

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

Course #: Math 4329 CRN: 21508
Course Title: Numerical Analysis
Credit Hrs: 3
Term: Spring 2017
Course Meetings & Location: Tuesday-Thursdays 12:00pm -1:20 pm
Liberal Arts Building Room 122
Prerequisite Courses: Math 3323 and basic introduction to programming
Course Fee: (if applicable) None
Instructor: Dr. Natasha S Sharma
Office Location: Room 318 Bell Hall
Contact Info: Phone # 915 747 6858
E-mail address nssharma@utep.edu

Office Hrs: TBA
Textbook(s), Materials: Required: Elementary Numerical Analysis, Third Edition by
Atkinson and Han, John Wiley and Sons 2004

Course Objectives
(Learning Outcomes):

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.

Course **Homeworks:** These will be distributed every other week.
Activities/Assignments: **No late homework will be accepted !**
Assessment of Course Objectives: The final grade will be determined on the performance in the homeworks, two mid terms and a final exam. Please note that these exams will be closed book exams and the use of a basic scientific calculator is permitted.

Course Schedule: **01/17:** Introduction to Numerical Analysis,
 Section 1.1-1.2 Taylor Polynomials Review
01/19: Sec 2.1-2.2 Floating point representation Sources of errors,
01/24: Sec 2.2.4 Loss of Significance,
 Underflow and Overflow of errors
01/26: Sec 2.3 Propagation of errors
01/31: Sec 3.1 Bisection Method
02/02: Review for midterm I
02/07: MIDTERM I
02/09: Sec 3.2 Newton's Method
02/14: Sec 3.3 Secant Method
02/16: Sec 3.4 Fixed Point Iteration
02/21: Sec 3.5 Ill-behaving root finding problems
02/23: Sec 4.1 Polynomial Interpolation
02/28: Sec 4.2 Error in polynomial interpolation
03/02: Sec 4.3 Spline Functions
03/07: Review for Midterm II Sec. 5.1 Trapezoidal Rule
03/09: MIDTERM II
03/14: SPRING BREAK !
03/16: SPRING BREAK !
03/21: Sec 5.1 Trapezoidal Rule and Simpson Rule
03/23: Sec 5.2 Error Formulas
03/28: Sec 5.3 Gaussian Numerical Integration
03/30: Sec 5.4 Numerical Differentiation
04/04: Sec 6.1 Systems of Linear Equations
04/06: Sec 6.2 Matrix Arithmetic
04/11: Sec 6.3 Gaussian Elimination
04/13: Sec 6.4 The LU decomposition
04/18: Sec 6.4 The LU decomposition
04/ 20: Sec 6.5 Error in solving linear systems
04/25: Sec 6.6 Iterative Methods
04/27: Extra topics
05/02: Review for final
05/04: Review for final

Grading Policy: **Homeworks 30% Midterms: 20% each Final Exam: 30%**

Make-up Policy: **NO MAKE-UP/ ALTERNATE EXAM will be given**

Attendance Policy: Students are expected to show up for every class on time and are expected to stay for the full duration of the class.

Academic Integrity Policy: For example, reference UTEP's policy cited in <http://academics.utep.edu/Default.aspx?tabid=23785>

Civility Statement: be explicit about your expectations regarding active participation, teamwork, use of cell phone, PDA's, talking, etc.

Disability Statement: If a student has or suspects she/he has a disability and needs an accommodation, he/she should contact the Disabled Student Services Office (DSSO) at 747-5148 or at dss@utep.edu or go to Room 106 Union East Building. The student is responsible for presenting to the instructor any DSS accommodation letters and instructions.

Military Statement: For example: 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 as soon as possible

