

THE UNIVERSITY OF TEXAS AT EL PASO

COLLEGE OF SCIENCE

Department Of Mathematical Sciences

Course #:	MATH 4329 (CRN 16888)
Course Title:	Numerical Analysis
Credit Hrs:	3
Term:	Fall 2015
Course Meetings & Location:	MW 09:00 ~ 10:20, Liberal Arts 203
Prerequisite Courses:	MATH 3323 and working knowledge of a high level programming language
Course Fee (if applicable)	None
Instructor:	Dr. Son-Young Yi
Office Location:	Bell Hall 218
Contact Info:	E-mail syi@utep.edu Phone (915) 747-6864
Office Hours:	M 14:30 ~ 15:20, W 13:00 ~ 13:50, or by appointment
Textbook(s), Materials:	Elementary Numerical Analysis, Third Edition, by Atkinson and Han, John Wiley & Sons, 2004.
Course Website:	http://www.math.utep.edu/faculty/yi/math4329f15.html
Course Objectives (Learning Outcomes):	<p>In this course, we study approximate solutions to mathematical problems that cannot be solved or are difficult to solve analytically. We will look at algorithms for solving basic problems and analyze the errors that are introduced. We will also look at the structure of computers and the implications of using them in numerical calculations.</p> <p>There are three main objectives of this course for students as outlined in the text.</p> <ol style="list-style-type: none">1. Students should obtain an intuitive and working understanding of some numerical methods for the basic problems of numerical analysis.2. Students should gain some appreciation of the concept of error and of the need to analyze and predict it.3. Students should develop some experience in the implementation of numerical methods by using a computer. This includes an appreciation of computer arithmetic and its effects.
Course Activities/Assignments:	Homework: Homework will be collected approximately every other week. Assignment will be posted on the course website and announced in class. No late homework will be accepted. Computer programming must be done in MATLAB.

Course Schedule:

8/24: Introduction to numerical analysis,
Sec.1.1-1.2 Taylor polynomials review
8/26: Sec. 2.1 Floating-point representation
8/31: MATLAB practice
9/02: Sec. 2.1 Rounding and Chopping
9/09: Sec. 2.2 Sources of Errors, Loss of Significance
9/14: Sec. 2.2.4 Underflow and Overflow errors
9/16: Sec. 2.3 Propagation of errors
9/21: Sec. 3.1 Bisection method
9/23: Review for Midterm I
9/28: **Midterm I**
9/30: Sec. 3.2 Newton's method,
Sec. 3.3 Secant method
10/05: Sec. 3.4 Fixed-point iteration
10/07: Sec. 3.5 Ill-behaving root finding problems
10/12: Sec. 4.1 Polynomial interpolation
10/14: Sec. 4.2 Error in polynomial interpolation
10/19: Sec. 4.3 Spline functions
10/21: Sec. 5.1 The trapezoidal rule
10/26: Review for Midterm II
10/28: **Midterm II**
11/02: Sec. 5.1 Simpson rule
11/04: Sec. 5.2 Error formulas
11/09: Sec. 5.3 Gaussian numerical integration
11/11: Sec. 5.4 Numerical differentiation
11/16: Sec. 6.1 Systems of linear equations,
Sec. 6.2 Matrix arithmetic
11/18: Sec. 6.3 Gaussian elimination
11/23: Sec. 6.4 The LU factorization
11/25: Sec. 6.5 Error in solving linear systems
11/30: Sec. 6.6 Iteration methods
12/02: Review for final
12/09: **Final exam (10:00 am– 12:45 pm)**

Assessment of Course Objectives:

Grade will be based on homework, two midterm exams, and a final exam. No books, notes, or programmable calculators will be allowed. A basic scientific calculator can be used.

Midterm I: Monday, September 28,

Midterm II: Wednesday, October 28,

Final exam: Wednesday, December 09.

- Grading Policy: Homework: 30%, Midterm exams: 20% each, Final exam: 30%
Note: A grade of Incomplete is only used in extraordinary circumstances confined to a limited event. If the student has missed a significant amount of work (e.g. multiple assignments or tasks), a grade of Incomplete is not appropriate or warranted.
- Make-up Policy: **No make-up/alternate exam** will be given.
- Course Drop Policy: The UTEP Spring 2015 drop deadline is April 6, 2015. The College of Science will remain aligned with the University and not approve any drop requests after that date.
- Attendance Policy: It is student's responsibility to attend every class. Students are expected to arrive for class on time and to remain for the class entire period.
- Academic Integrity Policy: <http://admin.utep.edu/Default.aspx?PageContentID=2083&tabid=30292>
- Civility Statement: 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 any calls should be taken outside of class. Please do not wear headsets or blue tooth devices 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.sa.utep.edu/cass.
- Military Statement: If you are a military student with the potential of being called to military service and/or training during the semester, please contact me by the end of the first week of class.