CMPSC 310
Artificial Intelligence
Spring 2020

Syllabus

Course Instructor
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Changes to the syllabus due to the switch to remote instruction on March 25, 2020 are marked in red.

Instructor’s Office Hours

- Monday, Wednesday, Friday: 9:30 am – 10:30 am (15 minute time slots)
- Tuesday and Thursday: 11:00am - 12:00pm (10 minute time slots)
- Wednesday: 1:30 pm - 2:30 pm (10 minute time slots)

To schedule a meeting with me during the office hours, please go to https://cs.allegheny.edu/sites/jjumadinova/schedule, click on the “book an appointment” link and select the available date and time of your choice. You can schedule an appointment outside of my office hours via course’s Slack channel or email.

To attend office hours during remote instruction, please schedule an appointment during available office hour slots on Google Calendar (as above), then click on the Google Meet link in the Google Calendar appointment description, and join the meeting.

Course Meeting Schedule

Discussion and Group Work: Monday, Wednesday, Friday, 11:00 am – 11:50 am
Laboratory Session: Friday, 2:30 pm – 4:20 pm

Remote instruction will be conducted asynchronously with a few synchronous meetings for Q&A during regular class time on Google Meet, which will be announced in advance in Slack.

Course Resources

Course Web page: https://cs.allegheny.edu/sites/jjumadinova/teaching/310
You can find the most up-to-date schedule of the course and the required readings on the course’s page.

GitHub Organization: https://github.com/allegheny-computer-science-310-s2020
GitHub will be used for sharing course materials by the instructor and GitHub Classroom will be used for releasing assignments and for submitting assignments by the students.

HANDED OUT ON JANUARY 13, 2020
Slack channel: https://cs310s2020.slack.com/
Slack will be used for discussion and communication outside of the classroom.

Academic Bulletin Course Description

A study of the design and implementation of intelligent computer systems that can learn, plan, and solve problems autonomously. In addition to examining techniques for designing intelligent software agents, students investigate the social, political, and ethical implications of intelligent systems. Through hands-on activities that often require teamwork, students explore the application of artificial intelligence methods in areas such as computer vision, natural language processing, and video game development. During a weekly laboratory session students use state-of-the-art technology to complete projects, reporting on their results through both written documents and oral presentations.
Prerequisite: CMPSC 101.
Distribution Requirements: QR, SP.

Course Objectives

Complex real-world problems, such as web search, speech/face recognition, machine translation, and autonomous driving, involve rigorous solutions from the field of artificial intelligence or AI. This course will introduce students to the foundational principles that drive these intelligent applications and offer an opportunity to practice implementing some of these systems. Areas of discussion include, but are not limited to probabilistic methods, learning, game playing, Markov decision processes, graphical models, natural language processing, virtual reality, and logic. The main goal of the course is to equip students with the tools to tackle new AI problems you might encounter in life by learning how to determine when an AI approach is appropriate for a given situation, being able to select AI method and implement it.

The course will introduce students to the theory and practice of artificial intelligence while covering both the well-established and the cutting-edge areas of the discipline. The course also invites students to assess the correctness of their implementations and conduct both analytical and empirical evaluations of the performance of the AI systems while considering their social, political, and ethical implications. Moreover, the course will ask students to implement small- and medium-scale intelligent systems and to use a wide variety of relevant AI tools. In addition to improving their teamwork skills, students will enhance their ability to write and speak about intelligent systems in a clear and concise fashion.

Learning Objectives

At the completion of this class, a student must be comfortable with the fundamental theory and practical techniques in artificial intelligence and be aware of the current research in the area. Students should be able to recognize new problems that may be solved using artificial intelligence methods and implement a complete application that uses them to solve the stated problem. Students must develop and apply a strong knowledge of analytical and empirical techniques that they can use to characterize and predict the performance of intelligent systems. Finally, students should be comfortable discussing and arguing the philosophical, ethical, social and political issues
surrounding intelligent systems.

Textbooks

There is not a single required textbook for this course. Instead, specific research articles and reports, chapters from various open source books and other online resources will be utilized as required readings.

For anyone who is serious in their pursuit of the AI field, it is recommended to obtain Artificial Intelligence: A Modern Approach textbook by Stuart Russell and Peter Norvig as it offers the most comprehensive and up-to-date introduction to the theory and practice of artificial intelligence.

Class Policies

Grading

The grade that a student receives in this class will be based on the following categories. All percentages are approximate and it is possible for the assigned percentages to be changed during the academic semester, if a need arises to do so.

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Class Participation</td>
<td>15%</td>
</tr>
<tr>
<td>Laboratory Assignments</td>
<td>35%</td>
</tr>
<tr>
<td>Exam I</td>
<td>15%</td>
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<tr>
<td>Exam II</td>
<td>15%</td>
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<tr>
<td>Final Project</td>
<td>20%</td>
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</tbody>
</table>

These grading categories have the following definitions:

- **Class Participation**: All students are required to actively participate during all of the class sessions. Your participation will take forms of completing class exercises (individually and in teams), answering questions about the required reading assignments, contributing to class discussions and asking constructive and relevant questions. Class participation during remote instruction will involve completion of class exercises via GitHub.

