THE UNIVERSITY OF TEXAS AT EL PASO
COLLEGE OF SCIENCE
DEPARTMENT OF MATHEMATICAL SCIENCES

Course Number: Math 4329 CRN 26683

Course Title: Numerical Analysis
Credit Hours: 3
Term: Spring 2020
Course Meeting Time: TR 4:30 pm-5: 50 pm in LART 101
Course Website:
http://www.math.utep.edu/Faculty/nsharma/public_html/sp20_4329.html
Prerequisite Courses: Matrix Algebra (Math 3323) and basic introduction to programming
Instructor: Natasha S. Sharma, Ph.D.
Office Location: Bell Hall 318
Contact Info: Phone: 747-6858
E-mail: nssharma@utep.edu
Office Hours: TR 3:00-4:00 pm
Textbook, Materials: Elementary Numerical Analysis, Third Edition by Atkinson and Han, John Wiley and Sons 2004
Course Objectives: In this course we will learn how to approximate the solutions to the mathematical problems which are traditionally deemed difficult to solve. In particular we study the functions which help us approximating the solutions such as Taylor Polynomials and Spline functions. Emphasis will be also laid on the accuracy of such approximations via the error analysis. We will also focus on solving large system of equations through algorithms including a discussion of how to numerically implement such algorithms. Students will simultaneously be trained in the theory and practice involved in solving large systems of equations and understand and interpret the quality of such solutions.
Assignments: Homeworks will be assigned every other week. No late homework will be accepted.

Assessment: The final grade will be determined on the performance in the homeworks, two mid term exams and a final exam. Please note that these exams will be closed book exams and the use of a basic scientific calculator is permitted.

Grading Policy: The usual grading scale will be used for this course (90%-100% is an A, 80%-89% is a B, etc.)

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2 Midterm exams	25% each
Homeworks and Worksheets	25%
Comprehensive final exam	25%
Total	100%

Make-up Policy: No make-up/alternate exam will be allowed.

Attendance Policy: As with every college course, attendance is essential for success. Try not to be absent unless it is absolutely necessary. If possible, it is

better to let me know ahead of time when you will be absent. If you are absent, it is your responsibility to find out which assignments you need to make up.

Academic Integrity: We will follow the university's policy in this course, as explained in the Handbook of Operating Procedures. You may find it here. You may be directed to change seats at any time during exams.

Civility: Please do not use cell phones, pagers, IPods, MP3 players, blue tooth devices, etc. during class. Cell phones and pagers should be set to silent or vibrate, and if you absolutely must answer your phone, calls should be taken outside of class. Please do not wear headsets or blue tooth devices during class. Please do not send text messages during class.

Disability Statement: If you have a disability and need classroom accommodations, please contact The Center for Accommodations and Support Services (CASS) at 747-5148, or by email to cass@utep.edu, or visit their office located in UTEP Union East, Room 106. For additional information, please visit the CASS website at www.utep.edu/CASS. *CASS' Staff are the only individuals who can validate and if need be, authorize accommodations for students with disabilities.*

Military Statement: If you are a military student with the potential of being called to military service and/or training during the course of the semester, you are encouraged to contact me as soon as possible.

Course Schedule: We will cover sections from chapters 1 to 6 of the textbook and selected topics from chapters 7 and 8.

- **01/21:** Section 1.1-1.2 Taylor Polynomials Review
- **01/23:** Section 2.1-2.2 Floating point representation, Sources of errors
- **01/28:** Section 2.1-2.2 Floating point representation, Sources of errors
- **01/30:** Section 2.1-2.2 Floating point representation, Sources of errors
- **02/04:** Section 2.2.4 Loss of Significance, Underflow and Overflow of errors; Introduction to MATLAB
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- **02/06:** Introduction to MATLAB; Section 3.1 Bisection Method; Rates of Convergence
- **02/11:** Section 3.2 Newton's Method
- **02/13: Review for Midterm 01**
- **02/18: Midterm 01**
- **02/20:** Discussion of Midterm 01 and Secant Method
- **02/25:** Section 3.4 Fixed Point Iteration
- **02/27:** Section 3.5 Ill-behaving root finding problems
- **03/03:** Section 4.1 Polynomial Interpolation
- **03/05:** Section 4.2 Error in polynomial interpolation
- **03/10:** Section 4.3 Spline Functions
- **03/12: Review for Midterm 02**
- **03/16-20: SPRING BREAK!**
- **03/24: Midterm 02**
- **03/26:** Section 5.1 Trapezoidal and Simpson Rule **Drop**

Date Deadline on 03/27

- **03/31:** Section 5.2 Error Formulas
- **04/02:** Section 5.3 Gaussian Numerical Integration
- **04/07:** Section 5.4 Numerical Differentiation
- **04/09:** Section 6.1 Systems of Linear Equations
- **04/14:** Section 6.2 Matrix Arithmetic
- **04/16:** Section 6.3 Gaussian Elimination
- **04/21:** Section 6.4 LU Decomposition
- **04/23:** Section 6.5 Error in solving Linear Systems
- **04/28:** Section 6.6 Iterative Methods
- **04/30:** Section 6.6 Iterative Methods continued
- **05/05: Review for final exam**
- **05/07: Review for final exam**
- **Final Exam May 12th 4:00-6:45 pm**

Drop Deadlines: The last day to drop the course is Friday, March 27th . Please note that the College of Science will remain aligned with the University and **will not approve any drop requests after that date.**

Tutoring: The Tutoring and Learning Center (TLC) offers free tutoring and is located on the second floor of the campus library. There are also numerous private tutors available. Please also make use of the instructor's office hours.