

Numerical Analysis - Math 128a - Spring 2002 - T Th 9:30-11 in 9 Evans

Discussion Section W 4-5 in 9 Evans

Professor: Jim Demmel, 737 Soda Hall, 643-5386, demmel@cs.berkeley.edu

Office Hours: MTW 11-12

Class Homepage: http://www.cs.berkeley.edu/~demmel/ma128a_Spr02, for announcements, notes, etc.

TA: Andy Miller, amiller@math, 1037 Evans. The TA will announce his office hours during section.

Computer Accounts: The TA will hand out accounts in section and explain the use of computer facilities.

Programming Assignments and Documentation: You will be expected to do significant programming assignments, as well as run programs we supply and analyze the output. These programs will be written in Matlab, a widely used language for numerical computing (learning Matlab is part of the course). Matlab documentation is available at various sites throughout campus, via Matlab's own extensive "help" facility, and in a rudimentary manual available on the class homepage. The version of Matlab available using the class accounts on socrates is older than the latest version widely available elsewhere on campus (5.3.1 as opposed to 6.0 or later). If you choose to use a later version of Matlab for your assignments, which is fine to do, be aware that there may be minor differences between the spelling of some commands in the two versions (and of course 6.0 has much more functionality and a fancier interface). We will strive to provide and ask for programs that work identically in both versions. The free documentation we provide for the even older Matlab version 4.0/4.1 should be enough for assignments.

Text: *Numerical Analysis*, third edition, by D. Kincaid and W. Cheney, available in textbook stores. We will also strive to post daily class notes on the web page.

Prerequisites: Math 53 and 54. You should review Taylor's theorem, differential equations, and linear algebra, in particular systems of linear equations. Those of you who do not know how to program will be expected to learn very quickly. The TA will use section to help teach Matlab at the beginning of the semester. If you have no programming experience, I recommend Matlab, because it will be easiest to learn (it is also taught in E77).

Syllabus: We will study methods for solving nonlinear equations, interpolation and approximation, numerical integration, numerical solutions of ODEs, and solving linear systems of equations. We will study algorithms, including their mathematical derivation, accuracy, and complexity. This material is found in parts of chapters 1, 2, 3, 4, 6, 7 and 8 of the text book.

Grading: Grading will be 40% final, 20% in-class midterm, 20% weekly homework and 20% programming assignments. The final is May 21, 8-11am. A makeup final will *only* be given for (1) unexpected circumstances beyond your control, documented by a signed note from a physician or equivalent, (2) conflict with another scheduled exam, or (3) a religious holiday. Homework is due at the beginning of the section for which it is assigned. Late homework will only count 50%, since we intend to hand out answers as soon as homework is due. You are encouraged to work in groups in homework, but you must each turn in your own work.