MATH 321: Linear Algebra
Adopted - Fall 2017

Catalog Description: Systems of linear equations, matrices and determinants. Vector spaces and linear transformations. Eigenvalues, eigenvectors, diagonalization of a symmetric matrix.
Prerequisites: Math 152 with grade of C or higher.

A. Course Description
   This is an introductory course in Linear Algebra. It includes a study of solving systems of linear equations, operations and properties of matrices, inverse matrices, determinants, vector spaces and subspaces, linear combinations, basis and dimension, rank of a matrix, linear transformations, eigenvalues and eigenvectors.

B. Course Objectives
   To develop an understanding of skills in solving differential equations and initial value problems, to develop skills in applying differential equations to physical world.

C. Textbook
   Elementary Linear Algebra, 8th edition, by Larson.

D. Course Outline and Topics

 Chapter 1: Systems of Linear Equations
        1.1: Introduction to Systems of Linear Equations
        1.2: Gaussian Elimination and Gauss-Jordan Elimination
        1.3: Applications of Systems of Linear Equations [optional]
Chapter 2: Matrices
        2.1: Operations with Matrices
        2.2: Properties of Matrix Operations
        2.3: The Inverse of a Matrix
        2.4: Elementary Matrices [optional]
        2.5: Markov Chains [optional]
        2.6: Applications of Matrix Operations [optional]
Chapter 3: Determinants
        3.1: The Determinant of a Matrix
        3.2: Determinants and Elementary Operations
        3.3: Properties of Determinants
        3.4: Applications of Determinants
Chapter 4: Vector Spaces
        4.1: Vectors in Rn
        4.2: Vector Spaces
        4.3: Subspaces of Vector Spaces
        4.4: Spanning Sets and Linear Independence
        4.5: Basis and Dimension
        4.6: Rank of a Matrix and Systems of Linear Equations
        4.7: Coordinates and Change of Basis
        4.8: Applications of Vector Spaces [optional]
Chapter 5: Inner Product Spaces [optional]
        5.1: Length and Dot Product in Rn [optional]
        5.2: Inner Product Spaces [optional]
        5.3: Orthonormal Bases: Gram-Schmidt Process [optional]
Chapter 6: Linear Transformations

In total, 24 sections are to be covered, with sections marked "optional" to be covered at instructor's discretion.