No. 9

Course syllabus for first cycle studies							
1.	**Course title**	Machine Learning					
2.	**Code**	MDE7M3					
3.	**Study Program**	Metallurgical Digital Engineering					
4.	**Study program organizer (unit, institute, department, division)**	Faculty of Technology and Metallurgy, Ss "Cyril and Methodius" University in Skopje					
5.	**Degree (first, second, third cycle)**	First cycle					
6.	**Academic year / semester**	IV/7	7.	**Number of ECTS**	6		
8.	**Instructors**	Dr Gorjan Nadzinski					
9.	**Prerequisites for course enrollment**	The student should be knowledgeable in the field of programming and algorithms.					
10.	**Objectives of the course syllabus (competences):** Students will be introduced to the basic machine learning principles, concepts, and techniques. **Acquired skills (competences):** Upon successful completion of the course, students will be able to independently solve practical engineering tasks using machine learning algorithms and approaches.						
11.	**Content of the course:** Introduction to machine learning. Supervised learning: Single-variable and multi-variable linear regression. Gradient descent method. Polynomial regression. Logistic regression. Classification as a machine learning problem. Regularization. Neural networks. Support vector machines. Unsupervised learning. K-means clustering. Feature compression. Anomaly detection systems. Machine learning for large data sets. Examples of machine learning algorithms implementation for real problem solving.						
12.	**Study methods:** Combined: presentations, homework, project assignments, practical laboratory work.						
13.	**Total available time**	180 hours					
14.	**Allocation of available time**	2+2+1					
15.	**Teaching activities**	15.1.	Lectures-theoretical teaching	30 hours			
		15.2.	Exercises (laboratory, practice classes), seminars, teamwork	45 hours			
16.	**Other types of activities**	16.1.	Projects, seminar papers	30 hours			
		16.2.	Individual tasks	30 hours			
		16.3.	Homework and self-learning	45 hours			
17.	**Grading system**						
	17.1.	Exams		0 points			
	17.2.	Seminar work/project (presentation: written and oral)		40 points			
	17.3.	Activity and participation		0 points			
	17.4.	Final exam		60 points			
18.	**Grading criteria (points/grade)**	Up to 50 points	5 (five) (F)				
		From 51 to 60 points	6 (six) (E)				
		From 61 to 70 points	7 (seven) (D)				
		From 71 to 80 points	8 (eight) (C)				
		From 81 to 90 points	9 (nine) (B)				
		From 91 to 100 points	10 (ten) (A)				
19.	**Prerequisites for taking the final exam**	Completion of laboratory work assignments.					
20.	**Language in which lectures are conducted**	Macedonian and English.					

21.	**Method for monitoring the quality of lectures**		Internal evaluation and polls.			
22.	**LITERATURE**					
	22.1.	Compulsory literature				
		No.	Author	Title	Publisher	Year
		1.	S. Marsland	Machine Learning: An Algorithmic Approach	CRC Press	2015
		2.	M. Kuhn, K. Johnson	Applied Predictive Modeling	Springer	2016
		3.				
	22.2.	Additional literature				
		No.	Author	Title	Publisher	Year
		1.	S. Raschka, V. Mirjalili	Python Machine Learning	Packt Publishing	2017
		2.	C. Bishop	Pattern Recognition and Machine Learning	Springer	2006
		3.				