

Instructor: Chuck Stevens**Office:** L-201V**email:** chuck.stevens@skagit.edu**Office Hours:** 11:30 Daily**Phone:** 416-7803**Website:** svcmath.site44.com

Course Description

An introductory course including systems of linear equations; matrices; the vector space \mathbb{R}^n ; determinants, Cramer's Rule; applications. Prerequisite: MATH 151 with a grade of C or better.

Text

Linear Algebra and its Applications, 4th Ed., David C. Lay; Addison Wesley/Pearson.

Calculator

You may find a calculator useful for this class. Most calculators have limited functions for linear algebra, including the TI-83 and TI-84. The TI-86, TI-89, and HP-Prime probably have the most functions for linear algebra. However, we will also be using *Mathematica* for larger calculations when appropriate.

Course Content

We will cover selected sections from chapters 1 through 6. See schedule for specific sections. After completing the course you will be able to:

1. Perform Gauss-Jordan elimination to solve a system of equations.
2. Transform a matrix to row-reduced echelon form.
3. Test for independence/dependence in \mathbb{R}^n .
4. Reduce a spanning set to a basis in \mathbb{R}^n .
5. Extend an independent set to a basis in \mathbb{R}^n .
6. Find a basis for the solution space $A\mathbf{x} = \mathbf{0}$.
7. Compute a basis for the kernel of a matrix.
8. Compute a basis for the image of a linear transformation.
9. Find eigenvalues and corresponding eigenvectors of a matrix.
10. Orthogonally diagonalize a symmetric matrix.
11. Use the process of linear algebra to solve application problems.

Coursework

Reading You will be expected to read the text for each section covered. We will cover the main topics of each section, but there is usually a substantial amount we won't be able to cover in class that you will need to cover on your own. Plan on spending about an hour reading the text **before** working on the recommended exercises.

Homework/Worksheets Homework is the most important part of any math course. This is the component where you actually learn the content. In addition to the daily exercises, each week there will be a set of selected homework problems to turn in for grading. These will usually be due on Wednesday of each week. Homework accounts for 20% of your final grade.

Exams There are four chapter exams throughout the quarter. Each chapter exam is worth 50 points. Exams cannot be taken late. Please contact me one week in advance if you need to reschedule the test due to a scheduling conflict or emergency. *Anyone found cheating on an exam will receive a 0 for that exam. Caught a second time will result in failing the course.* Remember the 5 P's: **Prior Preparation Prevents Poor Performance.**

Final Exam There is a comprehensive final exam covering material from the entire course and counts 25% of your overall grade. **The final is scheduled for Wednesday March 15th at 7:30.** You must receive at least a 60% on the final to pass the course. Your final grade will be based on your percentage of points earned according to the following scale:

Grading scale:

A	93%-100%	B+	87%-89%	C+	77%-79%	D+	63%-66%
A-	90%-92%	B	83%-86%	C	70%-76%	D	60%-62%
		B-	80%-82%	C-	67%-69%	F	<60%

Daily Schedule (Very Tentative)

Monday	Tuesday	Wednesday	Thursday	Friday
1/1	1/2	1/3 Intro	1/4 1.1	1/5 1.2
1/8 1.3	1/9 1.4	1/10 1.5	1/11 1.6	1/12 1.6
1/15 MLK DAY	1/16 1.7	1/17 1.8	1/18 1.9	1/19 1.10(?)
1/22 Review	1/23 Exam 1	1/24 2.1	1/25 2.2	1/26 2.3
1/29 2.4	1/30 2.5	1/31 2.7	2/1	2/2 3.1
2/5 3.2	2/6 3.3	2/7 Review	2/8 Exam 2	2/9 4.1
2/12 4.2	2/13 4.3	2/14 4.4	2/15 4.5	2/16 4.6
2/19 Presidents Day	2/20 4.7	2/21 4.7	2/22 4.9	2/23 Review
2/26 Exam 3	2/27 5.1	2/28 5.2	3/1 5.3	3/2 5.5
3/5 5.6	3/6 Review	3/7 Exam 4	3/8 Least Squares	3/9 Review
3/12 Finals	3/13 Finals	3/14 Finals 7:30	3/16	3/17

