MA 110 Introduction to Linear Algebra

Fall 2025

Department of Mathematics

The Cooper Union for the Advancement of Science and Art

Instructor	Nikola Janjušević
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Class Hours	Wednesdays 6-8pm, 41 Cooper Sq. (NAB) Room 101
Office Hours	Thursdays 5:30-6pm NAB Room 504 + by appointment
Textbooks	– Cuoco, Waterman, Kerins, Kaczorowski, and Manes, *Linear Algebra and Geometry*, American Mathematical Society, 2019. – Anton, H., *Elementary Linear Algebra*, 9th edition, Chapter 10. – Stein, Sherman K., and Anthony Barcellos, *Calculus and Analytic Geometry*, New York: McGrawHill, 1992.
Course website	nikopj.github.io/teaching/ma11025/

The following is adapted from Prof. Mili Shah's MA-110 syllabus.

Course Description: Course Descripton: Vectors in two- and three- dimensions, vector algebra, inner product, cross product, and applications, analytic geometry in three dimensions (lines, planes, spheres); matrix algebra, the solution of systems of linear equations, determinants, inverses, and basic properties of the complex number system. 2 credits. Prerequisite: none

ABET Outcomes for this Course: ABET is a nonprofit, non-governmental organization that accredits college and university programs in the disciplines of applied science, computing, engineering, and engineering technology. As part of the accreditation process, engineering programs are required to assess student outcomes which are acquired by students who are enrolled in the program. Student outcomes are succinct statements that describe what students are expected to know and be able to do by the time of graduation. These outcomes relate to skills, knowledge and behaviors that students acquire as they progress through the program. The outcomes most closely associated with this course (taken from the ABET website) are:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Grading Scheme:

Class Conduct and Participation	5%
Homework	30%
Exam 1	20%
Exam 2	20%
Final Exam	25%

1. **Class Conduct, Lab Conduct, and Participation**: You are expected to contribute to discussions related to course material throughout the semester in a manner respectful to your instructor and classmates. This can be in the form of answering/posing questions during class and/or office hours.

   You are expected to attend all lectures. Please notify me beforehand of any planned absence.

   Deductions may incur for violations of classroom conduct and/or technology policy (see Grading Scale below).

2. **Homework**: Homework problems are posted on the course website. Grading on the homework will be based on completeness and a random subset will be graded. Homework will be due at the beginning of class on Tuesdays. The lowest individual homework grade will be dropped.
3. **Exams**: 3 Written midterm and final exams will test your understanding of course material and principles. Exams will be administered during class hours.

Grading Scale:

90 - 100	A – superior and comprehensive understanding of the course principles
80 - 89	B – good degree of familiarity of the course principles
70 - 79	C – average knowledge of course principles and fair performance
60 - 69	D – minimum working knowledge of the course principles
< 60	F – unsatisfactory understanding of the course principles

The following section is from Associate Dean Shay's ECE-291 Syllabus, which I adopt and endorse for this course.

Issues and Concerns: I try to create course policies that support a fair and equitable classroom environment and set high performance standards for all students. I hope to create an inclusive learning environment where you feel both challenged but also constantly respected and recognized within the course. Please make an appointment with me if you are having any issues related to me, the course, or your fellow students.

While I want you to feel comfortable coming to me with issues you may be struggling with or concerns you have, please be aware that I have reporting requirements that are part of my responsibilities as a member of the faculty. If you inform me of an issue of sexual harassment, sexual assault, or discrimination, I will keep the information as private as I can, but I am required to report the basic facts of the incident to Cooper's Title IX Coordinator. The Cooper Union Title IX policy on sexual misconduct can be found here.

Counseling Services at The Cooper Union are coordinated through the Office of Student Affairs. Cooper's counseling and mental health services website can be found here.

Technology Policy: You may not use electronic devices (laptops, tablets, phones) during lecture without my permission.

Accommodations: Students with disabilities or who need special accommodations for this class are required to notify the Dean of Students and meet with me so that arrangements can be made. The Cooper Union has limited resources and extra lead time is required for such arrangements to be feasible. In order to receive accommodations for an exam, you must notify me in writing at least two weeks before the accommodations are needed and you must also be registered with the Dean of Students. Students will not be afforded any special accommodations retroactively, i.e., for academic work completed prior to disclosure of the disability to me. Support services for students are described here.

Group Work and Academic Integrity: You are encouraged to discuss your homework and projects outside of class time with your classmates, however, all work submitted must be your own. You are required to acknowledge collaboration with other parties (including a website or textbook reference) in arriving at your answers/explanations in homework and projects. Submitted work that is strongly suspected of being misrepresented as your own (i.e. plagiarism, including copying the output of generative AI) will be reported to the Dean's Office and may result in a zero on the assignment/exam and/or a D/F in the course.

Course Schedule (tentative): Below is an outline of the course schedule, subject to change.

#	Date	Topics	Textbook Sections
1	09/03	Points and Vectors	Ch 1.1-1.4
2	09/10	Length and Dot-Product	Ch 2.1-2.4
3	09/17	Cross-Product and Hyperplanes	Ch 2.5-2.6
3	09/24	Linear-Systems 1	Ch 3.1-3.3
4	10/01	Linear-Systems 2	Ch 3.4-3.5
5	10/08	Exam 1	
6	10/15	Matrix Algebra 1	Ch 4.1-4.3
7	10/22	Matrix Algebra 2	Ch 4.4-4.5
8	10/29	Matrix Algebra 3	Ch 4.5-4.6
9	11/05	Exam 2	
10	11/12	Matrices as Functions 1	Ch 5.1-5.3
11	11/19	Matrices as Functions 2	Ch 5.4-5.6
12	11/26	No class. Friday schedule	
13	12/03	Determinants	
14	12/10	Complex Numbers	Anton Ch 10
15	12/17	Final Exam	