MATH 3350: Introduction to Numerical Analysis

Spring 2012

Prerequisites: MATH 2700 and computer programming ability

Textbook: *Numerical Analysis* by Timothy Sauer

Course Contents: Description and mathematical analysis of methods used for solving problems of a mathematical nature on the computer. Roots of equations, systems of linear equations, polynomial interpolation and approximation, least-squares approximation, numerical solution of ordinary differential equations. We will cover all or patrs of Chapters 1 – 7, 10 (and 11 if time permits).

Grading Policy: Your course grade will be determined by your performance on the homework, the midterm examinations, and the **comprehensive** final examination, subject to the following guidelines:

Homework:	20%
Midterm #1:	20% (5th or 6th week)
Midterm #2:	20% (10th or 11th week)
Final Exam:	40% (Tuesday, May 8, 8:00-10:00am)

Attendance: Attendance is not compulsory. However it is often the case that students with good attendance receive better grades. **There will be NO makeup exams**.

Disability: It is the responsibility of students with certified disabilities to provide the instructor with appropriate documentation from the Dean of Students Office.

Cheating: Cheating includes but is not limited to using others or forbidden information sources during a quiz or an exam. Anyone caught cheating will receive an F for the course. Furthermore, a letter will be sent to the appropriate dean.

Course Evaluation: The Student Evaluation of Teaching Effectiveness (SETE) is a requirement for all organized classes at UNT. This short survey will be made available to you at the end of the semester, providing you a chance to comment on how this class is taught. I am very interested in the feedback I get from students, as I work to continually improve my teaching.

Instructor: Jianguo Liu
Office: GAB 471A
Email and Phone Number: jgliu@unt.edu, (940) 565-4703
Class Web Page: http://www.math.unt.edu/∼jliu
Office Hours: Tuesdays and Thursdays 2:00-5:00 (Students unable to see the instructor during these times may request an appointment.)

Topics To Be Covered

1. Introduction (0.3 and 0.4)
2. Introduction to Matlab (Appendix B)
3. Bisection (1.1)
4. Newton's Method (1.4)
5. Newton's Method with Backtracking (Class Notes)
6. Gaussian Elimination (2.1)
7. Iterative Methods (2.5)
8. Interpolation (3.1)
9. Cubic Splines (3.4)
10. Least Squares (4.1)
11. Numerical Differentiation (5.1)
12. Numerical Integration (5.2)
13. Gaussian Quadrature (5.5)
14. Improper Integrals (Class Notes)
15. Initial Value Problems (6.1)
16. Explicit and Implicit Methods (6.2)
17. Runge-Kutta Methods (6.4)
18. Multistep Methods (6.7)
19. Finite Difference Methods (7.2)
20. Least Squares with Periodic Data (4.2)
21. Fourier Transform (10.1)
22. Trigonometric Interpolation (10.2)
23. FFT and Signal Processing (10.3)