CSCI 4463: Artificial Intelligence
Spring 2021 Syllabus

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E-mail (course related): Use course Blackboard Course Messages tool.   **Phone (office):** x3526
E-mail (other than this course): See campus directory for address.

Course Time and Location: The course is **Online**. The course is scheduled as "Online Blended," which technically means partially synchronous with specific meeting times, and partially asynchronous. **However, the specific meeting time of Wednesdays, 12:45pm-2:00pm is optional**. I will post a link to Zoom for this in Blackboard. You are not required to attend the Wednesday synchronous meeting. If you do attend, you should be prepared to ask questions. The purpose of this optional synchronous meeting is to answer questions that you have about homework assignments, or just the course content more generally. I'm not going to take attendance during these Zoom meetings. And if nobody has any questions for me, then they will be over rather quickly. Also, if none of you are connected to the Zoom meeting by 1:00pm, I will simply end the meeting.

Office Hours: Zoom by appointment (contact me via Blackboard course messages tool).
- The reduced room capacity to account for social distancing during the pandemic for my office is 1 (i.e., if I'm in there, nobody else is allowed to be). So I'm not allowed to meet with you there.
- If the reason for meeting with me is something general enough to be relevant to the class as a whole (e.g., you are stuck on how to do a homework assignment, or would like me to do another example of how a search algorithm works, etc), then I'd prefer that you start with the **Optional Synchronous Class Meeting** (see "Course Time and Location" section above). Your question may benefit others if asked at that time rather than during virtual office hours.
- **Scheduling Virtual Office Hours**: Since office hours will be virtual via Zoom, I'm not setting specific days/times. Just send me a message via the Course Messages tool in Blackboard. For simple issues, we might be able to simply interact that way. But if you want to "meet" via Zoom include some suggested days/times (multiple options preferably) in your message, and I will either pick one or I'll suggest some alternatives if your requested days/times conflict with my schedule. Note: I won't meet on weekends or holidays, or after 4:30pm (I often have regular meetings for committees, etc at 4:30, and I don't work in the evening). My preference for meetings with students is between 10am and 2pm, but I can be available outside that time window if necessary.
- You can call my office phone. I will be there some days/times, and even if I'm not, I will get any voicemail you might leave. Although if I don't answer when you call, you will likely get a quicker response if you send me a message in Blackboard.

Electronic Communications:
- **Discussion Forum:** I set up a threaded discussion forum within Blackboard. If you have any general questions about course content, homework, exams, etc, feel free to post in that forum. You can also feel free to discuss course related topics with your classmates there as well. There are no requirements to post in the discussion. It is there as an additional way to communicate with your classmates, and with me. If someone posts a question about something, and you happen to see it before I do and think you know how to answer, you can even answer each other's questions there. **Rule 1:** You are not allowed to post your solutions (or parts of solutions) to homework or exams. **Rule 2:** You are not allowed to post your own personal grade details (this should be obvious since the entire class can read the contents of the discussion forum). **Rule 3:** You must be respectful with each other (this should also be obvious).
- **Course Messages:** If you do have something specific to you (e.g., your grades, or if you want to set up an office hours appointment), then use the "Course Messages" link in Blackboard.

- **My Response Time:** If you post in the Discussion Forum and your post is something that I must respond to, or if you send me a direct message in Course Messages, I will respond no later than 11:59pm the next weekday. E.g., if you post/message anytime on Monday, I will reply by 11:59pm on Tuesday night, or if you post/message anytime on Friday, Saturday, or Sunday, I will respond no later than 11:59pm on Monday night. I'm highly unlikely to respond to course related messages on the two precepting days.

Course Description: A study of tools, techniques, and applications associated with intelligent computer systems. Topics include problem-solving methods, search algorithms, knowledge representation, heuristics, constraint satisfaction, and other software tools for developing AI applications.

