Course Information

Course Number: CSCE420
Course Title: Introduction to Artificial Intelligence
Credit Hours: 3

Section: 500
Time: Mon/Wed/Fri 8:00 A.M. to 8:50 A.M.
Location: ZACH 310

Instructor Details

Instructor: Dr. Dylan Shell
Office: PETR 315
Phone: (979) 845-2369
E-Mail: dshell@tamu.edu
Office Hours: Walk-ins: Tuesdays 10:30 A.M. to 11:30 A.M; also by appointment via e-mail.

Assistant to the Instructor Details

Name: Reza Oftadeh
E-Mail: reza.oftadeh@tamu.edu
Office Hours: Wednesdays noon to 1pm, and Fridays 11:00 A.M. to noon; by appointment too.
Office Hours Location: Zoom: https://tamu.zoom.us/j/96308037223

Course Webpage: *http://robotics.cs.tamu.edu/dshell/cs420*

Course Description

Fundamental concepts and techniques of intelligent systems; representation and interpretation of knowledge on a computer; search strategies and control; active research areas and applications such as notional systems, natural language understanding, vision systems, planning algorithms, intelligent agents and expert systems.

The course is a broad survey that will require a significant amount of reading with basic programming in different languages. It will provide an understanding of the state of the practice of AI and set the foundation for further study in agency, logic, neural networks, robotics, uncertainty, and computer vision.

Course Pre- and co-requisites

A course dealing with Design and Analysis of Algorithms, including Complexity Theory (NP-Hardness, SAT, etc.), e.g., the class CSCE 411, or equivalent.

Course Learning Outcomes

- *List the basic techniques for creating intelligent programs. This will be measured by midterm exams.*
- *Detail and discuss the challenges imposed by different notions of uncertainty (e.g., nondeterminism, partial-observably, adversarial agents, incomplete models), including their implications for the methods used in the creation of intelligent programs. This will be measured by midterm exams.*
- *Create program illustrating the successful operation of these methods. This will be measured by the programming assignments.*
- *Apply the right programming language or technique to the right problem and be able to evaluate a proposed AI application for likelihood of success. This will be measured by programming assignments.*
- *Be able to discern sensationalism from science on the possible impact of AI on society. This will be assessed by exams and the communication project.*

Textbook and/or Resource Materials

Artificial Intelligence: A Modern Approach by Stuart Russell and Peter Norvig, 4th Edition, 2020.
(Either the US or Global Edition are suitable.)

Grading Policy

- *The grading scale is:*
    - A   *90-100*
    - B   *80-89*
    - C   *70-79*
    - D   *60-69*
    - F   *59 or below*

- *Grades will be based on:*
    - 40%   : Programming assignments (individual)
    - 20%   : Midterm exam (individual)
    - 15%   : Communication project (group or individual)
    - 25%   : Comprehensive Final exam (individual)

Late Work Policy

- The due dates are those that appear on the syllabus. Occasionally the instructor will permit a moderate extension to the deadlines, those extensions will apply to every student equally, and will be communicated in class and posted on the class website.

- For programming assignments and the communication project, we have a late policy with a discount of 10% per day. This is computed by the minute (not as a step-function at midnight) which works out to follow this rule (where t is in units of minutes late):

$$AwardedScore = \max(0,(14400 - t)/14400) \cdot RawScoreAsIfNotLate$$

  ○ The discounting is linear and reaches zero after 10 days.

- The midterm and final exams, being examinations, are not permitted to be late; they will likely be in-person written examinations, but the instructor may choose to treat these as take-home examinations instead.

- Standard university reasons for lateness shall be respected so long as the student communicates with the instructor as soon as possible—this means, specifically, it has been communicated before the deadline has passed and not *ex post facto* whenever feasible. (Note that job interviews and attendance of the career fair are, as per Student Rule 7, generally not excused absences.)

