COMP341 Introduction to Artificial Intelligence – Fall 2020

Class
Times: Mondays, Wednesdays and Fridays between 10:00 and 10:50
Website: http://blackboard.ku.edu.tr
E-mail policy: Students are responsible for checking their account frequently and consistently

Instructor
Barış Akgün
Office Hours: TBA
E-mail: baakgun@ku.edu.tr

Teaching Assistants
For communication, prefer the TA e-mail, comp341-tas-group@ku.edu.tr Their personal e-mails are given for specific questions.

NAME	E-MAIL	OFFICE HOURS
Ercan Serteli	eserteli18@ku.edu.tr	By appointment
Onur Berk Töre	otore19@ku.edu.tr	By appointment
Ainaz Jamshidi	ajamshidi18@ku.edu.tr	By appointment

Prerequisites:
ENGR200 or equivalent

Description
An undergraduate course to introduce the foundations of modern artificial intelligence, geared towards building systems and agents that can reason, learn and adapt to solve problems. Students will be exposed to search, constraint satisfaction, logic, uncertainty, machine learning and Markov decision processes with examples from vision, robotics, language and games.

Course Objectives
1. To provide a broad survey of Artificial Intelligence (AI)
2. To prepare students for the advanced courses related to AI
3. To have students develop design and programming skills to create AI systems and agents

Learning Outcomes
1. Understand basic concepts of AI and computational decision making (e.g. reasoning, inference, planning). Demonstrate knowledge about different types of AI problems.
2. Analyze a problem, use the right representation and the right AI method to solve it
3. Know various search algorithms, and their strengths and weaknesses
4. Understand different ways of representing knowledge and making decisions using these representations
5. Learn the basic concepts of Machine Learning (ML) and how it relates to AI
6. Understand sources of uncertainty and decision making under uncertainty

Textbooks

Required book:
- Peter Norvig and Stuart J. Russell, *Artificial Intelligence: A Modern Approach* 3rd Ed.

If you want to learn more about advance topics or get a different perspective:
- Poole and Mackworth, *Artificial Intelligence: Foundations of Computational Agents*
- Sutton and Barto, *Reinforcement Learning: An Introduction*
- Koller and Friedman, *Probabilistic Graphical Models: Principles and Techniques*
- Brachman and Levesque, *Knowledge Representation and Reasoning*
- Hastie, Tibshirani, and Friedman, *The Elements of Statistical Learning*

Teaching and Assessment Methods

The class will be taught mainly through lectures. Students are highly encouraged to participate, ask, and answer questions. There will be both written and programming homeworks. The class includes five midterm exams and one final exam. The grading will be:

Type	Description	Grade %	Min. to Pass %
Homework	Programming and Written Exercises. 5-7 HWs	35	15
Midterm Exam	Five written exams (best four will be taken)	40	15
Final Exam	Comprehensive written exam	25	10
Total		100	40

Minimum Passing Grade

You need to collect the minimum percentage grades from each assessment method as given in the above table to pass this course. If you did not collect the minimum for the homework and the midterm exams you will not be eligible for the makeup or the remedial exams.

Code of Conduct

The students are expected to abide by the student and classroom codes of conduct of KU. There will be no tolerance for cheating, plagiarism, unruliness, and all other unethical and disruptive behavior. Any violation will be dealt with according to university policies.

Late Policy

All homeworks will be submitted online through the blackboard system. The submission time will be taken as the **server** received time. Late homeworks will be graded as the instructor sees fit.

Make-up and Early Final Policy

There will be no makeup for the midterm exams. The makeup for the final exam will be given on the date announced in the academic calendar. There will be no makeups for the makeup exam.

You need to contact the instructor before week 10 to schedule an early final. There will be no makeups for the early final.

Topics

The instructor reserves the right to change the following schedule, such as changing the amount of time spent on subjects or removing them.

Subject	Details	Book Chapter
Introduction	Definition and history of AI, Agents, Basic concepts	1,2
Python Programming	Intro to Python for programmers (assuming previous coding experience)	N/A
Search	Problem definition, Uninformed Search, Informed Search, Local Search, Adversarial Search	3,4,5
Constraint Satisfaction	Problem Definition, Solution Methods (search based and local search based)	6
Uncertainty	Probability Primer, Representing Uncertainty, Bayes Nets: Representation, Independence, Inference, Probabilistic Reasoning over time: Hidden Markov Models	13,14,15
Machine Learning	Introduction to ML, Nearest Neighbors, Linear Regression, Naïve Bayes, Gradient Descent, Online linear regression	18, 20
Decision Making	Markov Processes, Markov Decision Processes (MDPs), Solving MDPs, Reinforcement Learning (RL), RL Solution Methods	16,17,21
Logic (Optional)	Concepts of Logics, Knowledge Representation, Propositional Logic, First Order Logic	7,8,9

Catalog Description

Introduction to artificial intelligence concepts; agent based thinking; uninformed and informed search; constraint satisfaction; knowledge representation; logic; introduction to machine learning; representing uncertainty; markov decision processes; examples from vision, robotics, language and games.