# EECS 492: Introduction to Artificial Intelligence, Winter 2022

## Quick Links

- Class calendar: https://calendar.google.com/calendar/u/0?cid=Y192bTJ0bXN0dnJmbTc5ZGZ2NjRsOG12bTU2b0Bncm91cC5jYWxlbmRhci5nb29nbGUuY29t
- EECS OH Queue: https://eecsoh.eecs.umich.edu/queues/1xp1x3f41XbrSMwbURBL0gqKpPw
- Reena's OH Zoom link: https://umich.zoom.us/j/91926295362
- Zijian's OH Zoom link: https://umich.zoom.us/j/94736226765 (Password: EECS492OH)
- Xingyao's OH Zoom link: https://umich.zoom.us/j/91395086623 (Passcode: EECS492OH)

## Basic Information

**Lecture time:** Tuesday & Thursday 3-4:30pm
**Lecture location:** 1060 FMCRB

**Faculty Instructor:** Laura Burdick, BBB 3824, lburdick@umich.edu

- Dr. Burdick typically responds to most e-mails within a day, though usually doesn't respond during evenings and weekends.

**Faculty Office Hours:** Tuesday 1-2pm (BBB 2725) & Thursday 1-2pm (BBB 3824)

- If these times don't work for you (or you'd prefer to meet remotely), please send an e-mail, and we can find another time to meet, either remotely or in-person.

**GSIs:**

Reena Dhankani, reenad@umich.edu, Office hours Tuesday & Thursday 1-3pm, remote

- To join office hours, sign up on the EECS OH Queue (https://eecsoh.eecs.umich.edu/queues/1xp1x3f41XbrSMwbURBL0gqKpPw)
- When you get close to the top of the queue, you can join this Zoom meeting: https://umich.zoom.us/j/91926295362

Zijian Zhang, zzjharry@umich.edu, Office hours Tuesday & Thursday 10am-12pm, remote

- To join office hours, sign up on the EECS OH Queue (https://eecsoh.eecs.umich.edu/queues/1xp1x3f41XbrSMwbURBL0gqKpPw)
- When you get close to the top of the queue, you can join this Zoom meeting: https://umich.zoom.us/j/94736226765 (Password: EECS492OH)

**IA**:
Xingyao Wang, xingyaow@umich.edu, Office hours Wednesday 2-4pm, remote

- To join office hours, sign up on the EECS OH Queue (https://eecsoh.eecs.umich.edu/queues/1xp1x3f41XbrSMwbURBL0gqKpPw)
- When you get close to the top of the queue, you can join this Zoom meeting: https://umich.zoom.us/j/91395086623 (Passcode: EECS492OH)

**Discussion times and locations:**

| | | |
|---|---|---|
| Friday 11:30am-12:30pm | 2166 DOW | Zijian Zhang |
| Friday 12:30pm-1:30pm | 107 GFL | Zijian Zhang |
| Friday 1:30pm-2:30pm | 1005 DOW | Xingyao Wang |
| Monday 4:30pm-5:30pm | 1010 DOW | Reena Dhankani |

# Prerequisites

Students must have completed EECS 281 with a grade of C or better; exceptions will not be granted. CSE graduate students should enroll in EECS 592.

# Textbook and Course Materials

The **optional** textbook for the course is Artificial Intelligence: A Modern Approach (4th Edition), by Stuart Russell and Peter Norvig (ISBN 9780134610993). If you wish to purchase this textbook from Pearson, you may use this link for a discounted version: https://www.pearson.com/store/p/artificial-intelligence-a-modern-approach/P100000291856/9780134610993

Additional course materials will be posted on Canvas.

# Course Description

This course is an introductory course to artificial intelligence. The purpose of this course is to provide an overview of this field. We will cover topics including: agents, search, planning, uncertainty, and learning. The goals of this course are to provide a fundamental knowledge of the field. The course evaluation will include homework, a midterm, and a final.

The goal of this course is to provide background in the field of artificial intelligence. The successful student will finish the course with specific modeling and analytical skills (e.g., search, logic, probability), knowledge of many of the most important knowledge representation, reasoning, and machine learning schemes, and a general understanding of AI principles and practice. The course will serve to prepare the student for further study of AI, as well as to inform any work involving the design of computer programs for substantial application domains.

