

Frequently Asked Questions

Fraida Fund

Will we have live meetings? Is this course synchronous or asynchronous?

This course includes both synchronous and asynchronous content. We will have a weekly live meeting on Zoom for a “chalk talk”, and you will also have to watch a weekly pre-recorded video of a programming/demo session. Some weeks may also have asynchronous pre-lecture content that you should watch or read *before* the live meeting.

What are the prerequisites for this course?

This course is mathematically oriented, and undergraduate-level knowledge of probability and linear algebra is required.

If you want to brush up, you can review:

- [Review of probability theory](http://cs229.stanford.edu/section/cs229-prob.pdf) (<http://cs229.stanford.edu/section/cs229-prob.pdf>)
- In [Boyd & Vandenberghe “Introduction to Applied Linear Algebra”](http://vmls-book.stanford.edu/vmls.pdf) (<http://vmls-book.stanford.edu/vmls.pdf>), these sections:
 - Section I, Chapter 1 (Vectors): vectors, vector addition, scalar-vector multiplication, inner product (dot product)
 - Section I, Chapter 3 (Norm and distance): Norm of a vector, euclidean distance
 - Section II, Chapter 5 (Matrices): matrix notation, zero and identity matrices, sparse matrices, matrix transposition, matrix addition, scalar-matrix multiplication, matrix norm, matrix-vector multiplication
 - Section II, Chapter 8 (Linear equations): systems of linear equations
 - Section II, Chapter 10 (Matrix multiplication): matrix-matrix multiplication
 - Section II, Chapter 11 (Matrix inverses): Inverse, solving a system of linear equations
 - Also a quick optimization review: Appendix C (Derivatives and optimization)

There will be a significant programming component to this course, and class and homework exercises will be in Python. You do not need to know Python a priori, but you should know basic programming concepts and have experience programming in some programming language. We will review some important Python basics in the first week of the course.

Do I need previous experience with machine learning for this course?

This is an introductory graduate level course and no prior machine learning knowledge will be assumed. If you already have significant ML experience, there is no need to take this class.

Do I need a computer with a GPU? Will I have to install some software on my computer?

In this course, we will use the Google Colab environment for practical programming demos and exercises. Colab is a free browser-based environment for Python programming. You don’t need to install anything to use Colab - you’ll just need a browser.

Do I need a textbook for this course?

You won't need to buy a textbook - all of the materials you'll need will be posted on the course site.

The course includes a project. Can I do the project on whatever topic I want?

Not exactly. For your project, I'm going to ask you to replicate and then build on a recently published result from a top machine learning conference. I'll give you a list of published papers (with code!) to choose from, in various areas of ML:

- Understanding images
- Generating images
- Understanding text
- Generating text
- Audio (speech)
- Audio (music and other sounds)
- Security and robustness
- Reinforcement learning
- ML and society: Fairness, privacy, explainability

You'll choose your project from that list of papers.