Other Important Information

- Arrive to class on time. Arriving consistently late is an inconsiderate disruption to the entire class.
- **Turn off AND put away all cell phones.** You should be able to concentrate for 50 minutes without glancing at text messages.
- Please do not eat meals in class. Drinks are okay.
- Be considerate to others during class.
- Take advantage of tutoring help in L-203, as well as the Math Center in L-221.
- Don't get behind!!!! Come see me immediately if you are struggling with material. Don't wait until the day before a test to tell me you're lost.
- Keep up on your homework DAILY. Math is exactly like music, sports, cooking, learning a foreign language, etc.; to be good you need to practice, practice, practice.
- Read the text. Actually, read the text a few times. And work the examples with paper and pencil. Most concepts you may have questions on from the homework probably have examples in the text to help explain the concept. Read the text!!
- Take good in-class notes and review those notes immediately after class as well as that evening. Fine-tune them when necessary.
- Be sure to use my office hours if you have questions, and email me if you get stuck at home.

DISABILITY AND SPECIAL NEEDS If you are a student with a disability and need academic accommodations, please contact Disability Access Services in the Counseling and Career Services center or call 360-416-7654.

Recommended Homework (tentative)

It is recommended you do as many of the problems in each section as possible. This is a bare minimum.

1.1	Systems of Linear Equations	p10	#1-33 odd, 34
1.2	Row Reduction and Echelon Forms	p21	#1-21 odd, 25, 29, 33
1.3	Vector Equations	p32	#1-23 odd, 27, 29
1.4	The Matrix Equation $A\mathbf{x} = \mathbf{b}$	p40	#1-29 odd, 32, 33, 37
1.5	Solution Sets of Linear Equations	p47	#1-23 odd, 28-32, 34, 39
1.6	Applications of Linear Systems	p54	#3-13 odd
1.7	Linear Independence	p60	#1-21 odd, 31, 33, 37, 41
1.8	Introduction to Linear Transformations	p68	#1-21 odd, 24, 29
1.9	The Matrix of a Linear Transformation	p78	#1, 3, 7, 11, 17, 23
1.10	More Applications	p86	#7, 9, 12, 14
2.1	Matrix Operations	p100	#1-11 odd, 15, 19, 23, 27
2.2	The Inverse of a Matrix	p109	#1-23 odd, 29, 31, 35, 39
2.3	Characterizations of Invertible Matrices	p115	#1-23 odd, 27, 31, 33, 41
2.5	LU Matrix Factorization	p129	#1, 3, 7, 9, 11, 15, 17
2.7	Applications to Computer Graphics	p144	#3,5,7,9,11
3.1	Introduction to Determinants	p167	#1-13 odd, 19-23 odd, 39, 40
3.2	Properties of Determinants	p175	#1-4, 5-33 odd, 39
3.3	Cramer's Rule, Volume, Linear Transf.	p184	#1, 5, 7, 11, 19-27 odd
4.1	Vector Spaces and Subspaces	p195	#1-23 odd
4.2	Null Spaces, Column Spaces, L.T.	p205	#1-23 odd, 25, 31, 33
4.3	Linearly Independent Sets, Bases	p213	#1-25 odd, 33, 35
4.4	Coordinate Systems	p222	#1-13 odd, 15, 17, 21, 27, 29
4.5	The Dimensions of a Vector Space	p229	#1-23 odd
4.6	Rank	p236	#1-17 odd, 21, 23, 25, 27
4.7	Change of Base	p242	#1-13 odd
4.9	Applications to Markov Chains	p260	#1, 3, 7, 11, 13, 15
5.1	Eigenvectors and Eigenvalues	p271	#1-27 odd
5.2	The Characteristic Equation	p279	#1, 3, 5, 9, 11,15, 17, 21, 25, 27
5.3	Diagonalization	p286	#1-19 odd, 21, 23, 33
5.5	Complex Eigenvalues	p300	#1-21 odd
5.6	Discrete Dynamical Systems	p309	#1, 3, 5, 9, 11, 13
6.1	Inner Product, Length, and Orthogonality	p336	#1-17 odd
6.2	Orthogonal Sets	p344	#1-13 odd
6.3	Orthogonal Projections	p400	#5, 13, 15
6.4	The Gram-Schmidt Process	p358	
6.5	Least Squares	p366	Exercises in notes