

New Jersey Institute of Technology

Ying Wu College of Computing

Department of Computer Science

CS670 - Artificial Intelligence – Fall 2023

Instructor Details: Arashdeep Kaur, Ph.D., Email: ak3257@njit.edu, Phone: 732-762-4265

Office Hours: Monday-1:30 p.m.-2:30 p.m. or by appointment

Grader: will be shared soon

Course Description

This course introduces the fundamentals of artificial intelligence. It contains a theory component about the concepts and principles that underlie modern AI algorithms, and a practice component to relate theoretical principles with practical implementation.

Prerequisite: CS 610 – Data Structures and Algorithms

Course Objective

The objective of this course is to gain understanding of artificial intelligence, formalization of knowledge, reasoning under uncertainty and without it, machine learning, and its applications. The focus will be to learn about major disciplines in artificial intelligence, their fundamental differences and applicability.

Learning Outcomes

Students will be able to state and apply major algorithms, methods, and theoretical results in the field of artificial intelligence.

Tentative Course Contents

Introduction: What is AI, agent, environment and its applications.

Problem solving by Search: principles of search, uninformed (“blind”) search, informed (“heuristic”) search, constraint satisfaction problems, adversarial search and games.

Knowledge representation and reasoning: rule-based representations, declarative or logical formalisms, Logic Programming and logic network.

Reasoning with Uncertainty: Uncertainty, Probabilistic Models.

Learning: Supervised learning, unsupervised learning, reinforcement learning. Generative discriminative models.

Applications: Discussion of practical cases from various domains.

Conclusions & Review: Final opinion and inference of methods discussed.

Textbook & References

- S. Russell and P. Norvig, Artificial Intelligence: A Modern Approach, 4th edition, Prentice Hall, 2020.
- V. N. Vapnik, The Nature of Statistical Learning Theory, 2nd edition, Springer, 2000.
- Selected papers and handouts.

Grading Policy

- Assignments 25%
- Midterm exam 15%
- Project 30%
- Class attendance and participation 10%
- Final exam 20%

Guidelines & Policies

Attendance: Attendance will be taken. Students are expected to attend the lectures in the section that they are registered in. Lectures are a sequence. If you skip one you will not be able to understand the lecture that follows, if you don't catch up with the one you missed. Catching up lectures is your responsibility and is done in your own time. Instructor has the right to modify the grading criteria to include attendance and class participation when necessary.

Email: Use of your NJIT email or Canvas inbox is strongly encouraged.

Grade Corrections: Check the grades in course work and report errors promptly. Please try and resolve any issue within one week of the grade notification.

Late submission: No late submissions will be allowed for homework assignments or projects or any other course related work assigned.

Exam and Proctoring Policy: See the [NJIT Online Course Exam Proctoring page](#) for information on proctoring tools and requirements.

Collaboration and External Resources for Assignments: Some homework problems will be challenging. You are advised to first try and solve all the problems **on your own**. For problems that persist you are welcome to talk to the course assistant or the instructor. You are also allowed to collaborate with your classmates and search for solutions online. But you should use such solutions only if you understand them completely (admitting that you don't understand something is way better than copying things you don't understand). Also make sure to give the appropriate credit and citation.

Requesting Accommodations: If you need an accommodation due to a disability please contact Scott Janz, Associate Director of the [Office of Accessibility Resources and Services](#), Kupfrian Hall 201 to discuss your specific needs. A Letter of Accommodation Eligibility from the office authorizing student accommodation is required.

NJIT Services for Students, Including Technical Support: Please follow this [link](#).

Canvas Accessibility Statement: Please follow this [link](#).

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