

Tompkins Cortland Community College  
**Master Course Syllabus**

**Course Discipline and Number: MATH 208**

**Course Title: Linear Algebra**

**Year: 2023-2024**

**Credit Hours: 4**

**Attendance Policy:** *To maintain good grades, regular attendance in class is necessary. Absence from class is considered a serious matter and absence never excuses a student from class work. It is the responsibility of all instructors to distribute reasonable attendance policies in writing during the first week of class. Students are required to comply with the attendance policy set by each of their instructors. Students are not penalized if they are unable to attend classes or participate in exams on particular days because of religious beliefs, in accordance with Chapter 161, Section 224-a of the Education Law of the State of New York. Students who plan to be absent from classroom activity for religious reasons should discuss the absence in advance with their instructors. See college catalog for more information.*

**Services for Students with Disabilities:** *It is the College's policy to provide, on an individual basis, appropriate academic adjustments for students with disabilities, which may affect their ability to fully participate in program or course activities or to meet course requirements. Students with disabilities should contact the Coordinator of Access and Equity Services, to discuss their particular need for accommodations. All course materials are available in alternate formats upon request.*

### **Course Description**

This course covers topics that involve emphasis on algebra, geometry, pre-calculus, and calculus skills. Topics include systems of linear equations, matrices and matrix operations, Euclidean n-space, vectors (algebraically and geometrically), linear transformations, vector spaces, eigenvalues, and eigenvectors. Prerequisites: RDNG 116 if required by placement testing; prior completion or concurrent enrollment in ENGL 100 and MATH 201. 4 Cr. (4 Lec.) Occasionally.

### **Course Context/Audience**

Linear Algebra teaches students mathematical concepts expanded on from Algebra, Pre-Calculus, and Calculus I. This course, which can be taken concurrently with MATH 201, helps prepare students for careers in medicine, management, economics, government, computer science, physics, psychology, engineering, and social sciences. Many transfer institutions require or recommend that students complete Linear Algebra for a baccalaureate degree in math or math/science.

### **Basic Skills/Entry Level Expectations**

**Writing:** WC College level writing skills are required. See course co-requisites or pre-requisites.

**Math:** MC College level math skills – Course requires college level math skills. See course description for co-requisite and/or prerequisite requirement(s).

**Reading:** R4 Before taking this course, students must satisfactorily complete RDNG 116 or have assessment indicating that no reading course was required.

### **Course Goals**

1. Students will master algebraic and geometric skills (without a calculator) at the college level to prepare them for higher-level mathematics.
2. Students will be able to formulate an organized approach to problem solving.
3. Students will have an understanding of dimensional spaces and vectors in n-space.

## Course Objectives/Topics

Objective/Topic	% Course
Introduction to systems of equations, Gaussian Elimination, matrices, matrix operations, inverses of matrices, rules of matrix arithmetic, determinants, and Cramer's Rule.	30%
Vectors, Norm of Vectors, Vector Arithmetic, Dot Product, Projections, and Cross Product.	20%
Euclidean n-Space, Linear Transformations, Real Vector Space, Subspaces, and Linear Independence.	25%
Inner Products, Angle and Orthogonality in Inner Product Spaces, Eigenvalues, and Eigenvectors.	25%

## General Education Goals - Critical Thinking & Social/Global Awareness

CRITICAL THINKING OUTCOMES	HOW DOES THE COURSE ADDRESS THE OUTCOMES (Include required or recommended instructional resources, strategies, learning activities, assignments, etc., that must or could be used to address the goal/outcomes)
<p>Students will be able to</p> <ul style="list-style-type: none"> <li>➤ develop meaningful questions to address problems or issues</li> <li>➤ gather, interpret, and evaluate relevant sources of information</li> <li>➤ reach informed conclusions and solutions</li> <li>➤ consider analytically the viewpoints of self and others</li> </ul>	<p><b>Students prove math concepts are true that have learned in previous math classes. This has the student make sure they really understand why something is true rather than just taking the teacher's word for it.</b></p>
SOCIAL/GLOBAL AWARENESS OUTCOMES	HOW DOES THE COURSE ADDRESS THE OUTCOMES (Include required or recommended instructional resources, strategies, learning activities, assignments, etc., that must or could be used to address the goal/outcomes)
<ul style="list-style-type: none"> <li>➤ Students will begin to understand how their lives are shaped by the complex world in which they live.</li> <li>➤ Students will understand that their actions have social, economic and environmental consequences.</li> </ul>	<p><b>Cheating is discussed.</b></p>

## Instructional Methods

Teaching methods should include lecture, discussion, group work on given problems without using a graphing calculator to explore vectors, matrices, and solving systems of equations. Homework problems should be emphasized to achieve an understanding of the concepts presented.



**Methods of Assessment/Evaluation**

Method	% Course Grade
Exams	60-80%
Homework Assignments/Quizzes	10-30%
Projects	0-10%
Professional Attitude (Attendance, Class Participation, Attitude toward fellow students, and instructor)	0-10%

**Text(s)**

Introduction to Linear Algebra by Jim DeFranza and Daniel Gagliardi, 1<sup>st</sup> edition

**Bibliography**

Meyer, Carl D. (February 15, 2001), Matrix Analysis and Applied Linear Algebra, Society for Industrial and Applied Mathematics (SIAM).

Strang, Gilbert. (July 19, 2005), Linear Algebra and Its Applications (4th ed.), Brooks Cole.

**Other Learning Resources**

<b>Audiovisual</b> No resources specified
<b>Electronic</b> No resources specified
<b>Other</b> No resources specified