Syllabus for Math 141 Fall 2024
Linear Algebra, Multivariable Calculus, Probability and Statistics

Class Information

Class webpage:	http://seaver-faculty.pepperdine.edu/dstrong/24F.141/index.html You'll find information, schedule, homework assignments, handouts, exam dates, etc. at this site.
Text:	Pearson's *Math 141 Digital Edition 2021*
Prerequisites:	C- or better in Math 140 or Math 150 or Calculus 1 in high school If you passed the AP Calculus Exam in high school with a 4 or 5, please contact me.

Instructor Information

Instructor: David Strong

Email: David.Strong@pepperdine.edu

Office hours:

Monday	12:00 – 12:50 p.m.
Tuesday	8:00 – 8:50 a.m.
Thursday	1:00 – 1:50 p.m.
Friday	9:00 – 10:50 a.m.

And feel free to drop by my office.
If I'm in, I'm usually 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

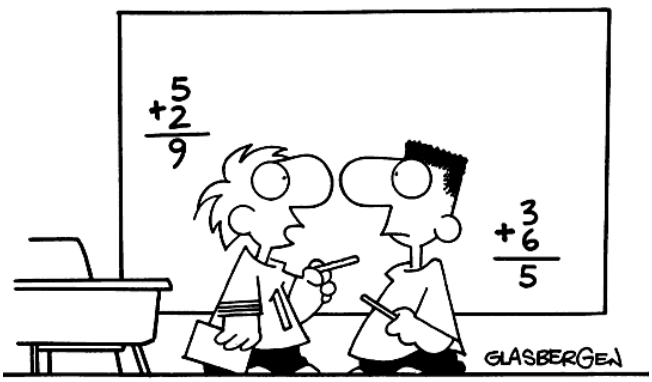
- Develop your ability to think clearly, logically and abstractly.
- Learn to be more careful, focused and persistent.
- Learn to be more resourceful, independent and creative in finding ways to find solutions to problems.

Course Objectives for Math 141

Each student in Math 141 should:

- Discover how mathematics is used within many fields of study and learn to describe real- world problems using mathematical models. This includes translating a problem into a mathematical expression as well as interpreting equations in context.
- Model complex systems using functions of several variables and analyze how they change with respect to each variable.
- Learn to solve optimization problems with multiple variables and constraints.
- Learn basic counting principles and use them to calculate probabilities.

- Learn the basic principles of probability including events, sample spaces, random variables, conditional probabilities, expectation, and variance.
- Model large scale systems using linear equations and solve these systems.
- Think more creatively about how to approach problems, decompose them into more manageable pieces, use various approaches to solve them, and then present the solution in a form consistent with the context.
- Develop the computational skills necessary to be successful in the Business Administration program which is quantitative in nature.



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

Specific Learning Outcomes for Math 141

Upon completing this course, students should be able to:

- Use partial derivatives to analyze rates of change with respect to individual variables.
- Optimize functions with respect to several variables and interpret the results in the context of the quantities they represent.
- Calculate basic probabilities using counting methods, trees and conditional probability.
- Solve linear systems using matrices.

General Education Learning Outcome

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

- Provide examples that illustrate the beauty, creativity, and pervasiveness of mathematics.
- Demonstrate logical reasoning ability and problem-solving skills that employ mathematical strategies.
- Demonstrate an understanding of the creation, use, and limitations of mathematical or statistical models.

Before, during, and after class: a typical day

Before class:

- Read that day's section in the textbook. Try to understand the Book Examples.
- Watch the posted video(s). Some of them are actually kind of entertaining.

During class:

- Participate. Be present, be engaged. Take ownership of your life, including time spent in our 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 a second time to understand the details and the examples more thoroughly.
- Work the homework problems. Before turning it 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 is out every day.

