

**CSc 44800 – Artificial Intelligence**

**Fall 2024**

**Erik K. Grimmelmann, Ph.D.**

**Syllabus v1.0**

**Overview**

This course will provide an overview of artificial intelligence including some of the history of the field.

**Prerequisites**

You are expected to have a basic knowledge of computer science including algorithms, data structures, and data analysis and a working knowledge of Python. In addition, you are expected to have a rudimentary understanding of probability, statistics, and basic linear algebra.

The recommended prerequisites are

* CSc 21200 Data Structures
* CSc 21700 Probability and Statistics for Computer Science
* CSc 22000 Algorithms
* CSc 22100 Software Design Laboratory
* CSc 30100 Scientific Programming
* CSc 30400 Introduction to Theoretical Computer Science
* Math 34600 Elements of Linear Algebra

**We will meet Tuesdays and Thursdays**

* Section P 2:00 pm to 3:15 pm NAC 7/219

Please note that, per the CCNY calendar, no classes for this course are scheduled on the following Tuesdays or Thursdays:

* Thursday, October 3 (No CUNY classes)
* Tuesday, October 15 (CCNY classes follow a Monday schedule)
* Thursday, November 28 (Thanksgiving)

**Attendance** in class is required.

To receive credit for attending, you must sign the sign-in sheet. When we have a Zoom sessions, you must post “present” in the Zoom chat to get credit for attending.

If you miss a class for a good reason (e.g., illness or a job interview), please email me; I may give you partial credit for attendance that day. Your attendance and class participation will be an important component of your final grade.

Please **arrive promptly**. We will be starting class at the appointed time. Arriving late is better than not arriving at all. Your arriving on time will be a component of your final grade.

Please **pay attention** in class. **No texting or doing anything else on-line during class.**

**Zoom**

A small number of classes will be held via Zoom.

Here are some tips for using Zoom:

* Note that I may require you to have your camera on.
* Use an up-to-date version of Zoom.
* Make sure that the name that appears indicates is recognizable as your name.

If you need to change the name that appears, right-click on your name on the Zoom screen, choose Rename, enter your new screen name, and hit enter. If I can’t connect your screen name with you, you won’t get credit for attending the class meeting.

* Make sure to sign in by typing “present” in the Zoom chat. If you don’t do this during the class session, you won’t get credit for attending.
* Mute your audio except when you want to say something to the class.
* Speak up when you do have something to say. It will be a lot more interesting for all of us if I’m not the only one speaking.
* If I’m speaking and you can’t hear me, please let me know via chat and/or speaking up; I may have unintentionally muted my microphone.
* If the chart I’m speaking about isn’t visible, please let me know via chat and/or speaking up.
* Remind me (via chat and/or speaking up) if we’ve gone over the allotted time. I’ve been known to get carried away with the material and lose track of the time.
* Leave the session at the end of the class; otherwise, I may think that, although you’ve been in the session, you’ve left to do something else and haven’t been paying attention.

**Covid-19 Protocols**

* I may wear a mask sometimes. In case you’re interested, I’m doubly vaccinated and have had four additional booster shots and still caught Covid last March.

**Textbook**

The required textbook is

* Russell, Stuart and Norvig, Peter. Artificial Intelligence: A Modern Approach, 4th Edition, ISBN 978-0-13-461099-3, 2020, Pearson.

Or

* Russell, Stuart and Norvig, Peter. Artificial Intelligence: A Modern Approach, 3rd Edition, ISBN 978-0-13-604259-4, 2010, Prentice Hall.

**Guest Lectures**

If time permits, I will try to bring some of my friends and mentors in to speak to the class. I’ll let you know when guest lectures are scheduled.

**Programming Exercises**

All programming in the course will be in Python and its relevant add-ins and libraries (such as NumPy, SciPy, MatPlotLib, Pandas, and Scikit-learn) and TensorFlow. You are free to work in any environment that supports Python (e.g., Windows, Max, Unix, Linux). We’ll be using Jupyter notebooks throughout the course. Programming exercises will be an important component of your final grade.

Please make sure that your name appears as part the file name of the programming exercises that you submit.

**Final Project**

During the final third of the semester, you’ll work on an individual project.

The project will include

* An in-class presentation with charts (in PowerPoint, Google Slides, etc.) The presentation will be six to seven minutes long.
* A written report (in PDF format). The report will be 12 to 15 pages in length (double spaced). If you have lots of tables and/or charts, you can include them in an appendix; the appendix won’t count toward the 12 to 15 pages mentioned above.

I’ll be providing more details about the project later. The final project will be an important component of your final grade.

**Blackboard**

We will be using Blackboard as our online environment. Once you’re enrolled in the course and the course has started, you should have access to the Blackboard course site. We will use the course site for

* This syllabus
* Links to reference materials
* Announcements
* Posting and submission of assignments
* Classroom presentations (typically within a week of the class session)
* Zoom links (contingency and office hours)
* Datasets
* Sample code
* Bug reports
* Assignment grades

Course grades will not be posted on Blackboard, but rather on CUNYfirst.

**Course Policies**

**Collaboration:** Except where I tell you otherwise, you are free to collaborate freely with each other in your work for this class. If you collaborate on an assignment, you must have contributed substantially to anything you submit for the assignment; just using a (current or past) classmate’s code without having contributed substantially to it is not collaboration -- it’s cheating.

If you collaborate on an assignment, you must indicate in your submission with whom you collaborated.

If you use code from any source other than your own imagination for any coding assignment, be sure to list the source(s).

