Syllabus for Math 260
Linear Algebra Spring 2025

Class Information

Class webpage:	http://seaver-faculty.pepperdine.edu/dstrong/25S.260/index.html
Meeting times:	MTRF 11:00 – 11:50 a.m.
Texts:	*Linear Algebra*, **4th Edition**, by David Lay and corresponding *Student Study Guide*
Prerequisite:	Multivariable Calculus, Math 250 with grade of C- or better

Instructor Information

Instructor: David Strong

Email: David.Strong@pepperdine.edu

Office hours:

Monday	12:00 – 12:50 pm
Tuesday	10:00 – 10:50 am
Thursday	1:00 – 1:50 pm

Feel free to drop by my office.
If I'm in and free, I'm happy to help you.

"Why is it important for today's kids to learn algebra? Because *I* had to learn this junk in school and now it's *your* turn, that's why!"

Pepperdine Mission

- Pepperdine is a Christian university committed to the highest standards of academic excellence and Christian values, where students are strengthened for lives of purpose, service, and leadership. This course is designed to complement and supplement the overall mission of Pepperdine.

General Objectives for any Mathematics Course

- Develop your ability to think clearly, logically and abstractly.
- Learn to be more careful, focused and persistent.
- Learn to be more resourceful, independent and creative in finding ways to find solutions to problems.

Course Objectives

- Demonstrate an understanding of the skills and concepts central to linear algebra.
- Demonstrate the ability to apply appropriate mathematical ideas from linear algebra to both theoretical and practical contexts.
- Demonstrate the ability to formulate logical arguments and proofs that make use of appropriate mathematical language and notation.
- Demonstrate the ability to solve problems using the ideas of linear algebra including the ability to translate problems into mathematical notation and interpret solutions appropriately.

Specific Learning Outcomes

Upon completing this course, students should be able to:

- Use Gaussian elimination to solve linear systems, find inverses, compute determinants, and determine the rank and fundamental subspaces associated with a matrix.
- Give examples that demonstrate specific properties of linear systems, matrices, vector spaces, bases, linear transformations and inner product spaces.
- Construct proofs that verify a vector space or subspace, linear transformation or inner product space.
- Understand the relationships between span, linear independence, rank, dimension and basis.
- Understand the properties that are equivalent to matrix being invertible.
- Find the kernel, range and matrix representation of a linear transformation.
- Calculate eigenvalues and eigenvectors of a matrix and if possible use them to diagonalize the matrix.
- Understand the relationship between inner products, projections and orthogonality, and use Gram-Schmidt to find orthogonal bases.

General Education Learning Outcome

These learning outcomes fulfill the mathematics learning outcome of the general education program which states students should be able to:

- Formulate mathematical proofs that are clear, correct, complete, and logical.
- Use appropriate mathematical ideas in applied or real-world contexts.

Before, during, and after class: a typical day

Before class:

- Read that day's handout posted online. Understand the ideas and the examples.
- Watch the posted video(s). They are helpful, and some are even kind entertaining.

During class:

- Participate, be present, be engaged. Take ownership of your life, including time spent in class.
- Don't be afraid to make mistakes. (This might be the scariest part of math.) You usually learn more through your mistakes than by getting things right every time.

After class:

- Read the book (at least once) to understand the details and the examples more thoroughly.
- Work the homework problems. Before turning HW in, you might scan or take a photo of your homework if you want to compare your work to the solutions which I will post after class.

