

THE DEPARTMENT OF MATHEMATICAL SCIENCES

MATH 630: Linear Algebra and Applications

Fall 2026 Course Syllabus

NJIT Academic Integrity Code: Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the Code of Student Conduct and Academic Integrity Policy that is found at: [Code of Student Conduct and Academic Integrity Policy](#).

Please note that I am required to report any suspected academic misconduct to the Office of the Dean of Students. Academic misconduct includes, but is not limited to, cheating, plagiarism, and the inappropriate use of online tools or software. Students who are found responsible for violating the Academic Integrity Code may be subject to disciplinary action. Possible outcomes can include a failing grade on an assignment or in the course, as well as additional sanctions up to and including suspension or dismissal from the university. If you have questions about the Code of Student Conduct and Academic Integrity or the student conduct process, you may contact communitystandards@njit.edu.

COURSE INFORMATION

Course Description: (This course is not intended for students in the Master's in Applied Mathematics program or in the doctoral program in Mathematical Sciences.) Development of the concepts needed to study applications of linear algebra and matrix theory to science and engineering. Topics include linear systems of equations, matrix algebra, orthogonality, eigenvalues and eigenvectors, diagonalization, and matrix decompositions.

Number of Credits: 3

Prerequisites: MATH 211 or MATH 213, and MATH 222

Course-Section and Instructors:

Course-Section	Instructor
Math 630-101	Professor E. Ammicht

Office Hours for All Math Instructors: [Fall 2026 Office Hours and Emails](#)

Recommended Textbook:

<i>No Required Text</i>

University-wide Withdrawal Date: The last day to withdraw with a W is **Tuesday, November 10, 2026**. It will be strictly enforced.

COURSE GOALS

Course Objectives: Linear algebra concepts are key for understanding and creating machine learning algorithms, especially as applied to deep learning and neural networks. This course reviews linear algebra with applications to probability, statistics and optimization.

Course Outcomes: Students will gain a thorough understanding of the concepts and ideas of linear algebra, resulting in the ability to formulate problems and apply appropriate algorithms to their solution.

Course Assessment: There are homework assignments, quizzes and a midterm exam held in class during the semester. The final exam will consist of an in class presentation of a final project.

POLICIES

DMS Course Policies: All DMS students must familiarize themselves with, and adhere to, the [Department of Mathematical Sciences Course Policies](#), in addition to official [university-wide policies](#). DMS takes these policies very seriously and enforces them strictly.

Grading Policy: The final grade in this course will be determined as follows:

Homework and Quizzes	40%
Midterm Exam	30%
Final Project/Final Exam	30%

Your final letter grade will be based on the following tentative curve.

A	86-100	C+	64-69
B+	80-85	C	50-63
B	70-79	F	0-49

Attendance Policy: Attendance at all classes will be recorded and is **mandatory**. Please make sure you read and fully understand the [Math Department's Attendance Policy](#).

Religious Observance: NJIT is committed to supporting students observing religious holidays. Students must notify their instructors in writing of any conflicts between course requirements and religious observances, ideally by the end of the second week of classes and no later than two weeks before the anticipated absence.

Homework: Students are expected to *solve each problem from every section covered*. Study groups are strongly encouraged.

Exams: There will be regularly scheduled quizzes and one midterm exam during the semester and a presentation of a final project/final exam during the last class and the final exam week:

Midterm Exam	Oct 20, 2026
Final Exam Period	December 16-22, 2026

Exams and quizzes will test your knowledge of all the course material taught in the entire course. Make sure you read and fully understand the [Math Department's Examination Policy](#). This policy will be strictly enforced.

Makeup Exam Policy: There will be **NO MAKE-UP QUIZZES OR EXAMS** during the semester. In the event an exam is not taken under rare circumstances where the student has a legitimate reason for missing the exam, the student should contact the Dean of Students office and present written verifiable proof of the reason for missing the exam, e.g., a doctor's note, police report, court notice, etc. clearly stating the date AND time of the mitigating problem. The student must also notify the Math Department Office/Instructor that the exam will be missed.

Cellular Phones: All cellular phones and other electronic devices must be switched off during all class times.

ADDITIONAL RESOURCES

Further Assistance: For further questions, students should contact their instructor. All instructors have regular office hours during the week. These office hours are listed on the Math Department's webpage for **Instructor Office Hours and Emails**.

Accommodation of Disabilities: The Office of Accessibility Resources and Services (OARS) offers long term and temporary accommodations for undergraduate, graduate and visiting students at NJIT.

If you need an accommodation due to a disability, please contact the Office of Accessibility Resources and Services at oars@njit.edu, or visit Kupfrian Hall 201 to discuss your specific needs. A Letter of Accommodation Eligibility from the office authorizing student accommodations is required.

For further information regarding self identification, the submission of medical documentation and additional support services provided please visit the Office of Accessibility Resources and Services (OARS) website at:

<https://www.njit.edu/accessibility/>

Important Dates (See: [Fall 2026 Academic Calendar, Registrar](#))

Date	Day	Event
September 1, 2026	Tuesday	First Day of Classes
September 5, 2026	Saturday	Saturday Classes Begin
September 7, 2026	Monday	Labor Day. University Closed
September 8, 2026	Tuesday	Last Day to Add/Drop Classes
September 8, 2026	Tuesday	Conversion Day - Monday Classes Meet
October 2, 2026	Friday	Wellness Day
November 10, 2026	Tuesday	Last Day to Withdraw
November 25, 2026	Wednesday	Conversion Day - Friday Classes Meet
November 26 to November 29, 2026	Thursday and Sunday	Thanksgiving Recess - Closed
December 11, 2026	Friday	Friday Classes Meet - Make up day for Wellness Day
December 12, 2026	Saturday	Saturday Classes Meet

December 13, 2026	Sunday	Last Day of Classes
December 14, 2026	Monday	Reading Day 1
December 15, 2026	Tuesday	Reading Day 2
December 16 to December 22, 2026	Wednesday to Tuesday	Final Exam Period

Course Outline

<i>Lecture #</i>	<i>Date</i>	<i>Section #</i>	<i>Main Subject Topics</i>
1	Sep 1	Class Notes	Vector and Matrix Operations, the Four Fundamental Subspaces
2	Sep 15	Class Notes	Gaussian Elimination, Gauss-Jordan Elimination, Inverses
3	Sep 22	Class Notes	Vector Spaces
3	Sep 29	Class Notes	Orthogonal Matrices, Givens Rotations, Householder Reflections
4	Oct 6	Class Notes	Normal Equations
5	Oct 13	Class Notes	QR Decomposition
7	Oct 20		MIDTERM EXAM
7	Oct 20	Class Notes	Determinants
8	Oct 27	Class Notes	Eigenvalues, Eigenvectors, Positive Definite and Semidefinite Matrices
9	Nov 3	Class Notes	Singular Value Decomposition, Eckart-Young Theorem
10	Nov 10	Class Notes	Rayleigh Coefficients, Vector and Matrix Norms
11	Nov 17	Class Notes3	Numerical Techniques
12	Nov 14	Class Notes	Randomized Matrix Multiplication and Applications
13	Dec 1	Class Notes	Generalized Eigenvalue Problem, Generalized SVD
14	Dec 8		Final Project Presentations

Updated by Professor E. Ammicht - 2026
Department of Mathematical Sciences Course Syllabus, Fall 2026