CRN: 45149, Math D002B.20Z Linear Algebra, Spring, 2021

Instructor: Dr. Karl Schaffer
Class meeting days: Tue/Thu
Class time 4:00-6:15 PM
Classroom: Zoom via Canvas
email: schafferkarl@fhda.edu

Office phone: ~~408-864-8214~~ (In limited use Spr. 2021)
Office: Online
Office Hours: Mon., 7:30 – 8:20 PM, Thu. 12:30-1:20 PM or by appointment
Class web site: Canvas web site

Course content: Linear algebra and selected topics of mathematical analysis. This class will cover the traditional topics of linear algebra: linear transformations, matrices, vectors and vector spaces, eigenvalues and eigenvectors, linear systems of equations, determinants, and applications.

Text: The text is *Introduction to Linear Algebra*, 5th edition, by Gilbert Strang, Wellesley-Cambridge Press. Additional materials will be available on class web site or handed out. One recommended and inexpensive text is *Schaum's Outline Linear Algebra* by Lipschutz, but also others are available free online. We will cover chapters 1-6, 8, most of 10, with some omissions and additions; some other material will also be provided.

Because Strang and MIT have been running this class for years, you will find lots of extra materials at the MIT web site: old exams, additional lectures, important idea lists, etc. See the site https://math.mit.edu/~gs/linearalgebra/.
There you can also find solutions to the 5th edition problems; however, some of the explanations may be very brief, so there can still be some work involved in writing up your own answers! And do try to work the problems on your own first. But there is nothing wrong with "working backwards" from the answers to better understand the material.

Attendance: It is expected that you will attend and participate in online classes. Collaborative class exercises and quizzes will count towards your grade, and must be completed during class time – as you will see, they often will not make sense as problems to be solved outside of class.

Grades: 90-100 A, 80-89 B, 70-79 C, 60-69 D, < 60 F, based on:

25% short quizzes or in-class assignments, usually to be given during class. These will almost always involve group work. 80% of the possible score will count as full credit, so there will be no makeups – that is, if there are ten such quizzes, and you miss class for two of them, you can still get full credit.

10% Video lecture response forms. The textbook author Strang has an excellent set of video lectures at http://web.mit.edu/18.06/www/videos.shtml. There are 3 to 5 short questions about each video that you will answer for 10% of your grade. Particular lectures will be assigned according to what we are covering in class. If you want to get started, view his Lecture 1 before the first class session – questions in first two quizzes are listed in a separate Pages document in Canvas. Note: you can set the speed of the videos as you like. Captioning is also available – by the way, students have told me it is possible to find captioning in Chinese because his lectures are popular in China; I'm not sure what other languages might also be available (please let me know what you find and I'll pass on to other students!)

Exams:
Exams are open book, notes allowed, in fact encouraged. I always involve collaborative work in my classes, but because of the unusual circumstances of the pandemic, more of this class will involve group work. One of the responsibilities of collaboration is to acknowledge and cite ideas and work that are not your own, even if this involves ideas communicated through casual conversation. We will practice such acknowledgement in group work; for example, for group quizzes, each student will turn in a paper, but give the names of those they worked with and cite important contributions of others.

Academic dishonesty regarding tests in this class is defined as using resources not made available by me to everyone in the class during the testing time. Academic dishonesty includes plagiarism. For work on the two exams that are individual I will ask you to sign a statement stating that you did not receive help from anyone else, either in or not in the class.

15%: one hour online exam, to be taken on Thu., May 6 - I have not yet decided exactly how that exam will be administered.
15%: Exam 2 will include as the major part a report assigned as both written paper and class presentation. Due date and more details TBA.

20% Homework assignments. Homework is assigned during each class and posted at the Canvas web site. Your homework will be turned in **ONLY** at the end of each chapter. Homework is graded for completion, not correctness. **NO LATE HOMEWORK ACCEPTED. EVER**! You may miss one homework assignment and still receive full credit.

15% Final Exam: mandatory, comprehensive, given on **Thur., June 24, 4-6 PM.** There will be no make-ups or early exams, but I have not yet determined exactly how the exam will be administered. A portion of the exam will be an individual online oral exam in which each student works several problems and shows work. The final exam score may be used to replace the first exam score, **if and only if** the final exam is higher and would raise the grade. Oral exam time schedule TBA.

NO LATE WORK IS ACCEPTED - NO MAKE-UPS. IF YOU MUST MISS THE FIRST MAJOR EXAM, IT WILL BE REPLACED WITH THE FINAL EXAM SCORE, BUT THIS IS NOT A GOOD IDEA! IF YOU GET BEHIND DO THE MOST RECENT WORK FIRST, KEEP YOUR WORK CURRENT!

Some background on the instructor: I have a Ph.D. in Mathematics from UC Santa Cruz, did undergraduate work at Univ. of Chicago and Univ. of Alabama, and I grew up in New England and Alabama. I do research in the mathematics of networks or graph theory, and am also a contemporary dancer and choreographer. The dance company I co-direct does shows about math and dance, among other things (see http://www.mathdance.org/) and has performed internationally. I am on the Teaching Artist Roster of the Kennedy Center for the Performing Arts for work integrating dance and mathematics, and have published widely on that subject.

Student Learning Outcome(s):

*Construct and evaluate linear systems/models to solve application problems.
*Solve problems by deciding upon and applying appropriate algorithms/concepts from linear algebra.
*Apply theoretical principles of linear algebra to define properties of linear transformations, matrices and vector spaces.