Homework

- There are two main goals for every student in any course: (1) learn and understand the material being taught, and (2) get a good grade. Fortunately, if you do the first then the second will usually happen automatically. Homework is where you accomplish both goals: it is by doing the homework (and understanding what you are doing) that you really learn the ideas, and consequently you will be prepared to take and do well on the exams, which will really determine your grade for the course. Homework is worth only 20% of your grade for the course, while exams are worth 80% of your grade.
- Most of the homework problems can be done with just paper and pencil, but there will occasionally be problems that will require the use of the computer. I will give you more information about computer use as it becomes necessary.
- For certain problems, solutions and/or hints can be found at the back of the book and/or in the optional *Study Guide*.
- Most sections contain at least one multi-question True/False question. For those that are true, you can generally simply answer them as true, without any explanation. For those that are false, you can do one of three things:
    - Explain why the statement is false
    - Give a counterexample
    - Change the statement so that it is true
- Since one of the best ways to learn an idea is discuss it with or explain it to someone else (this is why math teachers sometimes seem so smart…they've had to teach the ideas!), you are encouraged to work with other students in doing the homework. Of course the homework turned in must represent your own thinking and your own work. Remember that homework is worth relatively little of your grade, but doing it yourself will be what helps you really learn the material so that you can do well on the exams, which are what mostly determine your grade.
- On each homework assignment, be sure to include:
    - ✓ Name
    - ✓ Math 260
    - ✓ HW number (e.g. HW 1, HW 2, etc.)
- Here are some things to keep in mind when doing your homework (they may seem obvious, but unfortunately they are not always done):
    - ✓ Write neatly—if the grader can't read your work then he/she can't give you credit for it.
    - ✓ Don't try to squeeze your work into as little space as possible—it's more difficult for you to write and more difficult for the grader to read. Also, leave space between problems.
    - ✓ If the problem has a single answer in the end (as opposed to say the problem requiring you to write out a detailed proof of some theorem), circle the answer.
    - ✓ You'll scan your homework into a single PDF file which you'll submit online.
- Assignments are worth 20 points each. Some of the problems will simply be graded for having done them, and others will actually be carefully graded for correctness.
- Homework is due by the beginning of class every day. YOU CAN SUBMIT IT LATE BY THE NEXT CLASS MEETING. **LATE HOMEWORK IS WORTH HALF CREDIT.** I'm not trying to find reasons to take points away from you—I am simply trying to encourage you to get it in on time, which is a very important trait in all sorts of activities in life.

Exams

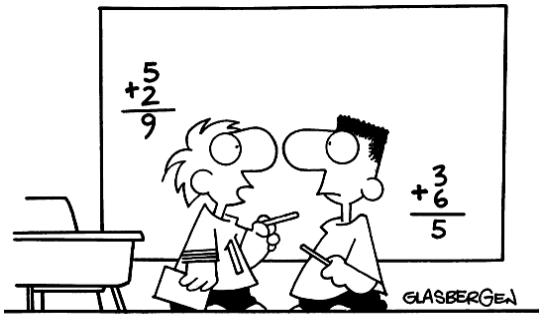
- Exam dates are listed at the online class schedule.
- The final exam is comprehensive.
- Questions for exams will generally be similar to those in the book examples and homework, so working on and understanding those problems is an excellent way to prepare for exams.
- If you have to miss an exam due to quarantining, any make-up exam will be in-person with me, and will probably (depending on the material being tested) be an oral exam.

Grading

Your grade will be calculated based on the following weighting of scores:

Homework	20 %
Exam 1	20 %
Exam 2	20 %
Exam 3	20 %
Final Exam	20 %

If you score higher on the final exam than on any of your midterms, then your final will count in place of that lowest midterm. The "official" grade breakdown is as follows:



"My lawyer says I can sue the school because they're violating my right to be stupid."

A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F
100%	93%	90%	87%	83%	80%	77%	73%	70%	67%	63%	60%	0%

I say the breakdown above is "official" (in quotes) because the above chart gives the guaranteed *minimum* grade that you will receive for a given total score for the class. I don't necessarily curve grades for the class, but if needed, I will curve in order to bring grades up. For example, if no one in the class had a total score above 90% (say, if the final exam turned out to be more difficult that I had expected), then I would lower the cutoff for an A so that at least some of the class would receive an A (unless nobody really deserved an A, which is unlikely). Any curving that is done will be done at the end of the semester—I don't curve individual exams or other parts of the course.

