

Welcome to Math 1080! Numerical Linear Algebra

Math 1080-1030 class 11417, Lecture: MWF 11-11:50 Ty. 704.

This is the second part of the sequence Math 1070, 1080. It covers numerical linear algebra including both direct and iterative methods for solving $Ax=b$ and eigenvalue problems.

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Office Hours: Office hours will be announced soon. Generally, MWF mornings are the best times to catch me in without someone else ahead of you. This is because most grad students and many faculties are asleep then. In the afternoons, you are welcome too but there is a much higher chance of a line ahead of you. **If my door is open you are welcome to stop by!**

Course materials: W Layton and M Sussman, *Numerical Linear Algebra*, 2012 version. The first 3 chapters have already been emailed to you. Check your spam folder if you didn't get it.

Supplementary books: Other good books [useful, different point of view, often used & cheap] include

C Cullen, *An Intro. to Numerical Linear Algebra*, 1993. – good book. Many used copies available.

L Trefethen and D Bau, *Numerical Linear Algebra*, 1997. –good book, unlikely to be found used.

R Barrett et al, *Templates for the solution of Linear systems*, 1987- **GET THIS BOOK!** It is absolutely essential if you want to actually use the methods. It includes codes and clear presentation of algorithms but no proofs. It is about 40\$ for a hardcopy but you can legally **download a PDF for free** at various places on the web.

Victor Eijkhout, *Introduction to High-Performance Scientific Computing*, more about the computing side of the Numerical Analysis, A PDF is **free** at Victor's web page

http://tacc-web.austin.utexas.edu/veijkhout/public_html/istc/istc.html

and a hardcopy is about 20\$ at

<http://www.lulu.com/shop/victor-eijkhout/introduction-to-high-performance-scientific-computing/paperback/product-20452679.html>

Testing: We will have a **Quiz Every FRIDAY** (except Fridays of weeks where there is an exam, the last Friday of class and possibly the first Friday of the term). There will be absolutely no makeup's of quizzes. Typical questions types include but are not limited to

- State a result (theorem) or definition,
- State an algorithm as pseudo code.
- Do a few steps by hand of an algorithm/method etc for a small example.
- Prove something extending a result in class or using a similar idea as in a proof given in class.
- Prove a result already proven in class.
- Any HW problem in the text or variations on HW problems in the text.
- Other types of questions, such as ones on previous terms exams...

How to do well on the quizzes: Study every week for the quiz. Make flash cards with the basic definitions and theorems. Get a study/work group together, divide up all the HW problems and make sure you see this solution to every theory problem in the text. ASK QUESTIONS! Don't get behind!

Important note: If you have difficulties many others will too and are unwilling to ask. ASK IN CLASS!

How to get extra credit on quizzes: COMPUTATIONAL EXERCISES: You can also do these and turn them in as hard copy in class. If the computational exercise is worked completely and clearly and the write-up is polished, it will earn you an extra +10 points (1 letter grade) on 1 quiz. **Timing:** Extra credit HW on a topic cannot be turned in after the exam on that topic is passed.

Exams: 2 exams and a comprehensive final. **No Makeup's will be given under any circumstances. EXAM 1 will be FRIDAY February 8, 2013.** Exam2 will be scheduled later. Final exam-see the universities "Schedule of Classes".

$$\text{Course Grade} = [\text{Exam 1} + \text{Exam 2} + \text{Final Exam} + \text{Quiz Avg}]/4$$

Policy on missed exams and quizzes: Sadly, the larger the class the more inflexible the exam rules must be. We have a large class. Thus: **(1) No Makeup's will be given for quizzes or exams under any circumstances.** **(2)** If you miss up to 1 exam the final exam can be substituted for that exam grade (giving the hard and comprehensive final double the weight in your course grade) **only if the following 3 conditions** are met: **Condition#1:** You notify me before the exam or quiz that you will miss: email, a message to the math office are both acceptable. **Condition #2:** The reason you missed is (in my judgment) URGENT, NECESSARY and BEYOND YOUR CONTROL (This excludes all social activities), and **Condition#3:** Physical evidence that of the reason you missed is brought to the first class you attend after missing the exam or quiz. **(3) Quizzes:** You can miss at most 2 quizzes provided the above 3 conditions are met. More than 2 means a "Zero" grade is recorded for the remaining misses. There is no makeup's on quizzes also. We will simply (if met) average fewer quizzes.

IMPORTANT General Policies:

- Make Up Exams or Quizzes will NOT be given.
- **Grades are NOT NEGOTIABLE.** Please do not wasted out time by attempting to argue over points, partial credit, etc.
- You are are graded on what your explanation of a proof conveys to the grader.
- Write for humans in complete and correctly punctuated sentences. Avoid symbolic logic.
- **Negative partial credit** is possible for extraneous and irrelevant nonsensical information.
- **No quibbling over "points";** Focus on learning!
- Programming: No previous experience is necessary. Use any language [Matlab, FORTRAN, C, C++...].
- It's important to come to every class prepared and especially on Fridays!
- Working together on HW is OK but you must acknowledge any help you get [including working together] and do your own write-ups and discussion. **Receiving help without acknowledgement is an academic integrity violation and will be reported as such.** If you receive help the standard format is:
"ACKNOWLEDGEMENTS: I thank INSERT for a helpful discussion on INSERT that led to the idea used in step INSERT of problem INSERT."