List of Course Topics (with relevant textbook chapters, etc):
- Introduction to A.I. (Chapter 1)
- Intelligent Agents (Chapter 2)
- Uninformed Search (Chapter 3: Sections 3.1, 3.2, 3.3, 3.4)
- Heuristic (or Informed) Search (Chapter 3: Sections 3.5, 3.6)
- Robot Motion Planning (Chapter 26: Section 26.5, pages 938-955)
- Constraint Satisfaction Problems (Chapter 6)
- Game Search (Chapter 5)
- Local Search (Chapter 4: Section 4.1, plus more coverage in videos/notes not in the textbook)
- Stochastic Sampling Search (Not in textbook)
- Evolutionary Computation (Mostly not in textbook, some minimal coverage in Section 4.1.4, but covered in much greater detail in course videos and notes posted in Blackboard).

Prerequisites: CSCI 3103: Data Structures & Algorithms I (C or better)

Minor in Behavioral Neuroscience: This course is an elective in the Behavioral Neuroscience Minor.

Q2: This course is a Q2 (Quantitative Reasoning Across the Disciplines). Course topics involve application of mathematics, especially discrete mathematics, such as but not limited to set theory, graphs, trees, logic, discrete probability, etc.

Required Textbook:
- Artificial Intelligence: A Modern Approach, 4th Edition, 2020, by S. Russell and P. Norvig. ISBN: 9780134610993.
- **You MUST have the 4th Edition.** The previous edition is far too old. The 4th Edition is the first update in over 10 years.

Other Required Resources:
- **The Respondus Lockdown Browser and a WebCam**: The exams for this course will be taken within Blackboard. However, you are required to take them using the Respondus Lockdown Browser on a computer with a WebCam (either one built into the computer such as a laptop WebCam, or an external usb WebCam).
  - Respondus uses your WebCam to automatically proctor the exam.
  - The Lockdown Browser gives you access only to the exam in Blackboard and nothing else (e.g., no other web browsing, no printing, no screen captures, no other applications).
  - Follow the instructions in Blackboard to install the Lockdown Browser. I also have a fake test set up in Blackboard that you can access an unlimited number of times to verify that Lockdown and Respondus is operating correctly.

Stockton Computer Science Student Learning Outcomes: This course supports the development of the following Computer Science Student Learning Outcomes and performance indicators:

- Outcome 1. An ability to analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
  - a. Students will analyze a complex computing problem.
  - b. Students will apply principles of computing and other relevant disciplines to identify solutions to a complex computing problem.
- Outcome 2. An ability to design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
  - a. Students will design a computing-based solution to meet a given set of computing requirements.
  - b. Students will implement a computing-based solution to meet a given set of computing requirements.
  - c. Students will evaluate a computing-based solution to meet a given set of computing requirements.
- Outcome 3. An ability to communicate effectively in a variety of professional contexts.
  - a. Students will write technical documentation of a computer-based system, process, component, or program.
- Outcome 6. An ability to apply computer science theory and software development fundamentals to produce computing-based solutions.
  - a. Students will apply computer science theory to produce computing-based solutions.
  - c. Students will evaluate the effects of alternative data representations and algorithms on the performance of computing-based solutions.

Course IDEA Objectives: The objectives of this course include:

- Gaining a basic understanding of the subject (terminology, methods, trends of the field of artificial intelligence with particular emphasis on computational intelligence, as well as the fundamental principles and theories of the field of artificial intelligence, focusing specifically on the theories underlying artificial intelligence search and problem solving strategies).
- Learning to apply the algorithms of the field of artificial intelligence to solving problems of real-world importance.
- Developing specific skills, competencies, and points of view needed by professionals in the field most closely related to this course.
- Learning appropriate methods for collecting, analyzing, and interpreting numerical information.

Grading:
Homework Assignments	50%	
Exam 1	25%	
Exam 2	25%	

Grading Scale:

A: at least 90.00	A-: at least 89.00	B+: at least 88.00
B: at least 80.00	B-: at least 79.00	C+: at least 78.00
C: at least 70.00	C-: at least 69.00	D+: at least 68.00
D: at least 60.00	D-: at least 59.00	F: less than 59.00

I reserve the right to adjust the scale at the end of the semester. Such adjustments are rare, but will only be in your favor; and are highly unlikely to occur at the D-/F boundary. Note the 2 decimal places in the chart above (i.e., I do not round to the nearest whole number): e.g., unless I adjust the grade scale, an 89.99 is an A-, etc. If I adjust the scale, it is done using a semi-automated approach involving clustering (i.e., "automated" == a program I wrote suggests a new scale based on all of the grades of the class; "semi-" == if that program's output is crazy, I ignore it and leave the scale alone; and "clustering" == a statistical technique). I never simply add a constant number of points to everyone's overall course score.

