Intoroduction to Artificial Intelligence
COSC 4550 / COSC 5550
M/W/F 1:10-2:00pm
Room: Engineering 3076

Instructors:

Professor Cheney

Office hours: M 2-3pm, F 12-1pm (Engineering 4081B)

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TA: Joost Huizinga

TA office hours: Tu 2-4pm, Th 2-4pm (Engineering 4086)

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Course Website:

Main Website/Schedule: ncheney.com/teaching/ai

Piazza Discussion Board: piazza.com/uwyo/fall2017/cocs45505550

Course Summary and Goals:
The course surveys the broad field of Artificial Intelligence (AI). Given the breadth of AI, the course will provide introductions to many of the main areas of AI. The class will strike a balance in between the extremes of covering all major areas superficially and drilling deeply into only a few areas. The goal is for students to understand the general principles of how to think about AI as well as the main approaches and techniques of many sub-disciplines. With that knowledge, students should gain the ability to recognize and or guess what type of AI fuels the technologies we encounter in daily life and the news. Such knowledge will also help students discover which areas of AI they would like to dive into more deeply in the future, perhaps in their research careers. Finally, it is my goal that you will learn about the intelligence of living creatures, including yourself. Unfortunately, given the large number of different AI sub-disciplines, many necessarily will not be covered at all. At the end of the class, students are encouraged to check which chapters of the textbook were not covered and to review those chapters to learn about other areas of AI.

Textbook:
<u>Artificial Intelligence: A Modern Approach</u>, Russell and Norvig, *3rdedition*.
Make sure to get the 3rd edition!

Additional Readings:
Additional readings will be provided from the scientific literature.

Readings Policy:
There will be readings associated with each class that you should **<u>read before class</u>**. I will not have time to cover all the material from the readings in class (in order to provide you with more hands-on examples, applications, and research highlights). You are <u>still responsible for knowing the material from the readings that is not covered during the lectures</u>! See the course website for those assignments.

Prerequisite skills:
You should know how to program as well as a working knowledge of computational thinking (e.g. algorithmic complexity in the form of big-O notation, basic data structures, etc.). The programming for the AI challenges will be done in the language Python. You can program in the language of your choice for your final, course project. If you do not know Python you can learn it fairly quickly by going through one of the many excellent tutorials online. Many people have successfully completed the course before without prior Python experience. You should also have a basic knowledge of statistics, probability, and linear algebra, although a motivated student can work on his or her own to fill in these skills as needed outside of class.

Difficulty:
This class is hard and time-consuming. I am interested in your learning a lot about the fascinating and fast-paced field of artificial intelligence. Doing that requires hard work and long hours. You have been warned!

Graded Material:

<u>AI Challenges</u>: 30% of grade
AI Challenges allow you to implement AI algorithms to solve fun problems and *learn by doing*. The assignments, deliverables, and due dates will be announced during the course. These assignments are meant to be done indepedantly, so please do not post the code you write for these challenges online or share them with anyone else.

<u>Early Final/Late Midterm</u>: 30%.
The early final consists of a test on all of the knowledge covered in lecture and assigned readings up to the date of the test. The test will be held towards the end of the semester and will thus be more of a 3/4ths-term test rather than a true final.

<u>Course Project</u>: 30%.
You will select some cool AI challenge, implement the AI, and share with your class what you did, why it is interesting, and how well it worked. You do not need to conduct new research in AI (i.e. come up with a new algorithm or solve a new type of problem), but you are encouraged to do something fun and novel (e.g. a new game or application, or some wrinkle on previous AI work). You may use previous code and ideas, but (a) you must get written permission from me, including clearly stating in writing what ideas/code/etc. you are building off of, and (b) you must do something sufficiently new that involves and applies AI principles you have learned in this course.

The output of this project will be a video that presents the project. You will show this video in class and then answer questions about it. The video should be 2-5 minutes long (shorter is better **if** you can tell your story that quickly). The final videos will be posted on YouTube to share your work with the world. More information about the course project will be announced in class and/or on Piazza.

To make sure that the scope of your project is appropriate, you are required to have it approved by me ahead of time. The "must be approved by" date will be announced in class.