The use of online (or in-person) assignment services (e.g., Chegg or Course Hero) is not permitted. Nor should you post assignments to such services or to other repositories of questions and answers.

If you are found to have cheated or helped others cheat, the consequences can range from a reduced or zero grade on the assignment to a reduced or F grade in the course and even to suspension or expulsion from CCNY.

**Professionalism**: I expect you to act professionally and respectfully to your classmates, to me, and to our occasional guests (if we have any), at all times. Harassment will not be tolerated.

If for any reason your preferred name is not the one that appears on the course roster, please let me know how you would like to be addressed.

**Grades**

Your grades will be based on the following factors:

* Classroom activities 25%
  + Attendance
  + Punctuality
  + Participation
  + Bug bounties (extra credit)
* Assignments including programming exercises 35%
* Individual final project 40%
  + In-class presentation 5%
  + Charts from In-class presentation 5%
  + Written report 30%

**Integrity**

Just to refresh your memory, here’s the City College statement on academic integrity:

Academic integrity is an essential part of the pursuit of truth, and of your education. We are all responsible for maintaining academic integrity at City College – it is the rock on which the value of your degree is built.

If you cheat on a test or plagiarize on an assignment by using someone else's work or ideas, you defeat the purpose of your education. In addition, academic dishonesty is prohibited in the City University of New York, and is punishable by failing grades, suspension, and expulsion.

Here’s a link to a list of City College and CUNY policies (and links to them), <https://www.ccny.cuny.edu/about/policies>

**Your feedback**

I welcome your feedback at all points in the course. If something is unclear, please speak up. If you find an error in my lectures, code examples, assignments, or in anything else, please point it out and submit a bug report.

Please complete the anonymous student survey that you’ll receive near the end of the course.

**My Contact Information**

The best (and fastest) way to reach me is via email at [egrimmelmann@ccny.cuny.edu](mailto:egrimmelmann@ccny.cuny.edu).

**Office Hours**

My office hours will be Tuesdays and Thursdays from 12:40 to 1:40 pm on days that we have class. Occasionally, I may have to reschedule an office hour due to a conflict with a faculty or committee meeting.

Since my office is not large enough for two people to maintain an appropriate physical distance between them, my office hours will be held over Zoom. The Zoom link can be found in Blackboard.

These office hours will be shared with the other courses that I’m also teaching this semester and with students whom I’m advising.

**Accessibility**

If you have any accessibility issues related to this course, please feel free to bring them to my attention.

**CCNY Resources**

Here are links to some of the resources that are available to you.

* AccessAbility <https://www.ccny.cuny.edu/accessability>
* Health and Wellness <https://www.ccny.cuny.edu/health-wellness>
* Student Affairs <https://www.ccny.cuny.edu/studentaffairs>
* Writing Center <https://www.ccny.cuny.edu/writing>

**Course Schedule**

The schedule on the following page is almost certainly more precise than it will be accurate. We will likely end up going faster on some of the topics and slower on others, so we could end up being ahead or behind of this schedule at varying points in the course. Please read the material (i.e., the chapter in the textbook or posting on Blackboard) prior to our covering the material in class.

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| --- | --- | --- | --- | --- |
| Meeting 1 | Th | Aug 29 | Course introductions | |
| Meeting 2 | Tu | Sep 3 |
| Meeting 3 | Th | Sep 5 | AI and its roots | |
| Meeting 4 | Tu | Sep 10 | A brief history of AI | |
| Meeting 5 | Th | Sep 12 | Intelligent agents | |
| Meeting 6 | Tu | Sep 17 | Search | |
| Meeting 7 | Th | Sep 19 |
| Meeting 8 | Tu | Sep 24 | Search in complex environments and optimization | |
| Meeting 9 | Th | Sep 26 |
| Meeting 10 | Tu | Oct 1 | Games | |
| **No Class** | **Th** | **Oct 3** | **No CCNY classes** | |
| Meeting 11 | Tu | Oct 8 | Introduction to machine learning | |
| Meeting 12 | Th | Oct 10 | Perceptron and Adaline model | |
| **No Class** | **Tu** | **Oct 15** | **CCNY classes follows a Monday schedule** | |
| Meeting 13 | Th | Oct 17 | Logistic regression | |
| Meeting 14 | Tu | Oct 22 | Support vector machines | |
| Meeting 15 | Th | Oct 24 | Decision trees | |
| Meeting 16 | Tu | Oct 29 | Neural networks | |
| Meeting 17 | Th | Oct 31 | Convolutional neural networks | |
| Meeting 18 | Tu | Nov 5 | Recurrent neural networks | |
| Meeting 19 | Th | Nov 7 | Large language models | |
| Meeting 20 | Tu | Nov 12 | Adversarial neural networks | |
| Meeting 21 | Th | Nov 14 | Reinforcement learning | |
| Meeting 22 | Tu | Nov 19 |  | |
| Meeting 23 | Th | Nov 21 | Ethics in AI | |
| Meeting 24 | Tu | Nov 26 |  | |
| **No Class** | **Th** | **Nov 28** | **Thanksgiving** | |
| Meeting 25 | Tu | Dec 3 | **In-class project presentations** | |
| Meeting 26 | Th | Dec 5 |
| Meeting 27 | Tu | Dec 10 |
| Meeting 28 | Th | Dec 12 |
| **No class** | **Fr** | **Dec 20** | **Project presentation charts due**  **Project report due** | **CCNY Exam Period** |