

MATH 312 - LINEAR ALGEBRA SYLLABUS

INSTRUCTOR: ELIJAH GUNTHER

This is a preliminary syllabus and is subject to change.

Summer Session II 2021

TOPICS

In this course we will cover the following topics:

Week 1 - Matrices, linear systems, row reduction, reduced form

Week 2 - Abstract linear algebra: Fields, vector spaces, linear functions, spans, bases, dimension

Week 3 - Determinant and trace

Week 4 - Eigen-everything, diagonalization

Week 5 - Inner products, orthogonality, quadratic forms, symmetric matrices.

These topics and schedule may be adjusted depending on students' backgrounds and interests.

HOMEWORK

Homework will be assigned bi-weekly on Canvas and due a week after it is assigned. Homeworks must be submitted on Canvas as a single pdf file by the due date. You are very strongly encouraged to work on the homework well before it is due. You are encouraged to work with other students on the homework, but you must write up your homework on your own, in your own words. If you collaborate with other students on a homework please list them on your homework as collaborators. You may not post online asking for help on specific homework questions.

Some problems will be graded for correctness and some just for completion. I will do my best to grade them promptly. If you think I made a mistake grading your homework or exam please let me know so I can fix it.

Your lowest homework grade will be dropped and one homework will be accepted up to 48 hours late, no questions asked. Aside from this all homework is due on time or will not receive credit, barring extenuating circumstances in which case you should contact me.

EXAMS

There will be a few midterm exams, roughly one per unit, and a final exam. The final exam will be a take home open notes exam and you will have at least a full day to complete it. The exact nature of the exams is to be determined based on time zone considerations to ensure fairness for all students.

GRADING

Your final grade will be determined as follows:

- Homeworks - 60%
- Midterms - 20 %
- Final Exam - 20%

Date: Summer Session II 2021 .

There will be extra credit available for sharing L^AT_EX notes and homework solutions.

TEXTBOOKS

We will use two textbooks as references.

- *Linear Algebra Done Wrong* by Sergei Treil:

http://www.math.brown.edu/streil/papers/LADW/LADW_2017-09-04.pdf

- *Linear Algebra with Applications* by Otto Bretscher:

<https://pdfcookie.com/documents/linear-algebra-with-applications-5th-edition-by-otto-bretscherpdf-rvr7xx1nw42o>

The 4th or 5th editions are both fine and should be available for sale if you want a hard copy.

There are many, many good resources on linear algebra available freely online, some of which I'll list on Canvas. You are encouraged to take a look at them as it's helpful seeing things from different perspectives.

CLASS AND RECORDINGS

We meet Monday - Thursday 10AM-12:10 ET on Zoom, but we will sometimes end early. Class goes July 1 - August 6, aside from July 5 for Independence Day.

Along with the synchronous class there will be recordings assigned to watch (some of which from previous courses). Depending on the amount of recordings assigned synchronous class will often end early to ensure a consistent class time week to week. If class goes the full 2+ hours we'll have a break in the middle.

You are expected to attend class synchronously if you are able to. If you will not be able to attend class synchronously please email me so we can discuss accommodations. Lectures will be recorded and posted on Canvas. Please keep your camera on if possible to give a sense of community and make sure you're muted unless you have something to say. When on Zoom you are expected to be focussed on class and not distracted by your phone or other stuff on your computer.

CONTACT AND LINKS

My contact: elijahg@sas.upenn.edu

Pronouns: He/him/his

- Piazza:
- Canvas:
- Zoom link: <https://upenn.zoom.us/j/93670653429>

There will be regular office hours using the same Zoom link. The times are to be determined and will be listed on Canvas.