# Course Schedule (Tentative)

Lecture topics and reading (all readings are optional and from Russell & Norvig):

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|---|---|
| Jan. 6 | Lecture 1: Introduction and Agents (Ch. 1) |
| Jan. 11 | Lecture 2: Agents and Rationality (Ch. 2) |
| Jan. 13 | Lecture 3: Problem Solving and Search (Ch. 3) |
| | *No discussion sections Friday, Jan. 14 or Monday, Jan. 17 for MLK Jr. Day.* |
| Jan. 18 | Lecture 4: Uninformed Search (Ch. 3) |
| Jan. 20 | Lecture 5: Informed Search (Ch. 3) |
| Jan. 25 | Lecture 6: Local Search and Genetic Search (Ch. 4) |
| Jan. 27 | Lecture 7: Adversarial Search (Ch. 5) |
| Feb. 1 | Lecture 8: Adversarial Search and Constraint Satisfaction (Ch. 6) |
| Feb. 3 | Lecture 9: Constraint Satisfaction (Ch. 6)<br>*Homework 1 due 11:59PM Ann Arbor time* |
| Feb. 8 | Lecture 10: Local Agents (Ch. 7) |
| Feb. 10 | Lecture 11: Propositional Logic and Inference (Ch. 7) |
| Feb. 15 | Lecture 12: Propositional and First-Order Logic (Ch. 8) |
| Feb. 17 | Lecture 13: First-Order Logic and Inference (Ch. 9) |
| Feb. 22 | Lecture 14: Planning (Ch. 11)<br>*Homework 2 due 11:59PM Ann Arbor time* |
| Feb. 24 | **Midterm** |
| Mar. 1 | *Winter break*<br>*No discussion sections Monday, Feb. 28 or Friday, Mar. 4.* |

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| Mar. 3 | *Winter break* |
| Mar. 8 | Lecture 15: Uncertainty (Ch. 12) |
| Mar. 10 | Lecture 16: Bayesian Networks (Ch. 13) |
| Mar. 15 | Lecture 17: Bayesian Inference (Ch. 13) |
| Mar. 17 | Lecture 18: Decision Analysis (Ch. 16) |
| Mar. 22 | Lecture 19: Making Complex Decisions (Ch. 17) |
| Mar. 24 | Lecture 20: Making Complex Decisions and Approximate Inference (Ch. 17, 13) |
| Mar. 29 | Lecture 21: Intro to Learning (Ch. 19)<br>*Homework 3 due 11:59PM Ann Arbor time* |
| Mar. 31 | Lecture 22: Decision Trees and Linear Regression (Ch. 21) |
| Apr. 5 | Lecture 23: Neural Networks (Ch. 22) |
| Apr. 7 | Lecture 24: Nonparametric Methods (Ch. 19) |
| Apr. 12 | Lecture 25: Reinforcement Learning (Ch. 22) |
| Apr. 14 | Lecture 26: Active Reinforcement Learning (Ch. 22)<br>*Last discussion section on Monday, Apr. 18.* |
| Apr. 19 | Lecture 27: Game Theory<br>*Homework 4 due 11:59PM Ann Arbor time* |
| Apr. 25 | Final Exam slot: 10:30am - 12:30pm |

Homework Schedule (subject to slight variation in content and due date):

Homework 1 (agents and search) --- due: February 3, 11:59PM Ann Arbor time
Homework 2 (logic and planning) --- due: February 22, 11:59PM Ann Arbor time
Homework 3 (probability and probabilistic models) --- due: March 29, 11:59PM Ann Arbor time
Homework 4 (machine learning) --- due: April 19, 11:59PM Ann Arbor time

# Lecture

Lectures will be recorded, and attendance will not be required. However, we will have interactive discussions and activities during lecture that will help your learning of the material, and will not be as useful if you do not attend in person.

If you are feeling sick, please watch the recording rather than coming to lecture.

# Discussion Sections

Weekly one-hour discussion sections will focus on developing problem-solving skills. Students should attend the same section every week, and are encouraged to bring problems (perhaps based on current assignments) to discuss. These smaller groups are designed to be interactive; students are expected to participate in the solution of problems under discussion.

Discussion sections will cover examples not seen in lecture. All sections will be recorded, and attendance will not be required. However, our hope is that you will find the in-person discussion and problem solving useful as you learn the material.

If you are feeling sick, please watch the recording rather than coming to discussion section.

# Homework

Homework must be turned in on the date that it is due, by 11:59PM Ann Arbor time. The homework must be submitted electronically using Canvas and Gradescope and we will use the later timestamp to validate turn-in time. Late homework will be penalized 10% per day (where each day starts at 11:55pm on the due day). Homework turned in after three days will not be accepted. Certain homework assignments may be associated with a single late day, to facilitate exam study. This will be noted when the assignment is released.

If you are unable to complete the homework assignment on time due to illness or a personal emergency, please contact the course staff.

Note that the only method of submission is Canvas/Gradescope. It is your responsibility to ensure that the homework has been uploaded successfully by the due date. This may include checking a box to verify accordance with the honor code policy. Homework that is incorrectly uploaded will be subject to the associated late penalty. Homework not successfully uploaded by the due date will not be accepted.

