

CMPS 3140/6140: Introduction to Artificial Intelligence

Spring 2022

2:00-3:15pm Tue/Thu ST302

[Zoom Link](#)

[Google Drive Link](#)

Instructor: Aron Culotta <aculotta@tulane.edu>

Office location: Stanley Thomas 303B

Office hours: Tuesday 1-2pm or by appointment

Teaching Assistants

- Linsen Li <lli23@tulane.edu> Office hours 10-11 T/R ST309
- Eli Mendels <emendels1@tulane.edu> Office hours M 1-3 and W 3:15-5:15

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Catalog/Course Description

The aim of this course is to provide the student with an introduction to the main concepts and techniques playing a key role in the modern arena of artificial intelligence. In addition to covering the main topics that concern modern AI, particular attention will be devoted to its applications in several fields. Among the topics covered are: “What is an intelligent artificial agent?”, problem solving using search and constraint satisfaction, uncertainty, Bayesian networks and probabilistic inference, supervised learning, planning, sequential decision problems, as well as several additional topics.

Prerequisite(s): CMPS 2200 Introduction to Algorithms or consent of instructor.

Note. This is a programming and mathematics intensive class. Students are expected to know the basics of Python and be able to navigate a Linux/Unix command prompt. Likewise a working understanding of graph theory, probability theory, and an understanding of basic

algorithms is expected. We will be working with large projects so you will be required to spend time navigating a code base you did not write.

Required Student Resources

Artificial Intelligence: A Modern Approach, Russell and Norvig, 4th Ed. 2021

<http://aima.cs.berkeley.edu/>

The 3rd edition should be fine as well if you happen to have it already. You can see the differences between the 3rd and 4th editions here: <http://aima.cs.berkeley.edu/newchap00.pdf>
If you do use the 3rd edition, some of the chapter numbers listed on the syllabus will differ.

Main course documents are available in [Google Drive](#).

Course Learning Outcomes

At the conclusion of this course students will be able to:

- Define an intelligent agent and be able to identify the different environmental factors at play in the design of an agent.
- Be able to describe when and how to use search techniques including uninformed search and heuristic search.
- Define the nature of information in an adversarial environment.
- Define and use one or more forms of logical entailment and resolution to solve problems.
- Build an autonomous agent that efficiently makes decisions in fully informed, partially observable, and adversarial environments.
- Build an autonomous agent that is able to draw inferences in uncertain environments and optimize actions for arbitrary reward structures.

Students should be comfortable with programming in at least one language (preferably Python) and have had a reasonable amount of math including some linear algebra and algorithms. You should know what a matrix is and you should be comfortable with everything in CMPS/MATH 2170.

Program-Level Outcomes

This course fulfills the requirement of one of the CMPS 3000-level or above courses required for the coordinate major in computer science. Students need to complete three such courses in order to complete the requirements for a coordinate major. For more information on the coordinate major please see the requirements at the Registrar's Website

Evaluation Procedures and Grading Criteria

- **Projects:** These will be programming projects to implement the key algorithms from the course. These can take 10-15 hours, so they should be started well in advance of the due date.
- **Quizzes:** Short answer questions on Canvas as a way to reinforce lecture. These can be taken on your own time and should be done individually. Typically they will be made available at least four days before they are due, and should take 1-2 hours.
- **Discussions:** Discussion questions on Canvas on some of the broader, less technical aspects of the material.
- **Midterm/Final:** Paper/pencil tests done in class. Closed book.
- **Participation:** Students are expected to attend class and participate in discussion.

Point distribution

Projects	200 points (5 @ 40pts each)
Quizzes	120 points (4 @ 30pts each)
Discussions	30 points (3 @ 10 pts each)
Tests	200 points (2 @ 100pts each)
Participation	10 points (attendance, participation)

Total 560 points

For graduate students, there will be an additional report due on a literature survey of an AI topic, worth an additional 40 points.

Grading scale (%):

100-93	92-90	89-87	86-83	82-80	79-77	76-73	72-70	69-67	66-63	62-60	59-0
A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F

Code of Academic Conduct

The Code of Academic Conduct applies to all undergraduate students, full-time and part-time, in Tulane University. Tulane University expects and requires behavior compatible with its high standards of scholarship. By accepting admission to the university, a student accepts its regulations (i.e., [Code of Academic Conduct](#) and [Code of Student Conduct](#)) and acknowledges the right of the university to take disciplinary action, including suspension or expulsion, for conduct judged unsatisfactory or disruptive.

Unless I indicate differently on instructions, all assignments are to be completed individually. For the homework assignments, you may discuss high level ideas with classmates, but **no code may be shared**.