- **Laboratory Assignments**: Lab assignments invite students to explore different techniques for designing, implementing, evaluating, and documenting software solutions to challenging problems that often have a connection to real-world concerns. To best ensure that students are ready to develop software in both other classes at Allegheny College and after graduation, students will complete assignments in teams. The evaluation for each lab assignment will include a code review, demonstration, and performance reviews.

- **Examinations**: The first and second examinations will cover all of the material in their associated module(s). While the second examination is not cumulative, it will assume that a student has a basic understanding of the material that was the focus of the previous examination. Unless prior arrangements are made with the course instructor, all students will be expected to take these examinations on the scheduled date as specified on the course schedule.

- **Final Project**: This project will present you with an opportunity to design and implement a correct and carefully evaluated intelligent system for a particular problem. Completion of the
final project will require you to apply all of the knowledge and skills that you have acquired during the course of the semester. The details for the final project will be given shortly in the first week of March.

Assignment Submission

All assignments have a stated due date and are to be turned in electronically on that due date. By submitting each assignment a student pledges that they have complied with Allegheny Honor Code. You must follow assignments instructions for submitting your completed programs in order for them to be graded.

Late assignments will be accepted for up to one week past the assigned due date with a 15% penalty. All of the late assignments must be submitted at the beginning of the session that is scheduled one week after the due date. Unless special arrangements are made with the course instructor, no assignments will be accepted after the late deadline.

Attendance

It is mandatory for all students to attend all of the class and laboratory sessions. If you will not be able to attend a session, then please see me at least one week in advance to describe your situation. In case you missed a class because of an emergency, please notify me as soon as possible. Students who miss more than five unexcused sessions will have their final grade in the course reduced by one letter grade. Frequent or prolonged absences due to illness should be documented by the student’s doctor, the Health Center, the Dean of Students’ Office, or the office of Student Disability Services. If you need to miss class due to a religious observance, please speak to me in advance to make appropriate arrangements.

Due to the asynchronous mode of teaching during remote instruction attendance is not expected. Instead, class exercises will be used to evaluate participation.

Communication

Various digital channels will be used in this course for communication, including email, Slack, and the GitHub issue tracker. Additionally, the course website will be used to store the syllabus, course schedule and the assignment sheets, course’s GitHub organization will contain participation activities, exams and starter assignment repositories, and Sakai will be used to report student’s numerical grades. Students are responsible for regularly checking all platforms to ensure that the important messages are not being missed.

Seeking Assistance

Students who are struggling to understand the knowledge and skills developed in a class or a laboratory session are encourage to seek assistance from the course instructor. Students who need the course instructor’s assistance should schedule a meeting through her Web site.

A Note on extenuating circumstances

If you should find yourself in difficult circumstances that significantly interfere with your ability to prepare for this class and to complete assignments, please inform me immediately so that we can
work something out together! Do not wait until the last day of class to ask for exceptions to what is stated in this syllabus. In such a situation, you may also find it helpful to contact one of the available resources on campus:

The Maytum Learning Commons, Library/Academic Commons, 814-332-2898
You may request an individual tutor through Learning Commons:
http://sites.allegheny.edu/learningcommons/tutoring/
Allegheny College Counseling Center, Reis Hall, 814-332-4368
Winslow Health Center, Schultz Hall, 814-332-4355
Allegheny College Chaplain, Reis Hall, 814-332-2800

Special Needs and Disability:

Students with disabilities who believe they may need accommodations in this class are encouraged to contact Disability Services at (814) 332-2898. Disability Services is part of the Learning Commons and is located in Pelletier Library. Please do this as soon as possible to ensure that approved accommodations are implemented in a timely fashion.

Honor Code:

All students enrolled at Allegheny College are bound by the Honor Code. It is expected that your behaviour will reflect that commitment. To this end, we expect that you will adhere to the following Department Policy:

Department of Computer Science Honor Code Policy

It is recognized that an important part of the learning process in any course, and particularly in computer science, derives from thoughtful discussions with teachers, student assistants, and fellow students. Such dialogue is encouraged. However, it is necessary to distinguish carefully between the student who discusses the principles underlying a problem with others, and the student who produces assignments that are identical to, or merely variations on, someone else’s work. It will therefore be understood that all assignments submitted to faculty of the Department of Computer Science are to be the original work of the student submitting the assignment, and should be signed in accordance with the provisions of the Honor Code. Appropriate action will be taken when assignments give evidence that they were derived from the work of others.

You are encouraged to periodically review the specifics of the Honor Code as stated in the College Catalog and The Compass.