CSS 382 A Wi 21: Introduction To Artificial Intelligence

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Instructor: Dr. Yusuf Pisan, pisan@uw.edu UW1-260Q (425) 352-3741

Class: Tue/Thu 11:00-1:00pm on **Zoom** (https://washington.zoom.us/j/96124538334?pwd=Um9kSU0rOS9Wb295eXAwMG1FQWZvQT09). Meeting ID: 961 2453 8334 password: 382A

Office Hours: Monday 1-2pm and Thursday 9-10am. Signup via **Canvas Calendar**

Class Discord: **invite link** (https://discord.gg/5mEm92e)

Course Description

Principal ideas and developments in artificial intelligence, such as problem solving, knowledge representation, search, reasoning under uncertainty, learning, and natural language processing.

Course Learning Goals

ABET Outcomes:

1. an ability to apply knowledge of mathematics, science, and engineering;
2. an ability to design a system, component, or process to meet desired needs within
3. realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability;
4. an ability to use the techniques, skills, and modern engineering tools;
5. knowledge of contemporary issues;
6. a recognition of the need for, and an ability to engage in lifelong learning;
7. an ability to identify, formulate, and solve engineering problems; and
8. an ability to design and conduct experiments, as well as to analyze and interpret data

At the end of this course, students will be able to:

1. Describe what artificial intelligence (AI) means and how machines can process information intelligently;
2. Identify the different fields that comprise AI as well as techniques and heuristics for each area;
3. Create a formal representation of a complex problem; and
4. Write programs to solve complex problems using AI methods in areas such as search, reasoning, natural language processing, games, and robotics.

Textbooks

[Reference] Russell, Stuart J., and Norvig, Peter. *Artificial Intelligence : a Modern Approach*. 3rd edition, Pearson, 2015. http://aima.cs.berkeley.edu/ (http://aima.cs.berkeley.edu/) and

https://www.amazon.com/Artificial-Intelligence-Approach-Stuart-Russell/dp/9332543518 **(https://www.amazon.com/Artificial-Intelligence-Approach-Stuart-Russell/dp/9332543518)**

Grading

- Exercises: 15%
- Projects: 40%
- Midterm: 20%
- Final: 25%

A scale of 90s (3.5-4.0), 80s (2.5-3.4), 70s (1.5-2.4), 60s (0.5-1.4) is a rough guide. A student who achieves 75% of the possible points will receive a 2.0 grade in this course. Students with 95% and above will receive a 4.0 grade. Scores in between will be interpolated.

Distance Learning

Owing to the UW response to COVID-19, this course will be delivered entirely online through the Canvas learning management system and Zoom (supplemented by other web resources). This means that you will need to put in more time on your own than in a conventional course. Of course, the benefit of this structure is that you do not need to be physically present at UW-Bothell.

This course is scheduled to run synchronously at your scheduled class time via Zoom. These Zoom class sessions will be recorded. The recording will capture the presenter’s audio, video and computer screen. Student audio and video will be recorded if they share their computer audio and video during the recorded session. The recordings will only be accessible to students enrolled in the course to review materials. These recordings will not be shared with or accessible to the public. The University and Zoom have FERPA-compliant agreements in place to protect the security and privacy of UW Zoom accounts. Students who do not wish to be recorded should 1) change their Zoom screen name to hide any personal identifying information such as their name or UW netid, and 2) not share their computer audio or video during their Zoom sessions.

Policies

Pet Policy: If a pet enters the camera frame during class, we will pause our discussion for an introduction to that pet and admiration by all. All pets are welcome.

Assignment Submission: You can miss one exercise without penalty.

For projects, you can work individually or in pairs. When working as a pair, all substantial work must be performed with both students present (virtually). You can submit one and only one project 24 hours late without any penalty (if working as a pair both people will need to use their one-time extension). If you are using your 24 hour extension, post a brief explanation to "Using Extension" assignment.

Other than when working in pairs, talking about code is OK, looking at each others code is not OK. Looking at references to understand how a functions gets used is OK; looking up assignment solutions is

not OK. It is also not acceptable for your code or solutions to be publicly accessible on the web (for example, a public GitHub repository). Plagiarism will result in an assignment score of zero and a misconduct letter in your student record. Please be very careful to adhere to the student code of conduct: http://www.washington.edu/cssc/for-students/student-code-of-conduct/ I will make allowances for exceptional circumstances such as sickness, bereavement and official university business. I will not make exceptions for work, other classes, personal obligations, etc.

Attendance: Attend all classes. You are responsible for all the material covered in class, as well as any announcements including change of due dates or assignment specifications. There will also be graded in-class group exercises to practice problem solving. If you miss a class, I expect you to make-up for it on your own by asking your friends, reviewing the textbook, lecture materials, etc.

