

Department of Mathematical Sciences

Clemson University

MthSc 860 An Introduction to Scientific Computing

Section 1

Spring 2007

Instructor: C. L. Cox, Martin 0-224, 656-5203

Office Hours: MTWF 9:00-10:00, or by appointment

E-mail address: clcox@clcmson.edu

Class meeting time: 8:00-8:50 MWF in Martin M204

Course WWW site: <http://www.math.clemson.edu/~clcox/860/>

Text: Michael T. Heath, Scientific Computing, An Introductory Survey (2002)

Other References:

Moler, Numerical Computing with Matlab, <http://www.mathworks.com/moler/>

Quarteroni, Sacco, and Saleri, Numerical Mathematics

Van Loan, Introduction to Scientific Computing: a Matrix- Vector Approach Using Matlab

Prerequisites: Undergraduate courses in linear algebra, ordinary differential equations, and computing (a language plus an applied computing course).

Course Objective: The main goal of this course is for students to ‘understand the capabilities and limitations of the techniques used in numerical scientific computing’ (from Kahaner, Moler, and Nash, Numerical Methods and Software).

Tentative Schedule:

I. Scientific Computing (Heath, Ch. 1)

II. Systems of Linear Equations (Heath, Ch. 2)

III. Linear Least Squares(Heath, Ch. 3)

Exam I (in class, closed-book, on or around February 21st)

IV. Nonlinear Equations (Heath, Ch. 5)

V. Interpolation (Heath, Ch. 7)

VI. Numerical Integration and Differentiation (Heath, Ch. 8)

Exam II (in class, closed-book, on or around April 11th)

VII. Initial Value Problems for Ordinary Differential Equations (Heath, Ch. 9)

VIII. Selected items from later chapters, time permitting

Grading: Course grades are determined by:

50 pts – In-class exams

50 pts – Homework exercises and projects

Attendance Policy: Attendance in every class is strongly recommended.

Guidelines for Homework Exercises and Computer Problems/Projects:

Unless otherwise specified by the instructor, all work must be done on an individual basis.

Discussion of concepts between students is encouraged.

Format for computer problems. Include for each problem

Matlab code (most matlab programs written for this class will be relatively short).

Brief discussion of algorithm/method (can be written alongside code)

Output - data and plots, where applicable.

Do not include long lists of output and/or diagnostics.

Summarize large data sets (e.g. with plots).

Discussion of results and answers to questions posed in problem.

Disability Access: It is University policy to provide, on a flexible and individualized basis, reasonable accommodations to students who have disabilities. Students are encouraged to contact Student Disability Services to discuss their individual needs for accommodation.

Lateness Policy: Regarding lateness on the professor's part: If no advance arrangements are made, students are authorized to leave after a fifteen-minute wait.