

COURSE INFORMATION					
Course Title	Code	Semester	L+P Hour	Credits	ECTS
MACHINE LEARNING	CSE585	2	3	3	10

Prerequisites	
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Language of Instruction	English
Course Level	Graduate
Course Type	Elective
Course Coordinator	
Instructors	Prof.Dr. Emin Erkan Korkmaz
Assistants	
Goals	The aim of this course is to provide students the knowledge about the basic techniques and methodologies of machine learning and abilities to apply machine learning methods on practical problems.
Content	Basic concepts and techniques of machine learning. Supervised learning techniques. Concept and Decision Tree Learning. Bayesian approach in machine learning. Evolutionary approach and genetic programming. Neural Networks, Support Vector Machines and reinforcement learning. Unsupervised machine learning and clustering.

Course Learning Outcomes	Program Learning Outcomes	Teaching Methods	Assessment Methods
1) Knowledge about the basic methodologies in machine learning.	3	1,2,3	A,C
2) Ability to use knowledge to formulate, and solve practical problems using machine learning techniques.	2	1,2,3	A,C

Teaching Methods:	1: Lecture, 2: Question-Answer, 3: Lab, 4: Case-study
Assessment Methods:	A: Testing, B: Experiment, C: Homework, D: Project

COURSE CONTENT		
Week	Topics	Study Materials
1	Introduction	Textbook
2	Concept Learning	Textbook
3	Decision Tree Learning	Textbook
4	Genetic Algorithms and Programming	Textbook
5	Project Proposal Presentations	Textbook
6	Bayesian learning	Textbook
7	Bayesian Belief Networks	Textbook
8	Feed Forward Neural networks	Textbook
9	Recurrent Neural Networks	Textbook
10	Support Vector Machines	Textbook
11	Reinforcement Learning	Textbook
12	Unsupervised Learning	Textbook
13	Project Presentations	Textbook
14	Project Presentations	Textbook

RECOMMENDED SOURCES	
Textbook	Machine Learning, McGraw-Hill, T. Mitchell (1997)
Additional Resources	

MATERIAL SHARING	
Documents	
Assignments	
Exams	

ASSESSMENT			
	IN-TERM STUDIES	NUMBER	PERCENTAGE
Assignment		1	20

Project	1	80
Total		100
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		35
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		65
Total		100

COURSE CATEGORY	Expertise/Field Courses
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COURSE'S CONTRIBUTION TO PROGRAM						
No	Program Learning Outcomes	Contribution				
		1	2	3	4	5
1	Ability to reach wide and deep knowledge through scientific research in the field of Computer Science and Engineering, evaluate, interpret and apply.				X	
2	Ability to use scientific methods to cover and apply limited or missing knowledge, and to integrate the knowledge of different disciplines.			X		
3	Ability to construct Computer Science and Engineering problems, develop methods to solve the problems and use innovative methods in the solution.			X		
4	Ability to develop new and/or original ideas and algorithm; develop innovative solutions in the design of system, component or process.				X	
5	Ability to have extensive knowledge about current techniques and methods applied in Computer Engineering and their constraints.			X		
6	Ability to design and implement analytical modeling and experimental research, solve and interpret complex situations encountered in the process.				X	
7	Ability to use a foreign language (English) at least at the level of European Language Portfolio B2 in verbal and written communication.			X		
8	Ability to lead in multidisciplinary teams, develop solutions to complex situations and take responsibility.	X				
9	Ability to pass process and the results in Computer Science and Engineering field, in national and international area in or outside of the field, systematically and clearly in written or oral form.	X				
10	Awareness of the social, legal, ethical and moral values, and the ability to conduct research and implementation work within the framework of these values.		X			
11	Awareness of the new and emerging applications in Computer Science and Engineering field, and the ability to examine them and learn if necessary.				X	
12	Ability to describe the social and environmental dimensions of Computer Science and Engineering applications.			X		

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Course Duration	14	3	42
Hours for off-the-classroom study (Pre-study, practice)	14	5	70
Project	1	95	95
Assignment	1	30	30
Final examination	1	3	3
Total Work Load			240
Total Work Load / 25 (h)			9.6
ECTS Credit of the Course			10