Communication: We will use discord as an extension of the classroom. Use a meaningful nickname and act professionally. If your question can be answered publicly by me or by a classmate, post it to discord. Use the office hours for complex issues or topics you are struggling with.

Use your UW email rather than "Canvas Messaging" to communicate directly with me. "Canvas Submission Comments" should only be used to draw the grader's attention to a specific part of your submission.

Problems: If you are having difficulties, come and talk to me. If I don't know about it, I cannot help you. Small problems can be fixed easily early in the quarter, but might become impossible to fix later on.

Course Material: Lecture notes and other material will be posted to Canvas under "Files".

See the **School of STEM Course Policies (https://www.uwb.edu/getattachment/stem/about/stem-policies/classroom-policies-stem-fc-1-12-17.pdf)** , which covers:

- Academic Integrity
- Access and Accommodations
- Classroom Emergency Preparedness
- For Our Veterans
- Grade of Incomplete
- Inclement Weather
- Parenting Resources
- Religious Accommodations
- Respect for Diversity
- Student Support Services
- Surviving Sexual and Relationship Violence
- Wonder How to Address Faculty?

Course Calendar

Week	Tuesday/Thursday	Notes

5 Jan 7 Jan	Introduction, Uninformed Search	
12 Jan 14 Jan	A* Search and Heuristics	**Search Project**
19 Jan 21 Jan	Constraint Satisfaction	18 Jan, Martin Luther King Day
26 Jan 28 Jan	Minimax, Expectimax, Utilities	**Multi-Agent Search Project - Part1**
2 Feb 4 Feb	Markov Decision Processes	**Multi-Agent Search Project - Part2**
9 Feb 11 Feb	Review **Midterm**	
16 Feb 18 Feb	Hidden Markov Models	15 Feb, Presidents' Day **Reinforcement Learning Project**
23 Feb 25 Feb	Bayes' Nets	
2 Mar 4 Mar	Natural Language Processing	**Ghostbusters Project**
9 Mar 11 Mar	Perception, Robotics	
16 Mar 18 Mar	**Final** - 18 Mar	No classes during finals week

Course Summary:

Date	Details	
Mon Jul 27, 2020	QSearch-01-Uninformed Search (https://canvas.uw.edu/courses/1444271/assignments/6006696)	due by 11am

Date	Details	
Tue Jul 28, 2020	QSearch01-Informed Search (https://canvas.uw.edu/courses/1444271/assignments/6006705)	due by 10:33am
Wed Jul 29, 2020	QSearch02-Insect In Maze (https://canvas.uw.edu/courses/1444271/assignments/6006700)	due by 11:59pm
Thu Jul 30, 2020	QSearch03-Search Algorithms (https://canvas.uw.edu/courses/1444271/assignments/6006703)	due by 11:59pm
Fri Jul 31, 2020	QCSP01 (https://canvas.uw.edu/courses/1444271/assignments/6006690)	due by 11:59pm
Mon Aug 3, 2020	QCSP02 (https://canvas.uw.edu/courses/1444271/assignments/6006706)	due by 11:59pm
Wed Aug 5, 2020	QMinimax01 (https://canvas.uw.edu/courses/1444271/assignments/6006698)	due by 11am
	QMinimax02 (https://canvas.uw.edu/courses/1444271/assignments/6006691)	due by 11:59pm
Thu Aug 6, 2020	QMDP01 (https://canvas.uw.edu/courses/1444271/assignments/6006704)	due by 12pm
Wed Aug 12, 2020	QRL01 (https://canvas.uw.edu/courses/1444271/assignments/6006701)	due by 12pm
Mon Jan 4, 2021	Office Hours (https://canvas.uw.edu/appointment_groups/8595)	1pm to Mar 11 at 10am
Tue Jan 5, 2021	CSS 382 A (https://canvas.uw.edu/calendar?event_id=1869898&include_contexts=course_1444271)	11am to 1pm
	Zoom Profile Picture (https://canvas.uw.edu/courses/1444271/assignments/5964177)	due by 11am
Thu Jan 7, 2021	CSS 382 A (https://canvas.uw.edu/calendar?event_id=1869899&include_contexts=course_1444271)	11am to 1pm

