Sinclair Community College
444 E. Third St.
Dayton, OH 45402

Master Syllabus

MAT 2320 - Linear Algebra

Division: Science, Mathematics and Engineering

Department: Mathematics

Credit Hour Total: 3.0 **Lecture Hrs:** 3.0

Prerequisite(s): MAT 2280

Other Prerequisite(s): AND Other with a grade of C or better or satisfactory score on math placement test

Date Revised: March 2015

Course Description:

Systems of linear equations, matrices, determinants, linear transformations, Euclidean n-space, coordinate vectors, abstract vector spaces, dimension and rank, eigenvalues and eigenvectors.

General Education Outcomes:

- Critical Thinking/Problem Solving

Course Outcomes:

Gauss-Jordan reduction and inverse matrices
Solve linear systems of equations using Gauss-Jordan reduction and the inverse matrix method.

Assessment Method: Locally developed exams
Performance Criteria: Passing grade on exams with a score of 70% or better

Bases, eigenvalues, and eigenvectors
Determine a basis for a vector space, determine eigenvalues and eigenvectors of a matrix and then use them to diagonalize the matrix.

Assessment Method: Locally developed exams
Performance Criteria: Passing grade on exams with a score of 70% or better

Proofs from Linear Algebra
Prove elementary theorems from linear algebra; prove that given sets are vector spaces or subspaces; prove that given transformations are linear.

Assessment Method: Locally developed exams
Performance Criteria: Passing grade on exams with a score of 70% or better

Outline:

Understand algebraic and geometric properties of vectors in Rn. Solve systems of linear equations by using Gauss-Jordan elimination and by using the inverse of the coefficient matrix.Perform matrix operations such as addition, scalar multiplication, and multiplication.Discuss spanning sets and linear independence for vectors in Rn. Prove elementary theorems concerning rank and nullity of a matrix.Interpret a matrix as a linear transformation from Rn to Rm. Discuss the transformation’s kernel and image in terms of nullity and rank of the matrix.Use determinants and their interpretation as volumes. Describe how row operations affect the determinant.Use characteristic polynomials to compute eigenvalues and eigenvectors. Use eigenspaces of matrices, when possible, to diagonalize a matrix.Use axioms for abstract vector spaces. Discuss the space of all polynomials and of all matrices.Describe coordinates of a vector relative to a given basis. For a linear transformation between vector spaces, discuss its matrix relative to given bases.Discuss orthogonal and orthonormal bases, and the Gram-Schmidt orthogonalization process.