

CS 3600: Introduction to Artificial Intelligence

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Office Hours: TBD

Office: TBD

Class Hours: TBD

Class Room: TBD

Course Description

Introduction to Artificial Intelligence is a three-credit undergraduate course emphasizing the building of agents, environments, and systems that can be considered as acting intelligently. In particular, you will learn about the methods and tools that will allow you to build complete systems that can interact intelligently with their environment by learning and reasoning about the world.

There are three primary objectives for the course: To provide a broad survey of AI; To develop a deeper understanding of several major topics in AI; To develop the design and programming skills that will help you to build intelligent artifacts.

In practice, you should develop enough basic skills and background that you can pursue any desire you have to learn more about specific areas in IS, whether those areas are planning, knowledge representation, machine learning, vision, robotics or whatever. In particular, this class provides a useful foundation for a number of courses involving intelligence systems, including Machine Learning (CS4641), Knowledge-Based AI (CS4634), Computer Vision (CS4495), Robotics and Perception (CS4632), Natural Language Understanding (CS4650) and Game AI (CS4731).

Required Materials

Artificial Intelligence: A Modern Approach, 4th Edition (the purple edition) by Russell and Norvig. The textbook is a good resource for the things we will cover in class. While I believe I do a good job of introducing the material through lecture, the book provides a secondary description of topics that can reinforce understanding.

Prerequisites

To succeed at this class, you should know a bit about data structures and algorithms. At the very least, you will have to be able to read pseudocode and understand basic algorithms as they are presented to you.

Much of AI concerns itself with finding fast algorithms for NP-hard problems. You should be comfortable with the common data structures (hash tables and trees mostly) and big-O notation.

As the semester continues, a familiarity with basic probability theory will also be very useful; however, we will spend some time on that in class in order to refresh your memory.

Finally, you should feel pretty comfortable programming on your own. All projects will be implemented in Python. We will spend no time explaining languages in class; at this point in your career you've been exposed to several programming language and are expected to be able to readily acquire new programming language skills if necessary.

Topics Covered

- Introduction to AI and Agents
- Uniformed Search
- Informed Search
- MDPs
- Reasoning with Uncertainty
- Probabilistic Reasoning over Time
- Decision Trees
- Neural Networks
- Monte Carlo Tree Search

Grading

Programming Assignments: (70%) There will be 5 graded projects (14% each) throughout the semester. Many assignments will have extra credit opportunities.

Late policy: You have four free late days to be used at your discretion throughout the semester. That means you might turn in one assignment two days late or two different assignments one day late, etc. A free late day is "used" one minute after an assignment due date. A second free late day is "used" 24 hours and one minute after the due date. A third free late day is used 48 hours and one minute after the due date. And so on. After the free late days are exhausted, you will receive a 20% penalty per day. Absences due to sickness or GT-approved travel do not count against the late days.

Exams: (30%) There will be a mid-term and a final exam, worth 15% and 15% of your final grade, respectively. These will be open-note and open-book. You will have a week to complete the

exam, but we will aim to make it so that the exam itself shouldn't take you more than a day. Collaboration is not allowed for the exam (This includes answer checking!)

Attendance: Attendance will not be recorded and will not be used in assessing grades.