

## 1.1. Course description

NAME OF THE COURSE		Machine Learning				
Code	PMIH21	Year of study				
Course teacher		Credits (ECTS)	5,0			
Associate teachers		Type of instruction (number of hours)	L	S	E	F
Status of the course		Percentage of application of e-learning				
COURSE DESCRIPTION						
Course objectives	The course goal is introducing students to the artificial intelligence field dealing with algorithm design based on collected data. Students will have the opportunity to learn about machine learning basics and its applications in classification, data mining, bioinformatics, natural language processing, robotics, autonomous vehicles. During the course, students will learn and apply supervised and unsupervised learning methods in a domain of interest.					
Course enrolment requirements and entry competences required for the course	Passed exam - Introduction to artificial intelligence Good knowledge of the object-oriented programming paradigm Good knowledge of the implementation of the statistics					
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Define basic concepts of machine learning Argument benefits and weaknesses of basic machine learning algorithms for a specific domain Evaluate the fitness of different models Design use and evaluate data classification and grouping algorithms Demonstrate the possibility of using machine learning by creating an application for a specific domain of interest					
Course content broken down in detail by weekly class schedule (syllabus)	Introduction to machine learning and motivation for its usage Different approaches to machine learning and different application environments The dimensionality of the problem, bias, generalisation and training problem Probabilistic models, Bayes classifier Linear and logistic regression models, benefits and pitfalls Linearly separable problems, perceptron and generalisation of separability based on multilayer perceptron Support vector machines, kernel functions and regression Nonparametric methods. k-nearest neighbours algorithm. Decision trees. Feature selection, data visualisation and training results Clustering, k-means algorithm, hierarchical clustering Actual usage of machine learning How to get the data? Data collection methods Ethical questions in machine learning usage					
Format of instruction						
Student responsibilities						

Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)	Name	Ects	Name	Ects	Name	Ects
	Class attendance	1	Research	0.5	Experimental work	
	Oral exam	0.5	Report		Homework assignments	
	Seminar essay		Essay			
	Tests	0.5	Practical training	1		
	Written exam	0.5	Project	1		
Grading and evaluating student work in class and at the final exam						
Required literature (available in the library and via other media)	Title			Number of copies in the library	Availability via other media	
	Kanber, Burak. Hands-on Machine Learning with JavaScript: Solve complex computational web problems using machine learning. Packt Publishing Ltd, 2018			0		
	Ng, A. "Machine learning yearning: Technical strategy for ai engineers in the era of deep learning." (2019).			0		
	Ethem Alpaydin; Introduction to Machine Learning, Fourth Edition; MIT press, 2020.			0		
Optional literature (at the time of submission of study programme proposal)	In accordance to the chosen domain.					
Quality assurance methods that ensure the acquisition of exit competences	Student discussion, anonymous student evaluation questionnaire, student success rate, self-assessment					
Other (as the proposer wishes to add)						