

Artificial Intelligence CE-417, Group 1
Computer Engineering Department
Sharif University of Technology
Spring 2020

Instructor

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Course webpage: <http://ce.sharif.edu/courses/98-99/2/ce417-1/>

Course Quera page: <https://quera.ir/course/4789/>

Teaching Assistants

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Course Objective

This course is a gentle introduction to the concepts and methodologies in Artificial Intelligence from both theoretical and practical perspectives. This includes designing intelligent agents through techniques such as state-space search methods, knowledge representation and inference, and Machine Learning. At the end of this course, students are expected to be able to develop intelligent solutions for semi-real world problems through appropriate methods that are discussed in the course. Furthermore, they are expected to gain knowledge and experience to analyze inner-working of the methods and customize them for specific problems.

Course Textbooks and Resources

- **Artificial Intelligence: A Modern Approach**, Stuart Russell and Peter Norvig, 3rd Edition, 2009. (more at <http://aima.cs.berkeley.edu>)

Prerequisites

Knowledge and experience of a general purpose programming language (preferably Python), Data Structures and Algorithms, and ideally **Probability and Statistics** (Random Variables, (Joint) Probability Mass Functions, Conditional Probability, Independence, Bayes Theorem) and Linear Algebra.

It is highly recommended to have the Engineering Probability and Linear Algebra courses passed before taking this course.

Grading Policy

Homework and Programming Assignments	30%
Short Quizzes	10%
Midterm exam	25+5%
Final exam	35+5%

Office hours and recitation classes

There would be a recitation class weekly. In this class, TAs would explain and clarify programming assignments, turn in corrected quizzes and answer your questions. Participating in this class is optional.

Homework Grading Policy

Please turn in your solutions to the TAs on time, otherwise you would not earn any credit for it.

Please note that there is no late homework delivery policy.

Course Schedule (tentative)

	Session	Topic	Readings	HW/Quiz
1	98/11/19 Sat.	Introduction to AI, and Intelligent Agents	Ch. 1 and 2	
2	98/11/21 Mon.	Problem space and search (Uninformed)	Ch. 3	
3	98/11/26 Sat.	Informed search (Preliminary Heuristics, Best First Search, A*, etc.)	Ch. 4.1 and 4.2	

4	98/11/28 Mon.	Advanced Heuristics and Pattern DBs	Ch. 4.2	HW 1
5	98/12/03 Sat.	Local Search (Hill Climbing, Simulated Annealing, beam search, and Genetic Algorithms)	Ch. 4.3	
6	98/12/05 Mon.	Search in continuous spaces (Convex Optimization and Gradient descent)	Ch. 4.4	HW 2
7	98/12/10 Sat.	Constraint Satisfaction Problems	Ch. 5	Quiz 1
8	98/12/12 Mon.			
9	98/12/17 Sat.	Adversarial Search (minimax, alpha-beta pruning, expectimax)	Ch. 6	
10	98/12/19 Mon.			HW 3
11	98/12/24 Sat.	Inference under uncertainty	Ch. 13	Quiz 2
12	98/12/26 Mon.	Introduction to Bayesian Networks	Ch. 14.1, 14.2, and 14.3	
13	99/01/16 Sat.			
14	99/01/18 Mon.	Inference in Bayesian Networks	Ch. 14.4 and 14.5	
15	99/01/23 Sat.			HW 4
16	99/01/25 Mon.	Temporal Probability Models (Markov Models and Particle Filtering)	Ch. 15.1-15.5	
17	99/01/30 Sat.			Quiz 3
18	99/02/01 Mon.	Introduction to Machine Learning (key concepts)	Ch. 18.1, 18.2	
19	99/02/06 Sat.	Solving a practice exam		
20	99/02/08 Mon.	Learning a decision tree (classification)	Ch. 18.3	HW 5
	99/02/04 Thr. 9:00 AM	Midterm exam (From session 1 upto and including session 15)		
21	99/02/13 Sat.	Linear and Logistic Regression		
22	99/02/15 Mon.	Neural Networks (Multilayer Perceptron and Convolutional Neural Networks)		
23	99/02/20 Sat.			Quiz 4
24	99/02/22 Mon.			HW 6
25	99/02/27 Sat.	Markov Decision Processes	Ch. 17	

26	99/02/29 Mon.			
27	99/03/03 Sat.	Reinforcement Learning	Ch. 21	
28	99/03/05 Mon.	Official Holiday (Eyde Fetr)		
29	99/03/10 Sat.	Reinforcement Learning	Ch. 21	HW 7
30	99/03/12 Mon.	Applications (Optional Presentations)		
31	99/03/17 Sat.			
		Final exam (From session 16 to the end)		

Statement on Collaboration, Academic Honesty, and Plagiarism

Please check out the Education Committee statement on course assignment ethics:

https://wiki.ce.sharif.edu/آیین_نامه/آداب_نامه_انجام_تمرین_های_درسی