Carthage Mathematics Department
Course Summary for Math 2040 (200) Linear Algebra

1. Credits: 4 credits
2. Semesters Offered: Spring
3. Text(s): *Elementary Linear Algebra* by Larson, Edwards, and Falvo, sixth edition
4. Topics Covered:
    a. Systems of linear equations
    b. Gaussian elimination and Gauss-Jordan elimination
    c. Applications of systems of linear equations
    d. Operations with matrices
    e. Properties of matrix operations
    f. Inverse of a matrix
    g. Elementary matrices
    h. Applications of matrix operations
    i. Determinant of a matrix and evaluation of the determinant
    j. Properties of determinants
    k. Eigenvalues and eigenvectors
    l. Diagonalization
    m. Applications of determinants
    n. Vector spaces and vector subspaces
    o. Spanning sets and linear independence
    p. Basis, dimension, and rank
    q. Coordinates and change of basis
    r. Applications of vector spaces
    s. Linear transformations
    t. Kernel, range, and matrix of a linear transformation
    u. Applications of linear transformations
5. Skills Enhanced:
    a. Technical writing: Students complete a paper on an application of linear algebra of 10-20 pages typed. Students respond to essay questions on every test they take as part of this course
    b. Computer skills:
        1. Mathematica
        2. MS Word
    c. Oral presentations: Students give a formal presentation on their final project and present answers to problems in class.

6. Sample Syllabus:
    Chapters 1-7 in Larson, Edwards, and Falvo
7. Miscellanea
    a. This course is writing intensive.
8. Course Goals: By the end of the course, students should be able to do the following.
    a. Row reduce a matrix into reduced row Echelon form (by hand and using Mathematica).
        i. The two tests include questions that require this knowledge.
    b. Describe and give an example of a vector space.
        i. Assessment: The two tests include questions that require this knowledge.
    c. Present a mathematical talk.
        i. Assessment: Students give a formal presentation on their linear algebra project and present answers to problems in class

d. Write a technical mathematics paper using correct notation and appropriate form.
    i. Assessment: Students complete a paper on an application of linear algebra of 10-20 pages typed. Students respond to essay questions on every test they take as part of this course. Formal writing assignments are evaluated for correctness of writing as well as computation.
e. Demonstrate sufficient knowledge of the course content.
    i. Assessment: Tests, quizzes, and homework assignments. Sufficient knowledge is required to obtain a passing grade. The knowledge must be demonstrated on homework and tests.