



Course Name: MAT-228 Linear Algebra

Date Updated: 2/2022

Credit Hours/week: 3 hrs./wk. – 3 cr.

BEGINNING: SPRING 2022

Catalog Description: Selected topics including systems of linear equations, matrices and determinants, vector and inner product spaces, linear transformations, eigenvalues and eigenvectors, with applications from a variety of disciplines.

Prerequisite: MAT 132 (grade of “C” or better).

Text: Larson, Ron, Elementary Linear Algebra, 8th ed. (Brooks/Cole, Cengage Learning).

Supplementary Material: “Web Assign”

Syllabus:

Period	Text Sections	Topics
1-2	1.1-3	Introduction to systems of linear equations; Gauss and Gauss-Jordan elimination; applications
3	2.1-2	Operations with matrices: addition, multiplication; properties of matrix operations
4-5	2.3-5	Inverse of a matrix; elementary matrices; applications of matrix operations
6		Test 1
7	3.1-3	Determinant of a matrix; evaluation
8	3.4	Properties of determinants
9	4.1-2	Vectors in R^n . Vectors spaces
10	4.3-4	Subspaces of vector spaces; spanning sets, linear independence
11	4.5-6	Basis and dimensions; rank of a matrix, systems of linear equations
12	4.7-8	Coordinates and changes of basis; applications of vector spaces
13		Test 2
14	5.1-2	Length and dot product in R^n , inner product spaces
15	5.3	Orthonormal bases, Gram-Schmidt Process
16-17	5.4	Mathematical models and least-square analysis
18-19	5.5	Application of inner spaces
20		Test 3
21-22	6.1-2	Introduction to linear transformations, kernel and range
23-24	6.3-5	Matrices, linear transformations, similar matrices, applications
25-26	7.1-2	Eigenvalues, eigenvectors, matrix diagonalization
27-28	7.3-4	Symmetric matrices, orthogonal diagonalization, Applications of eigenvalues and eigenvectors
29-30		Final Exam

Students are expected to adhere to the policies of the County College of Morris. These can be accessed at: (insert link here)

Statement of Expected Course LEARNING OUTCOMES

- **Identify and solve** linear systems of equations using Gaussian elimination
- **Define and manipulate** matrices and **apply** factorization techniques
- **Define** and utilize determinants and **apply** them to solve systems of equations using Cramer's Rule
- **Explain and apply** the Least-Squares approximation process
- **Define, describe and interpret** vector spaces, and **define** and **apply** linear transformations between spaces
- **Define, interpret and calculate** eigenvalues and eigenvectors