

Applied and industrial algebra (Math 127), Spring 2020
San José State University
MacQuarrie Hall 233, MW 10:30–11:45am (Sec. 01, code 24040)

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

Office and phone: MacQuarrie Hall 419, (408)924-5071.

Office hours: MW noon–1pm. 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 24 hours.

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

Text: Course notes available online.

Grading: Your semester grade consists of: Homework 20%; Exam 1 14%; Exams 2 and 3 18% each; Final exam 30%.

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 Jan 29**, and the final version due **Mon Feb 03**. 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 31**, I will also hold problem sessions for this class every **Fri**, from **10:30am–noon**, somewhere on the 4th floor of MacQuarrie Hall. 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. All exams are closed-book.

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 **Fri May 15**, from **9:45am–noon**. 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 14).

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 **Tue Feb 04** (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 (**Tue Feb 11**). Note, however, that graduating seniors have the highest priority, and that Open University students have the lowest priority.

How to drop this course. Until **Tue Feb 04**, you can drop at my.sjsu.edu. Nothing will appear on your transcript, but please let me know if you drop.

To drop after Tue Feb 04, 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	Reading	Date	Reading
Mon Jan 27	Euclidean Alg	Mon Mar 30	SPRING BREAK
Wed Jan 29	Euclidean Alg	Wed Apr 01	NO CLASSES
Mon Feb 03	Euclidean Alg	Mon Apr 06	Cyclic codes
Wed Feb 05	Polynomials	Wed Apr 08	Cyclic codes
Mon Feb 10	Polynomials	Mon Apr 13	BCH codes
Wed Feb 12	Polynomials	Wed Apr 15	BCH codes
Mon Feb 17	Rings	Mon Apr 20	BCH codes
Wed Feb 19	Rings	Wed Apr 22	DFT
Mon Feb 24	Exam 1	Mon Apr 27	Abelian groups
Wed Feb 26	Linear alg	Wed Apr 29	Exam 3
Mon Mar 02	Linear alg	Mon May 04	FFT
Wed Mar 04	Linear alg	Wed May 06	FFT
Mon Mar 09	Codes	Mon May 11	FFT
Wed Mar 11	Codes		
Mon Mar 16	Codes	Fri May 15	Final exam,
Wed Mar 18	Ideals		9:45am–noon
Mon Mar 23	Ideals		
Wed Mar 25	Exam 2		