This syllabus is a plan, not a contract. This is an unusual semester, and I want us to work together to find the best way for you to learn.

CMPU 365  
Artificial Intelligence  
Fall 2020

Monday & Wednesday, 1:30–2:45 p.m.  
Sanders Physics 309 and Zoom

Prof. Jonathan Gordon

cs.vassar.edu/~cs365

Overview

Artificial intelligence (AI) aims to understand thinking and intelligent behavior in ways that enable the construction of machines that are able to reason in uncertain environments. Work in AI has supported the development of a wide range of technology, from systems that have defeated champion chess players to driverless cars.

This course serves as an introduction to artificial intelligence concepts and techniques, covering both the traditional foundations of the field and recent advances. Topics include the history and philosophical foundations of AI, the agent paradigm, search, game-playing, knowledge representation and reasoning, probabilistic inference, neural networks, and machine learning. Significant programming assignments and a course project complement the material presented in class.

Prerequisites

CMPU 145: Foundations of Computer Science
CMPU 203: Software Design and Implementation

The dependency on CMPU 245 listed in the catalog is not in effect.

Course Format

This course uses a synchronous staggered hybrid format:

- The Monday and Wednesday meetings will simultaneously take place face-to-face and live-streamed on Zoom.
- Students who are on-campus are divided into two groups.
- One group meets face-to-face on Monday while the other group participates remotely through the live stream.
- On Wednesday, the groups switch who’s in person and who’s online.
You are free to opt out of your group's face-to-face meeting and participate synchronously online.

The class sessions are intended to augment and support the material in your readings by providing an opportunity for in-depth discussion, working through examples, and the chance for you to ask questions.

The calendar with lecture notes, assigned readings and exercises, and exams is on the course website and will be updated throughout the semester.

Readings

_Artificial Intelligence: A Modern Approach_, fourth edition
Stuart Russell and Peter Norvig

This is the standard textbook for AI. It is fascinating, authoritative, heavy, and expensive.

The fourth edition was just published this year, a decade after the third. While I recommend reading this new edition, there will be very few used copies available, so I will assign corresponding reading for anyone using the third edition.

I will provide additional readings, including classic and recent AI research papers.

Each class meeting is preceded by a reading assignment. It is important to keep on top of the reading, which will be assumed during the lecture and discussion in class. You should set aside two hours to complete each reading. I don’t expect you to fully understand everything before coming to class; the goal is to familiarize yourself with new terminology and definitions, and to determine which parts of the subject you want to hear more about. I encourage you to bring questions to class about material that is confusing; other students may share your confusion!

Coursework and Grades

To develop and assess your understanding of the topics presented in this course, there will be a variety of elements to the course, weighted approximately as follows:

- Reading journal & class activities 15%
- Programming assignments 35%
- Exams 35%
- Final paper 15%

Final grades take into account each component. You must achieve a passing grade in all components to pass this course, and to receive an A, you must have high performance in all categories.
Remember that success in the course is more than just good grades. It means that you are being challenged to grow as a learner, that you are engaging actively with tasks that feed your growth, and that you are creating excellent work by completing challenging AI-related tasks with an appropriate level of support. It also means that you are building your lifelong learning skills so that once the course is over, you are better and stronger as a learner and can continue to learn new things independently, especially in artificial intelligence and related fields.

**Reading Journal**

To help focus your efforts and give us a basis for discussion, you will be provided short a list of questions to answer for each day’s reading. Reflecting upon your responses to the questions will help to give you a deeper understanding of the most important concepts surrounding each topic. See the accompanying “Reading Journal” document on the course website.

Your responses are due by 11:59 p.m. the night before class. No late responses will be accepted. You will submit your responses electronically on Gradescope, where I will be able to give you feedback on your writing.

While these low-stakes writing assignments are “informal”, they must reflect a certain level of engagement and evidence of thinking seriously about the material. They will be graded on the following scale:

- ✓ + Exhibits exceptional clarity, insight, and/or creativity
- ✓ Exhibits evidence of processing and studying concepts
- ✓− Superficial response or insufficient evidence of engagement
- ○ Did not complete

Because I expect most entries will receive a check, I will comment on your journal to report a plus or minus. You should expect to discuss the issues raised in your reading journal entries during class.

