MATH 2135: Linear Algebra for Math Majors
MWF 2:00-2:50 pm, STAD 135

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Office hours: Tuesday 10-11 am, Wednesday 3-4 pm
Course website: `http://math.colorado.edu/~mayr/teaching/math2135fall19/`

Course description. Linear algebra is not only about solving systems of linear equations and calculating with vectors. Its applications are everywhere in math, physics, computer science, and engineering. For example, it provides tools for computer graphics, fitting a line through a cloud of points, analyzing mappings in $\mathbb{R}^n$, and the development of dynamical systems.

This is a proof-based course. The difference to *Linear Algebra for Non-Math Majors* is that we cover the material in greater depth and from a more general abstract perspective. Correspondingly there is less emphasis on computation and more on writing proofs.

We will cover the following topics:

- systems of linear equations, Gaussian elimination
- vector spaces over arbitrary fields
- basis, dimension
- linear transformations, matrices
- determinants
- eigenvalues, eigenvectors
- diagonalization of matrices
- inner products and orthogonality

Assignments. Every Friday I will post homework problems on the course website. Please hand in solutions at the beginning of class on the following Friday or send a pdf at least 30 minutes before class. Please use "Math 2135 - assignment n" in the subject line of the mail for the n-th assignment (otherwise I will not find and grade it).

There will be a short quiz every Wednesday. There are 2 midterm exams in class on Wednesday, October 2 and on November 6, as well as a final exam in the finals week.

Grading. You will be graded on your written work, which will be judged on the basis of correctness, completeness, and legibility. Your final grade will be determined by the scores of your homework, quizzes, midterms, and final exam. To combine these items the following weights will be used:

Homework: 40%
Quizzes: 10%
Midterms: 30%
Final exam: 20%

Late homework will not be accepted. However the 2 lowest homework scores and the 2 lowest quiz scores will not count towards the final grade.

Text. We will mainly use the following book which is available for free online:

Sergei Treil. Linear algebra done wrong (updated Sept. 4, 2017).

How to succeed in this class.

Go to class! It seems obvious, but learning the material in small portions 3 times a week is easier than reading up on it in some book by yourself. Always keep up with the topics. You also get nerdy Math jokes.

Ask questions early and often! If you are not sure about something, ask about it immediately – no matter whether in class, in office hours, or by mail. Do not assume that you can skip or figure out things later that you do not understand now. If you are missing the basics, you may fall behind and struggle with more complicated concepts later in class.

Do the work! The only way to learn stuff is to try it yourself. Strive to do all the homework assignments. Some will be more challenging than others. If you are stuck on the hard ones, discuss them with colleagues or ask for possible hints in office hours or by mail.

Learn from mistakes! Look at all feedback you get on graded homework, quizzes, exams, etc. Make sure you understand where you went wrong and how to get the correct solution. In particular revise all relevant graded work before exams.

Organize in study groups! Meet with classmates a couple of times a week to discuss lectures and homework. Still write up your solutions to assignments when you are alone, never in a group.

Take advantage of office hours! If you cannot make it to the official hours, ask to meet at some other time. Office hours are an additional resource for you to discuss stuff for which there is no time during class. Come prepared! Try to solve homework problems alone before you ask for help and be ready to explain your thoughts and where you are stuck.

University regulations. I am happy to accommodate disabilities or religious observances, or a request that I address you with a different name or pronoun than my roster indicates. Please contact me as soon as possible.

For details on accomodations and university policies please see the official statements of the Division of Academic Affairs `http://www.colorado.edu/policies`