

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

Course #: Math 4329 CRN: 16026
Course Title: Numerical Analysis
Credit Hrs: 3
Term: Fall 2016
Course Meetings & Location: Tuesday-Thursdays 3:00pm -4:20 pm CBA Room 321
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

Emergency Contact 8326300313
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: **08/23:** Introduction to Numerical Analysis,
 Section 1.1-1.2 Taylor Polynomials Review
08/25: Sec 2.1-2.2 Floating point representation Sources of errors,
08/30: Sec 2.2.4 Loss of Significance,
 Underflow and Overflow of errors
09/01: Sec 2.3 Propagation of errors
09/06: Sec 3.1 Bisection Method
09/08: Review for midterm I
09/13: MIDTERM I
09/15: Sec 3.2 Newton's Method
09/20: Sec 3.3 Secant Method
09/22: Sec 3.4 Fixed Point Iteration
09/27: Sec 3.5 Ill-behaving root finding problems
09/29: Sec 4.1 Polynomial Interpolation
10/04: Sec 4.2 Error in polynomial interpolation
10/06: Sec 4.3 Spline Functions
10/11: Sec. 5.1 Trapezoidal Rule
10/13: Review for Midterm II
10/18: MIDTERM II
10/20: Sec 5.1 Simpson Rule
10/25: Sec 5.2 Error Formulas
10/27: Sec 5.3 Gaussian Numerical Integration
11/01: Sec 5.4 Numerical Differentiation
11/03: Sec 6.1 Systems of Linear Equations
11/08: Sec 6.2 Matrix Arithmetic
11/10: Sec 6.3 Gaussian Elimination
11/15: Sec 6.4 The LU decomposition
11/17: Sec 6.5 Error in solving linear systems
11/ 22: Sec 6.6 Iterative Methods
11/24: THANKSGIVING !
11/29: Extra topics
12/01: 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