

SOUTHEAST COMMUNITY COLLEGE
DIVISION OF ARTS AND SCIENCES
Mathematics
Revision Date: 07-01-26

I. CATALOG DESCRIPTION

Course Number: MATH2314
Course Title: Linear Algebra
Prerequisite(s): MATH1700 (Calculus II)
Catalog Description: Fundamental concepts of linear algebra, including properties of matrix arithmetic, systems of linear equations, vector spaces, inner products, determinants, eigenvalues and eigenvectors, and diagonalization.
Credit Hours: 3.0
Class Hours: 45
Lab Hours: 0
Total Contact Hours: 45

II. COURSE OBJECTIVES: *Course will:*

- A. Linear Algebra has many applications to diverse scientific areas, and even has powerful uses in computer graphics, linguistics, audio engineering, artificial intelligence, humanitarian aid, and legal studies etc. This course is a transition course from computational courses, like calculus, to more theoretical ones. The material in the course will be more mathematically subtle than that encountered in previous math courses. This course will introduce students to fundamental concepts of linear algebra and show how that is used in solving systems of linear equations. It will also introduce student the concepts of vector spaces, inner products, determinants, eigenvalues and eigenvectors, and methods of diagonalization.

III. STUDENT LEARNING OUTCOMES AND GENERAL EDUCATION LEARNING OUTCOMES

- A. Student Learning Outcomes: *Student will be able to:*
1. Use matrices to represent systems of linear equations
 2. Do matrix algebra operations and compute determinants
 3. Understand the concept of vector spaces
 4. Be able to compute eigenvalues and eigenvectors
 5. Understand concepts of orthogonality, and inner product spaces, and quadratic forms.
 6. Use mathematics to model problems and analyze the results.
- B. General Education Learning Outcomes
1. GELO #3: Critical Thinking & Problem Solving
Outcome: Collect, identify, interpret and analyze data.
Outcome: Synthesize information to arrive at reasoned solutions to problems.
Outcome: Evaluate the validity of arguments, alternatives, data, outcomes, and/or impacts of actions.
Outcome: Acquire and integrate knowledge and construct relationships across disciplines.
 2. GELO #5: Analytical, Quantitative, and Scientific Reasoning
Outcome: Apply mathematical and scientific methods to solve problems from an array of contexts and everyday situations.
Outcome: Understand and create logical arguments supported by quantitative and scientific evidence and communicate those arguments in a variety of formats.
Outcome: Effectively develop strategies, algorithms, or experiments (or performing experiments) to better describe the systems or to solve the problems.

Outcome: Manipulate formulas, data sets, graphs, tables, etc. in a way to produce a meaningful outcome.

IV. CONTENT/TOPICAL OUTLINE (*course outline may provide more detailed information*)

- A. Linear equations in Linear Algebra
- B. Matrix algebra
- C. Determinants
- D. Vector spaces
- E. Eigenvalues and eigenvectors,
- F. Orthogonality, and inner product spaces
- G. Quadratic forms

V. INSTRUCTIONAL MATERIALS

- A. Required text(s):
 - 1. Poole, David. *Linear Algebra: A Modern Introduction*. Current edition.

or

UNL'S OER book for Linear Algebra
(https://levi-heath.github.io/unl_math314_OER/frontmatter.html)

VI. METHOD OF PRESENTATION/INSTRUCTION

- A. Methods of presentation typically include a combination of the following:
 - 1. Lecture
 - 2. Small group discussion
 - 3. Canvas discussion

VII. METHODS OF EVALUATION

- A. Methods of evaluation typically include a combination of the following:
 - 1. Homework and quizzes
 - 2. Mid-term exams
 - 3. Projects
 - 4. Class participation
 - 5. Final exam

Students will receive a course outline/syllabus indicating the instructor's specific attendance policy, course timeline, course requirements, and grading criteria.
- B. SCC GRADING SCALE

A+	95-100	C+	75-79	F	59 or less
A	90-94	C	70-74		
B+	85-89	D+	65-69		
B	80-84	D	60-64		

VIII. SPECIFIC COURSE REQUIREMENTS

- A. None.