

THE UNIVERSITY OF TEXAS AT EL PASO
COLLEGE OF SCIENCE
DEPARTMENT OF Mathematical Sciences

Course #: MATH 5329 (CRN 12491)
Course Title: Numerical Analysis
Credit Hours: 3
Term: Fall 2015
Course Meetings & Location: MW 10:30 ~ 11:50, Location: CRBL C304
Prerequisite Courses: MATH 3323 and programming experience
Course Fee (if applicable): None
Instructor: Dr. Son-Young Yi
Office Location: Bell Hall 218
Contact Info: E-mail syi@utep.edu
Phone 747-6864

Office Hours: M 14:30 ~ 15:20, W 13:00 ~ 13:50
Textbook(s), Materials: Numerical Analysis, Mathematics of Scientific Computing, Third Eds, by D. Kincaid and E. Cheney.

Course Website <http://www.math.utep.edu/faculty/yi/math5329f15.html>

Course Objectives
(Learning Outcomes): The objectives of the class are to understand
1.the principle of numerical methods
2.how to implement the methods in a computer language (MATLAB)
3.how to apply these methods to application problems

Course Activities/Assignments: **Homework:** There will be approximately 5 homework assignments this semester. Assignments will be posted on the course website and announced in class. Most of the homework problems will be from the textbook. **No late homework** will be accepted. Your homework should show all necessary work you used to solve problems and the reasoning and logic underlying all arguments should be clearly spelled out. Some homework assignments will involve computer programming. Computer projects must be done in MATLAB. For every assignment, turn in a complete printout of the program and of the output along with detailed explanation of solutions.

Assessment of Course Objectives: **Exams:** There will be two midterm exams and a final exam. No books, notes, or graphing/programmable calculators will be allowed. A basic scientific calculator can be used, but will not be needed. **No make-up/alternate exam** will be given. More information will be coming up as the exam dates approach.

Midterm exam I: Wednesday, September 30.

Midterm exam II: Wednesday, Nov. 4.

Final exam: Friday, Dec. 11 from 10:00 am to 12:45 pm.

Course Schedule:

- 8/24:** Course introduction
Section 2.1: Floating-point numbers and round-off errors
- 8/26:** Section 2.1 continued
- 8/31:** Section 2.2: Absolute and relative errors
Loss-of-significance error
- 9/02:** Section 2.3: Stable and unstable computations: Conditioning
- 9/07:** Labor day- No class
- 9/09:** Section 3.1: Bisection method
- 9/11:** Section 3.2: Newton's method
- 9/16:** Section 3.3: Secant method
- 9/21:** Section 3.4: Fixed point iteration
- 9/23:** Section 4.2: LU and Cholesky factorization
- 9/28:** Section 4.3: Pivoting and constructing an algorithm
- 09/30:** Midterm I
- 10/05:** Section 4.3-continued
Section 4.4: Norms and the analysis of errors
- 10/07:** Section 4.6: Solution of equations by iterative methods
- 10/12:** Section 4.7: Steepest Descent and Conjugate Gradient methods
- 10/14:** Section 4.7 continued
- 10/19:** Section 6.1: Polynomial interpolation
- 10/21:** Section 6.2: Divided differences
- 10/26:** Section 6.3: Hermite interpolation
- 10/28:** Section 6.4: Spline interpolation
- 11/02:** Section 7.1: Numerical differentiation and Richardson extrapolation
- 11/04:** Midterm II
- 11/09:** Section 7.2: Numerical integration based on interpolation
- 11/11:** Section 7.3: Gaussian quadrature
- 11/16:** Section 8.2: Taylor-series method
- 11/18:** Section 8.3: Runge-Kutta methods
- 11/23:** Section 8.4: Multistep methods
- 11/25:** Section 8.8: Boundary value problem: Shooting method
- 11/30:** Section 8.9: Boundary value problem: Finite-Differences
- 12/02:** Section 8.9 continued
- 12/11:** Final exam @ 10:00 am ~ 12:45 pm

Grading Policy:	Homework: 30%, Midterm exam: 40%, Final exam: 30%
Make-up Policy:	No make-up/alternate exam will be given. If you have an emergency on the exam day, you have to contact me immediately.
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:	The University policy is that all suspected cases or acts of alleged scholastic dishonesty must be referred to the Dean of Students for investigation and appropriate disposition. Any student who commits an act of scholastic dishonesty is subject to discipline. Scholastic dishonesty includes, but is not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts. For further information, please refer to: http://academics.utep.edu/Default.aspx?tabid=23785 or http://www.lib.iastate.edu/commons/resources/facultyguides/plagiarism/dishonest.html .
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 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:	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.