Attendance Statement

All students are to attend class in-person regularly. This contributes to the attendance portion of the grade. At least for the start of the semester, I will also simulcast to Zoom, but only for students who have a documented reason for needing to attend remotely (e.g., isolating.) and who have contacted me before class. Accommodations will be made for students with

COVID-related absence from class through some combination of recordings and/or shared notes.

Course Schedule/Outline/Calendar

The weekly schedule is in the [google drive](#). Please review it regularly for the latest due dates. It is subject to change.

ADA/Accessibility Statement

Tulane University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability, please let me know immediately so that we can privately discuss options. I will never ask for medical documentation from you to support potential accommodation needs. Instead, to establish reasonable accommodations, I may request that you register with the Goldman Center for Student Accessibility. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. **Goldman Center contact information:** goldman@tulane.edu; (504) 862-8433; accessibility.tulane.edu.

Religious Accommodation Policy

Per Tulane's religious accommodation policy, I will make every reasonable effort to ensure that students are able to observe religious holidays without jeopardizing their ability to fulfill their academic obligations. Excused absences do not relieve the student from the responsibility for any course work required during the period of absence. Students should notify the instructor within the first two weeks of the semester about their intent to observe any holidays that fall on a class day or on the day of the final exam.

Title IX

Tulane University recognizes the inherent dignity of all individuals and promotes respect for all people. As such, Tulane is committed to providing an environment free of all forms of discrimination including sexual and gender-based discrimination, harassment, and violence like sexual assault, intimate partner violence, and stalking. If you (or someone you know) has experienced or is experiencing these types of behaviors, know that you are not alone. Resources and support are available: you can learn more at allin.tulane.edu. Any and all of your communications on these matters will be treated as either "Confidential" or "Private" as explained in the chart below. Please know that if you choose to confide in me I am required by the university to share your disclosure in a Care Connection to the Office of Case Management and Victim Support Services to be sure you are connected with all the support the university can offer. The Office of University Sexual Misconduct Response and Title IX Administration is also notified of these disclosures. You choose whether or not you want to meet with these offices. You can also make a disclosure yourself, including an anonymous report, through the form at tulane.edu/concerns.

Confidential	Private
<p><i>Except in extreme circumstances, involving imminent danger to one's self or others, nothing will be shared without your explicit permission.</i></p> <ul style="list-style-type: none"> ▪ Counseling & Psychological Services (CAPS) (504) 314-2277 ▪ The Line (24/7) (504) 264-6074 ▪ Student Health Center (504) 865-5255 ▪ Sexual Aggression Peer Hotline and Education (SAPHE) (504) 654-9543 	<p><i>Conversations are kept as confidential as possible, but information is shared with key staff members so the University can offer resources and accommodations and take action if necessary for safety reasons.</i></p> <ul style="list-style-type: none"> ▪ Case Management & Victim Support Services (504) 314-2160 or srss@tulane.edu ▪ Tulane University Police (TUPD) Uptown - (504) 865-5911 Downtown – (504) 988-5531 ▪ Office of University Sexual Misconduct Response and Title IX Administration (504) 865-5611 or msmith76@tulane.edu ▪ Student Affairs Professional On-Call (24/7) (504) 920-9900

Emergency Preparedness & Response

EMERGENCY NOTIFICATIONS: TU ALERT	SEVERE WEATHER
<p>In the event of a campus emergency, Tulane University will notify students, faculty, and staff by email, text, and/or phone call. You were automatically enrolled in this system when you enrolled at the university.</p> <p>Check your contact information annually in Gibson Online to confirm its accuracy.</p>	<ul style="list-style-type: none"> ▪ Follow all TU Alerts and outdoor warning sirens ▪ Seek shelter indoors until the severe weather threat has passed and an all-clear message is given ▪ Do not use elevators ▪ Do not attempt to travel outside if weather is severe <p>Monitor the Tulane Emergency website (tulane.edu/emergency/) for university-wide closures during a severe weather event</p>
ACTIVE SHOOTER / VIOLENT ATTACKER	EVERBRIDGE APP
<ul style="list-style-type: none"> ▪ RUN – run away from or avoid the affected area, if possible ▪ HIDE – go into the nearest room that can be locked, turn out the lights, and remain hidden until all-clear message is given through TU ALERT ▪ FIGHT – do not attempt this option, except as a last resort ▪ For more information or to schedule a training, visit emergencyprep.tulane.edu 	<ul style="list-style-type: none"> ▪ Download the Everbridge app from the App Store or Google Play store ▪ The Report feature allows you to silently and discreetly communicate with TUPD dispatchers ▪ The SOS button allows you to notify TUPD if you need help ▪ The Safe Corridor button serves as a virtual escort and allows you to send check-in notifications to TUPD

From: Tulane Office of emergency preparedness and response