MTH 351: Section 010/Section 020
Introduction to Numerical Analysis
Fall 2007

Professor: Dr. Vrushali Bokil
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Email: bokilv@math.oregonstate.edu
Office Hours: MW: 10:00-10:50 am, 2-2:50 pm and by appt.

Class Time and Room:

- Section 010 MWF: 1:00-1:50 pm BAT 250
- Section 020 MWF: 9:00-9:50 am STAG 109

Website: http://www.math.oregonstate.edu/~bokilv/MTH351


Course Description:

This course is an introduction to the subject of Numerical Analysis. The underlying themes of this subject are the approximation of problems by simpler problems, the construction of algorithms, iteration methods, error analysis, stability, asymptotic error formulas, and the effects of machine arithmetic.

We will study approximate solutions to mathematical problems for which an analytical form of the solution cannot be found. We introduce several methods of computing these approximations and analyze the errors that are introduced. We will consider linear and nonlinear equations, interpolation and approximation, and numerical integration and differentiation. We will cover topics from Chapters 1-6 and a bit of chapter 7 if time permits.

There are three main objectives of this course for students as outlined in the text.

1. Students should obtain an intuitive and working understanding of some numerical methods for the basic problems of numerical analysis mentioned above.

2. Students should gain some appreciation of the concept of error and the need to analyze and predict it.

3. Students should develop some experience in the implementation of numerical methods by using a computer, including an understanding of computer arithmetic and its effects.

Prerequisites: MTH 253 or MTH 306 and programming experience. Please contact me to discuss your background if you do not have the necessary prerequisites.

MATLAB: The programming language for this course is MATLAB. If you have not used this language before you will have time to understand the basics of MATLAB during the first week of classes. A number of different introductory tutorials are available on my website. The textbook presents an introduction to MATLAB in Appendix D; and the programs in the text serve as further examples. Students are encouraged to modify these programs and to use them as models for writing their own MATLAB programs.
Course Grading:

1. Homework Assignments (25%): Homework is required for this course. There will be (approximately) five homework assignments this term and a sixth one that will not be graded. Late homework will not receive any credit. Assignments will be given in class and consist (mostly) of problems from the text. Exam problems will (mostly) be similar to homework problems. Students may work together, but must turn in individual copies. (If typed, the wording must differ!)

2. Computer Assignments (25%): Computer, or programming, assignments are required for this course. Assignments will be posted on the course website and announced in class. There will be approximately 5 programming assignments or Labs. Students must complete assignments individually, in particular code must be written by each individual! A printout of the relevant output must be turned in along with detailed explanations of solutions and supporting plots. Any questions should be directed to the Professor.

3. Midterm (25%): Monday, November 5, 2007, in class. There will be no makeup exams. No books, notes, or graphing/programmable calculators will be allowed on exams. A basic scientific calculator can be used but will not be needed.

4. Final (25%):
   - Section 010: Friday, Dec 7th at 7:30 am in BAT 250
   - Section 020: Tuesday, Dec 4th at 6:00 pm in STAG 109

   Scheduling conflicts with the final exam must be resolved in advance.

Grades: Course Grades are based on percentage of total possible points:

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<th>Grade</th>
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NOTE: While it may not be stated explicitly each day, students are expected to read each section to be covered before class. Questions not addressed during class time should be asked in office hours. Students are responsible for any material missed due to absence.

Special arrangements: For students with disabilities, absence during exams due to extenuating circumstances, etc.: please contact the instructor and provide appropriate documentation. Course drop/add information is at http://oregonstate.edu/registrar/.

Check the class website (given above) for general information and other policies regarding the class.