

COURSE: Math 422 - Numerical Analysis II
INSTRUCTOR: Dr. Merv Newton
OFFICE: Second Floor of Roth Hall
OFFICE HOURS: M W 12:30 - 1:00 or by appointment.

PHONE: 2200

REQUIRED MATERIALS:

TEXT: Burden & Faires, *Numerical Analysis* 8th ed.
CALCULATOR: HP 49G+

GRADING:	HOMEWORK	25%
	CLASS PARTICIPATION	25%
	TEST 1 (February 27	25%
	TEST 2 (April 29 3:30 PM)	25%

It is the policy of Thiel College and its educational programs not to discriminate against qualified students with documented disabilities. Students desiring accommodation for a disability are responsible for providing evidence from a qualified professional confirming the disability and identifying appropriate interventions. This evidence should be taken to the Office for Special Needs AC-126 as early as possible in the semester. The Coordinator of the Office of Special Needs will develop a letter of accommodation to be sent to course instructors and other appropriate offices.

If documentation is already on file, the students with disabilities are responsible for visiting the Office for Special Needs to set up accommodations for EACH semester. They are also responsible for talking to their professors about their needs as early as possible for EACH semester.

HOMEWORK: Homework is due at the beginning of the period on the day indicated. If you do it without help, it will be graded on the basis of 10 points per problem. If you need more time for some of the problems, they will be accepted at the beginning of the next period but will be considered late. Problems for which you received help or which are turned in late will be graded on a basis of 8 points. You are expected to adhere to Thiel's honor code and clearly mark such problems as being 8 point problems.

ATTENDANCE AND CLASS PARTICIPATION: Because there are only two in the class it will be conducted as a seminar. **Attendance and participation are crucial.**

Below is a list of the reading assignments and homework for the first half (approximately) of the course. After spring break, we will play it by ear and do things of interest to the class. [ATPS](#) is an online text *Algebra Though Problem Solving*.

Date	Read Section	Problems
1/9	5.1	Due 1/14 - 1, 3
1/14	5.2	Due 1/23 - Use Euler's method to approximate the solutions to 1 of Section 5.1 with $h = .25$. Compare the approximation to the actual solution.
1/16	5.3	I will not be here, but the two of you should discuss it to help each other until you understand it.
1/23	5.4	Due 1/28 - Use the modified Euler's method to approximate the solutions to 1 of Section 5.1 with $h = .25$. Compare the approximation to the actual solution and to Euler's method. Due 1/30 - Implement Algorithm 5.2 on the calculator and use it to approximate the solutions to 1 of Section 5.1 with $h = .25$. Compare the approximation to the actual solution, to Euler's method and to the modified Euler's method.
1/28	P & P	
1/30	6.1	Discuss 1(a, b), 2(b), 4(a), 12 Due 2/4 - 7, 14 Do these on the calculator using full calculator accuracy.
2/4	6.2	Due 2/6 10(b), 14(b), 18(b), Repeat problem 10(b) using Gauss-Jordan with scaled partial pivoting.
2/6	6.3, 6.5	Due 2/11 Use Crout's LU factorization method to solve the following system:

$$\begin{bmatrix} 1 & 2 & -2 & -1 \\ 1 & -1 & -5 & -7 \\ 2 & 5 & -2 & 3 \\ -1 & 0 & 3 & 4 \end{bmatrix} \mathbf{X} = \begin{bmatrix} -2 \\ 19 \\ -19 \\ -10 \end{bmatrix}.$$

Show your work clearly.

Date	Read Section	Problems
2/11	6.6	<p>Due 2/13 Solve the following system using LU decomposition by Crout's method.</p> $2x_1 + x_2 = 1$ $2x_1 + 7x_2 + 2x_3 = -1$ $3x_2 + 16x_3 + 3x_4 = 41$ $10x_3 + 22x_4 + 5x_5 = 98$ $4x_4 + 9x_5 = -2$ <p>Show your work clearly.</p>
2/13	3.4	<p>Due 2/20 - 3(d), 5(d), Find the clamped cubic spline for the data in 3(d). Use the information given in 5(d) to find the $f'(.1)$ and $f'(.4)$. Repeat using the three point forward and backward difference formulas to approximate $f'(.1)$ and $f'(.4)$</p>
2/18	P & P	
2/20	P & P	
2/25	Review	
2/27	Test 1	
3/10 - 4/21		We will start working through ATPS . The three of us will work out the details as we go. The purpose help you prepare for you teaching careers.
4/20	Review	
4/29	Test 2	
Return to:	Course Calendar	Dr. Newton's home page.