

Applied and industrial algebra (Math 127), Spring 2018
San José State University
MacQuarrie Hall 235, MW noon–1:15pm (Sec. 01, code 28587)

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

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

Office hours: MW 9:00–10:30; M 2:00–3:00; W 1:30–3:00. Current schedule available at:
<http://www.math.sjsu.edu/~hsu/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.math.sjsu.edu/~hsu/courses/127/>

Text: *A Concrete Introduction to Higher Algebra*, Lindsay N. Childs (3rd edition, 2009); 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 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 may 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 31**, and the final version due **Mon Feb 05**. 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 Feb 02**, I will also hold problem sessions for this class every **Fri**, at a time and a place to be announced. 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 **Wed May 16**, 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 15).

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 05** (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 12**). 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 05**, 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 05, 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

Numbered reading is from Childs; other reading is from course notes, to be obtained from course website.

Date	Reading	Date	Reading
Wed Jan 24	Numbers	Mon Mar 26 Wed Mar 28	SPRING BREAK NO CLASSES
Mon Jan 29 Wed Jan 31	3A–3C 3D–3F	Mon Apr 02 Wed Apr 04	23A–23B 23C–23D
Mon Feb 05 Wed Feb 07	7A, 7C 13A–13C	Mon Apr 09 Wed Apr 11	24A–24B 24B–24C
Mon Feb 12 Wed Feb 14	14A–14B Encryption	Mon Apr 16 Wed Apr 18	Ideals, 25A 25A–25B
Mon Feb 19 Wed Feb 21	5A–5B, 5E–5F Exam 1	Mon Apr 23 Wed Apr 25	11A–11B Exam 3
Mon Feb 26 Wed Feb 28	6A–6E 8A–8C	Mon Apr 30 Wed May 02	11C The FFT
Mon Mar 05 Wed Mar 07	Cyclotomic rings The DFT	Mon May 07 Wed May 09	Fast polynomials Fast matrices
Mon Mar 12 Wed Mar 14	Complexity 8E	Mon May 14	Review
Mon Mar 19 Wed Mar 21	Linear algebra Exam 2	Wed May 16	Final exam, 9:45am–noon