

Syllabus for CSC 380: Foundations of Artificial Intelligence, Winter 2023

Overview

An in-depth survey of important concepts, problems, and techniques in artificial intelligence, including search, knowledge representation, logical reasoning, and reasoning with uncertainty. A particular focus and a unifying theme of the course will be the concept of intelligent agents. No prior knowledge of AI is required. The course is particularly suitable for graduate and advanced undergraduate students who want to gain the technical background necessary to build intelligent systems, or who want to prepare for more advanced work in AI. The concepts and techniques learned in this course will be directly applicable to many other areas of computer science including software design, distributed systems, databases, and information management and retrieval.

Learning Outcomes

By the end of this course you should be able to:

- describe the central concepts and approaches in agent-based artificial intelligence,
- describe how an agent-oriented approach helps conceptualize what is needed to produce intelligent behavior,
- implement AI techniques using search, logic, and constraint satisfaction approaches to solve challenging problems.

Prerequisites

CSC 301 or CSC 393

Textbooks

Required: Artificial Intelligence: A Modern Approach, FOURTH EDITION (United States), by Stuart Russell and Peter Norvig, 2020. Prentice-Hall. ISBN 13: 9780134610993.

NOTE: There are other editions of the AIMA textbook available, but the US 4th edition is the official one for the class. If get any another edition, some information will be missing and/or in different chapters. It will then be your responsibility to find the corresponding chapters for the readings. You can get more information about the editions via the [AIMA Editions and Translations page](#).

Attendance

All class sessions will be hosted on Zoom, and you will need to login to the zoom app with your DePaul credentials to access the sessions. (More info is available on course's News on D2L.) You will get the most out of class if you attend the zoom sessions "live." They will be recorded though, so you will be able to access them later.

Class Plan

The following class plan is tentative and subject to change as the course progresses.

- **Class 1:** (1/3) Introduction to AI
- **Class 2:** (1/10) Search
- **Class 3:** (1/17) Heuristic and adversarial search
- **Class 4:** (1/24) Constraint satisfaction
- **Class 5:** (1/31) Logic
- **Class 6:** (2/7) Planning
- **Class 7:** (2/14) Planning; Reasoning with uncertainty
- **Class 8:** (2/21) Learning
- **Class 9:** (2/28) Neural Networks and Deep Learning
- **Class 10:** (3/7) Natural Language Processing

Instructor Information

Email	peterh@cdm.depaul.edu
Home Page	http://reed.cs.depaul.edu/peterh/
Phone	312-362-5736
Office Hours	Tuesdays and Thursdays 3:30-5:00PM or by arrangement in my office or via Zoom or phone. Please email beforehand (at least a few hours) or make an appointment through mycdm to be sure I'll be there.
Address	CDM Center 717

Assessment

Your final grade will be based on:

Item	Pct
Weekly warm-ups*	12
Weekly exercises	12
4 written assignments	48
Final exam	28
Total possible	100

The grading scale will be:

Pct	Grade
93.3	A
90	A-
86.6	B+

Pct	Grade
83.3	B
80	B-
76.6	C+
73.3	C
70	C-
66.6	D+
60	D
< 60	F

Weekly Warm-ups and Cool-downs

I use a "Just In-Time Teaching" methodology which is intended to help students by lining up what's done in and outside of class. So each week (after the first), you will be given some "warm-up questions" based on the assigned readings to help you come to grips with what you've read, and to help me see what you're getting and what you're not. (That way the class time can be tailored to your needs.) The Warm-ups must be completed before **2 PM** (Central time) on the day of the class. The lowest score will be dropped.

Each week, there will also be a "Cool-Down quiz" on D2L. It will consist of more questions than the Warm-up, and is meant to help you assess **for yourself** if you have understood that week's topics. The Cool-downs will be scored, but those scores will **not** be part of your final grades for the class.

Assignments

- Four projects will be assigned this quarter, each worth 12% of the final grade.
- Purpose: apply the theories you've learned
- Submit on D2L, PDF (preferred) or docx format for documents. Also submit short videos describing what you did.
- You should expect these projects to take a *significant* amount of time.
- Students fail this class because:
 - they do not budget enough time to work on these assignments, or
 - do not know how to begin on programming projects.
- Submission grace period for emergencies: 15% penalty per day late, up to 3 days.
 - Not done by then? Submit what you have for partial credit, and indicate what works and what does not.

Exercises to D2L Discussion Forums

The weekly exercises will be discussed in class. You should post your responses to the corresponding forum / topic on D2L. To encourage you to engage your mind, you won't be able to look at other students' responses until you've posted your own. Afterwards, you can modify/add to your response if you want. To make sure you stay up-to-date with class, the exercise forums will only be open until the next class. Grading will focus on whether or not it looks like you made a good faith effort to answer the question(s). The lowest score will be dropped.

Assignment Questions to Discord or D2L

The preferred place to ask questions about assignments is the class discord channel. If you haven't already joined the CDM discord server, [click here](#) to join it. (Don't hesitate: it will be very useful to you to be on it, even if you think you won't want to ask questions.

Once you're on the server, go to the **#bot-usage** channel and type:

```
/join course:csc380 password:turing23
```

There will be subchannels for general comments/questions/issues and for assignments. This is the best place to ask questions, because you're likely to get a quicker response – either from me or from another student.

You can also post questions to the D2L discussion forums. All students should subscribe to the forums so that you receive email updates. I will subscribe too. But D2L is not so good at highlighting unanswered questions, so if you don't get an answer within a day, feel free to ping me. Also, please feel highly encouraged to answer other students' questions – but **not** with code (e.g., "This is how I did this ...").

