Course Outcome Summary
Standard Course

Math 251 Introduction to Linear Algebra

Course Information
Division   Science-Mathematics
Contact Hours   45
Total Credits   3

Prerequisites   A grade of C or better in Math 171 Calculus I, within the last three years is highly recommended.

Course Description
Matrix operations, echelon form, solutions of systems of linear equations, basics of vector spaces, subspaces, and linear transformations: span, linear independence, bases, dimension, matrix representation of linear transformations; determinants; characteristic polynomials, eigenvalues, eigenvectors, Jordan canonical form, inner-product spaces (including orthogonal polynomials); unitary, self-adjoint, and orthogonal matrices, least squares method, discrete Markov processes; bilinear and quadratic forms; introduction to the spectral theorem. Students will be expected to work with mathematics numerically, graphically, analytically, and verbally.

Course Outcomes
In order to evidence success in this course, students will be able to:
1. Solve a system of linear equations by row reduction, Cramer's rule, and using an inverse matrix.
2. Compute eigenvalues and eigenvectors of a matrix and write it in Jordan canonical form and its spectral decomposition.
3. Apply the least squares method to fit data to polynomials.
4. Analyze discrete Markov processes.
5. Use an appropriate inner product to find a polynomial approximation to a continuous function.
6. Geometrically interpret and construct a matrix for a linear transformation.
7. Demonstrate understanding of basis, span, dimension, linear independence, linear dependence, and the Gram-Schmidt process.

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