Course Content: All course content is within Blackboard. The **"Topics (Videos and Notes)"** page is where you will find all of the course topics. For each topic, I have recorded several videos, as well as have provided in note form any PowerPoint slides I used during the videos. If you don't watch the videos, then you won't do well in the course (not watching the videos would be equivalent to not attending class).

Exams: The exams are not explicitly cumulative, although some concepts covered in the course build on earlier topics. **You are allowed to use paper notes only during the exams.** You are not allowed to use any other resources during exams (no electronic devices other than the computer on which you are taking the exam, which includes no cell phones, no tablets, no second computer---see academic honesty policy later in syllabus for penalty details). You are also not allowed to use the textbook or any other books during the exams. Respondus is used to ensure this rule is followed (automated video proctoring).

Exam Timing: The dates of the exams can be found in Blackboard. For each exam, there is a 48 hour time window. During that time window, you can choose any 3 hour block to take the exam. Once you start the exam, a timer starts enforcing the 3 hour time limit. The exams are not designed to require 3 hours. They are actually designed assuming a 2 hour block. E.g., they are approximately what I'd have you do on paper in a classroom if we had a two hour class module. I consider 1 of those 3 hours to be a buffer to deal with any technical issues that may come up during the exam. If you lose your Internet connection during the exam (either on purpose or due to issues beyond your control), then the timer continues to count down (it doesn't stop). In this case, you will need to reconnect as soon as you can resolve your issue. Blackboard will allow you to continue from where you left off assuming you haven't run out of time. In nearly all cases of technical issues, the problem is usually resolved within a few minutes, so a 1 hour buffer is ample time to deal with this. Unless you are able to document extensive technical issues lasting over 1 hour, you won't be given any extra exam time for such circumstances.

Make-Up Exams: Make-up exams will not be given (i.e., missed exam = 0), with the following exceptions:
1. Medical excuse: Provide documentation to the Wellness Center who will contact course instructors.
2. Based on University policy (https://stockton.edu/policy-procedure/documents/procedures/2030.pdf), if you are to be absent for a religious holiday on the date of an exam, you must notify me of that planned absence during the first 10 business days of the semester. Keep in mind though that the religious holiday would need to span both days of the 48 hour time window of the exam to be relevant (if the holiday is only during one of the two days, then you can take the exam the other day).

Homework Assignments: Homework will consist of sets of problems related to course topics; and some will involve programming. Unless otherwise indicated, homework is to be done individually. There are a small number of assignments where small teams are allowed, and those assignments explicitly indicate the size of teams that are allowed. Homework that involves programming will either require Java specifically (e.g., if I'm giving you code that is in Java), or in some other cases you will have the option of Java or Python 3 (Note: No assignments will be accepted if completed using Python 2. If you choose to use Python, it must be Python 3.x). Most of the homework assignments will include problems, exercises, and review questions related to the course topics. These must all be done independently.

- **Paper than Scan**: I strongly suggest that problems involving math or where you need to show a diagram of some type are done on paper and then scanned to submit in Blackboard. It will probably take you less time to do it that way, then to try to format math in Word or some other word processing software, or to use some drawing software to draw the relevant diagram.
- **Phone PDF Scanner Apps**: If you don't have a scanner, there are some good (and free) apps available for phones that use your phone camera to scan a document as a pdf (including multipage documents). One such app that I have personally used on Android is "Office Lens" from Microsoft. It is free and even has no ads (some of the other free aps have ads).
- **Programming**: For assignments involving programming just submit the source code and anything else specified on the assignment page.

