MAT 272 - Linear Algebra

Catalog Description:

(A) Linear systems, matrix algebra, vector spaces, with emphasis on Euclidean n-spaces, linear transformations, eigenvalues and eigenvectors, orthogonality, and selected applications. Prerequisite: A grade of C- or better in MAT 122 or MAT 236. Fulfills: LASR. (3 cr. hr.)

Course Goals / Objectives:

- Proficiency in solving systems of linear equations with matrices
- Proficiency in basic matrix calculations (sums, scalar multiples and matrix products) and determinant calculations
- Understanding of vector spaces as an abstract structure
- Knowledge of linear transformations
- Ability to read and write proofs in linear algebra

Required topics:

- Systems of linear equations, coefficient matrix and augmented matrix of a system
- Gauss-Jordan elimination, row-reduced echelon form
- Determinants, singular and nonsingular matrices
- Vector spaces (both $\mathbb{R}^n$ and general vector space over a field), subspaces
- Dot product and orthogonality
- Linear independence, spanning set, basis, dimension
- Linear transformations, images and kernels (range/null space)
- Matrix representation of linear transformations
- Eigenvalues, eigenvectors and diagonalization

Optional topics:

- Elementary matrices, LU-factorization
- Least squares method
- Orthonormality and Gram-Schmidt process
- Symmetric matrices
- Computer algebra systems