

Subject card

Subject name and code	Machine Learning and Artificial Intelligence, PG_00203640						
Field of study	Informatics						
Date of commencement of studies	October 2026	Academic year of realisation of subject			2027/2028		
Education level	Master's 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	part-time studies	Mode of delivery			at the university		
Year of study	2	Language of instruction			Polish		
Semester of study	3	ECTS credits			5.0		
Learning profile	academic	Assessment form			credit		
Conducting unit	Division of Artificial Intelligence -> Institute of Informatics -> Faculty of Mathematics, Physics and Informatics -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		mgr Grzegorz Madejski				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	20.0	0.0	20.0	0.0	0.0	40
	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	40		0.0		85.0	125
Subject objectives	The aim of the course is to familiarize students with the possibilities and techniques of computational intelligence. It is assumed that the participant will learn the basic techniques and acquire the ability to select appropriate models and algorithms for tasks and discuss solutions.						
Learning outcomes	Course outcome		Subject outcome			Method of verification	
	[INFMU2_W09] knows and understands formal models of data representation and structures (e.g. graphs, relational and non-relational models), knows the applications of mathematical models and data structures in solving practical problems, understands the connections between theory (e.g. graphs) and practical data processing systems (e.g. databases, Big Data systems)						
	[INFMU2_W05] has in-depth knowledge of artificial intelligence algorithms and techniques, their properties and importance in practical applications						
	[INFMU2_U06] can solve problems using artificial intelligence algorithms and tools						

Subject contents	<ul style="list-style-type: none"> • Biologically inspired metaheuristic algorithms, with particular emphasis on the genetic algorithm. • Supervised machine learning. Classification task. • Unsupervised machine learning. • Artificial neural networks. Deep learning. • Fuzzy logic. 														
Prerequisites and co-requisites	<ul style="list-style-type: none"> • basics of programming in Python • basics of algebra, statistics, and probability calculus 														
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="456 568 794 591">Subject passing criteria</th> <th data-bbox="799 568 1137 591">Passing threshold</th> <th data-bbox="1142 568 1481 591">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="456 598 794 620">Solving tasks</td> <td data-bbox="799 598 1137 620">51.0%</td> <td data-bbox="1142 598 1481 620">25.0%</td> </tr> <tr> <td data-bbox="456 627 794 649">Projects</td> <td data-bbox="799 627 1137 649">51.0%</td> <td data-bbox="1142 627 1481 649">50.0%</td> </tr> <tr> <td data-bbox="456 656 794 678">Exam</td> <td data-bbox="799 656 1137 678">51.0%</td> <td data-bbox="1142 656 1481 678">25.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Solving tasks	51.0%	25.0%	Projects	51.0%	50.0%	Exam	51.0%	25.0%
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Recommended reading	Basic literature Supplementary literature eResources addresses	<ul style="list-style-type: none"> • David E. Goldberg: Algorytmy genetyczne i ich zastosowanie, WNT 2003 • Marcin Szeliga: Praktyczne uczenie maszynowe, PWN 2019 • Joel Grus: Data science od podstaw, Helion 2018 • Drew Conway, John Myles White: Uczenie maszynowe, Helion 2015 • Marcin Szeliga: Data Science i Uczenie Maszynowe, PWN 2017 • Sebastian Raschka, Vahid Mirjalili: Python. Uczenie Maszynowe, wyd. 2, Helion 2019 • Seth Weidman: Uczenie głębokie od zera. Podstawy implementacji w Pythonie, Helion 2020 • Jacek Tabor, Marek Śmieja, Łukasz Struski Przemysław: Uczenie głębokie. Wprowadzenie, Helion 2022 • Maciej Wenerski: Podstawy logiki rozmytej i wnioskowania rozmytego, 2013 • Internet tutorials 													
Example issues/ example questions/ tasks being completed	<ul style="list-style-type: none"> • Solving the knapsack problem using the genetic algorithm. • Finding an appropriate algorithm for diagnosing diabetes in individuals with given medical parameters (classification in medicine). • Creating a system based on fuzzy logic to calculate tips. • Creating a neural network to recognize whether there is a dog or a cat in a photo. 														
Work placement	Not applicable														

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