

Course Objectives/Course Outline
Spokane Community College

Course Title: Linear Algebra

Prefix and Course Number: MATH 220

Course Learning Outcomes:

By the end of this course, a student should be able to:

- Communicate mathematical ideas in both every day and mathematical language using appropriate vocabulary and notation
- Use matrices and matrix theory in a variety of situations
- Apply linear transformations using matrices
- Find Eigenvalues of matrices
- Find the row, column, and null space of matrices
- For a given set of vectors: determine linear independence or dependence & find their span
- Identify vector spaces and their subspaces & demonstrate examples using \mathbb{R}^n

Course Outline:

I: Matrices

- A. Gaussian Elimination & Row Echelon Forms
- B. Solve Systems Using Matrices
- C. Matrix Algebra (Operations & Inverses)
- D. Linear Transformations from \mathbb{R}^n to \mathbb{R}^m and their Matrix Representations.
- E. Determinants

II: Vectors

- A. Span (of a set of vectors)
- B. Linear Dependence and Independence
- C. Orthogonal Vectors
- D. Orthogonal Projections

III: Eigenvalues

- A. Eigenvalues and Eigenvectors
- B. Characteristic Polynomials
- C. Diagonalization of Matrices

IV: Vector Spaces

- A. Definitions of Vector Spaces and Subspaces
- B. Row, Column, and Null Space of a Matrix
- C. Subspaces of \mathbb{R}^n
- D. Basis and Dimension
- E. Change of Bases
- F. Introduction to Inner Product