

Course Syllabus

SSEA Mathematics 2022

Instructors (contacts)

Shintaro Fushida-Hardy sfh@stanford.edu

Pranav Nuti pranavn@stanford.edu

Megan Selbach-Allen mselbach@stanford.edu

Course meetings

Section A (Megan) Y2E2 299 9:00am to 11am.

Section B (Pranav) Y2E2 300 9:00am to 11am.

Section C (Shintaro) Shriram 108 9:00am to 11am.

Office hours

Megan: CERAS, 321 8/16, 8/23, 8/30, 11:30AM-12:45PM,

Pranav: Building 380, 381A. 8/18, 8/25, 7:00PM– 9:00PM.

Shintaro: Building 380, 381B. 8/17, 8/24, 8/31, 8AM - 8:50AM.

Course description, course goals

This class is an introduction to linear algebra, without any prerequisites. The goal of the class is to use linear algebra as a vessel to teach broader meta-mathematical skills that will be useful throughout your time at Stanford. Specifically:

- You'll learn how to read unfamiliar technical texts
- You'll practice working in groups
- You'll practice exploring/solving unfamiliar problems

At the mathematical-content level, the class will introduce vectors and their properties, vector-spaces, lines and planes in three dimensions, and projections.

Expectations for instructors and students

Most expectations will be filled out on the first day of class.

For instructors:

- Availability. Instructors will reply to emails (during the work week) within 24 hours. They will have office hours at a time that suits students, as determined on the first day of class. When necessary, they will do their best to meet with students even outside of office hours.
- Adaptability. Instructors will ask for feedback from students, and will always engage with it. They will work with students to ensure needs are addressed at both the individual and community levels.

For Students:

- Participation. Students will engage with every discussion and activity.

- Attendance. Students will attend every class (except in the event of emergencies, medical or otherwise). In the event of missing class, students will contact an instructor as soon as possible to determine a way to make up the loss.
- Group responsibility. In this class, a lot of student learning will come from other students. Students have a responsibility to their community, and must engage with the class to benefit their peers as well as themselves.

Assignments + grading policy

The assignments will be based on the pace of the class and exactly what material is covered over the course of the next 3.5 weeks. There are two kinds of assignments in this class. To imitate how classes at Stanford will be organized, all reflections and essays will be posted on Canvas, at this link: <https://canvas.stanford.edu/courses/158167/assignments> and will need to be submitted on Canvas, while all problem sets will be posted at this link: <https://canvas.stanford.edu/courses/158167/files/folder/Math/Problem%20sets>, and will need to be submitted on Gradescope.

Grading policy:

- The class is pass/fail.
- Communicate to us in the event that you can't complete an assignment. (We understand that reasons can be sensitive, so we won't require you to explain the reason.) We will then work together to determine how to make up for the missed assignment. **Passing this class requires attempting all assignments.**
- For "graded" work we will return feedback within three working days of the due date.
- For "non-graded" work we will provide solutions collated from class submissions.

Attendance policy

- You are expected to attend every class. In the event of an emergency making you unable to attend, communicate to us.
- If you miss class, the make-up assignment will typically consist of an activity to ensure you learn the material you missed in class.

Accommodations

Students with Documented Disabilities: Students who may need an academic accommodation based on the impact of a disability must initiate the request with the Office of Accessible Education (OAE). Professional staff will evaluate the request with required documentation, recommend reasonable accommodations, and prepare an Accommodation Letter for faculty dated in the current quarter in which the request is being made. Students should contact the OAE as soon as possible since timely notice is needed to coordinate accommodations. The OAE is located at 563 Salvatierra Walk (phone: 723-1066, URL: <http://studentaffairs.stanford.edu/oae>).

For additional, unofficial accommodations (related to disability, life circumstances, unplanned absences, work conflicts, or situations where OAE would otherwise be unable to help), feel free to approach the teaching team, and we will do our best to work out a fair accommodation program with you.

