OSTIM TECHNICAL UNIVERSITY
COMPUTER ENGINEERING

CENG 401 Machine Learning an Artificial Intelligence

CENG 401 Machine Learning an Artificial Intelligence							
Course Name	**Course Code**	**Term**	**Hour**	**Practice**	**Lab**	**Credit**	**ECTS**
Machine Learning an Artificial Intelligence	CENG 401	7	3	0	0	3	4

Language of the Course	English
Type of Course	Compulsory
Course Level	Undergraduate
Method of Teaching	Face-to-face, online
Instructor	
Course Learning and Teaching Techniques	Lecture, Homework, Project

Purpose of the Course

The aim of this course is to explain machine learning and artificial intelligence in detail and to work on these issues. Participants get to know different aspects of this type of next generation technology.

Learning Outcomes

Students who successfully complete this course;

- Have knowledge about machine learning,
- Find out which types of problems to solve with which machine learning method,
- Have coding knowledge at a level to apply a theorem related to machine learning.
- Recognize artificial intelligence conceptually,
- They learn how artificial neural networks work and can apply when necessary.
- They know how to use machine learning and artificial intelligence in current applications.

Course Content

This course introduces the student to machine learning and artificial intelligence. It begins by introducing concepts such as knowledge, learning, and layers. Topics progress by covering topics such as state space searching, heuristic searching, information representation, analysis, constraint satisfaction problems, meta-logic programming, meta-interpreters, and inductive logic programming. Then, related topics such as Deep learning and reinforcement learning are mentioned. Finally, the applicability of these topics is discussed on sample problems.

Weekly Plan and Related Preparation Studies

Week	Subjects
1	AI Fundamentals
2	Defining Artificial Intelligence, Defining AI techniques,
3	State Space Search and Heuristic Search Techniques

4	Defining problems as State Space search, Production systems and characteristics, Hill
5	Climbing, Breadth first and depth first search, Best first search
6	Representations and Mappings, Approaches to knowledge representation
7	Midterm
8	Using Predicate Logic and Representing Knowledge as Rules [20%]
9	Representing simple facts in logic, Computable functions and predicates, Procedural vs Declarative knowledge, Logic Programming, Forward vs backward reasoning
10	Non-monotonic Reasoning, Logics for non-monotonic reasoning
11	Probability and Bayes Theorem, Certainty factors, Probabilistic Graphical Models,
12	Bayesian Networks, Markov Networks, Fuzzy Logic
13	Introduction to Natural Language Processing, Hopfield Networks,
14	Neural Networks, Recurrent Networks, Symbolic AI
15	Important Applications
16	Final

Resources (Textbook and supplementary book)

1. Artificial intelligence : structures and strategies for complex problem solving; Luger, George F.; ;Boston: Pearson Addison-Wesley, 2009
2. Artificial intelligence : a modern approach; Russell, Stuart Jonathan; Norvig, Peter; Boston: Pearson Education, cop. 2010

Evaluation System

Studies	Number	Contribution
Attendence		
Lab		
Application		
Field Study		
Course Specific Internship (if applicable)		
Quizzes/Studio/Critical		
Homework		
Presentation	1	% 20
Projects	1	% 20
Report		
Seminar		
Midterm Exams/Midterm Jury	1	% 30
General Exam/Final Jury		% 30
	Total	**% 100**
Contribution of Mid-Semester Studies to Success Grade		% 40
Contribution of End of Semester Studies to Success Grade		% 60
	Total	**% 100**

Course Category

Basic Vocational Courses	
Specialization/Field Courses	x
Support Lessons	
Communication and Management Skills Lessons	
Transferable Skills Lessons	

Course Learning Outcomes and Program Qualifications

No	Program Qualifications / Outcomes	Contribution Level				
		1	2	3	4	5
1	Ability to apply knowledge of mathematics, science, and engineering				x	

2	ability to analyze a problem and solve it with machine learning methods					
3	Ability to design a system, component and process according to specified requirements.				x	
4	Ability to work in teams in interdisciplinary areas.				x	
5	Ability to identify, formulate and solve engineering problems.					X

ECTS/Workload Table			
Activities	**Count**	**Duration (Hours)**	**Total Workload**
Lesson hours (Including the exam week: 16 x total lesson hours)	16	3	48
Lab			
Application			
Course Specific Internship			
Field Study			
Out of Class Study Time			
Presentation/Seminar Preparation			
Projects	1	90	80
Reports			
Homeworks	4	5	20
Quizzes/Studio Critic			
Preparation Time for Midterm Exams/Midterm Jury	1	50	40
Preparation Time for the General Exam/General Jury			
Total Workload			**188**