Math 54 Syllabus
Summer 2019
Instructor: Kevin Donoghue
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Overview. Math 54 is a first course in linear algebra and an introduction to differential equations. The prerequisite for this class is Math 1b or Math 10b. Having previously taken Math 53 helps, but it is not required.

Course Hours. The course is scheduled for 10 hours of lecture a week, 8-10 AM, MTWThF. Some of these hours will be converted to discussion. Stay tuned for details.

Course Website. I will use

math.berkeley.edu/~donoghue/math54_summer2019/

to post class material such as the schedule, the homework, resources, et cetera.

Office Hours. I will hold office hours immediately after class in my office, 1087 Evans. If you can't make this time, send me an email and we'll set something up.

Homework. Homework will be due Tuesdays and Thursdays at the start of class (8:10 AM). No late homework will be accepted. If you know you won't be awake at 8 AM, you can slide it under my office door (1087 Evans) the day before or email it to me. The lowest two homework scores will be dropped. The homework due Tuesday will cover material from class the previous Wednesday, Thursday, Friday. The homework due Thursday will cover material from class on Monday and Tuesday. The first homework will be posted on Tuesday June 25 and due on Thursday June 27.

Midterms and Final. There will be midterms on Tuesday July 9 and Tuesday July 30. These will be held in the first hour (8:10-9 AM) of class time. There will be a final on Thursday August 15 which will last the full class time (8:10-10 AM). Note that this is NOT the last day of classes. On the last day of classes, I will hold an optional lecture that will either cover something fun or will review the final. I've arranged it this way to make it easier for students who need to book a flight on the last day of the summer session.

Grading. Your raw score will be calculated according to the following formula:

Homework	10%
Midterm 1	25%
Midterm 2	25%
Final	40%

Your final score will replace up to one of your midterm scores if such a replacement improves your grade.

Textbooks. The two required textbooks for the course are Lay, Lay, McDonald's *Linear Algebra and its Applications, 5th edition* and Nagle, Saff, Snider's *Fundamentals of Differential Equations, 9th edition.*

Outline. We will not cover all of the material in the two textbooks. Roughly speaking, this is what will be covered:

Topic	Sections
Row Reduction	Lay 1.1, 1.2
Getting Familiar with $\mathbb{R}^n$	Lay 1.3, 1.5
Linear Independence, Span, Bases	Lay 1.7, 4.1, 4.3, 4.4, 4.5
Linear Maps	Lay 1.8, 1.9
Null Space and Column Space	Lay 4.2, 4.6
Change of Bases	Lay 4.7
Eigenvectors and Eigenvalues	Lay 5.1, 5.2, 5.3, 5.4, 5.5
Inner products and orthogonality	Lay 6.1, 6.2, 6.3
Gram-Schmidt	Lay 6.4
Singular Value Decomposition	Lay 7.4
Second Order Linear Differential Equations	Nagle 4.2, 4.3, 4.4
Linear Systems of Differential Equatoins	Nagle 9.2, 9.4, 9.5, 9.6
Fourier Transform	Nagle 10.3, 10.4
Heat, Wave, Laplace Equations	Nagle 10.5, 10.6, 10.7