Due Dates: Homework Assignments are due in Blackboard by 11:59pm on the dates due (dates found in Blackboard on the assignment pages). Late assignments are penalized as follows: (a) 25% off if late by no more than 24 hours, (b) 50% off if late by no more than 48 hours, (c) 75% off if late by no more than 72 hours, and (d) a grade of 0 if late by more than 72 hours. The first time a homework assignment is late (within 72 hours), the late penalty is waived.

Academic Honesty: Please familiarize yourself with Stockton's policy on academic honesty. Each violation is penalized by a 0 on the relevant assignment/exam/etc, plus a 10 point penalty on your overall course grade. For example, if you have one violation, you'll have a 0 on that assignment or exam plus 10 points off your overall average, but if you have two violations, you'll have grades of 0 on the two assignments/exams/etc and 20 points off your overall average. Example violations include, but are not limited to: (a) any form of cheating on an exam or assignment, (b) passing off the work of another as your own (including other students, former students, code or problem solutions found on the Internet written by someone else, etc), (c) assisting someone in violating the academic honesty policy, (d) asking someone to assist you in cheating or other academic honesty violations (even if they refuse to help you cheat), etc. [Yes, I encountered that last one once in a General Studies course.]

Incomplete Policy: In general, no grades of incomplete will be given. The only exception to this rule is an institutionally documented medical emergency that necessitates your complete absence from Stockton for at least two continuous semester weeks. Additionally, you must be caught up on all work up to the point where your medical emergency began and currently in the "C" range or better overall at the point where the emergency began.

LockDown Browser + Webcam Requirement: This course requires the use of LockDown Browser and a webcam for online exams. The webcam can be the type that's built into your computer or one that plugs in with a USB cable.
- Watch this brief video to get a basic understanding of LockDown Browser and the webcam feature: https://www.respondus.com/products/lockdown-browser/student-movie.shtml
- **Download Instructions:** Download and install LockDown Browser from the following link: https://download.respondus.com/lockdown/download.php?id=353467840
- **Once Installed**
  - Start LockDown Browser
  - Log into Blackboard Learn
  - Navigate to the test
- Note: You won't be able to access tests with a standard web browser. If this is tried, an error message will indicate that the test requires the use of LockDown Browser. Simply start LockDown Browser and navigate back to the exam to continue.
- **Guidelines**: When taking an online test, follow these guidelines:
  - Ensure you're in a location where you won't be interrupted
  - Turn off all other devices (e.g. tablets, phones, 2nd computers) and place them outside of your reach
  - Before starting the test, know how much time is available for it, and also that you've allotted sufficient time to complete it
  - Clear your desk or workspace of all external materials not permitted – textbook, other books, phones and other devices (**You are allowed paper notes only.**)
  - Remain at your computer for the duration of the test
  - If the computer, Wi-Fi, or location is different than what was used previously with the "Webcam Check" and "System & Network Check" in LockDown Browser, run checks again prior to the exam
  - To produce a good webcam video, do the following:
    - Avoid wearing baseball caps or hats with brims

- Ensure your computer or device is on a firm surface (a desk or table). Do NOT have the computer on your lap, a bed, or other surface where the device (or you) are likely to move
- If using a built-in webcam, avoid readjusting screen tilt after the webcam setup is complete
- Take the exam in a well-lit room, but avoid backlighting (avoid window behind back)
  - Remember that LockDown Browser will prevent you from accessing other websites or applications; you will be unable to exit the test until all questions are completed and submitted
- **Getting Help:** Several resources are available if you encounter problems with LockDown Browser:
  - The Windows and Mac versions of LockDown Browser have a "Help Center" button on the toolbar. Use the "System & Network Check" to troubleshoot issues, and also run the "Webcam Check".
  - Respondus has a Knowledge Base available from support.respondus.com. Select the "Knowledge Base" link and then select "Respondus LockDown Browser" as the product. If your problem is with a webcam, select "Respondus Monitor" as your product
  - If you're still unable to resolve a technical issue with LockDown Browser, go to support.respondus.com and select "Submit a Ticket". Provide detailed information about your problem and what steps you took to resolve it.