

Obuda University Bánki Donát Faculty of Mechanical and Safety Engineering				Insitute of Mechatronics and Vehicle Engineering				
Subject title and code:				Introduction to Machine Learning BMXBGE5BNF			Credits:	4
Full-time study				2026/2027		ac. 1		semester
				year				
The course is available at:				mechatronical engineering BSc				
Supervised by:				Andrew Frigyik, PhD		Instructors: Andrew Frigyik, PhD		
Prerequisite (neptun code):				Mathematics III (BTXMME3BNF), Object-oriented Programming (BMXOPE3BNF)				
Weekly number of lessons								
Lecture: 1		Group seminar: 0		Lab:2			Consultation: 0	
Way of assessment:		Midterm mark		(Oral)				
Online consultation (in case it's required): ... (BBB link)								
Edu. goal:		The purpose of the course is to survey the basic methods of machine learning. The students will get familiar with some basic statistical learning methods first and with more advanced machine learning methods later in theory and in practice. Through a sequence of Jupyter notebooks they will have an opportunity to test all the introduced methods on non-trivial databases both in the lab and at home.						
Schedule								
Education week		Topics						
1.		Basic idea of statistical learning, Python introduction/refresher						
2.		Simple and multiple Linerar Regression						
3.		Classification using Logistic Regression, Linear and Quadratic Discriminant Analysis, as well as K-Nearest Neighbors model						
4.		Cross-Validation and Bootstrap methods						
5.		Linear Model Selection and Regularization, Dimension Reduction method						
6.		Non-linear methods: Polynomial Regression, Splines and Generalized Additive Models						
7.		Tree-Based methods: Decision Trees, Bagging, Random Forests						
8.		Support Vector Classifiers and Machines						
9.		Single Layer and Multilayer Neural Networks, Convolutional Neural Networks, Deep Learning						
10.		Time related methods: Survival Analysis and Censored Data						
11.		Unsupervised Learning: Principal Component Analysis, Clustering methods						
12.		Rector's Holiday						
13.		Methods for Inference: Multiple Testing						
14.		Overview						
Mid-semester requirements								
Test		Assignment to be submitted			Lab measurement			
amount	dates	amount	deadlines		amount	dates		
		12	weekly					
According to the HKR attendance of group seminars and lab exercises are mandatory.								
Other requirements for participation in sessions not covered by the regulations and restrictions on substitutions:								
Test		Assignment to be submitted			Lab measurement			
maximum points available	minimum score required to pass /test	maximum points available	minimum score required to pass / assignment		maximum points available	minimum score required to pass /lab		
...points	...points	100 points	50 points		...points	...points		

Total number of points achievable in semester: ...points				
Grading thresholds	satisfactory 50 % and above	average 63 % and above	good 76 % and above	excellent 90 % and above
Other evaluation criteria: The grade is entirely based on the assignments. Assignments can be resubmitted for a better grade.				
Receive a signature denied entry:				
Required references:				
Recommended references:	Gareth James, Daniela Witten, Trevor Hastie, Robert Tibshirani, Jonathan Taylor; An Introduction to Statistical Learning with Applications in Python; Springer 2023			
Quality assurance methods of the subject:				

Things, that are not included, can be found within the regulations of Óbuda University.