MA 237 Linear Algebra

Course Description. This course introduces the basic theory of linear equations and matrices, real vector spaces, bases and dimensions, linear transformations and matrices, determinants, eigenvalues and eigenvectors, inner product spaces, and the diagonalization of symmetric matrices. Additional topics may include quadratic forms and the use of matrix methods to solve systems of linear differential equations.

Credit Hours. 3

Course Objectives:

The student shall demonstrate knowledge of:

1. Linear algebra.
2. The sequential nature of mathematics and the interrelated nature of the various branches of mathematics.

The student shall demonstrate ability to:

3. Use language and symbols of mathematics accurately in communication.
4. Select or create appropriate mathematical models to solve problems in mathematics and in other disciplines.

Course Content: Linear equations and matrices including systems of linear equations, matrix operations, algebraic properties of matrix operations, special types of matrices and partitioned matrices, echelon form of a matrix, elementary matrices – finding A^t, equivalent matrices, and LU-factorization.

Real vector spaces including vectors in the plane and in 3-space, vector spaces, subspaces, linear independence, basis and dimension, coordinates and isomorphisms, homogeneous systems, and rank of a matrix.

Inner product spaces including standard inner product on R^2 and R^3, inner product spaces, Gram-Schmidt process, orthogonal complements.

Linear transformations and matrices including kernel and range of a linear transformation, matrix of a linear transformation, and similarity.

Determinants including properties of determinants, cofactor expansion, inverse of a matrix, and other applications of determinants.

Eigenvalues and eigenvectors, diagonalization, and diagonalization of symmetric matrices.

Course Requirements: Regular attendance.
Calculator Policy: Please refer to your instructor's course syllabus to find their course-specific calculator policy.

Course Evaluation: There will be a minimum of 3 hourly examinations at 100 points each and a final comprehensive examination at 150 points.

ACCOMMODATION STATEMENT:

In accordance with the Americans with Disabilities Act (ADA) and Section 504 of the Rehabilitation Act of 1973, the University offers reasonable accommodations to students with eligible documented learning, physical and/or psychological disabilities. Under Title II of the Americans with Disabilities Act (ADA) of 1990 and Section 504 of the Rehabilitation Act of 1973, a disability is defined as a physical or mental impairment that substantially limits one or more major life activities as compared to an average person in the population. It is the responsibility of the student to contact ***Developmental Services*** prior to the beginning of the semester to initiate the accommodation process and to notify instructors within the first three class meetings to develop an accommodation plan. Appropriate, reasonable accommodations will be made to allow each student to meet course requirements, but no fundamental or substantial alteration of academic standards will be made. Students needing assistance should contact ***Developmental Services.***