Miscellaneous

- Any student with a documented disability (physical, learning, or psychological) needing academic accommodations should contact the Disability Services Office (TCC 264, 506-6500) as early in the semester as possible. All discussions will remain confidential. Please visit http://www.pepperdine.edu/disabilityservices for additional information.
- It has been suggested that all faculty include a copyright note. Here is one suggested by the university, which I'll use. (Any lawyers-in-training might find this exciting.)

  Course materials prepared by the instructor, together with the content of all lectures and review sessions presented by the instructor, are the property of the instructor. Video and audio recording of lectures and review sessions without the consent of the instructor is prohibited. Unless explicit permission is obtained from the instructor, recordings of lectures and review sessions may not be modified and must not be transferred or transmitted to any other person. Electronic devices other than laptops (e.g., cell phones, PDAs, calculators, recording devices) are not to be used during lectures or exams without prior permission of the instructor.

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  My lectures and all other class materials are protected by state common law and federal copyright law. They are my own original expression and I record them at the same time that I deliver them in order to secure protection. Whereas you are authorized to take notes in class thereby creating a derivative work from my lecture, the authorization extends only to making one set of notes for your own personal use and no other use. You are not authorized to record my lectures, to provide your notes (including any presentations, handouts, guides, outlines made available to you in this class) to anyone else or to make any commercial use of them without express prior written permission from me.

- It has been suggested that all faculty include a note on academic integrity. Here is one suggested by the university that I agree with.

  Academic Integrity is the expression of intellectual virtue in human beings as a result of their creation in God's image. It represents the convergence of the best of the human spirit and God's spirit, which requires personal, private and community virtue. As a Christian institution, Pepperdine University affirms that integrity begins in our very created being and is lived out in our academic work. In order for the code to be effective, the community must maintain its health and vitality. This requires a genuine sense of maturity, responsibility, and sensitivity on the part of every member. In particular, each member of the Seaver College community is expected to pursue his or her academic work with honesty and integrity. Academic integrity is violated when one of the following events occurs: plagiarism, cheating, fabrication, or facilitating academic dishonesty. All violations will be reported and handled according to the Academic Integrity Committee Procedures.

Finally

With anything you do in life, it's better to spend a little more time than you think you should or feel like you need to, rather than spending a little less time. This is certainly the case with a math class. Spending that little bit of extra time can make a huge difference in your success in and your enjoyment of this class. In college the rule of thumb is generally that for each hour in class, you should spend two to three hours outside of class. Remember, if you are willing to work, you will learn and enjoy the material, end up with a good grade, and enjoy the class a lot more.

Some thoughts on the effort needed to earn each grade

Grade	Time	Reading	Examples in textbook	Homework Problems
A	2+ hours a day	Read every section, usually twice	Be able to work most every example	Do every assignment, and find a way to find a solution to all (or most) problems.
B	1.5 hours a day	Read many of the sections once or twice	Be able to work many examples, and understand most of the other examples	Do most assignments, and work many of the problems, but often give up if they are too tough.
C	1 hour a day	Read some sections, usually just once	Be able to work some of the examples and understand many of the other examples	Do many assignments, and do some of the easier problems and sometimes attempt the tougher problems.
D	0.5 hour a day	Rarely read; don't try too hard to understand	Be able to understand some of the examples	Do some of the problems on some of the assignments.
F	I didn't even want to take this class—I'm not wasting my time on it!	We're supposed to read the book?	The book has examples?	I have to do homework, too? This class sure is demanding!

Success is 10% inspiration (talent, etc.) and 90% perspiration (hard work).

That which we persist in doing becomes easier—not that the nature of the task has changed, but our ability to do has increased.

In sports, the will to prepare is far more important than the will to win.
(So if you want to do well on exams—and get a good grade—reading well and work hard on your homework.)