Linear Algebra for Data Science and Engineering
M491 Section 01 (77123)
Fall 2025

Time: **1:00pm-2:15pm TR**	Room: **HSB 104**

Course Description: This course will focus on understanding how linear algebra (using matrices to encode data sets) can be used to efficiently process, represent, approximate, visualize, and compute with data in the sciences and engineering. Topics discussed will include but not be limited to theory and applications of linear systems, matrix factorizations, symmetric and positive definite matrices, minimization of quadratic forms, least squares, matrix approximations, SVD and PCA (See tentative daily schedule for further details)

Prerequisites: Permission from instructor

Co-requisites: There are no co-requisites

Learning Outcomes:

- Looking at data sets through matrices
- Learning how ideas from linear algebra give rise to algorithms and solution techniques
- Using Linear Algebra to formulate and solve data science and engineering problems involving large data sets

Course Page: linalg.mathematics.land

Textbooks: Suggested references will be given out in class

Instructor: Atish J Mitra (email: amitra@mtech.edu)

Office Hours (MUS 203): 12:00pm-12:45pm TR, or by appointment. Please send me an email if you need to meet at any other specific time.

Attendance Policy: Regular attendance is strongly recommended.

Grading Policy: Grades will be based on attendance and participation (10%), a hourlong in-class exam (20%) and a project (70%). I do not grade on a curve, and do not assign individual extra credit assignments. Your grades will be independent of how the rest of the class performs.

Grading Scale:

	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F
	93-	90-92	87-89	83-86	80-82	77-79	73-76	70-72	67-69	63-66	60-62	0-59

Academic integrity:

A zero-tolerance policy will be enforced for academic dishonesty / cheating. Academic dishonesty / cheating includes plagiarism on homework or other assignments, copying from or deliberately aiding another student during quizzes / exams, using unauthorized books, notes, calculators or other computing devices, using cell phones, pagers, Apple/Android watches or any other communicating devices during quizzes / exams.

Any student who is found to have cheated on a homework / quiz / exam will receive a penalty (at the discretion of the instructor) ranging from a 0 in that particular homework / quiz / exam to a grade of F in the course. Moreover, the incident of academic dishonesty will be reported to the office of the Provost/Vice Chancellor for Academic Affairs.

You should carefully read Montana Tech's academic dishonesty policies. It is available in the student handbook, which can be found following the link:
https://www.mtech.edu/student_life/student-handbook.pdf

The instructor reserves the right to assign seating arrangements or change a student's current seating arrangement before or during any quiz or exam.

Policy on Generative AI:

While you are encouraged to experiment with Generative AI, be aware that you are not allowed to use such resources for homework, take-home exams and projects for this class. The reason for this policy for our class is that the use of generative AI for mathematics problems often produce incorrect solutions or solutions with incorrect reasoning, and therefore does not help in learning the material.

Miscellaneous Policies:

1. Check Canvas for announcements and other notes regularly. Canvas will be used in this course to record your scores on quizzes or exams, and not to calculate the course grade. Course grade will be calculated at the end of the semester as per "grading policy" given above. If Canvas lists a column marked "total score" (or something similar), please ignore it.

2. Please do not hold conversations, either with your classmates or through your cell phones, during the lecture. Cell phones/pagers must be put on silent at all times. No texting during class.

3. All unauthorized recordings of class are prohibited. Recordings that accommodate individual student needs must be approved in advance and may be used for personal use during the semester only.

4. It is your responsibility to check all your grades on Canvas before the final exam date and report me in writing if your grades are recorded incorrectly. You should keep all your graded exams/quizzes/classwork/homework until you receive your final course grade.

5. **Special Accommodations**: If you qualify for special accommodations and would like to avail of it, please send me an email to set up an appointment ASAP. When you come for your appointment, please have a letter from your Tech Counselor available.

6. **Emergency Evacuation Procedure:** See university webpage and emails.