



Subject card

Subject name and code	, PG_00073162						
Field of study	Automation, Robotics and Control Systems						
Date of commencement of studies	October 2026		Academic year of realisation of subject		2026/2027		
Education level	second-cycle studies		Subject group				
Mode of study	Part-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		assessment		
Conducting unit	Department of Electric Drives and Energy Conversion -> Faculty of Electrical and Control Engineering -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Daniel Wachowiak				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	10.0	0.0	0.0	0.0	10.0	20
	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	20		10.0		45.0	75
Subject objectives	The objective of the course is to familiarize students with the fundamental algorithms used in data mining.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_U04] has the ability for self-directed learning in order to improve his/her professional qualifications, and is able to identify directions for further learning		Is able to independently search, analyze, and select scientific literature and the latest programming tools to solve advanced data mining problems.		[SU5] Assessment of ability to present the results of task		
	[K7_W08] has in-depth knowledge of program development and design of complex systems automation systems using PLC and SCADA, transmission and processing of signals occurring in a variety of physical objects		Has an in-depth knowledge of data preprocessing techniques, and implementing machine learning and data mining algorithms in modern programming environments.		[SW1] Assessment of factual knowledge		
	[K7_W06] has an extended knowledge of the design of automation components and devices, control and decision support systems control and decision support systems and complex mechatronic systems		Knows and understands the architecture of decision support systems as well as advanced classification, clustering, and association analysis methods used to extract insights from large datasets.		[SW3] Assessment of knowledge contained in written work and projects		

Subject contents	Course content – lecture Overview of data mining concepts, and examples of practical engineering and business applications. Discussion on algorithms for discovering binary association rules, including support and confidence measures. Mining advanced multilevel and multidimensional association rules. Overview of data classification methods, training/testing data split techniques, and evaluation and validation criteria for classification models. Decision tree induction using the Gini Index and Information Gain. Introduction to data clustering concepts and problem definition. Methods for defining and calculating object similarity and distance measures in multidimensional feature spaces. Overview of hierarchical clustering and iterative optimization clustering methods. Introduction to modern software tools and advanced programming environments for data mining.		
	Course content – seminar Review and comparative analysis of software environments and applications used in intelligent data analysis processes. Practical verification of data preprocessing methods, including data cleaning strategies, missing value handling, and normalization techniques. Methodical performance evaluation of binary, multilevel, and multidimensional association rule mining algorithms on selected datasets. Comparative analysis of classification processes, including model evaluation using confusion matrices and accuracy metrics. Examination of structures and splitting criteria in decision trees using the Gini Index and Information Gain. Practical determination and interpretation of object similarity and distance measures. Analysis and verification of hierarchical and iterative-optimization clustering algorithms in data segmentation problems. Case studies on the deployment and performance of practical data mining systems.		
Prerequisites and co-requisites			
Assessment methods and criteria			
	Subject passing criteria	Passing threshold	Percentage of the final grade
	Lecture test	60.0%	50.0%
	Presentation	60.0%	50.0%
Recommended reading	Basic literature	Morzy T.: Eksploracja danych, Wydawnictwo Naukowe PWN, Warszawa 2013. Osowski S.: Metody i narzędzia eksploracji danych, Wydawnictwo BTC, Legionowo 2013.	
	Supplementary literature	Witten I. H., Frank E.: Data Mining: Practical Machine Learning Tools and Techniques, Second Edition, Morgan Kaufmann Publishers, 2005. Han J., Kamber M., Pei J.: Data Mining Concepts and Techniques, Third Edition, Morgan Kaufmann Publishers, 2012	
	eResources addresses		
Example issues/ example questions/ tasks being completed	Based on a store's transaction list, find sets of products that frequently co-occur in consumer shopping carts. Based on patient data, identify or determine disease symptoms. Based on insurance data, propose a decision tree to classify customers into specific risk groups. Group files of similar topics from a collection of text documents.		
Practical activities within the subject	Not applicable		

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