Course Schedule

Week-by-week topic breakdown

Date	Wk	Topic	Core Readings (from R&N Global Edn); others posted
1/17, 1/19	1	Course overview, Introduction	Chapts. 1
1/22, 1/24, 1/26	2	Search, Reminder: DFS/BFS	2, 3.1–3.4
1/29, 1/31, 2/2	3	Informed Search. Heuristics; Generalizations; Guest Lecture: [Likely: D*Lite]	3.5–3.6
2/5, 2/7, 2/9	4	Local Search, Optimization	4.1–4.2, 4.3–4.4
2/12, 2/14, 2/16	5	Search for games	6.1–6.3, 6.4–6.5
2/19, 2/21, 2/23	6	Constraint Satisfaction Problems	5
2/26, 2/28, 3/1	7	On knowledge representation Introduction to Logic	7

3/4, 3/6, 3/8	8	*First-order Logic: Syntax and Semantics*	8
		[Spring Break]	
3/18, 3/20, 3/22	9	Prolog and Temporal Logic	
3/25, 3/27	10	First-order Logic: Inference	9
4/1, 4/3, 4/5	11	Classical Planning	11.1–11.4
4/8, 4/10, 4/12	12	Learning Basics, Neural Networks	19.1–19.6, 22.1–22.4
4/15, 4/17, 4/19	13	Reinforcement Learning	23
4/22, 4/24, 4/26	14	Philosophical Foundations	28
4/29, 4/30	15	Catch-up Week	
		Comprehensive Final Exam (May 2nd, 10:00 A.M.–12:00 P.M.)	

Important due dates:

Date	Item	Course Weight
3/6 (Wed)	Midterm	20%
4/10 (Wed)	Communication Project	15%
5/2 (Thr)	Comprehensive Final Exam	25%

Programming assignments:

The course will include five programming homeworks, which will be submitted for credit by the prescribed deadline. The assignments are not worth equal grade value and the effort needed will vary quite markedly.

Date	Programming Assignment	Weight
2/9 (Fri)	Programming Assignment 1: Search	10% (25% of PAs)
2/23 (Fri)	Programming Assignment 2: Game Search	10% (25% of PAs)
3/22 (Fri)	Programming Assignment 3: Basic Prolog	5% (12.5% of PAs)
4/19 (Fri)	Programming Assignment 4: Wumpus!	10% (25% of PAs)
4/26 (Fri)	Programming Assignment 5: PDDL	5% (12.4% of PAs)

Teaching technology/infrastructure:

The lectures will be delivered in person. The class will make use mainly of material at the URL mentioned above, and also a Campuswire instance (for persistent, threaded discussions which support code).

This is not an "on-line" offering of the course; some effort will be made to ensure that those who are unable to attend (owing to illness or quarantining) will be able to follow the progress of the course, and submit work, but this is a courtesy offered by the instructor for University excused absences. (Pay attention to the fact that interviews and career fair events are do not fall into this category.)

Class policy on the use of AI and associated tools

Writing (as for your communication project and other documentation): Use of AI tools, including ChatGPT, is permitted in this course for students who wish to use them. To adhere to TAMU scholarly values, students must cite any AI-generated material that informed their work (this includes in-text citations and/or use of quotations, and in your reference list). Using an AI tool to generate content without proper attribution qualifies as academic dishonesty. See https://www.chicagomanualofstyle.org/qanda/data/faq/topics/Documentation/faq0422.html for information how to properly cite AI tools.

Computer Code (as in use for your programming assignments): In principle you may submit AI-generated code, or code that is based on or derived from AI-generated code, as long as this use is properly documented. In doing so, your submissions must include an extra file (or files) that provide (1) the lists of prompts you employed and (2) also the outputs thereby obtained. AI tools may help you avoid syntax errors, but there is no guarantee that the generated code is correct and it is entirely your responsibility to identify errors in program logic through comprehensive, documented testing. Moreover, generated code, even if syntactically correct, may have significant scope for improvement, in particular regarding separation of concerns and avoiding repetitions. The submission itself must meet TAMU standards of attribution and validation (see section on "Academic Integrity Statement and Policy" below).

University Writing Center

The University Writing Center (UWC) has trained peer consultants available to work with you on any kind of writing or speaking project, including research papers, lab reports, application essays, or creative writing, and at any stage of your process, whether you're deciding on a topic or reviewing your final draft. You can also get help with public speaking, presentations, and group projects. They can work with you in person in Evans or BLCC locations or via Zoom or email. To schedule an appointment or to view their handouts, videos, or interactive learning modules, visit writingcenter.tamu.edu. If you have questions, need help making an appointment, or encounter difficulty accessing our services, call 979-458-1455 or email uwc@tamu.edu.

For your communication project can obtain 5% extra-credit by providing evidence of having used the UWC to improve your draft. For instance, showing a before and after, with evidence of their input, e.g, via an appointment.

