MATH 2410 APPLIED LINEAR ALGEBRA I(3 credit hours)

Elmira College

SPRING 2025

Required Text:
David C. Lay; Judi J. McDonald; Steven R. Lay, (2021). ***Linear Algebra and Its Applications*** **(6th ed.).** Pearson.
Supplemental readings might be included to illustrate or expand on textbook readings.

Pre-requisites: MATH 1536 Calculus with Analytic Geometry II

Course Description

This course introduces students to the concepts and skill of linear algebra. At first the topics will focus on linear equations, vector spaces, determinants, orthogonal projections, eigenvalues and eigenvectors, singular value decomposition. At the end it relates to other applications chosen, such as linear programming and duality and the simplex method.

Course Objectives and Goals

- Gain knowledge of vector spaces, matrix algebra, eigenvalues and eigenvectors, linear discrete dynamical systems.
- Know the importance of linear algebra and its applicability to practical problems.
- Decompose linear transformations and analyze their spectra.
- Apply relevant concepts and skills learned in the course to real life situations.

Evaluation of Performance

Your grade will be based upon your performance on exams, assignments, and participation.

Problem Sets	30%
Mini Quizzes	20%
Exams	50%
Total	100%

Grades will be assigned as follows:

A	93% and above	B-	80 - 82%	D+	67 - 69%
A-	90 - 92%	C+	77 - 79%	D	63 - 66%
B+	87 - 89%	C	73 - 76%	D-	60 - 62%
B	83 - 86%	C-	70 - 72%	F	59% or below

Withdrawal Policy: Please see Elmira College Bulletin for information on this policy.

Academic Honesty: Please read the section on Academic Honesty in the **Code of Conduct**. Briefly, academic dishonesty includes: cheating, fabrication, facilitating academic dishonesty, and plagiarism. Ask if you have any questions on whether something constitutes as academic dishonesty. All work must be original and new. Past assignments from current or other courses will not be accepted. Academic dishonesty will not be tolerated. It will result in zero on the assignment, and a report will be filed with the school. Continued practice will result in failure of the class. Institutional penalties may also apply with repeated acts of academic honesty.

Student Responsibility:

- It is your responsibility to keep track of assignments and due dates.
- You should ask questions concerning assignments and lectures, if you need any clarifications.
- If you are struggling in class, have concerns, and/or unsure about expectations, please stop by during office hours or make an appointment for another time.

Tentative Schedule of Topics

Topic	Materials	Tasks & Evaluations
Linear Equations in Linear Algebra	Chapter 1	
Row Reduction and Echelon Forms	Chapter 2	
Vector Equations	Chapter 3	
The Matrix Equation	Chapter 4	Problem Set 1
Matrix Algebra	Chapter 5	
Determinants	Chapter 6	
Determinants and Matrix Products	Chapter 7	Mini Quiz 1
Vector Spaces	Chapter 8	
The Column Space of a Matrix	Chapter 9	
Linear Difference Equations	Chapter 10	Exam 1
Eigenvalues and Eigenvectors	Chapter 11	
The Characteristic Equation	Chapter 12	Problem Set 2
Diagonalization	Chapter 13	
Orthogonality and Least Squares	Chapter 14	Mini Quiz 2
The Gram–Schmidt Process	Chapter 15	
Symmetric Matrices and Quadratic Forms	Chapter 16	
The Singular Value Decomposition	Chapter 17	Problem Set 3
The Geometry of Vector Spaces	Chapter 18	
Optimization	Chapter 19	Problem Set 4
Linear Programming	Chapter 20	
Simplex Method	Chapter 21	Exam 2