<u>Participation</u>: 10%.
You are encouraged to attend class, ask questions, participate in discussions, give high-quality grade evaluations to your peers, and be an active member in the Piazza online forum for the class (see below). Students will be rewarded for asking good questions on Piazza. Good questions share all of the necessary detail and reveal that you have tried to resolve the issue on your own before asking the question. Students will be especially rewarded for providing courteous, informative answers to the questions of others, or proactively making interesting posts (e.g. tricky technical solutions, interesting questions or articles for discussion, etc.).

<u>Graduate vs. Undergraduate Students</u>: The scope and expectation of the course project will be larger for graduate students. Additionally, they will do longer, harder AI Challenges, and occasionally will be assigned more reading material. Generally, the expectations for graduate students are higher, which will be reflected in the grades awarded.

<u>Grades</u>:
A: ≥93%, A-: ≥90%, B+: ≥87%, B: ≥83%, B-: ≥80%, C+: ≥77%, C: ≥73%, C-: ≥70%, D+: ≥67%, D: ≥63%, D-: ≥60%, F: <60%

Late policy:
Please note the due dates (and times – e.g. before class starts vs. midnight of the day before) of all assignments. Due to the fast pace of this class, late assignments will only be accepted for a limited amount of time, and with the following penalties: One class late: 25% deduction, Two classes late: 50% deduction, Three classes late: 75% deduction, afterwards: 100% deduction.

Piazza Online Community:
You are required to sign up for the Piazza forum for this class at Piazza.com. More information about

the early final and Course Project will be added to the course website and/or announced via Piazza during the semester. Make sure you are receiving emails from Piazza, or you will miss important course announcements!

Asking Questions Outside of Class:
While questions in class are highly encouraged, please direct questions outside of class to the Piazza forum. That way your fellow classmates can also benefit from the answer you receive. Students also have been shown to learn much more when they are helping fellow classmates with material and when they are engaged in online communities. Please also help answer questions on Piazza! Note: You should not expect that your question on Piazza will be answered. It is merely an additional tool that can help in the event that someone provides an answer. If you need an answer to a question, especially by a certain time, make sure to ask it in class or office hours.

Academic Integrity:
You are not allowed to share code amongst yourselves or on Piazza. Also, do not post the code you write for the AI challenges online or share them with anyone else: doing so constitutes cheating. You are encouraged to discuss the class with other students, but you cannot give another student specific algorithms (detailed instructions, code, verbal pseudocode, etc.) for solving the homework problems. In order to look at or use someone else's code, including code found online, you must get prior permission from me (which you will be given for your final projects!). If you use anyone else's code after getting permission, you must explicitly report it (not in the comments of the code, but the project write-up: if there is no project write-up, you may mention it in an email to an instructor or TA). In addition to these specific issues, you are obliged to follow the University's policy on academic integrity (http://www.uwyo.edu/generalcounsel/_files/docs/unireg802.pdf). When in doubt, ask first! The University of Wyoming is built upon a strong foundation of integrity, respect and trust. All members of the university community have a responsibility to be honest and the right to expect honesty from others.

Laptops & Smartphones:
Please do not use smartphones or open laptops in class. Studies show that they distract from your ability to learn. Your use of them is also distracting to the other students around you, and me while teaching – and that is not fair to everyone else. Please bring a pen and paper for any in-class exercises or notes. Slides will be posted online following each lectures, so note taking from the slides is not required.

Differently Abled Students:
If you have a physical, learning, or psychological disability and require accommodations, Dean of Student's office offers excellent Disability Support Services (room 128 Knight Hall). Please contact them first to enroll in their services, and they will then contact me regarding how best to accommodate your needs, which I am very happy to do.

Attendance:
Your attendance affects your participation grade and your ability to do well in the class. It is expected that you will attend every class unless something important and unavoidable prevents you from doing so. You are required to attend class the day the early final is being held and when final presentations are being made by you and your peers, which will happen in the last few regular classes and during the final examination time slot. For these dates, absences must be approved by the dean of students (i.e. a "University Excused Absence"). Mark these dates on your calendar and plan accordingly. The Final Exam time is posted online (though it is subject to change).

Subject to Change:

The policies laid out in this document, and especially the schedule laid out on the course website, are subject to any changes that may be necessary to accommodate our class' timing and/or needs throughout the semester. Please check back frequently for any changes.