Final Exam

Due to our continuing pandemic situation, the final exam will be delivered online in the form of a D2L "quiz", using LockDownBrowser. There will be a "test set-up quiz" available to ensure that it works, and you must complete that before you can take the exam. The questions on the Final will come primarily from the weekly Warm-ups and Cool-downs. The Final Exam itself will be available from Thursday, March 9th at 9 AM through Tuesday March 14th at 9 PM.

LockDownBrowser only works on (up-to-date) Mac and Windows operating systems, and only works (reliably) with the Chrome browser. If you don't have these, you should arrange to get them, or go to a quiet library or lab where you can take the final.

Extra participation credit

You can get up to 2 extra credit points by participating in the [CDM / COMM Participation Pool](#). Each hour of participation will earn 1 point, up to a max of 2 points.

Workload

This is an advanced class. Students should plan on devoting at least 10 hours per week to the readings, warm-ups, and assignments.

On Plagiarism

You are encouraged to *discuss* all homeworks and projects with your classmates. You are, however, required to complete (write) them on your own. In particular, this means that you are not allowed to "cut and paste" code or text **from anywhere or anyone** else for the assignments. I have previously failed students who "wrote their assignments together", and brought them up for Academic Integrity violations.

All students are expected to abide by the University's Academic Integrity Policy which prohibits cheating and other misconduct in student coursework. /Publicly sharing or posting online any prior

or current materials from this course (including exam questions or answers), is considered to be providing unauthorized assistance prohibited by the policy./ Both students who *share/post* **and** students who *access or use* such materials are considered to be cheating under the Policy and will be subject to sanctions for violations of Academic Integrity.

More information can be found at <http://academicintegrity.depaul.edu/>. If you have any questions be sure to consult with your professor. See also the following web pages for information on:

- [Definitions related to Academic Integrity Violations](#), including cheating, plagiarism, and complicity.
- [A FAQ for Students](#) including information on working with classmates and plagiarism.

Incompletes

An incomplete grade is given only for an *exceptional* reason such as a death in the family, a serious illness, etc. Any such reason must be documented. Any incomplete request must be made at least two weeks *before* the final, and approved by an Associate Dean of the College of Computing and Digital Media. Any consequences resulting from a poor grade for the course will not be considered as valid reasons for such a request.

Moreover, in my experience, no student – *including myself* – has ever completed an incomplete. Then the grade turns into an F. So you're better off to not even consider it. Just buckle down and get the work done as best you can. It's better than failing.

Changes to Syllabus

This syllabus is subject to change as necessary during the quarter. If a change occurs, it will be thoroughly addressed during class, posted under Announcements in D2L and sent via email.

Online Course Evaluations

Evaluations are a way for students to provide valuable feedback regarding their instructor and the course. Detailed feedback will enable the instructor to continuously tailor teaching methods and course content to meet the learning goals of the course and the academic needs of the students. They are a requirement of the course and are key to continue to provide you with the highest quality of teaching. The evaluations are anonymous; the instructor and administration do not track who entered what responses. A program is used to check if the student completed the evaluations, but the evaluation is completely separate from the student's identity. Since 100% participation is our goal, students are sent periodic reminders over three weeks. Students do not receive reminders once they complete the evaluation. Students complete the evaluation online in CampusConnect.

Academic Policies

All students are required to manage their class schedules each term in accordance with the deadlines for enrolling and withdrawing as indicated in the University Academic Calendar. Information on enrollment, withdrawal, grading and incompletes can be found at <http://www.cdm.depaul.edu/Current%20Students/Pages/PoliciesandProcedures.aspx>.

Students with Disabilities

Students who feel they may need an accommodation based on the impact of a disability should

contact the instructor privately to discuss their specific needs. All discussions will remain confidential. To ensure that you receive the most appropriate accommodation based on your needs, contact the instructor as early as possible in the quarter (preferably within the first week of class), and make sure that you have contacted the Center for Students with Disabilities (CSD) at:

Lewis Center 1420, 25 East Jackson Blvd.

Phone number: (312)362-8002

Fax: (312)362-6544

TTY: (773)325.7296

Mental Health and Academic Assistance

Balancing the hard work of achieving your educational goals with the other demands of life is difficult at the best of times. For many of us, for a variety of reasons, things are all the more difficult now. I want to make sure you feel comfortable, not embarrassed, reaching out to me for support. I will also point out where the University has great resources just a phone call or email away. These have been created and maintained for you, so use them. Sometimes people feel like their situation isn't the worst possible, so they assume they do not need help, but don't let that prevent you from reaching out.

- [DePaul University Counseling Services](#) Mental health is as important as physical health, and we have professionals just a phone call away. Call (773) 325-7779 or 911 for emergencies.
- The kind people at the [Office of the Dean of Students](#) can help you with a wide range of topics, including figuring out if you should withdraw or apply for an incomplete.
- There are lots of additional, more specific resources listed with [the Office of Student Affairs](#), including crisis hotlines and sexual assault resources (note Title IX refers to a law protecting you from sex discrimination, including harassment and assault).

Diversity, Equity, and Inclusion

At DePaul, in CDM, and in this class, we take Diversity, Equity, and Inclusion very seriously. In particular for this class, that means that I am committed to maintaining an environment which values diversity, and where *all* members of the learning community will be given the support they need to best achieve the learning objectives of the course. For more information, consult [CDM's Diversity, Equity, and Inclusion page](#).