



## MASTER COURSE OUTLINE

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### COURSE TITLE

Linear Algebra

### GENERAL COURSE INFORMATION

Dept.: MATH

Course Num: 220

(Formerly: )

CIP Code: 27.0102

Intent Code: 11

Program Code:

Credits: 5

Total Contact Hrs Per Qtr.: 55

Lecture Hrs: 55

Lab Hrs: 0

Other Hrs: 0

Distribution Designation: Math Science MS, Symbolic or Quantitative Reasoning SQR

### COURSE DESCRIPTION (as it will appear in the catalog)

A study of matrix algebra and systems of equations, abstract vector spaces including basis and dimension, linear transformations, eigenvalues and eigenvectors.

### PREREQUISITES

MATH&152 or instructor permission

### TEXTBOOK GUIDELINES

Appropriate college level text as chosen by the instructor

### COURSE LEARNING OUTCOMES

*Upon successful completion of the course, students should be able to demonstrate the following knowledge or skills:*

1. Solve simultaneous systems of equations using reduction and matrix methods
2. Prove mathematical theorems of an abstract nature
3. Apply the concepts of linear transformations, eigenvalues, and eigenvectors
4. Solve problems requiring the application of matrix methods and abstract linear spaces

### INSTITUTIONAL OUTCOMES

IO2 Quantitative Reasoning: Students will be able to reason mathematically.

### COURSE CONTENT OUTLINE

1. Matrices and systems of equations
  - a. Solutions of systems of equations using Gauss/Jordan method
  - b. Solutions of systems of equations using matrices and matrix inverses
  - c. Rank of a matrix
  - d. Solution space of a matrix
2. Applications of matrices
  - a. Markov Chains
  - b. Equilibrium networks

- c. Production planning: Leontiff models
- d. Linear programming
- 3. Abstract Vector Spaces
  - a. Vector spaces and subspaces
  - b. Basis and dimension
  - c. Orthogonally and orthogonal bases
  - d. Linear transformations
- 4. Eigenvalues and Eigenvectors

**DEPARTMENTAL GUIDELINES** (*optional*)

In order to give the instructor the greatest flexibility in assigning a grade for the course, grades will be based on various instruments at the instructor's discretion. However, to maintain instructional integrity there must be four class exams or three class exams and a project. A final exam will be given if there are less than four exams or a project may be substituted for the final exam if there are four in-class exams. At least 60% of the grade will be based on quantifiable work (exams, homework, quizzes, etc.). The remaining portion of the grade may be based on quantifiable work, attendance, projects, journal work, etc., at the instructor's discretion. The following is a compilation of acceptable grading instruments: in class exams and a final, attendance, homework or quizzes, research paper, modeling projects on the calculator or computer. Other projects or assignments may be assigned as deemed appropriate at the instructor's discretion.

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**DIVISION CHAIR APPROVAL**

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**DATE**