Math 22A, Winter quarter 2018

Instructor: Gabriel Herczeg

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Office Hour and Location: Wedensday and Friday 4:15 - 5:15, MSB 2149. Please arrive within the first 15 minutes of office hours or send me an email letting me know you're coming later.

TAs:

Joshua Parker

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Office Hour and Location: Monday, Wednesday 1:00 - 2:00, MSB 2131

Wencin Poh

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Office Hour and Location: Tuesday 2:00 - 3:00 and Thursday 1:00 - 2:00, MSB 3129

Chang Shu

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Office Hour and Location: Wednesday 2:00 - 3:00, MSB 2117

Colin Hagemeyer

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Office Hour and Location: Tuesday and Thursday 3:00 - 4:00, MSB 3137

Welcome to Math 22A!

Linear Algebra is a foundational element of modern science, engineering and mathematics. Knowledge of linear algebra is a basic prerequisite for the study of Signal Processing, Statistics & Data Analysis, Ordinary & Partial Differential Equations, Quantum Mechanics, Quantitative Economics, Optimization & Control, Network, Numerical Analysis, Mathematical Finance, and Computational Models of Aerodynamics, Climate Change, Hydrology, Structures, Traffic Flow, Weather, and so on. It is difficult to find an area in engineering and science, including many of the social sciences, in which some essential aspect of that area does not require a background in Linear Algebra.

The purpose of MAT 22A is to introduce students to the fundamental objects and concepts in Linear Algebra, including scalars, vectors, matrices, inverse matrices, linear combination, linear dependence & independence, vector spaces, subspaces, the dimension of a vector space, bases of vector spaces, rank and nullity, determinants, eigenvectors & eigenvalues, and the fundamental operations on these objects including the inner products, matrix multiplication, matrix transpose, reduction of a matrix to reduced row echelon form, the solution of systems of linear equations in an arbitrary number of unknowns, and the Gram-Schmidt procedure, and more.

In MAT 22A a modern, innovative approach is taken in presenting this material. Each new idea is introduced by constructing concrete examples, in which, for example, the student learns to determine key parameters associated with a given matrix, (e.g., its rank and nullity), by applying procedures, (e.g., row reduction) to find the relevant canonical form of the matrix

(e.g., reduced row echelelon form) from which these parameters can be easily found.

This approach provides the student with a constructive proof of each of the key theorems presented in the course. This allows students to learn the theory underlying Linear Algebra by associating theorems with procedures they have learned to perform on matrices and vectors, such as reduction to RREF. Thus, this approach gives students an introduction to logic and proof, which is one of the goals of this course.

Class Hours

Class meets Monday, Wednesday, and Friday, 3:10 - 4:00 PM in Giedt 1001.

Lab section (22AL)

MAT 22A students are required to take 22AL, unless they have taken Eng 6 or have a good knowledge MATLAB and its use in Linear Algebra. If you are enrolled in Eng 6 this quarter, you still need to take MAT22AL.

Textbook

Introduction to Linear Algebra, 5$^{\text{th}}$ edition, by Gilbert Strang.

Approximate Schedule of Topics

An approximate schedule of topics can be found at:
https://www.math.ucdavis.edu/courses/syllabus_detail?cm_id=58

Homework

Homework will be assigned weekly and will consist of ~ 10 problems from your textbook. This is an extremely important component of the course. I expect that most of you will learn more from working through homework problems on your own, and/or in study groups (which I strongly encourage) than you will learn in lecture.

However, due to the large size of the class, grading individual homeworks is impractical, and homework will not be collected. To keep you accountable, one or two homework problems will be selected for a weekly quiz.

Quizzes

Every Friday (except the first), the last ~ 25 minutes of class will be reserved for a weekly quiz. The quiz will consist of one or two problems selected from the homework. You will not be permitted to use calculators or cell phones. **There will be no makeup quizzes**, either before or after the regular quiz time. You may miss one quiz for any reason without penalty. Additionally, I will drop the lowest score from among the quizzes you do take. If you have to miss a quiz due to a medical emergency or official university event, email me **with appropriate documentation** and we can discuss how to proceed.

Regrades

Requests for regrades should be submitted electronically to the TA that graded your quiz with me in CC. Your message should include a succinct explanation of why you believe you received the wrong grade, and a clearly legible photo or scan of your quiz must be attached.

All regrades must be submitted within one week after the quiz was returned. Most regrade requests will not result in a change of grade. If you do request a regrade, your score may be raised **or lowered.**

Final

Your final is scheduled for Thursday, March 22$^{\text{nd}}$, 10:30 AM - 12:30 PM in Giedt 1001. You will not be permitted to use calculators or cell phones. The final will be cumulative.

Grading

Course grade = 60% quizzes + 40% final exam.

Class Website

The class website may be accessed on Canvas.

Communicating with me

The best way to contact me is via email. All messages should be sent to gherczeg@math.ucdavis.edu or to my personal address Gabe.Herczeg@gmail.com. **Do not message me on canvas.** Please be sure to include "Math 22A" in the subject line so I know to respond quickly.

Academic Dishonesty

Academic dishonesty of any form will be reported to the Office of Student Support & Judicial Affairs for appropriate action.