Homework

- Homework will be due pretty much every day. Math is learned best when done regularly, and you're more likely to do it regularly if you have homework due regularly. Generally you will turn in problems covering the material we covered in class the previous day.
- There are two main goals students have 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 naturally tend to happen as well. By doing the homework—and really understanding what you are doing—that you really learn the ideas (which to me is the most important point of this class!), and consequently you will be prepared to take and do well on the exams, which is what will determine your course grade.
- Homework is worth 15% of your grade. That's not a lot. It's enough to encourage you to do it, but not enough that it will have a significant effect on your final grade. I have found that students who do the homework the right way—you complete all or at least most problems, and you do them yourself (rather than getting them from a friend or simply finding some other lazy shortcut way)—get good grades, and those who do not don't get good grades. If you are willing to work, you will likely learn the material and end up with a good grade, and just as importantly your experience in class will be much more enjoyable as well.
- Since one of the best ways to learn an idea is discuss it with or explain it to someone else (this is why teachers might sometimes seem smart…they have had to teach the ideas!), you are encouraged to work with other students in doing the homework. This might be more difficult while we're all separated, but it's still possible. Remember that homework is worth relatively little of your grade, but doing it yourself (including if you are working on it with other students) will be what helps you really learn the ideas, which of course also means you'll do better on exams.
- On each homework assignment, be sure to include:
  - ✓ Name
  - ✓ Math 141
  - ✓ Homework number (Homework 1 or Homework 2 or …)
- 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 and darkly, especially since your homework will be scanned, thus a bit harder than usual to read.*
  - ✓ C*ircle your answer*.
  - ✓ *Leave a bit of space between problems.*
  - ✓ *If you are required to quarantine/isolate, you'll scan in your homework into a single PDF file which will be submitted online.*
- 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.
- Answers (but not full solutions) for odd problems are at the back of each chapter. I will post solutions online at the class website for all problems. I expect that you will look at those on your own, so I will not work very many homework problems in class, since this will allow us more time in class to discuss ideas and work other examples. Since you have answers to odd problems, think of the odd problems as your chance to work a problem and get immediate feedback. For the even problems, you are a little more on your own.
- One note of caution: there are plenty of ways to do a mediocre job in doing the homework, ranging from simply not doing it to getting too much "help" from a friend to trying to find solutions online. Your homework scores will <u>not</u> have a significant effect on your grade for this course, but *doing* the homework (or not) in a legitimate way definitely <u>will</u> affect how you do on the midterm exams, which ultimately <u>will</u> determine your grade. In other words, if you take shortcuts in doing homework, your

grade will suffer. And just important, you will be much more satisfied with yourself (always take some pride in your work, whatever it is you're doing!) and with your experience in this course if you actually work hard and try to do your best as much as possible. Doing homework is your opportunity for learning the mathematics. Exams are my opportunity for measuring what you know and understand. Don't use AI to do your homework.

Exams

- There will be an in-class midterm exam following each chapter that we cover. The dates listed online at the class homepage are tentative and are subject to change (but right now I don't plan to).
- The final exam this semester will be cumulative: it will test everything we cover this semester.
- Most questions for exams will be similar to examples and homework problems from the textbook, so working on and understanding these problems is a great way to prepare for exams.
- If you have to miss an exam due to quarantining (or any other reason), the make-up exam will be in-person with me, and may (depending on the material being tested) be an oral exam.

Grading

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

5 %	Attendance
15 %	Homework
10 %	Exam 1
10 %	Exam 2
10 %	Exam 3
10 %	Exam 4
10 %	Exam 5
30 %	Final exam

If you score higher on the final exam than on any of your midterms, then your final exam will count in place of that lowest midterm. So in that case your final would be worth 40% of your grade and that lowest midterm score is dropped.

The "official" grade breakdown will be as follows:

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" 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 a bit. For example, if no one in the class had a total score

above 90%, then of course I would lower the cutoff for an A so that at least a portion of the class would receive an A (unless nobody really deserved an A, which is not likely). 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.

Other

- 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.

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. For additional information, please visit http://www.pepperdine.edu/disabilityservices.
- It has been suggested that all faculty include a note on academic integrity. Here is one suggested by the university, with which I agree.

  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.

- Other miscellaneous items:

  Student and faculty privacy. *In order to safeguard the privacy of all our students and faculty in online learning environments, no individual may record, reproduce, screenshot, photograph or distribute any video, audio, or visual content from an online course. This restriction applies to, but is not limited to, live online sessions, recorded lectures, live discussions, and discussion boards. The only exceptions to this policy are the instructional recordings referenced above and one screenshot per meeting/ discussion that faculty may take as a form of attendance. These screenshots may not be shared or used for any other purpose. Any violation of this policy may subject the individual to disciplinary and/or legal action.*

  Intellectual property rights. *All class lectures and materials herein, including but not limited to, pre-recorded and live lectures, live discussions and discussion boards (and recordings thereof), posted course materials, visual materials that accompany lectures/discussions, and virtual whiteboard notes (collectively "Course Intellectual Property") remain the intellectual property of the faculty member or other third-parties. No individual may record, reproduce, screenshot, photograph, or distribute any Course Intellectual Property in partial or full-format without the permission of the professor. Any violation of this policy may subject the individual to disciplinary and/or legal action.*

Suggested approximate efforts 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.

The will to prepare is far more important than the will to win.