GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Machine learning, PG_00062733		
Field of study	Technologies for Industry 5.0		
Date of commencement of studies	October 2025	Academic year of realisation of subject	2027/2028
Education level	first-cycle studies	Subject group	Obligatory subject group in the field of study 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	3	Language of instruction	Polish
Semester of study	5	ECTS credits	5.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Department Of Functional Materials Engineering -> Faculty Of Electronics Telecommunications And Informatics -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Milena Marycz	
	Teachers		

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	30.0	0.0	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	75.0	125

Subject objectives

The goal of the course is to provide knowledge about different types of machine learning and artificial neural networks, as well as practical skills in using existing software to create and train models.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W06] demonstrates knowledge related to data analysis and engineering, machine learning, knows the principles of integrating data with management systems to analyze complex engineering and technological problems	As a result of the learning process, the student acquires knowledge of fundamental concepts related to machine learning and artificial neural networks, as well as higher mathematics and IT techniques necessary for solving moderately complex physical problems using machine learning methods.	[SW1] Assessment of factual knowledge
[K6_U06] performs analysis, exploration and cleaning of data sets, can use statistical models and machine learning models, integrate various analytical, management and data storage tools	As a result of the learning process, the student acquires the ability to apply machine learning and artificial neural networks to practical problems, as well as skills in performing simple experiments, observations, numerical calculations, and computer simulations using standard software packages. The student also develops the ability to critically analyze measurement results, observations, and calculations, along with assessing the accuracy of the results.	[SU1] Assessment of task fulfilment

Subject contents	1. Introduction to artificial intelligence and machine learning (algorithms and methods). 2. Methods for data acquisition and preparation. 3. Supervised learning, linear regression, and the least squares algorithm. 4. Decision trees. 5. Support vector machines. 6. Unsupervised learning. 7. Principal component analysis (PCA). 8. Introduction to neural networks. 9. Linear neural networks and forms of nonlinearity. 10. Reinforcement learning.
Prerequisites and co-requisites	The student is familiar with: - basics of linear algebra, mathematical analysis, and probability theory, including Bayes' theorem, - basics of data analysis methods, - basics of the Python programming language.
Assessment methods and criteria	

Subject passing criteria	Passing threshold	Percentage of the final grade
	60.0%	50.0%
	60.0%	50.0%

Recommended reading	Basic literature	1. Tadeusiewicz, R., Neural Networks, Warsaw, 2006. 2. Hertz, J., Krogh, A., Palmer, R., Introduction to the Theory of Neural Computation, Warsaw, 1991. 3. Conway, D., White, J. M., Machine Learning for Programmers, Warsaw, 2020. 4. Raschka, S., Mirjalili, V., Python Machine Learning, Packt Publishing, 2019. 5. Recommended articles during the course.
	Supplementary literature	1. Deisenroth, M. P., Mathematics for Machine Learning, Cambridge University Press, 2020. 2. Norvig, R., Artificial Intelligence: A Modern Approach, 2010.
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

Document generated electronically. Does not require a seal or signature.