Math 4A: Introduction to Linear Algebra **Winter 2026**

INSTRUCTOR	Paul J. Atzberger https://web.atzberger.org/	Office: 6712 South Hall Office Hours: TR 12:30pm – 2:00pm
CLASS TIMES	TR 8:00am – 9:15am. IV THEA1	
PREREQUISITES	Math 2B or 3B or 3BI with a minimum grade of C.	
DESCRIPTION	This course will discuss topics in linear algebra and its applications. Topics include systems of linear equations, matrix algebra, determinants, vector spaces and subspaces, basis and dimension, linear transformations, eigenvalues and eigenvectors, diagonalization, and orthogonality. Applications include topics in AI/machine learning, data science, numerical analysis, control, and optimization.	
TEXTBOOKS	*Linear Algebra and Its Applications,* D. Lay, S. Lay, J. McDonald, 5th edition, published by Pearson.	
GRADING	Homework / Attendance / Quizzes Midterm I, II (max of the two scores) Final Exam	30% 30% 40%
ASSIGNMENTS	Homework and exercises will be assigned in class and posted on the course website. Prompt submission of homeworks will be required. While no late homework will be accepted, one missed homework will be allowed without penalty. While it is permissible for you to discuss materials with classmates, the submitted homework must be your own work.	
MESSAGES	While we make every effort to reply to messages, given the especially large class size, not all emails, canvas messages, etc... will be able to have a response. For general questions or other related logistic items, please try first start by talking in person with your TA in the review sessions. If there are issues that require further discussions or other items, please come to the faculty office hours to discuss them in person. Please first try to contact course staff in person, then message. If you need to miss a session or lecture, please just bring a note to the next session or lecture for excusal. The schedule of topics also shows what was covered during that lecture day.	
EXAMS	Midterm Exam I: Midterm Exam II: Final Exam:	Tues, Jan, 27, 2026 Thurs, Feb, 12, 2026 Thurs, Mar, 19, 2026
LECTURES	Please note you are responsible for all material presented in class, including announcements about course procedures. Also, for exams, pop-quizzes, and homeworks questions may be on materials only presented during class.	

Please install the iClicker App on your phone or laptop for use during lectures. You must register in iClicker with your PERM NUMBER at www.iclicker.com. The course code and related information can be found on the course website.

Lecture participation via the iClicker will be part of your grade. Periodic pop-quizzes also will be part of your grade.

Please check periodically for supplemental materials posted on course websites.

MATERIALS The instructor retains rights to the course materials and there is a policy of no student recording (i.e. video/audio) or posting of course materials.

AI POLICY AI technologies are now ubiquitous and a part of many work environments. Please keep in mind for this course that AI should be used judiciously and in a way to enhance your learning. All the answers you submit must be your own original work.

AI GUIDELINES AI should be used to enhance your learning. For example, if you are stuck on a problem and can not find information in the textbook, then it is permissible to use AI prompts to ask for a reminder on a topic, solution techniques, or hints on steps. However,you should not simply be typing in full problems assigned and ask for the answers. Not only does this defeat the purpose of the exercises, this also will likely harm your preparation for quizzes and exams throughout the course.

Keep in mind the objective of class assignments is for your learning benefit so you can build a mastery of the subject materials.

Throughout use of any AI technology, you should be applying and building up your critical thinking skills. Be sure to validate all AI responses against your prior knowledge, by performing derivations, or against reputable sources. Overall, always be on the look out for errors in the outputs and for ways you can help assess correctness. AI technologies are well-known to make mistakes, many of which are subtle.

Please only use AI as a supplement in your learning not as a substitute to more traditional and well-established approaches. You should still be engaging each week in reading the textbook, attending lectures, asking questions in class or TA sessions, and doing hand-written mathematical derivations for the exercises.

TOPICS Sample of Subject Areas

- Introduction to Linear Algebra
  - Systems of Linear Equations
  - Vector Equations

- Row reduction and echelon forms
  - Simple Matrix Equations, Solution Sets
  - Applications of Simple Matrix Equations

- Linear Independence, Bases
  - Linear Transformations

- Matrix Operations
  - Matrix Inverses and Determinants
  - Properties of Determinants, Vector Spaces, Subspaces
  - Coordinate Systems, Dimension and Rank

- Eigenvectors and Eigenvalues
  - Characteristics Equation
  - Diagonalization, Inner-Product, Applications
  - Orthogonal Sets, Least Squares
  - Gram-Schmidt, Applications

WEBSITE For additional course information, please see the website https://web.atzberger.org/teaching