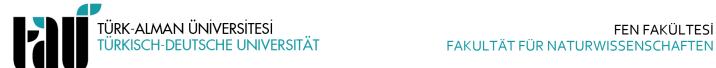


DEPARTMENT OF ENERGY SCIENCE AND TECHNOLOGY **COURSE SYLLABUS**

Course Details								
Code				Acad	Academic Year			ster
EBT357				4	7			
Title					Α	L	ECTS	
Introduction to Machine Learning	Ş			3	1	0	6	
Language	English							
Level	Undergraduate X Graduate Postgraduate							
Department / Program	Energy Science and Technology							
Forms of Teaching and Learning	Face-to-face							
Course Type	Compulsory			Ele	ective			X
Objectives	The aim of this course is to provide students with a fundamental understanding of machine learning (ML) techniques and algorithms. Students will acquire practical skills in machine learning by learning key processes such as data analysis, modeling, and evaluation. Additionally, the course aims to develop students' comprehension of the theoretical foundations of machine learning and how machine learning algorithms are developed.							
Content	This course covers the fundamental concepts, methods, and applications related to machine learning. The content is supported by both theoretical knowledge and practical examples, aiming to equip students with the ability to analyze machine learning methods, develop applications, and interpret results.							
Prerequisites	None							
Coordinator	Dr. Kaan Deveci							
Lecturer(s)	Dr. Kaan Deveci							
Assistant(s)	Dr. Kaan Deveci							
Work Placement	None							
Recommended or Required R	eading							
Books / Lecture Notes	Goodfellow, I., Bengio, Y., & Courville, A. (2016). Deep learning. MIT Press. http://www.deeplearningbook.org . Machine Learning, Tom Mitchell, McGraw Hill, 1997. https://www.cs.cmu.edu/~tom/mlbook.html							
Other Sources	Course notes Google Python eğitim notları, https://developers.google.com/edu/python/							
Additional Course Material								
Documents			-					
Assignments	4 assignments and 1 term project							
Exams	1 midterm and 1 final							
Course Composition								



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		COURSEST	LLADOS			
Mathematics u Sciences	nd Basic	25	%			
Engineering		25	%			
Engineering De	sign	-	%			
Social Sciences		-	%			
Educational Sci	ences	-		%		
Natural Science	es	25	5	%		
Health Sciences	S	-		%		
Expert Knowled	lge	25	5	%		
Assessment						
Acti	vity	Cou	int	Percentage (%)		
Midterm Exam		1		20		
Quiz		-		-		
Assignments		4		20		
Attendance		-		5		
Recitations		-		-		
Projects		1	15			
Final Exam		1	40			
			Total	100		
ECTS Points a	nd Work Load					
Acti	ivity	Count	Duration	Work Load (Hours)		
Lectures		14	3	42		
Self-Study		12	6	72		
Assignments						
Presentation / Preparation	Seminar	1	15	15		
Midterm Exam		1	2	2		
Recitations						
Laboratory		14	1	14		
Projects		1	20	20		
Final Exam		1 2		2		
			Total Work Load	168		
ECTS Points (Total Work Load / Hour) 6				6		
Learning Outo	omes					
1	Students will be able to explain the fundamental concepts and theoretical foundations of machine learning.					
2		Students will be able to implement various machine learning algorithms and understand their advantages and limitations.				
3	Students will be able to perform data preprocessing, model selection, and evaluation.					
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4	Students will gain knowledge on advanced topics such as feedforward neural networks and deep learning.
5	Students will be able to apply machine learning models to real-world datasets and analyze the results.

Weekly Conte	nt
1	Introduction to Machine Learning
2	Supervised Learning – Linear Regression
3	Supervised Learning – Logistic Regression
4	Supervised Learning – Classification
5	Unsupervised Learning – Clustering
6	Support Vector Machines
7	Feedforward Neural Networks
8	Midterm Exam
9	Data Preprocessing, Cleaning, and Model Selection
10	Model Evaluation Metrics
11	Principal Component Analysis
12	Reinforcement Learning
13	Model Ensembles
14	Ethics
15	Project Work
16	Final Exam

Contribution of Learning	Outcomes to Program	Objectives	(1-5)
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	P1	P2	Р3	P4	P5	Р6	P7
1	4	5	4	3	4	3	3
2	4	5	5	3	5	4	3
3	3	4	4	2	5	4	3
4	4	5	5	3	5	4	2
5	4	5	5	3	5	5	3
Contribution Level 1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High							

P1 Working with modern scientific sources.

- P2 Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
- P3 Having theoretical and practical skills in the area of Energy Science and Technology.
- P4 Having foreign language skills to follow the worldwide advancements in the field of Energy Science and Technology and to be able to discuss them with foreign colleagues.
- P5 Having computational skills for research data analysis purposes.
- P6 Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
- P7 Having knowledge about work occupational work and safety.

Compiled by:	aan Deveci
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