

Applied and industrial algebra (Math 127), Spring 2021
San José State University
MacQuarrie Hall 233, MW 9:00–10:15am (Sec. 01, code 23404)

Instructor: Dr. Tim Hsu (pronounced “shoe”).

Office hours: M 2–3pm, W 1–2pm. Current schedule available at:

<http://www.timhsu.net/courses/generic/sched.pdf>

E-mail: tim.hsu@sjsu.edu. I can be reached by e-mail at many times of the day, and will try to respond within 48 hours.

Course web page: <http://www.timhsu.net/courses/127/>

Text: Course notes available online.

Grading: Your semester grade consists of: Homework 25%; Exam 1 14%; Exams 2 and 3 18% each; Final exam 25%.

Goals of this course. In this course, we define applied math to be math that you can use to make money in the real world (e.g., in the tech industry). Specifically, our choice of topics is aimed at teaching you ideas that you can go out and use in industry.

So in contrast with Math 128A, which teaches you to do proofs in abstract algebra, the goal of this class is to teach you enough of the ideas of abstract algebra to be able to understand practical applications like encryption, error-correcting communication, and the Fast Fourier Transform. In short, the goal is for you not to become a *producer* of abstract algebra (i.e., someone who does proofs and comes up with new theorems), but an *enlightened consumer* of abstract algebra: someone who can use the tools of abstract algebra for practical purposes without having to treat them as a black box.

No proof or abstract algebra experience is expected. Although the homework will occasionally involve proof, and will deal with abstract algebra, you do not need to have experience with either proofs or abstract algebra, and Math 108 and Math 128A are certainly not prerequisites. In fact, if this class succeeds and you become an enlightened consumer of abstract algebra, my not-so-secret hope is that you will then go on to take Math 108 and Math 128A, to become an even more enlightened consumer of algebra, or maybe even a producer of algebra.

Class is a cell-free zone. Please turn off all cellphones before you get to class.

Homework. Homework will be due roughly once a week, with an outline of problem set 01 due **Wed Feb 03**, and the final version due **Mon Feb 08**. For more details on homework content and the process of doing homework (including outlines and revisions), see the handout on homework.

Specific homework assignments will be determined as the term progresses. For a complete list of all homework assigned to date, and downloadable versions of almost all handouts from class, you can always check the course web page.

Problem sessions. In addition to my regular office hours, starting on **Fri Jan 29**, I will also hold problem sessions for this class every **Fri**, from **10:00am–noon** online. These sessions are completely optional, and you should be fine without them, but the time is available for those who can make it.

Checkins. Because we only meet on two days each week, it is *crucial* that you do substantial independent work in the long gap between Wed and Mon. To that end, I will require you to “check in” with me each week in that time period. See the handout on check-ins for more details.

Exams. We will discuss this topic in more detail before the first exam, but briefly, the material on exams will mostly resemble the material from the homework. For each exam, you will be allowed one page of notes (both sides).

Calculators. You will *not* be allowed to use calculators for *any* in-class exams. The numerical work on exams will be simple enough that a calculator shouldn’t be necessary, and even if you make numerical mistakes, you won’t lose a lot of points on them.

On the other hand, you are encouraged to use a calculator or computer to help with the homework, especially when the homework involves a fair amount of arithmetic.

Exam dates. The dates of our three in-class exams and final exam are found on the syllabus below. In particular, the final exam will be held on **Wed May 19**, from **7:15–9:30am**. Please make sure that you are still on campus at that time (e.g., don't buy a plane ticket that leaves town on May 18).

How to add this course. If you are not registered for this course, and you would like to add it, you must first put a full effort into completing all of the work in the course. Second, if you are a graduating senior, you need to produce documentation to verify that.

I'll make a waiting list, which you get on by filling out and turning in the information form for the course. I'll give out add codes starting **Mon Feb 08** (or possibly earlier), mainly based on completeness of homework, and as long as there is room, I will continue to give out add codes until add date (**Mon Feb 15**). Note, however, that graduating seniors have the highest priority, and that Open University students have the lowest priority.

How to drop this course. Until **Mon Feb 08**, you can drop at my .sjsu.edu. Nothing will appear on your transcript, but please let me know if you drop.

To drop after Mon Feb 08, you must go to the student services center and submit a Course Drop form to the Director of Academic Services. Dropping under these circumstances is only allowed for “serious and compelling reasons” (course catalog). A low grade is not a serious and compelling reason.

Academic integrity. Your commitment to learning (as shown by your enrollment at SJSU) and SJSU's Academic Integrity Policy require you to be honest in all of your academic course work. Faculty are required to report all infractions to the Office of Student Conduct and Ethical Development. See: www.sjsu.edu/studentconduct

Disabilities. If you need course adaptations or accommodations due to a disability, or if you need special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Presidential Directive 97-03 requires that students with disabilities register with the Accessible Education Center (formerly the Disability Resources Center) to establish a record of their disability.

(Very) tentative syllabus

Date	Activity	Date	Activity
Wed Jan 27	Euclidean Alg	Mon Mar 29	SPRING BREAK
		Wed Mar 31	NO CLASSES
Mon Feb 01	Euclidean Alg	Mon Apr 05	Ideals
Wed Feb 03	Euclidean Alg	Wed Apr 07	Cyclic codes
Mon Feb 08	Polynomials	Mon Apr 12	Cyclic codes
Wed Feb 10	Polynomials	Wed Apr 14	BCH codes
Mon Feb 15	Polynomials	Mon Apr 19	BCH codes
Wed Feb 17	Rings	Wed Apr 21	BCH codes
Mon Feb 22	Exam 1	Mon Apr 26	DFT
Wed Feb 24	Rings	Wed Apr 28	Abelian groups
Mon Mar 01	Linear alg	Mon May 03	Exam 3
Wed Mar 03	Linear alg	Wed May 05	FFT
Mon Mar 08	Linear alg	Mon May 10	FFT
Wed Mar 10	Codes	Wed May 12	FFT
Mon Mar 15	Codes	Mon May 17	FFT
Wed Mar 17	Codes		
Mon Mar 22	Ideals	Wed May 19	Final exam,
Wed Mar 24	Exam 2		7:15–9:30am