Detailed class schedule table

The class runs every day for four weeks. This is a tentative schedule which might change depending on how we make progress.

Week	Monday	Tuesday	Wednesday	Thursday	Friday
1	Getting to know each other! Introduction to linear algebra	Magic carpet problem and group work	Reading textbooks and other maths resources. Exponents.	Problem solving strategies and lengths of vectors	Perpendicular vectors
2	Math epistemology and dot product	One-on-one meetings Review day	Introduction to planes with various sneaky mathematicians	Planes and sneaky mathematicians continued	Forms of planes
3	Planes telephone	Applications of Linear Algebra	Maths Lecture	Defining a Basis	Orthogonal Basis
4	Projection onto line	Projection onto line continued	Projection onto a subspace	Projection onto a subspace continued Course wrap-up	CLASS IS DONE :(

Honor Code

- The Honor Code is an undertaking of the students, individually and collectively:
 - that they will not give or receive aid in examinations; that they will not give or receive unpermitted aid in class work, in the preparation of reports, or in any other work that is to be used by the instructor as the basis of grading;
 - that they will do their share and take an active part in seeing to it that others as well as themselves uphold the spirit and letter of the Honor Code.
- The faculty on its part manifests its confidence in the honor of its students by refraining from proctoring examinations and from taking unusual and unreasonable precautions to prevent the forms of dishonesty mentioned above. The faculty will also avoid, as far as practicable, academic procedures that create temptations to violate the Honor Code.

3. While the faculty alone has the right and obligation to set academic requirements, the students and faculty will work together to establish optimal conditions for honorable academic work.

This class is all about collaborating with peers and sharing knowledge. If you have any questions about how the Honor Code might interfere with the class, don't hesitate to contact us.

Equity and solidarity statement

We strive to create a nurturing, welcoming, and inclusive environment for individuals from diverse backgrounds along a number of dimensions, including race, ethnicity, national origins, gender, gender identity, sexuality, class, religion, documentation, and DACA status. It is our commitment to increase equity and representation from communities that have been historically excluded from the field of mathematics.

The purpose of this class is to benefit you as an individual, and the class as a community. We embrace who you are, and are motivated by your history, experiences, and wellbeing. It is well documented that issues around [race](#) and [gender](#) impact students' experiences in mathematics classrooms. We acknowledge this disparity and that you have been shaped by these types of experiences. We value you and will strive to create an environment that engages with all of your needs.

The land on which Stanford was built was inhabited by indigenous people. Stanford sits on the territory of Huichin, the ancestral and unceded land of the Muwekma Ohlone Tribe, who are the successors of the historic and sovereign Verona Band of Alameda County (see <http://www.muwekma.org/> to learn more). As students of Stanford, we should think seriously about this fact's implications (for example, consider visiting the website of Landback, <https://landback.org/>, a movement focusing on returning indigenous land and knowledge back to indigenous hands).

In Stanford, you will find that only some kinds of knowledge are considered valuable. Universities like Stanford allow these kinds of knowledge to gain funding and social power. Typically, pursuits that have some recent history in Europe are considered valuable. So abstract mathematics and Shakespeare criticism, for example, are provided with prestige, and this comes at the expense of other forms of knowledge (knowledge of the land possessed by indigenous people, for example) that might be significantly more useful in solving problems of everyday life. But it is not just that abstract pursuits are valued by universities— art produced by indigenous people doesn't receive any of the funding abstract mathematics, or classical music does, for example. As students at Stanford, we should think about and question what this system we are a part of finds valuable, and whether this is justified.

But we should note that abstract mathematics has been practiced by people around the world, and not just by the mainly Greek and white mathematicians whose names are attached to various theorems and procedures in the mathematics you are likely to have experienced and will experience during your time in Stanford! Mathematics has a history outside of Europe too!

Abstract mathematics belongs to us all, and it is available for all of us to enjoy regardless of our race, gender or any other identities we hold.