

MTH 351: Introduction to Numerical Analysis Spring Term 2008

Dear Students,

Welcome to our exploration of Numerical Analysis, the mathematics of scientific computing! The subject of Numerical Analysis is the computation of approximate solutions to mathematical problems, usually by means of a computer. It includes finding a suitable method to solve a given problem as well as analyzing the possible error of the computed solution. During this quarter we will explore and master a number of fundamental ideas and techniques in this exciting and growing area.

Please note the following general information about our course and the homework assignments below.

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Office hours. Monday, Wednesday, Friday 2:00-2:50pm. The times above may change. Please watch out for announcements.

Text. Atkinson and Han: Elementary Numerical Analysis, Third Edition, Wiley, 2004. Note that the book has a supporting website. The URL is given in the Preface.

Objectives of the course. The main objectives are as follows: The course will enable you to

- Obtain an intuitive and working understanding of the numerical methods introduced during the course. This includes being able to choose a suitable method, and to implement it on a computer as well as using it in a ‘hand’ calculation for simple cases.
- Gain some appreciation of the concept of error and the need to analyze and predict it. This includes an appreciation of computer arithmetic and its effects.
- Master certain mathematical techniques which are needed for understanding the methods and the analysis of errors.
- Improve your programming skills and gain a working knowledge of MATLAB, a modern interactive programming environment.

We will cover material from chapters 1-7 in the text.

Grading.

Homework: 30%;

Midterm (Wednesday, May 7, in class): 30%

Final exam (Wednesday, June 11, 9:30am): 40%

In order to complete the course at least one of the programming homework problems must be solved.

If your midterm does not go well, you may make up for it in the final. If your final is *better* than the midterm it will count in its place (i.e., will be weighted more). If your final is worse than the midterm, both will count as described above. The final exam will be comprehensive.

Miscellaneous.

1. **Mutual support and commitment to learning** are among the most important values of our classroom. Getting to know each other, working together, and helping each other will greatly benefit everyone. Recall that you will not be competing with each other for a small number of good grades - the supply of A's is not limited, there is one for every student who performs well enough.
2. **Help.** If you need additional help, seek it sooner rather than later and do not hesitate to see me during my office hours.

During the first week of classes familiarize yourself with Matlab.

The programming language for this course is MATLAB. Appendix D in the textbook provides an introduction. *If you do not already know MATLAB, please work through this appendix during the first week of classes.* You may also consider working through MATLAB tutorials available on the Web. Some links are on my website, others can be found by searching the Web.

There are several ways of access to MATLAB:

1. The Mathematics Department computer lab is located in the Math Learning Center, Kidder 108. In order to use the computers there, you will need an ONID account. If you have none please visit <http://onid.orst.edu> and sign up as soon as possible.
2. The computer lab in the Milne basement. Again, you will need an ONID account. Both labs may be scheduled for classes at certain times, so it is a good idea to find out in advance when they are open.
3. You may have access to MATLAB through a computer lab or network of your department.
4. If you would like to have MATLAB at home, consider purchasing the MATLAB Student Edition.