Subject outcome			Method of verification			
	K7_U04		Moore Penrose's theory allows a wider look at the method of solving classical methods of ordinary and partial differential equations. This theory is applied to a limited extent to the CUR method as an algebraic machine learning method.			[SU1] Assessment of task fulfilment			
	K7_W06		a concise view of machine learning methods			[SW3] Assessment of knowledge contained in written work and projects			
	K7_U13		solves design tasks using R or SAS software			[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools			
	K7_W08		i.e. SVM and kernel methods			[SW3] Assessment of knowledge contained in written work and projects			

Subject contents	Essentialy we have three main roots of that lecture: paper S. Smale, Y. Yao Online Learing Algorithm,						
	Vapnik V., Statistical Learning Theory, Wiley-Interscience, 1 edition, 1998,						
	Regularization: From Inverse Problems to Large-Scale Machine Learning						
	Ernesto De Vito, Lorenzo Rosasco, and Alessandro Rudi, 2021. All others part are consequence of that choice.						
Prerequisites and co-requisites	probability and three courses in statistics						
Assessment methods	Subject passing criteria	Passing threshold	Percentage of the final grade				
and criteria	lecture 50 lab 50%	50.0%	100.0%				
Recommended reading	Basic literature	PAULSEN, MRINALRAGHUPATHI An Introduction to the Theory. of Reproducing Kernel Hilbert Spaces .Cambridge University Press 2016					
		Heinz Werner Engl, Martin Hanke, A. Neubauer Regularization of Inverse Problems					
		Springer Science \& Business Media, 31 lip 1996					
		S. Smale, Y. Yao Online Learing Algorithms, Found. Comput. Math. 145170 (2006), Springer					
		Vapnik V., The Nature of Statistical Learning Theory, Springer, 2000. s. 38					
		A. Christmann and I. Steinwart. Support Vector Machines. Springer, Berlin, 2008					
	Supplementary literature	W. Rudin Functional Analysis					
	eResources addresses	Adresy na platformie eNauczanie:					
		Metody analityczne w uczeniu statystycznym i maszynowym - Moodle ID: 38027 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=38027					
Example issues/ example questions/ tasks being completed	Data will be given. Present result of machine learning						
Work placement	Not applicable						