Course Policies

Prof. Shahed Sharif

Textbook. We will be using *Linear Algebra Done Right*, Fourth Edition, by Sheldon Axler. A free pdf is available at https://linear.axler.net/. We will be covering the first six chapters.

Course description. Covers real and complex vector spaces, subspaces, independence, bases, dimension, linear transformations, determinants, eigenvalues and eigenvectors, inner product spaces and orthogonality, diagonalization, introduction to spectral theorems and normal forms. Some overlap with MATH 264, but from an advanced, theoretical viewpoint.

Course objectives. At the end of the class students should be able to

- recall the definitions of vector space, subspace, dimension, bases, and isomorphism,
- use axioms and vector space properties to derive (prove) further properties of vector spaces,
- recall the properties of the algebra of linear mappings and their represenation by matrices,
- apply properties of linear mappings to specific examples,
- work with linearly independent and dependent sets of vectors to prove properties of vector spaces and linear mappings,
- use the concept of invariant subspaces,
- apply the relation between polynomials and linear mappings,
- recall the definition of orthogonal basis and construct orthogonal basis for specific examples,
- recall the Theorem of Riesz and apply it to the representation of elements of the dual space.

Course requirements. The grading scheme is as follows:

10%	for homework
5%	for worksheets
50%	for two midterm exams
35%	for final exam

Homework is posted every Tuesday on my webpage and is due the following Tuesday night. Homework will be turned in via Gradescope. Please obtain a scanner or scanning app (such as Adobe Scan, available for free with your CSUSM credentials), and use it to convert

your written homework assignments to pdf format. Then upload these to Gradescope. Please make sure to identify which problem is on which pages.

Worksheets are done in groups on an occasional basis. Groups are comprised of 5–7 people. One person should write up the work; this duty should rotate. Make sure to write everyone's full name at the top of your work. Worksheets should be turned in by the end of class. Worksheets are graded on effort, not completeness or correctness. (Although those things can be indicators of effort.)

You must show all work to receive full credit. Any method that does not use a standard algorithm from class must be justified in complete sentences. Proofs must be written legibly and in complete sentences. *You will be graded on your writing!* Correct and clear grammar is essential to a correct solution. Of course, your reasoning must also be completely clear for full credit. Rewriting homework before handing it in is highly advisable. I also highly encourage you to type up your problem sets. Homework fulfills this course's writing requirement.

The **first exam** is tentatively scheduled for March 3. The **second exam** is tentatively scheduled for April 21. The **final exam** will be Monday, May 11, 6:15–8:15PM. If it would help, the final exam score will replace your lowest midterm exam score.

Late assignment policy. Late homework is not accepted. There are no exceptions! Instead, the lowest two homework scores are dropped.

Make-up exams are not given. The replacement policy for exams will be used instead.

Office hours. My office hours are Tuesdays and Thursdays, 1–2 PM. Drop by the math conference room, ADM 6242, during those times—you don't have to make an appointment or have any questions. Feel free to bring your homework and a friend and just work on your own if you like. If you have a conflict, send me an email and we'll work out an alternate time. You can also email me any questions that you have. Make sure you include as much relevant detail as possible, and be aware that I may not have the textbook with me when I read your email.

Ethics. You are encouraged to work with others on homework assignments, but the final product should be your own work. In particular, you may not read your classmates' finished assignments until your own is completed! The same goes for other sources—online, back of the book, or other sources. Avoid looking at these sources, or if you do, take no notes on them. Failure to follow these guidelines is considered plagiarism, and all involved parties will *at a minimum* earn a zero on the relevant assignment and have their actions reported to the Dean of Student Affairs.

LLM use policy. You may use LLMs on your homework, as long as your use complies with the ethics guidelines. On your written homework, you must indicate how you used it. I do discourage the use of LLMs, since the point of this course is learning to think mathematically. Additionally, the purpose of homework is to prepare for the exam, where you will not have access to any technology.

Electronics-free classroom. I do not allow the use of electronics devices during class. Please silence and stow your phones, tablets, etc. If you need your device for class purposes, please let me know ahead of time and I will give you permission. If you prefer, I am happy to hold on to your electronics for the duration of the class.

ADA policy. Students with disabilities who require reasonable accommodations must be approved for services by providing appropriate and recent documentation to the Office of Disability Support Services (DSS) in Administrative Hall 4300 (ph: (760) 750-4905; TTY: (760) 750-4909). Students authorized by DSS to receive reasonable accommodations should meet with me during my office hours in order to ensure confidentiality.

Advice. To learn a proof, you should do two things:

- Identify the main ideas of the proof. Usually there's only one or two.
- Develop the skills to fill in the remaining details.

Homework and in-class problems are meant to test your ability to both of the above. If you are stuck, either figure out what idea you need to use, or what proof-writing skills you need to develop.