**Programming Assignments**

There will be four or five programming assignments during the semester. These computational assignments will ask you to develop or work with implementations of algorithms discussed in class. We expect that all code will run, be well-written and be commented appropriately.

**Exams**

There are two exams during the semester. There will not be a final exam. The exams will be completed outside of class, either taken online or scanning an exam taken on paper.

For each exam, you may refer to an 8.5×11-inch piece of paper, double-sided, with anything written (or typed) on it that you want. **Preparing this sheet of notes is an excellent way to study, forcing you to consider what’s important that you will want to refer to.**
Final paper

The final paper can describe a system you have built, discuss more theoretical issues, or survey cutting-edge work in an active area of AI research.

The grade for the paper will be based on your initial proposal (10%), a brief in-class or recorded presentation of your work (15%), and the project itself (75%).

Papers that involve an implementation may be done in teams of up to three students.

The final paper will be due at 5 p.m. on the last day of the study period.

Grading

We will be using Gradescope this term to provide feedback on your work. Homework will be submitted through Gradescope, and both homework and exam grades will be returned through Gradescope. As soon as grades are posted, you will be notified immediately so that you can log in and see your feedback.

Late Work

For flexibility, you have three “late days” that you can use to extend the deadline of any homework assignment by 24 hours. You may use up to two late days per homework assignment. If you plan to use a late day, please email the instructor before the original deadline.

If you run out of late days, late assignments will incur a penalty of 20% for each day past the deadline. No late days can be used for the final paper.

If you know you won’t be able to submit an assignment, talk to me. If you’re experiencing a major problem – medical, psychological, family, etc. – that is interfering with your ability to complete your class work, you should talk with the Dean of Studies, your class advisor, or Health Services, who will recommend appropriate accommodations to all of your professors, who honestly want to help you.

Collaboration Policy

The goal of the course is to gain an understanding of the field of artificial intelligence, not to compete with each other. Indeed, in real research, collaboration is the norm. As such, you’re encouraged to discuss class material with other CMPU 365 students when reading, studying, and thinking about the problems.

You have the option to complete the programming assignments individually or with one classmate. If you work in a group of two, you are expected to design and implement the solutions together. You
should submit a single assignment with both names on it and will receive the same grade for the assignment. Note that submitting work you have not contributed to fairly or do not understand is *academic dishonesty*. There's no penalty for working in a pair; the assignments will be graded the same as those done individually.

You may also consult with your classmates as you work on homework assignments, but you are not permitted to look at another student's code or to talk about assignments in terms of code or pseudocode. In addition, you must cite any books, articles, websites, lectures, etc. that have helped you with your work.

**Academic Integrity**

Please read the CS department's guide to academic integrity:

[cs.vassar.edu/integrity](http://cs.vassar.edu/integrity).

In particular, note that:

1. You may not copy code written by anyone else (e.g., a classmate, a friend, an online source, a book).

2. Using code or other material from sources as “inspiration” and submitting highly derivative solutions is considered copying. (That is, you can't “paraphrase” someone else's work!)

3. You may not post a public question that contains any part of your code.

4. You may consult online resources as part of your course work, but you may not copy code from online source. If you get an idea of how to solve a problem from an online source, include a citation near the top of your source code. You do not need to include a similar notation if you consulted with a classmate; we expect that – just don't share code!

If you haven't already done so, you should read “Going to the Source”, available from the Dean of the College website. Note that the guidelines that apply to writing in general apply equally to the writing of computer programs. *Copying someone else's code without attribution is plagiarism.* Give proper attribution for the help you receive.

Quoting from Chapter X, “In suspected cases of plagiarism, the instructor prepares a written statement of complaint to the Academic Panel.” Please don't put yourself or your professor in that position. When in doubt, *stop* and ask me first.