Also note that any changes you make to the homework already submitted on Canvas/Gradescope counts as a resubmission. If you make any changes to the assignment after the due date has passed you will be assigned a late penalty based on the number of days that have passed. For example, if you edit an assignment on October 5 and it was due on October 2 you will be assigned a 30% penalty (10% per day) as explained above. This is non-negotiable.

# Exams

The midterm will take place in class, on the day announced in the schedule. The final exam will take place after class ends, during our final exam slot. More information will be announced.

# Office Hours

The instructors will have regularly scheduled office hours each week. You are encouraged to make use of these to discuss aspects of the course including lecture material and the homework problems. In cases where you cannot make office hours, contact the course staff to arrange an appointment; don't wait until the last minute though!

# Piazza

We will be using Piazza to host a course forum and asynchronous Q&A. You are encouraged to read this regularly and post technical questions as it will be a significant source of help on the projects. Please search before posting to avoid re-asking questions that have already been answered.

It is important that you do NOT post your own code or homework solutions to the forum. If you have a question about any of these things, use a **private** post (visible only to instructors).

Course staff will answer questions on Piazza throughout the day, but do not expect an immediate response (particularly on evenings and weekends). We will try to answer questions within 24 hours when possible. Of course, students are encouraged to answer each others' questions!

# Email Policy

**We do not answer technical questions via email.** In order to save everyone time, we want all students to have the benefit of seeing each question and its answer, so please use Piazza instead.

# Grading

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| Homework | 45% |
| Midterm | 25% |
| Final | 30% |

The values are subject to slight adjustments based on the discretion of the instructor. If you have a problem with the grading on a particular assignment or exam, write a brief (one-paragraph) description of the problem, and e-mail it, along with a copy of the assignment/exam, to Dr. Burdick for a regrade. **Regrade requests must be submitted within one week of when the graded assignment is made available to the student.** Later regrade requests will not be accepted.

Final letter grades will be calculated according to the following table:

| Numerical Grade (%) | Letter Grade |
|---|---|
| 98 ≤ % ≤ 100 | A+ |
| 93 ≤ % < 98 | A |
| 90 ≤ % < 93 | A- |
| 87 ≤ % < 90 | B+ |
| 83 ≤ % < 87 | B |
| 80 ≤ % < 83 | B- |
| 77 ≤ % < 80 | C+ |
| 73 ≤ % < 77 | C |
| 70 ≤ % < 73 | C- |
| 67 ≤ % < 70 | D+ |
| 63 ≤ % < 67 | D |

| | |
|---|---|
| 60 ≤ % < 63 | D- |
| % < 60 | E |

# Honor Code

All homework in this course is to be done individually and in accordance with the College of Engineering Honor Code. Suspected violations will be referred to the Engineering Honor Council. You are encouraged to discuss ideas and techniques broadly with other class members, but all written work, whether in scrap or final form, is to be generated by you working alone unless otherwise expressly stated in the homework assignment.

The following are considered **honor code violations**:

- Sitting together and working out the details of the problems with someone
- Discussing the problem set with previous class members, or anyone else who has significant knowledge of the details of the problem set
- Comparing your written solutions, whether in scrap paper form or your final work product, to other students (and vice versa)
- Possessing, looking at, using, or in anyway deriving advantage from the existence of solutions prepared in prior years, whether these solutions were former students' work product or copies of solutions that had been made available by instructors

If you are at all unsure whether your collaboration is allowed, please contact the course staff via Piazza, Office Hours, or email before you do anything. We will help you determine if what you're thinking of doing is in the spirit of collaboration for this class.

# Wellness

**If for any reason you are having difficulty in this course, please come talk to me; I want to help.** Any member of our community may experience stressors that can impact both their academic experience and their personal well-being. These may include academic pressure and challenges associated with relationships, mental health, alcohol or other drugs, finances, etc.

If you are facing challenges, seeking help is a courageous thing to do for yourself and those who care about you. If the source of your stressors is academic, please contact me so that we can find solutions together.

# Accomodations for Students with Disabilities

The University of Michigan recognizes disability as an integral part of diversity and is committed to creating an inclusive and equitable educational environment for students with disabilities. Students who are experiencing a disability-related barrier should contact Services for Students with Disabilities (https://ssd.umich.edu/; 734-763-3000 or ssdoffice@umich.edu). For students who are connected with SSD, accommodation requests can be made in Accommodate. If you have any questions or concerns please contact your SSD Coordinator or visit SSD's Current Student webpage. SSD considers aspects of the course design, course learning objects and the individual academic and course barriers experienced by the student. Further conversation with SSD, instructors, and the student may be warranted to ensure an accessible course experience.

# COVID-19 Pandemic Statement

As they have throughout the past year and a half, policies around academic and public health are subject to change as this pandemic evolves. This course will follow all policies issued by the University, which are documented on the Campus Blueprint's FAQ. These policies may change over the course of the term, so please review the Campus Blueprint's FAQ for the most up to date information.