MAT 682 Numerical Linear Algebra
A. Lutoborski, Syracuse University
Spring 2010.

Classes: Monday, Wednesday, Friday, 9:30-10:25, Carnegie Room 219.

Instructor: Professor Adam Lutoborski, Department of Mathematics, 213 B Carnegie, phone 443-1489, e-mail `alutobor@syr.edu`.

Office Hours: Mondays 3:30-4:30, Tuesdays 3:30-4:30.

Text: "Numerical Linear Algebra" by L.N. Trefethen and D. Bau, SIAM 1997, `http://web.comlab.ox.ac.uk/people/Nick.Trefethen/text.html`.

Auxiliary Text: "Numerical Matrix Analysis" by I. Ipsen, SIAM 2009.

Prerequisites: Basic linear algebra (MAT 531). MATLAB will be used in some of our homework problems, `http://www.mathworks.com/moler/chapters.html`.

Course Description: This is a course in numerical computations with matrices and covers the fundamentals of matrix analysis, singular value decompositions (SVD), QR factorizations, conditioning, stability and floating point arithmetic, least squares problems, eigenvalue problems and iterative methods. The course material will be selected from all 6 chapters of the text. Homework will be assigned from the text, from the auxiliary text and occasionally from applications.

Course Grades: Course grades will be determined by: homework= 50%, midterm exam= 25%, final exam= 25%.

Course Content:

- Matrix fundamentals.
- Matrix partitioning, special matrices.
- Matrix norms
- Inner products, orthogonality
- SVD
- Spectral norm
- Gram-Schmidt orthogonalization
- QR
- Projections, reflections
- Householder matrices
- Linear least squares
- Conditioning and stability
- Systems of linear equations Gauss elimination
- Cholesky factorization
- Eigenvalue problems
- Iterative methods

Disability-Related Accomodations: Students who are in need of disability-related academic accommodations must register with the Office of Disability Services (ODS), 804 University Avenue, Room 309, 315-443-4498. Students with authorized disability-related accommodations should provide a current Accommodation Authorization Letter from ODS to the instructor and review those accommodations with the instructor. Accommodations, such as exam administration, are not provided retroactively; therefore, planning for accommodations as early as possible is necessary. For further information, see the ODS website, Office of Disability Services http://disabilityservices.syr.edu/

Academic Integrity: The Syracuse University Academic Integrity Policy holds students accountable for the integrity of the work they submit. Students should be familiar with the Policy and know that it is their responsibility to learn about instructor and general academic expectations with regard to proper citation of sources in written work. The policy also governs the integrity of work submitted in exams and assignments as well as the veracity of signatures on attendance sheets and other verifications of participation in class activities. Serious sanctions can result from academic dishonesty of any sort. For more information and the complete policy, see http://academicintegrity.syr.edu