**MTH 351**  
Introduction to Numerical Analysis  
Spring 2010

**Professor:** Dr. Vrushali Bokil  
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**Class Time and Room:** 1:00-1:50 pm BAT 250  
**Class Details:** CRN 50503, Section 001  
**Website:** http://www.math.oregonstate.edu/~bokilv/MTH351S10


**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 as 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. Written Assignments (25%): There will be five written assignments this term, each due at the beginning of class on the due date. Late assignments will not receive any credit. Assignments will consist of problems from the text. The lowest two (out of five) written assignment grades will be dropped. Students may work together, but must turn in individual copies. (If typed, the wording must differ!)

   **Note:** Even though the lowest two written assignment grades will be dropped, students should attempt all written assignments as the midterm and final exams will partly be based on problems from all of the five written assignments.

2. Computer Assignments (25%): Computer, or programming assignments are required for this course. Assignments will be posted on the blackboard 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 HARDCOPY of the relevant output must be turned in along with detailed explanations of solutions and supporting plots. PLEASE DO NOT EMAIL YOUR CODE TO THE TA. The lowest two (out of five) computer assignment grades will be dropped.

   **Note:** Even though the lowest two computer assignment grades will be dropped, students should attempt all computer assignments as the midterm and final exams will partly be based on problems from all of the five computer assignments.

3. Midterm (25%): Friday, May 7, 2010, in BAT 250 at 1:00 pm. There will be no makeup exams. Books, notes, or graphing/programmable calculators will NOT be allowed on exams. Exam problems will (mostly) be similar to written/computer assignment problems.

4. Final (25%): Monday, June 7th at noon in BAT 250 Scheduling conflicts with the final exam must be resolved in advance.

**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.

**Course Grade Scale:** Each letter grade below corresponds to grades scored between the lower limit (including) and less than the upper limit (excluding).

- **A:** 90% - 100%
- **A-:** 87% - 90%
- **B+:** 84% - 87%
- **B:** 80% - 84%
- **B-:** 77% - 80%
• C+: 74 - 77%
• C: 70 - 74%
• C-: 67 - 70%
• D+: 64 - 67%
• D: 60 - 64%
• D-: 57 - 60%
• F: below 57%

Special arrangements: For students with Disabilities, make-up exams and other special arrangements, please contact Professor Bokil. For all types of special arrangements appropriate documentation will be required. 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.