University Policies

Attendance Policy

The university views class attendance and participation as an individual student responsibility. Students are expected to attend class and to complete all assignments.

Please refer to Student Rule 7 in its entirety for information about excused absences, including definitions, and related documentation and timelines. Please pay careful attention: an interview is only considered an excused absence in very particular circumstances, which tend to happen very rarely for CS jobs.

Makeup Work Policy

Students will be excused from attending class on the day of a graded activity or when attendance contributes to a student's grade, for the reasons stated in Student Rule 7, or other reason deemed appropriate by the instructor. In cases where the decision is at the instructor's discretion, the likelihood of an accommodation/makeup is directly related to whether the student communicates with the instructor as soon as possible; requests for foreseeable absences that are made only after the absence will not be granted.

Please refer to Student Rule 7 in its entirety for information about makeup work, including definitions, and related documentation and timelines.

Absences related to Title IX of the Education Amendments of 1972 may necessitate a period of more than 30 days for make-up work, and the timeframe for make-up work should be agreed upon by the student and instructor" (Student Rule 7, Section 7.4.1).

"The instructor is under no obligation to provide an opportunity for the student to make up work missed because of an unexcused absence" (Student Rule 7, Section 7.4.2).

Students who request an excused absence are expected to uphold the Aggie Honor Code and Student Conduct Code. (See Student Rule 24.)

Academic Integrity Statement and Policy

"An Aggie does not lie, cheat or steal, or tolerate those who do."

"Texas A&M University students are responsible for authenticating all work submitted to an instructor. If asked, students must be able to produce proof that the item submitted is indeed the work of that student. Students must keep appropriate records at all times. The inability to authenticate one's work, should the instructor request it, may be sufficient grounds to initiate an academic misconduct case" (Section 20.1.2.3, Student Rule 20).

You can learn more about the Aggie Honor System Office Rules and Procedures, academic integrity, and your rights and responsibilities at aggiehonor.tamu.edu.

Americans with Disabilities Act (ADA) Policy

Texas A&M University is committed to providing equitable access to learning opportunities for all students. If you experience barriers to your education due to a disability or think you may have a disability, please contact Disability Resources in the Student Services Building or at (979) 845-1637 or visit disability.tamu.edu. Disabilities may include, but are not limited to attentional, learning, mental health, sensory, physical, or chronic health conditions. All students are encouraged to discuss their disability related needs with Disability Resources and their instructors as soon as possible.

Title IX and Statement on Limits to Confidentiality

Texas A&M University is committed to fostering a learning environment that is safe and productive for all. University policies and federal and state laws prohibit gender-based discrimination and sexual harassment, including sexual assault, sexual exploitation, domestic violence, dating violence, and stalking.

With the exception of some medical and mental health providers, all university employees (including full and part-time faculty, staff, paid graduate assistants, student workers, etc.) are Mandatory Reporters and must report to the Title IX Office if the employee experiences, observes, or becomes aware of an incident that meets the following conditions (see University Rule 08.01.01.M1):

- The incident is reasonably believed to be discrimination or harassment.
- The incident is alleged to have been committed by or against a person who, at the time of the incident, was (1) a student enrolled at the University or (2) an employee of the University.

Mandatory Reporters must file a report regardless of how the information comes to their attention – including but not limited to face-to-face conversations, a written class assignment or paper, class discussion, email, text, or social media post. Although Mandatory Reporters must file a report, in most instances, you will be able to control how the report is handled, including whether or not to pursue a formal investigation. The University's goal is to make sure you are aware of the range of options available to you and to ensure access to the resources you need.

Students wishing to discuss concerns in a confidential setting are encouraged to make an appointment with Counseling and Psychological Services (CAPS).

Students can learn more about filing a report, accessing supportive resources, and navigating the Title IX investigation and resolution process on the University's Title IX webpage.

Statement on Mental Health and Wellness

Texas A&M University recognizes that mental health and wellness are critical factors that influence a student's academic success and overall wellbeing. Students are encouraged to engage in proper self-care by utilizing the resources and services available from Counseling & Psychological Services (CAPS). Students who need someone to talk to can call the TAMU Helpline (979-845-2700) from 4:00 p.m. to 8:00 a.m. weekdays and 24 hours on weekends. 24-hour emergency help is also available through the National Suicide Prevention Hotline (800-273-8255) or at suicidepreventionlifeline.org.