

Division: ACADEMIC

DATE: January 14, 1993

B: Department: SCIENCE & MATHEMATICS

New Course: _____

Revision of Course

Information form: Y

DATED: October 1979

MAT 232	D:	Linear Algebra	E:	3	C:	M
Alternative Title		Semester Credit		Subject & Course No.		Description

Summary of Revisions:

A one semester introductory course designed to provide a solid foundation in the mathematics of linear algebra. This course is often

(Enter date & section; Ex: Section C 5 F 8 D)

mathematics and the student is taught to include the solving of systems of

Dec. 11, 1992. F, N, O, P, R

the first course in abstract mathematics how to prove theorems. Topics include covectors, matrices and determinants, dimensional Euclidean space, normal vectors, linear transformations, eigenvalues and eigenvectors, and diagonalization of matrices.

G: Type of Instruction: Hours Per Week:

H: Course Prerequisites:

Per Semester
4 Hrs

MAT 120

- Laboratory
- Seminar
- Clinical Experience
- Work Experience
- Practicum
- Shop

Hrs.
Hrs.
Hrs.
Hrs.
Hrs.
Hrs.

H: Course Corequisites:

NONE

I: Course for which this course

is a pre-requisite

MAT 421

Studio

Hrs.

Student Directed Learning

Hrs.

K: Maximum Class Size:

Student:

N. Textbooks and Materials to be Purchased By S

Course Objectives:

Upon completion of MAT 232 the student should be able to:

- solve systems of n equations in m unknowns using Gauss-Jordan elimination and Gaussian elimination.
- solve problems in electrical network analysis or traffic flow (Optional).

prove and apply the basic properties of matrix addition, scalar multiplication, matrix multiplication, transpose of a matrix, and the inverse of a matrix.

Course Objectives (continued)

Upon completion of MA 232 the student should be able to:

of vectors, bases and dimension in \mathbb{R}^n

determine the rank of a matrix, the basis and dimension of the

and dimension of the row-space of a matrix

prove and apply the basic properties of the dot product and use the dot product to solve problems and

the angle between two vectors, the distance between two vectors and derive the norm of a vector, the

orthogonality in \mathbb{R}^n

prove the triangular inequality using the Cauchy-Schwartz Inequality.

determine a basis for the column vectors of

calculate the projection of one vector onto another in \mathbb{R}^n

and use the cross product to calculate the

prove and apply the basic properties of the cross product

area of a triangle and the volume of a parallelepiped

the distance from a point to a plane and the distance from a point to

P , and the set of 2×2 matrices M_2 are vector spaces

prove that the set of polynomials of degree less than or equal to n

of vectors, basis and dimension in P_n and M_n

and define the inner product

prove and apply the basic properties of an inner product in F and

and orthogonality

solve problems involving two vectors a

O. Course Objectives (continued)

- transformations from given linear transformations
- form composite trans
- ard matrix for a linear transformation from \mathbb{R}^n to \mathbb{R}^m
- determine the standa
- es that describe a rotation, a shear, a dilation or contraction and a reflection
- determine the matrix
- of a linear transformation in terms of the foregoing
- in \mathbb{R}^2 and \mathbb{R}^3
- determine the kerne
- of a subspace
- determine the matrix and rank of a linear transformation
- determine the matrix and rank of a linear transformation
- vectors of vectors in \mathbb{R}_2 and M_{22}
- determine the coordinate
- explain isomorphism of vector spaces
- relative to given bases and the image of a given vector using the matrix of the transformation
- find the matrix of a linear transformation
- determine the characteristic polynomial, eigenvalues and corresponding eigenspaces of a given matrix
- prove that similar matrices have the same eigenvalues and use this property to diagonalize a square matrix
- compute the power of a square matrix using the fact that $A = PDP^{-1}$
- solve systems of first order recurrence equations and second order recurrence (difference) (Optional)

P. Course Content:

1. Solving Systems of Equations
2. The Algebra of Matrices
3. Determinants.
4. The Vector Space \mathbb{R}^n
5. Vector Geometry.
6. General Vector Spaces.
7. Inner Product Spaces.
8. Linear Transformations and Linear Operators

Lectures, problem sessions and assignments.

Course Evaluation

Written course outline with specific evaluation criteria at the beginning of the semester. Evaluation will be based on some of the following:

	1. Weekly tests	{ 0 - 40% }	
ation tion	{ 20 - 70% }		2. Micterm tests
	{ 0 - 15% }		3. Assignments
	{ 0 - 5% }		4. Attendance
	{ 0 - 5% }		5. Class participa
	{ 30% }		6. Final Examina