



Subject card

Subject name and code	Machine Learning , PG_00069146						
Field of study	Electrical Engineering, Automation, Robotics and Control Systems						
Date of commencement of studies	February 2026	Academic year of realisation of subject			2026/2027		
Education level	second-cycle studies	Subject group					
Mode of study	Full-time studies	Mode of delivery			at the university		
Year of study	1	Language of instruction			Polish		
Semester of study	2	ECTS credits			3.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Intelligent and Decision Support Systems -> Faculty of Electrical and Control Engineering -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Michał Grochowski				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	30.0	0.0	45
	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	45		5.0		25.0	75
Subject objectives	The aim of the course is to familiarize students with comprehensive knowledge of the dynamically developing field of Machine Learning and to indicate its practical applications in the broadly understood areas of automation and computer science.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
Subject contents	Course content – lecture The course content will be delivered in three thematic blocks: Data analysis, Models and methods of training, Model performance analysis and improvement. 1. Data analysis, including: exploratory data analysis, data grouping and clustering, feature selection and extraction, dimensionality reduction, data normalization, visualization of multidimensional data. 2. Models and methods of training, including: regression models, support vector machines (SVM), neural networks, recurrent neural networks (RNN), deep neural networks (DNN), decision trees, random forests. 3. Model performance analysis and improvement, including: model performance evaluation metrics, regularization techniques, model validation, model hyperparameter tuning.						
	Course content – project The theoretical issues and methods discussed during the lectures will be illustrated with examples of their practical applications and implementation methods. Selected topics will be implemented in practice during the project classes, including: - design and implementation of a face recognition system, - design and implementation of a human activity recognition system based on data from wearable fitness devices.						
Prerequisites and co-requisites							
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	Lectures		50.0%		50.0%		
	Project		50.0%		50.0%		

Recommended reading	Basic literature	Bonaccorso, G. Algorytmy uczenia maszynowego. Zaawansowane techniki implementacji. Helion, 2019 Szeliga, M. Data Science i uczenie maszynowe. Wydawnictwo Naukowe PWN, 2017. Grus, J. Data science od podstaw. Analiza danych w Pythonie. Helion, 2019. Bengio, Y., Courville A., Goodfellow I. Deep Learning. Systemy uczące się. Wydawnictwo Naukowe PWN, 2018. Alpaydin, E. Introduction to Machine Learning. The MIT Press Cambridge, Massachusetts London, Engl
	Supplementary literature	Haykin, S. Neural Networks and Learning Machines (3rd Edition), Prentice Hall, 2009. Bishop C. M. Pattern Recognition and Machine Learning. Springer, 2006. MATLAB Statistics and Machine Learning Toolbox User's Guide, 2021. James, Gareth, et al. An introduction to statistical learning. Vol. 112. New York: springer, 2013. Murphy, Kevin P. Machine learning: a probabilistic perspective. MIT press, 2012.
	eResources addresses	
Example issues/ example questions/ tasks being completed	<ul style="list-style-type: none"> • Feature exploration and knowledge extraction from large datasets, data normalization, handling of missing data, dimensionality reduction, and visualization of multidimensional data. • A system for identifying athletes activities based on data from wearable fitness devices. 	
Practical activities within the subject	Not applicable	

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