

- D. This course transfers as a Linear Algebra course. For NJ schools go to the NJ Transfer website, www.njtransfer.org. For all other colleges and universities go to their individual websites.

V. Outline of Course Content

- A. Linear Equations
 - 1. Linear Systems
 - 2. Gaussian and Gauss-Jordan elimination
 - 3. Applications

- B. Matrices
 - 1. Operations
 - 2. Properties
 - 3. Inverse
 - 4. Elementary matrices
 - 5. Applications

- C. Determinants
 - 1. Definition
 - 2. Evaluation
 - 3. Properties
 - 4. Eigenvalues
 - 5. Applications

- D. Vector Spaces
 - 1. Vectors in R^n
 - 2. Spaces
 - 3. Subspaces
 - 4. Linear Independence
 - 5. Basis
 - 6. Rank
 - 7. Change of Basis
 - 8. Applications

- E. Inner Product Spaces
 - 1. Inner Product
 - 2. Gram-Schmidt Process
 - 3. Models, Least Squares Analysis
 - 4. Applications

- F. Linear Transformations
 - 1. Introduction
 - 2. Kernel and Range
 - 3. Matrices for Linear Transformations
 - 4. Transition Matrices and Similarity

5. Applications

G. Eigenvalues and Eigenvectors

1. Eigenvalues and Eigenvectors
2. Diagonalization
3. Symmetric matrices
4. Applications

H. Complex Vector Spaces

1. Complex numbers in rectangular and polar forms
2. Complex vector spaces and inner product spaces
3. Unitary and Hermitian matrices
4. Applications

VI. Educational Goals and Learning Outcomes

A. General Education Goals

Students will:

1. apply mathematical arguments to problems.(GE-RVCC 1; NJ 2).
2. solve problems quantitatively and symbolically.(GE RVCC 7; NJ 2).

B. Learning Outcomes

Students will be able to:

1. solve application problems that are modeled by linear systems of equations with 3 or more variables using Gauss-Jordan elimination methods and other Matrix Methods.
2. recognize the structure of vector spaces and inner product spaces.
3. construct orthogonal bases for vector spaces using the Gram-Schmidt Process.
4. Solve application problems using eigenvalues and eigenvectors.
5. apply matrix operations to matrices of complex numbers.
6. construct proofs of propositions involving one or more of the following: matrices, determinants, vector spaces and inner product spaces.

VII. Modes of Teaching and Learning

- A. tests
- B. quizzes
- C. cumulative final examination

- D. projects
- E. homework
- F. small groups

VIII. Papers, Examinations, and other Assessment Instruments

- A. tests
- B. final examination
- C. projects
- D. laboratory products
- E. quizzes

IX. Grade Determinants

- A. cumulative final examination
- B. tests
- C. projects
- D. individual teacher determinants

X. Texts and Materials

Suggested Textbook: *Elementary Linear Algebra*, latest ed., by Larson, Edwards, and Falvo, Houghton Mifflin

Please Note: The course outline is intended only as a guide to course content and resources. Do not purchase textbooks based on this outline. The RVCC Bookstore is the sole resource for the most up-to-date information about textbooks.

XI. Resources

No special resources are needed.