MAT 682   Numerical Linear Algebra
A. Lutoborski,   Syracuse University
Spring 2016.

Classes: TTh, 2:00-3:20, Carnegie Building, Room 120.

Instructor: Professor Adam Lutoborski, Department of Mathematics, Room 311 A Carnegie, phone 443-1489, e-mail `alutobor@syr.edu`.

Office Hours: Monday 11:00-12:00, Wednesday 3:00-4:00.

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

Second Text: "Iterative Methods for Solving Linear Systems, by Anne Greenbaum, SIAM 1997.
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 other sources and occasionally from applications.

Exams, Final Exam: There will be a midterm exam in the week before the spring break. Precise date will be announced in class. There will be absolutely no make-ups for any reason. If you miss a test for a valid reason, the final exam grade will count correspondingly. Final exam will be on May 5, Tuesday, 5:15- 7:15 pm. Everyone is required to take the final exam.

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

Religious observances policy: SU religious observances policy recognizes the diversity of faiths represented among the campus community and protects the rights of students, faculty, and staff to observe religious holidays according to their tradition. Under the policy, students are provided an opportunity to make up any examination, study, or work requirements that may be missed due to are religious observance provided they notify their instructors before the end of the second week of classes. For fall and spring semesters, an online notification process is available through MySlice (Student Services $\rightarrow$ Enrollment $\rightarrow$ My Religious Observances) from the first day of class until the end of the second week of class.