AMSC 600 / CMSC 760 TTh 9:30-10:45 CSI 1121

Advanced Linear Numerical Analysis, Fall, 2007

http://www.cs.umd.edu/users/oleary/a600/

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Office Hours: Monday 1:15-3:15, Thursday 8:00-9:00, and by appointment, in AVW 3271.
Please restrict telephone inquiries to office hour times, except in "emergencies." E-mail is welcome anytime!

Prerequisite: AMSC/CMSC 666 or AMSC/CMSC 660 or permission of instructor. Undergraduate-level knowledge of linear numerical analysis: solution of linear equations and eigenvalue problems. Matlab programming.

Text: Iterative Methods for Sparse Linear Systems, 2nd edition, by Yousef Saad, SIAM Press. $95 retail, but $66.50 for SIAM members (www.siam.org) and SIAM membership is free to students.

News: You are responsible for checking the course's website before each class.

Final Exam: None.

Grading: Based on take-home exams, project, and an optional in-class presentation on your project. Keep all of your work in case there is any question about recording of grades. If your grade is 90% or higher you are guaranteed an "A", although a curve might put the cut-off lower than that.

- **Take-home exams**: 4 exams, 200 points. At least 2 weeks will be allowed for each assignment. To pass this course, you must make an honest effort at each exam. Partial credit will be given for partially-working programs. There will be a 15% penalty for exams turned in up to 2 days late, 30% penalty for exams turned in 2-4 days late, etc.
- **Project**: 200 points. More information will be given in early October. It is due at noon on Friday, December 14.

Note for Computer Science Department students: This is a PhD and MS qualifying course in SC, but does not count toward the MS Comp unless you arrange for an final exam.

Regrades: If you think a mistake has been made in grading your work, submit it for regrading within two weeks of the date on which the work was returned to the class. After that, the grade will be considered final.

Academic Integrity: Class accounts are to be used only for class assignments. All files within the accounts are subject to inspection, and the campus code of computer conduct must be followed. All work that you submit in this course must be your own; group efforts will be be considered academic dishonesty. See http://www.studenthonorcouncil.umd.edu/code.html for definitions and sanctions. You may discuss homework in general way, but you may not consult any one else's written work, program drafts, computer files, etc. Any marked similarity in form or notation between submissions with different authors will be regarded as evidence of academic dishonesty – so protect your work. You are free to use reference material to help you with assignments, but you must cite any reference you use and clearly mark any quotation or close paraphrase that you include. Such citation will not lower your grade, although extensive quotation might.

Topics for AMSC 600 / CMSC 760

- Sparse matrices and direct methods for solving linear systems (approx. 2 lectures)

  Storage of sparse matrices and the effects of ordering of equations and unknowns.

- Iterative methods for solving linear systems and eigenproblems (approx. 11 lectures)

  A survey of Krylov-subspace methods for symmetric and nonsymmetric linear systems, emphasizing open questions and the interconnections among algorithms, sparsity considerations, and choice of preconditioners.

- Solving structured matrix problems (approx. 6 lectures)

  Methods for matrices with displacement structure, with applications in signal and image processing. Problems arising in control and optimization.

- Parallel matrix computations (approx. 6 lectures)

  The design and analysis of matrix algorithms for computers with multiple processing units.

- Special topics (time permitting)