Syllabus, Math 170A, Winter 2020

Numerical Linear Algebra

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Course website: www.math.ucsd.edu/~dumitriu/m170a.html
All information in this syllabus can be found in more detail on the course website.

Office Hours: Tue, 3-4:30pm; W, 12:30-2pm, APM 5824
TAs: Yizhe Zhu and Saeed Vahidian, see course website.

About this class. This is an intro course to numerical linear algebra. By the end of this class, you should be able to perform calculations, either by hand or using Matlab (more below); explain concepts, processes, definitions and theorems; and prove some results relating to the material.

The main subjects will be solving linear systems $Ax = b$ (triangular systems, banded systems, LU and Cholesky decompositions, Gaussian elimination with and without pivoting, QR decomposition, iterative methods); perturbation theory (rounding errors, sensitivity, condition numbers, backward error analysis and stability); least squares (Gram-Schmidt, orthogonal matrices, QR decomposition); singular values (SVD decomposition); iterative methods for eigenvalues (power method, simple extensions).

MATLAB: from “matrix laboratory”, it’s a very friendly programming language and numerical computing environment often used in applied mathematics. Many assignments and some test questions will include writing short MATLAB codes. MATLAB is freely available to UCSD students; you have probably used it before if you have taken Math 18. To learn how to access MATLAB, go to the website (see above) and click on the MATLAB tab.

Homework: will be assigned weekly by posting them BOTH on the website and in Canvas. Solutions will be posted ONLY in Canvas.

Homework will be due on Fridays, by 11pm. Late homework will not be accepted, BUT the lowest homework grade will be dropped from the final grade calculation.

All homework will be turned in using Gradescope AND will have to be in .pdf form (one single file for each homework). For more information on Gradescope, please go to the course website and click on the Gradescope tab.

Note: Homework 0, due Friday, 01/10, will be collected and ONLY be graded for completion. It is only meant to familiarize you with Gradescope and MATLAB.
Exams: NOTE that the midterms will take place OUTSIDE of lecture, on 01/28 and 02/25, in both cases from 7-8:50pm in HSS 1330. The final exam is scheduled for 03/20, location TBA. The midterms are scheduled for 1 hour and 50 minutes, but they will be designed for you to complete in 50 minutes. No books, notes, or other assistance will be allowed. You will be provided with the more complicated definitions you will need.

There will be NO makeup exams. It is your responsibility to make sure you have no conflicts in final exam scheduling; if you do, do not take this class.

Grading. Your total grade will be computed using the maximum of the following two grade averages:

- 20% Homework, 20% Midterm 1, 20% Midterm 2, 40% Final Exam
- 20% Homework, 30% Best Midterm, 50% Final Exam.

Piazza. We will be using Piazza for course discussions, the link is provided on the course website; click on the tab Piazza for more details.

Incomplete Grades. The only way to obtain an Incomplete is if a student had been doing satisfactory work up until the final exam, and then misses the final exam because of a documented medical or family emergency.