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MATH 170C: Numerical Ordinary Differential Equations (4 units)

Spring Quarter 2001
MWF 11:15am–12:05pm HSS 1315

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CLASS WEBPAGE: http://scicomp.ucsd.edu/~mholst/teaching/ucsd/170c_F01/index.html

Many of the advances of modern science have been made possible only through the sophisticated use of computer modeling. The mathematical foundation of the computer modeling techniques now used in all areas of mathematics, engineering, and science is known as *numerical analysis.* The Math 170ABC series at UCSD provides an introduction to the exciting field of numerical analysis, which is also sometimes referred to as *computational mathematics* or *scientific computing.*

Math 170C deals primarily with the numerical solution of ordinary differential equations (ODEs). In 170C we will also study related numerical techniques for approximating the derivatives and integrals of functions in a stable and accurate way. Previous quarters dealt with numerical linear algebra (170A) and numerical approximation theory (170B), and we will have occasion to use these ideas to develop new techniques in 170C. The textbook for the course will be:

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Textbook: *Numerical Analysis, Sixth Edition*, by Burden & Faires.

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The lectures will follow the textbook quite closely; in particular, we will cover Chapters 4, 5, and 11, in that order. (Chapters 6, 7, and 9 were covered in 170A, and Chapters 2, 3, and 8 were covered in 170B. Chapter 10 is covered in 171AB, and Chapter 12 is covered in 172AB.) Polynomial interpolation (Chapter 3, covered in 170B) will be reviewed briefly in 170C due the central role it plays in numerical differential equations.

Homework assignments will be a combination of theoretical and computer problems; this will *require* some computer programming, using a standard language such as C, FORTRAN, or MATLAB. The use of the interactive matrix package MATLAB is encouraged; MATLAB enables you to concentrate on the algorithms in 170C rather than the details of programming.

The course will be graded on the homework assignments, two midterm examinations and a final examination, according to the following guidelines:

Written and Computer HW (approximately six homeworks):	30%
Midterm #1 (In class on Monday April 23):	15%
Midterm #2 (In class on Monday May 14):	15%
Final (Appointed time during finals week):	40%

1. All HW assignments will count towards the final grade (i.e., none can be dropped). Late HW will not be accepted.

2. In order to receive credit on a homework, you must at least attempt the computer parts of the homework assignments. *This rule will be strictly enforced.*

3. There will be no make-up exams. If you miss a midterm with an excused absence (i.e., illness with a note from a doctor), the other midterm and the final exam will be weighted accordingly.

Course information, such as homework assignments and exam dates, will be maintained on the class webpage. Therefore, CHECK THE WEBPAGE FREQUENTLY.