

1.	Course title	Machine Learning		
2.	Course code	CSEW517		
3.	Study program	IKI		
4.	Unit offering the course	FCSE		
5.	Undergraduate/postgraduate/PhD	Undergraduate		
6.	Year/semester 3 / winter / elective	7. ECTS: 6		
8.	Teacher(s)	Prof. Ljupco Kocarev, Prof. Zhaneta Popeska, Assoc. Prof. Ana Madevska Bogdanova, Assoc. Prof. Dejan Gjorgjevikj, Assoc. Prof. Andrea Kulakov, Asst. Prof. Igor Trajkovski, Asst. Prof. Gjorgji Madjarov		
9.	Course prerequisites	none		
10.	Goals (competences): The goal of the course is to introduce the students to the basics of the modern machine learning techniques. After completion of the course the students will: have deeper knowledge of advanced techniques and methods of machine learning; be able to apply successfully the machine learning algorithms for solving real world problems; be able to conceptualize, analyze, realize and estimate the performances of a machine learning system.			
11.	Course content: Introduction to machine learning. Linear regression with one or more variables. Logistic regression, hypothesis representation, classification, cost functions, error evaluation, model selection and validation. Bayesian theory, naïve Bayesian classifier, neural networks, support vector machines, decision trees, lazy classifiers. Ensembles. Unsupervised and supervised learning. Contemporary problems in machine intelligence.			
12.	Teaching methods: Lectures supported by slide presentations, interactive lectures, trainings (using lab equipment and software packages), team work, case studies, invited guests and lectures, individual practical assignments presentations, seminar paper, e-learning (forums, consultations).			
13.	Total available time		Total available time	
14.	Distribution of the available time		30+60+50+40 = 180 h	
15.	Teaching activities	15.1.	Lectures	30 hours
		15.2.	Training (labs, problem solving), seminar and team work	60 hours
16.	Other activities	16.1.	Home work	50 hours
		16.2.	Self study	40 hours
17.	Grading			
	17.1.	Mid-term exams (2)		70 points

	17.2.	Homework assignments			20 points	
	17.3.	Active participation			10 points	
18.	Grading criteria	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.	Final exam prerequisites	Successful completion of activities 15.1 and 15.2				
20.	Course language	Macedonian and English				
21.	Quality assurance methods	Internal evaluation mechanisms supported by student polls				
22.	Literature					
	22.1.	Compulsory				
		No.	Authors	Title	Publisher	Year
		1.	Peter Harrington	Machine Learning in Action	Manning Publications	2012
		2.	Tom M. Mitchell	Machine Learning	MIT Press	1997
	3.	Christopher M. Bishop	Pattern Recognition and Machine Learning	Springer	2006	
	22.2.	Additional				
		No.	Authors	Title	Publisher	Year
		1.	Ethem Alpaydin	Introduction to Machine Learning	MIT Press	2004
		2.	Ian H. Witten, Eibe Frank, Mark A. Hall	Data Mining: Practical Machine Learning Tools and Techniques	Morgan Kaufmann	2011
3.						