Date	Details	
Sun Jan 10, 2021	Post on Discord (https://canvas.uw.edu/courses/1444271/assignments/5930888)	due by 11:59pm
	Python Intro (https://canvas.uw.edu/courses/1444271/assignments/5930893)	due by 11:59pm
	Send Email (https://canvas.uw.edu/courses/1444271/assignments/5930896)	due by 11:59pm
	Run PacMan	to do: 11:59pm
Tue Jan 12, 2021	CSS 382 A (https://canvas.uw.edu/calendar?event_id=1869900&include_contexts=course_1444271)	11am to 1pm
Wed Jan 13, 2021	Rebooting AI (https://canvas.uw.edu/courses/1444271/assignments/5930894)	due by 11:59pm
Thu Jan 14, 2021	CSS 382 A (https://canvas.uw.edu/calendar?event_id=1869901&include_contexts=course_1444271)	11am to 1pm
Sun Jan 17, 2021	Project 1: Search (https://canvas.uw.edu/courses/1444271/assignments/5930889)	due by 11:59pm
	Using Extension (https://canvas.uw.edu/courses/1444271/assignments/5930897)	due by 11:59pm
Tue Jan 19, 2021	CSS 382 A (https://canvas.uw.edu/calendar?event_id=1869902&include_contexts=course_1444271)	11am to 1pm
	HW1 - Search MC (https://canvas.uw.edu/courses/1444271/assignments/5930886)	due by 11am
Thu Jan 21, 2021	CSS 382 A (https://canvas.uw.edu/calendar?event_id=1869903&include_contexts=course_1444271)	11am to 1pm
Tue Jan 26, 2021	CSS 382 A (https://canvas.uw.edu/calendar?event_id=1869904&include_contexts=course_1444271)	11am to 1pm

Date	Details	
Thu Jan 28, 2021	CSS 382 A (https://canvas.uw.edu/calendar?event_id=1869905&include_contexts=course_1444271)	11am to 1pm
Sun Jan 31, 2021	Project 2: Multi-Agent Search -P1 (https://canvas.uw.edu/courses/1444271/assignments/5930890)	due by 11:59pm
Tue Feb 2, 2021	CSS 382 A (https://canvas.uw.edu/calendar?event_id=1869906&include_contexts=course_1444271)	11am to 1pm
Thu Feb 4, 2021	CSS 382 A (https://canvas.uw.edu/calendar?event_id=1869907&include_contexts=course_1444271)	11am to 1pm
Sun Feb 7, 2021	Project 2: Multi-Agent Search - P2 (https://canvas.uw.edu/courses/1444271/assignments/5930891)	due by 11:59pm
Tue Feb 9, 2021	CSS 382 A (https://canvas.uw.edu/calendar?event_id=1869908&include_contexts=course_1444271)	11am to 1pm
Thu Feb 11, 2021	CSS 382 A (https://canvas.uw.edu/calendar?event_id=1869909&include_contexts=course_1444271)	11am to 1pm
	Midterm (https://canvas.uw.edu/courses/1444271/assignments/5930887)	due by 1:15pm
Tue Feb 16, 2021	CSS 382 A (https://canvas.uw.edu/calendar?event_id=1869910&include_contexts=course_1444271)	11am to 1pm
Thu Feb 18, 2021	CSS 382 A (https://canvas.uw.edu/calendar?event_id=1869911&include_contexts=course_1444271)	11am to 1pm
Sun Feb 21, 2021	Project 3: Reinforcement Learning (https://canvas.uw.edu/courses/1444271/assignments/5930892)	due by 11:59pm
Tue Feb 23, 2021	CSS 382 A (https://canvas.uw.edu/calendar?event_id=1869912&include_contexts=course_1444271)	11am to 1pm

Date	Details	
Thu Feb 25, 2021	CSS 382 A (https://canvas.uw.edu/calendar?event_id=1869913&include_contexts=course_1444271)	11am to 1pm
Tue Mar 2, 2021	CSS 382 A (https://canvas.uw.edu/calendar?event_id=1869914&include_contexts=course_1444271)	11am to 1pm
Thu Mar 4, 2021	CSS 382 A (https://canvas.uw.edu/calendar?event_id=1869915&include_contexts=course_1444271)	11am to 1pm
Sun Mar 7, 2021	Project 4: Ghostbusters (https://canvas.uw.edu/courses/1444271/assignments/5938384)	due by 11:59pm
Tue Mar 9, 2021	CSS 382 A (https://canvas.uw.edu/calendar?event_id=1869916&include_contexts=course_1444271)	11am to 1pm
Thu Mar 11, 2021	CSS 382 A (https://canvas.uw.edu/calendar?event_id=1869917&include_contexts=course_1444271)	11am to 1pm
Thu Mar 18, 2021	Final (https://canvas.uw.edu/courses/1444271/assignments/5930885)	due by 1:15pm
	Beyond The Classroom (https://canvas.uw.edu/courses/1444271/assignments/5948461)	
	Online Final (https://canvas.uw.edu/courses/1444271/assignments/6006702)	
	QMDP02 (https://canvas.uw.edu/courses/1444271/assignments/6006692)	
	QMinimax03 (https://canvas.uw.edu/courses/1444271/assignments/6006694)	
	QMinimax04 (https://canvas.uw.edu/courses/1444271/assignments/6006699)	

Date	Details
	Test Final (https://canvas.uw.edu/courses/1444271/assignments/6006693)
	Test1 (https://canvas.uw.edu/courses/1444271/assignments/6006697)