

THE UNIVERSITY OF KENTUCKY
Department of Mathematics

MA/CS 522 Matrix Theory and Numerical Linear Algebra I.
Fall 2018
MWF 1:00-1:50 in CB 341

Instructor: Dr. Qiang Ye
735 POT, 257-4653, Email: qye3 'at' uky

Office Hours: MWF 2:00-3:00 pm

Class Home Page: <http://www.ms.uky.edu/~qye/ma522.html>

Text: James Demmel, *Applied Numerical Linear Algebra*, SIAM, 1997.

Prerequisites: Good knowledge of linear algebra at the level of MA322 or equivalent; experiences with a computer programming language.

Homework and Exams: There will be roughly 9 homeworks. There will be a midterm and a final exam to be scheduled.

Grading: Homework: 60%,
Mid-term: 15%,
Final: 25%.

The following is a tentative scale for grading, subject to adjustment.

Grade	Minimum %
A	90
B	75
C	60

Computer Resources: Access to a computer on which a recent version of MATLAB runs is required for this course. MATLAB documentation is available from at least two sources. First, MATLAB has an extensive on-line help facility (just type “help” or “help command-name” in MATLAB). Second, a brief manual only slightly out of date is available free on the class homepage.

The Free Software Foundation’s Matlab clone called **Octave** may also be used by those who do not have access to MATLAB.

Syllabus: The course studies numerical algorithms and their theoretical background and analysis for solving dense linear algebra problems that include linear systems of equations, linear least squares problems, matrix eigenvalue problems, and matrix singular value problems. Applications of recent interests will also be discussed whenever possible. It will cover the following from the text:

- Chapter 1: Sec. 1.5, 1.7
- Chapter 2: Sec. 2.2, 2.3, 2.4, 2.5, 2.7
- Chapter 3: Sec. 3.2, 3.3, 3.4, 3.5
- Chapter 4: Sec. 4.2, 4.3, 4.4
- Chapter 5: Sec. 5.2, 5.3.1, 5.3.2, 5.3.4, 5.4

Some References The following is a list of additional texts you may find helpful:

1. *Numerical Linear Algebra and Applications*, B. Datta, Brooks/Cole Publishing, 1995
2. *Matrix Computations*, G. Golub and C. Van Loan, 3rd Ed. Johns Hopkins Press 1997.
3. *Numerical Linear Algebra*, L. N. Trefethen and D. Bau, III., SIAM, 1997.