APPLIED MACHINE LEARNING

1	Course Title:	APPLIED MACHINE LEARNING
2	Course Code:	END5162
3	Type of Course:	Optional
4	Level of Course:	Second Cycle
5	Year of Study:	1
6	Semester:	2
7	ECTS Credits Allocated:	7.50
8	Theoretical (hour/week):	3.00
9	Practice (hour/week):	0.00
10	Laboratory (hour/week):	0
11	Prerequisites:	
12	Language:	Turkish
13	Mode of Delivery:	Face to face
14	Course Coordinator:	Doç. Dr. DUYGU YILMAZ EROĞLU
15	Course Lecturers:	
16	Contact information of the Course Coordinator:	Doç. Dr. Duygu Yılmaz Eroğlu duygueroglu@uludag.edu.tr, 0(224) 2940916 Endüstri Mühendisliği Bölümü Görükle Bursa
17	Website:	ukey.uludag.edu.tr
18	Objective of the Course:	It is aimed to get knowledge about the area of usage and limits of techniques selected in basic machine learning titles such as linear models, neural networks, kernel methods for regression and classification. Another objective is improving the application skill of the algorithms in Python environment.
19	Contribution of the Course to Professional Development:	It is planned to contribute to professional development by gaining knowledge about the basic machine learning techniques which provide the desired behaviors by learning from data and experiences.
20	Learning Outcomes:	

		1	Gaining initial level theoretical knowledge about machine learning techniques
		2	Ability of coding the learned algorithms in Python environment
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21	Course Content:	

Course Content:

Week	Theoretical	Practice
1	The aim, content and introduction of the course.	

2	Linear Model for regression: Linear regression model, MAP (Maximum a posteriori), ML (maximum likelihood) approaches and comparison for parameter vector prediction.	
3	Linear Model for regression: Least mean squared (LMS)) algorithm and the examples about the subject.	
4	Reinforcement of the gains about simple linear regression, multiple linear regression in Python environment.	
5	Linear models for classification: Learning the Rosenblatts' Perceptron (single layer perceptron) and Widrow-Hoff rule, which are single-node and simplest examples for classification of neural networks.	
6	Neural Networks – Multi layers perceptron and Backpropagation Algorithm.	
7	Reinforcement the gains of neural networks in Python environment.	
8	Model selection, k-fold cross validation	
9	Kernel Methods: Radial Basis Function Networks and RBF solution of XOR problem.	
10	K-means clustering method.	
11	Sparse Kernel Machines: Support Vector Machines (SVM)) and SVM solution of XOR problem.	

Activites	Number	Duration (hour)	Total Work Load (hour)
Theoretical application in Python	14	3.00	42.00
Practicals/Labs	0	0.00	0.00
Self study and preperation	14	8.00	112.00
Homeworks	0	0.00	0.00
Projects	0	30.00	30.00
Field Studies	0	0.00	0.00
Midterm exams	0	0.00	0.00
Others	0	0.00	0.00
Final Exams	1	40.00	40.00
Total Work Load			224.00
Total work load/ 30 hr			7.47
ECTS Credit of the Course			7.50

22 Textbooks: References and/or Other   Books:

learning: springer, 2006

• Haykin, Simon. Neural networks and learning machines,

• Deisenroth, Marc Peter, A. Aldo Faisal, and Cheng Soon Ong. Mathematics for machine learning. Cambridge

• Friedman, Jerome, Trevor Hastie, and Robert Tibshirani. The elements of statistical learning. Vol. 1. No. 10. New

23 Assesment

TERM LEARNING ACTIVITIES	NUMBER	WEIGHT
Midterm Exam	0	0.00
Quiz	0	0.00
Home work-project	1	40.00
Final Exam	1	60.00
Total	2	100.00
Contribution of Term (Year) Learning Activities to Success Grade		40.00
Contribution of Final Exam to Success Grade		60.00
Total		100.00
Measurement and Evaluation Techniques Used in the Course		Project and final exam

24	ECTS / WORK LOAD TABLE															
25	**CONTRIBUTION OF LEARNING OUTCOMES TO PROGRAMME QUALIFICATIONS**															
	PQ1	PQ2	PQ3	PQ4	PQ5	PQ6	PQ7	PQ8	PQ9	PQ10	PQ11	PQ12	PQ13	PQ14	PQ15	PQ16
ÖK1	5	3	4	5	5	3	3	4	4	3	2	4	4	0	0	0
ÖK2	3	4	4	5	5	2	2	4	4	2	2	3	4	0	0	0
LO: Learning Objectives PQ: Program Qualifications																
Contribution Level:	1 very low			2 low			3 Medium			4 High			5 Very High			