Math 113: Linear Algebra and Matrix Theory (Fall 2015)

Lecture: MWF 11:30am–12:20pm, in **420-041**

Course website: `http://math.stanford.edu/~church/teaching/113-F15/`

	Professor: Thomas Church	**Teaching assistant**: Guanyang Wang
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Office:	383-Y	380-R
Office hours:	Monday 2:30–4 in 380-Y	Tuesday 3–6 in 380-D
	Thursday 3-4 in 380-X	

Course: Math 113 is a course on linear algebra, the study of *vector spaces* and *linear maps*. The emphasis will be quite theoretical: we will study abstract properties of vector spaces and linear maps as well as their geometric interpretation, mostly ignoring the computational aspects. If you are more interested in applications of linear algebra, you should consider taking Math 104 instead.

Besides studying linear algebra, an important goal of the course is to learn how to write mathematics. In class we will give rigorous proofs, emphasizing proper mathematical language and notation. Through the homework assignments, you will learn to apply mathematical reasoning and write clear, compelling and correct proofs yourself. Your homework and exams will be judged accordingly. No background in linear algebra or proofs is assumed, and there are no formal prerequisites for the course; Math 113 is appropriate for students who have already seen some linear algebra in Math 51.

Textbooks: The required textbook for the course is *Linear Algebra Done Right* (3rd ed.) by Sheldon Axler, available at the campus bookstore. We will supplement this with other handouts, available on the course website. As Stanford students you also have free access to the textbook online at `http://link.springer.com/book/10.1007/978-3-319-11080-6`. (This link should give you access from any campus computer; for off-campus access, use `http://link.springer.com.ezproxy.stanford.edu/book/10.1007/978-3-319-11080-6` or set up a proxy as explained here: `http://library.stanford.edu/using/connect-campus`.)

Homework: Homework problems will often consist of proofs. Even if the problem doesn't start with "Prove that...", you are expected to prove that your answer is correct. Make sure you write complete sentences (not just a string of formulas), and emphasize which axioms, propositions, lemmas and theorems you use in your argument.

It is very important that you do all the homework; experience shows that it is impossible to learn to write mathematical proofs without repeated practice. You may discuss the problems with each other, but you must work on your own when you write them down. In particular, you should understand your answers well enough to reproduce them yourself, especially since similar problems and ideas are likely to appear in the exams.

We will also have extremely-short weekly homework assignments due Sunday, on the reading for the following week. These are designed to give the course staff information on how the reading is going, and let us know if certain concepts give you more trouble than we expect, not to test your performance.

Homework Policy: Weekly assignments will be posted on the course website each Wednesday and due the following Wednesday in class. If you will not be in class, you must either arrange for another student to turn in your homework, or contact me about turning it in early. Homework is due at the beginning of class (before 11:35am); homework handed in at the end of class (anywhere between 11:35am–12:20pm) will result in a deduction of −10%. *Late homework **will not** be accepted*

under any circumstances. To accomodate exceptional situations such as a serious illness, your lowest homework grade will be dropped.

Students are expected to take care in writing their assignments. For instance, assignments should be written neatly and contain clear, complete solutions. Homeworks which contain multiple pages should be stapled, and you should put your name on every page.

Piazza: We will use the online discussion system Piazza for questions and discussions about the course and the material. Answers can come from students or course staff, and are visible to everyone. The course website is at `https://piazza.com/stanford/fall2015/math113/`.

Final grades: The grade for the course will be calculated as follows:

Homework:	30%
Midterm — Monday, October 26, 7:00–9:00pm (in 420-041, the usual classroom):	30%
Final exam — 8:30–11:30am on Friday, December 11:	40%

Resources:

- Office hours are the best way to get individualized explanations of anything you are having trouble with. Students who attend office hours do better in Math 113. You are encouraged to attend any of the professor or TA's office hours for Math 113; no appointment is necessary.

- The Stanford University Mathematics Organization (SUMO) organizes a Homework Night every Tuesday from 7:00pm–10:00pm in the math building (381-U), where you can work with other students on homework problems. `sumo.stanford.edu`

Stanford Honor Code:

a. The Honor Code is an undertaking of the students, individually and collectively:

  1. 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;

  2. 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.

b. 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.

c. 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.

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 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: 650-723-1066, `studentaffairs.stanford.edu/oae`).