MATH 222a, Linear Algebra with Applications, Fall 2004

Gunnar Martinsson, phone: 432-1277, email: per-gunnar.martinsson@yale.edu

Text: "Linear Algebra and its applications" by David Lay, 3rd edition. There is a study guide for the text that you may find useful. However, it is by no means required.

Office hours: Monday 5pm-6pm, Thursday 1pm-2pm. Room 109 in A.K. Watson on 51 Prospect St.

Homework: There will be a weekly homework, due on Wednesdays.

Exams and grading: There will be two midterms in addition to the final. The final is worth 50% of the grade, the midterms are worth 20% each and the remaining 10% can be earned by handing in homeworks. The final is scheduled for Dec 17 at 2pm.

Syllabus: The course will cover the basic topics of linear algebra, as outlined below. There will be a significant emphasis on practical applications. At this point, requests from students to discuss particular topics (*e.g.* biology, electrical engineering, economics, web searching, ...) are welcome. Furthermore, we will touch briefly upon computational issues relating to very large systems of equations. (Some methods that make perfect sense from an exact mathematical point of view turn out to be less suitable in an environment where noisy data and round-off errors are present.)

Whichever applications we choose to include, the following topics form the core syllabus:

- Systems of linear equations: sections 1.1, 1.2, 1.3, 1.4, 1.5, 1.7, 1.8, 1.9.
- Matrix algebra: sections 2.1, 2.2, 2.3, 2.5.
- Vector spaces: sections 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7.
- Eigenvectors and eigenvalues: sections 5.1, 5.2, 5.3, 5.4.
- The singular value decomposition, determinants: class notes.
- Orthogonality and least squares: sections 6.1, 6.2, 6.3, 6.4, 6.5.
- Symmetric matrices and quadratic forms: sections 7.1, 7.2.

Note that this is a tentative syllabus; some application areas will be added. A detailed syllabus specifying what is covered in each of the three exams will be found on the course web-page in due time.

Web-resources: There is a class website with up-to-date information about the syllabus, homework assignments, class handouts, and so on. You find it at:
`http://www.math.yale.edu/users/pjm34/Math222`

Email list: Please send an email to: per-gunnar.martinsson@yale.edu with "math 222" in the topic to have your email address added to the class mailing list.

A remark: You have probably heard this said many times before, but please keep in mind that for most of us, learning mathematics is a matter of *doing* mathematics rather than reading. So try to work as many of the examples as you can stomach (more than just the homeworks if at all possible).