Math 706 – Numerical Linear Algebra

Instructor   Professor Doug Meade
                   Office Hours: MW 9:00–10:00, Tu 1:00–2:00, and by *prior* appointment
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Course Website http://www.math.sc.edu/~meade/math706/

Meeting Times MWF 2:30pm– 3:20pm, LC 310

Office Hours   MWF 12:00noon– 1:00pm

Text   David S. Watkins, *Fundamentals of Matrix Computations*, second edition, Wiley,
                   2002.

Prerequisite   Math 700

Course Content Numerical linear algebra is fundamental to almost all scientific and numerical
                   computations. This first course in the subject introduces the main ideas from
                   which more sophisticated methods can be developed. Material will be selected
                   from all seven chapters of the text. Most material fits into one of the following
                   categories:
- **Mathematical Tools** norms, projections, orthogonal and unitary matrices, Schur's theorem, and spectal theorem
- **Decompositions** LU, Cholesky, singular value, eigenvalue, and QR
- **Error Analysis** floating-point arithmetic, round-off errors, stability, and conditioning
- **Iterative Methods** Jacobi, Gauss-Seidel, Richardson, successive over-relaxation, steepest descent, and conjugate gradient
- **Least-Squares Problems** normal equation, Gram-Schmidt process, and Householder transformation
- **Eigenvalue Problems** power methods, Gershgorin circles, Rayleigh iteration, deflation, Laczos' algorithm

Grading   Your grade in this course will be based on your performance on (weekly) home-
                   work, (weekly) labs, two (2) mid-term exams, and a final exam. The weights
                   assigned to each of these components will be:

Homework/Project	60%
Mid-term exam	20%
Final exam	20%

Homework   Homework will be assigned weekly. You are expected to work all assigned prob-
                   lems and turn in your solutions at the beginning of class on Mondays (generally).
                   Some assignments might be accepted electronically. Details about this will be
                   given at an appropriate time.

Attendance   Attendance at every class meeting is important – and expected. Students missing
                   more than 10% of the class meetings (4 days) can have their grade lowered.

Academic Honesty Cheating and plagiarism will not be tolerated. You may discuss homework
                   problems with others, but do not copy work from another student or from a book.
                   Violations of this policy will be dealt with according to University guidelines.