**Communication and Getting Help**

I expect all students to participate in classroom discussions, both by asking questions and by expressing opinions. In return, I will make
myself available to answer questions, listen to concerns, and talk to any student about topics related to the class. I welcome your feedback throughout the semester about how the course is going.

Our course uses Campuswire for online discussions. You can use it to ask questions about course concepts, assignments, and logistics. It is also used for discussions among students, including for any work to be done in groups.

The quickest way to get feedback and help will be via Campuswire. We expect you to read Campuswire every day or two for announcements and clarifications to assignments; you are responsible for all clarifications made at least 48 hours before an assignment is due.

Posts on Campuswire can be either public or private. Public posts are visible to everyone, while private posts are visible only to course staff. Any questions having to do with your particular solution to an assignment should be private; all other posts should be public. (If you have a question about something, it’s very likely that other students do, too!) The course staff reserves the right to make private posts public if the answer is of general interest.

Because Campuswire is an extension of our classroom discussion, we expect everyone to behave accordingly: No disrespect, rudeness, or abuse will be tolerated – towards fellow students or towards the course staff.

Instructor Availability

Office hours will be listed on the instructor’s website. All student meetings this semester will be conducted online unless you have a specific need that requires a physical meeting.

I typically only check email and other messages between 8 a.m. and 8 p.m. on weekdays. If you send a message that needs a response during those times, you can expect to get a response within six hours (often much sooner). Otherwise, you can expect one when I’m back online.

Academic Accommodations

Academic accommodations are available for students registered with the Office for Accessibility and Educational Opportunity (AEO). Students in need of disability (ADA/504) accommodations should schedule an appointment with me early in the semester to discuss any accommodations for this course that have been approved by the Office for Accessibility and Educational Opportunity, as indicated in your AEO accommodation letter.
Diversity and Inclusion

In an ideal world, science would be objective. However, much of science is subjective and is historically built on a small subset of privileged voices. There may be both overt and covert biases in the material due to the lens with which it was written, even though the material is primarily of a scientific nature. Since integrating a diverse set of experiences is important for a more comprehensive understanding of science, please contact me if you have any suggestions to improve the quality of the course materials.

I would like to create a learning environment that supports diversity of thoughts, perspectives, and experiences, and honors your identities.

- If you have a name and/or set of pronouns that differ from those that appear in your official records, please let me know!

- If you feel that your performance in the class is being impacted by your experiences outside of class, please don't hesitate to contact me. If you prefer to speak with someone outside of the course, you can contact your class advisor or the Dean of Studies.

- I (like many people) am still in the process of learning about diverse perspectives and identities. If something was said in class (by anyone) that made you feel uncomfortable, please talk to me about it.

Pandemic Policies

This class will take place as we try to navigate a global pandemic. While we can't predict even the near future, the following are guidelines and plans for how we can work together productively in this situation.

Taking care of yourself

Take care of your own physical and mental health during these difficult times. Make sure you are getting sufficient rest, staying connected to friends and family, and giving yourself time and space to do things you enjoy outside of your coursework. This website lists tips for good self-care in our situation.

Before coming to class, perform a self-evaluation and, if you feel even the slightest bit of sickness, stay home and participate remotely. You should be physically present in class only if you feel as healthy as normal.

Please know that at any time this semester, if you feel unable or unwilling to be present for a face-to-face meeting, you can opt out and participate remotely – no questions asked, no permission needed, no penalty incurred. Remember that face-to-face meetings are live-
streamed, and you can participate in the class remotely through Campuswire, so you will not fall behind if you have to participate in class from home.

**Keeping our class meetings safe**

When you are present in a face-to-face meeting, please observe the following:

- **Wear a mask at all times.** Face coverings, such as masks, are required to be worn in the classroom. The evidence is clear that face coverings are a crucial part of keeping coronavirus at bay. Vassar’s policy on face coverings is posted on the [Vassar Together website](#).

  Please note: Students who remove their masks during class, wear the mask incorrectly (for example, with the nose exposed), or refuse to wear a mask at all will be reminded of this policy once and will be asked to leave if non-compliance continues.

- **Observe proper social distancing.** The classroom has been specially arranged so that students are six feet apart from each other and from the professor at all times. This is sufficient for social distancing. We will also use technology to allow for more remote communication, for example using the chat rooms in Campuswire. Please do not encroach on the space of another person.

- **Practice appropriate personal hygiene.** Wash your hands regularly and use hand sanitizer when washing is not convenient. If you must cough or sneeze, do so facing away from other people.

  Although our current understanding of coronavirus indicates that infection occurs primarily person-to-person, not from surfaces, it’s best to avoid sharing physical objects with other students. You may wish to bring sanitizing wipes to wipe down your desk and the classroom keyboards and mice before and after class.

**Contingency plans for the semester**

We’ll begin the semester in “staggered hybrid” mode, but several things could happen that might alter this setup. Here are the initial plans for the most likely of those things.

- **If the entire college goes fully online:** All face-to-face meetings will be replaced by synchronous online meetings. No other changes will be made.

- **If the professor cannot be on campus due to self-quarantine:** In this case, we will follow the plan above until I am able to return to campus.

- **If the professor cannot be on campus due to infection:** Other professors will be asked to give guest lectures via Zoom. Assignment deadlines,
exams, and grading will be postponed until I am well enough to continue remotely, at which point we follow the plan above.

In any of these scenarios, there may be significant changes to the course calendar or to the syllabus. Check the course website and Campuswire for current information.

Some encouragement

Although these procedures and plans can be scary and demoralizing, I want you to know that Vassar is doing everything in its power to keep people safe from Covid-19. In my view, Vassar’s campus is at least as safe from Covid-19 as the average large supermarket, which many of us visit on a regular basis without much trepidation. Furthermore, I believe that if we observe reasonable precautions like the ones described here, then while the risk of Covid-19 is still present, there’s no reason to be afraid. We will still learn and grow intellectually – just as in “normal” times – if we stay focused and work together.

Title IX

Vassar College is committed to providing a safe learning environment for all students that is free of all forms of discrimination and sexual harassment, including sexual assault, relationship abuse, and stalking. If you (or someone you know) has experienced or experiences any of these incidents, know that you are not alone. Vassar College has staff members trained to support you in navigating campus life, accessing health and counseling services, providing academic and housing accommodations, helping with legal protective orders, and more.

Please be aware all Vassar faculty members are “responsible employees,” which means that if you tell me about a situation involving sexual harassment, sexual assault, relationship abuse, or stalking, I must share that information with the Title IX Coordinator. Although I have to make that notification, the Title IX office will only provide outreach by email. You will control how your case will be handled – you don’t have to read or respond to the email, and it is completely up to you whether to pursue a formal complaint. Our goal is to make sure you are aware of the range of options available to you and have access to the resources you need.

If you wish to speak to someone privately, you can contact any of the following on-campus resources:

- Counseling Service (counselingservice.vassar.edu, 845-437-5700)
- Health Service (healthservice.vassar.edu, 845-437-5800)
- Nicole Wong, SAVP (Sexual Assault and Violence Prevention) director (savp.vassar.edu, 845-437-7863)
• SART (Sexual Assault Response Team) advocate, available 24/7 by calling the CRC at 845-437-7333 and asking for SART

The SAVP website (savp.vassar.edu) and the Title IX section of the EOAA website (eoaa.vassar.edu/title-ix) have more information, as well as links to both on- and off-campus resources.

Acknowledgments

This course – and this syllabus – is based in large part on work by other professors, including Luke Hunsberger at Vassar. This syllabus adapts some policies and descriptions from Harvard’s CS 182 and Swarthmore’s CS 63. The policy on asking and answering questions and on communication on Campuswire is adapted from Laney Strange. The statement on diversity and inclusion is adapted from Monica Linden. The description of the reading journal is adapted from Jerod Weinman and is released under a Creative Commons attribution–non-commercial–share-alike license.