MA242 Linear Algebra
Summer 1 2025

Lectures:. MTTh 6:00-8:30pm in CAS 228.
Instructor: Jacksyn Bakeberg
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Office: CCDS 544
Office Hours: MTTh 4:00-5:00pm.
Course Website: `http://math.bu.edu/people/bakeberg/Teaching/ma242.html`
Textbook: *Understanding Linear Algebra* by David Austin (free online).

Material

Linear algebra is the study of vector spaces and linear transformations. It is a field with profound applications elsewhere in mathematics as well as in computer science, physics, economics, etc. In this course we will learn how to solve linear systems of equations using matrices. We will learn what are vector spaces, linear transformations, eigenvalues, eigenvectors, etc. We will explore applications depending on your interests. Examples include image compression, Google's PageRank algorithm, dynamical systems, and more.

We will both emphasize being able to solve these problems by hand with a pencil and paper, as well as highlight the computational nature of the subject using the computer algebra software called `Sage`.

Lectures

Each lecture will begin with a warm-up problem to review the previous lecture. We will break into groups and present solutions to the warm-up problems to each other.

Please bring a notebook, pencil, and a laptop (if you have one) to the lectures. A core component of the course will be in-class work both individually and in groups, so it is very important that you attend the lectures.

Problem Sets

There will be weekly problem sets, due by the end of every Saturday. You will upload your solutions to Gradescope and you will receive feedback from a grader. You will have the opportunity to respond to the feedback and correct any errors.

The time you spend struggling with the problem sets is when you will really learn the material. I encourage you to **work together** on the problem sets outside of class. Please submit your own solutions and at the top of your submission acknowledge who you worked with.

The pace of this course is very fast and late submissions can quickly get all of us behind. Please be respectful of everyone's time and submit your problem sets on the assigned date. You should still do all of them even if you miss the deadline. If it is not submitted on time, however, I cannot guarantee that we will be able to give you the feedback you need to make progress in the course.

Final Presentation

During the last week of class you will give a 10-15 minute presentation on a deeper aspect of the theory or an application of linear algebra of your choosing. You will indicate to me your topic before the end of Week 4. You will provide feedback to each other using a rubric.

Assessment

There will be **no numerical grades** in this course. Your grade will be assigned via self-evaluation on the criteria of **technical skill in computation and reasoning, effective written and oral communication, and engagement with the material**. You will be given ample opportunities to demonstrate competency in these categories.

During week 3 and week 6, each of you will schedule a one-on-one conference with me in which you assess your progress and explain your self-evaluated grade. At that time you will show me your corrected homework solutions. If you aren't satisfied with your week 3 midterm self-evaluation, we will discuss steps to take to get your grade where you want it to be.

Here is an outline of my expectations:

- "A" work looks like:
  - **Technical skill**: Mastery of all core concepts and techniques. Confidence when confronting exercises. Great care taken to minimize technical errors.
  - **Communication:** Clear and effective communication of mathematical concepts in written work, oral presentations, and in conversation.
  - **Engagement:** Attending every lecture. Regularly asking questions during class and in office hours. Contributing to group activities. Demonstrating curiosity about the subject. Submitting all work on-time. Responses to all feedback show reflection and growth. Completing course evaluations.
- "B" work looks like:
  - **Technical skill**: Mastery of most core concepts and techniques. Occasional trouble when confronting exercises. Technical errors some times cloud otherwise correct work.
  - **Communication:** Mostly clear communication. Written work some times leaves out details. Oral communication some times requires clarification. Occasionally mixing up terminology in conversation.
  - **Engagement:** Attending almost every lecture. Only occasionally asking questions during class or in office hours. Submitting work on-time. Responding to feedback.
- "C" work looks like:
  - **Technical skill**: Deficiency in some core concepts and techniques. Frequent trouble when confronting exercises. Technical errors prevent the successful completion of exercises on the first attempt.
  - **Communication:** Occasionally unclear communication. Written work often leaves out details. Oral communication requires clarification. Frequently mixing up terminology in conversation.
  - **Engagement:** Missing multiple lectures. Rarely asking questions during class or in office hours. Occasionally submitting work late. Responses to feedback show little reflection and growth.
- "D" work looks like:
  - **Technical skill**: Deficiency in some multiple core concepts and techniques. Frequent trouble when confronting exercises. Technical errors prevent the successful completion of exercises on the first attempt.
  - **Communication:** Unclear communication. Written work includes few details. Oral communication does not convey understanding of the material.

  - **Engagement:** Missing multiple lectures. Rarely asking questions during class or in office hours. Frequently submitting work late. Responses to feedback are rare and of poor quality.

- "F" work looks like:
  - **Technical skill**: No demonstrated competency in most core concepts and techniques. Inability to effectively complete exercises.
  - **Communication:** Inability to communicate about the course material in any medium.
  - **Engagement:** Missing multiple lectures. Asking little-to-no questions during class or in office hours. Frequently submitting work late. Responses to feedback show no reflection or growth. .

The purpose of this grading scheme is to encourage you to take risks and struggle with the problems, and to decrease anxiety about grades and exams. If at any point you find yourself worried about your performance in this course, please reach out to me.

Important Dates:

- **Classes begin:** Tuesday 20 May.
- **Memorial Day - No Class:** Monday 26 May.
- **Last day to drop without a W:** Tuesday 27 May.
- **MIDTERM SELF-EVALUATION:** 5-10 June.
- **Last day to drop with a W:** Thursday June 12.
- **Final presentations:** Tuesday 24 June.
- **FINAL SELF-EVALUATION:** Thursday 26 June.

Accommodations

Students with documented disabilities may be entitled to accommodations in this course. If you believe you should receive accommodations, please contact the Office of Disability & Access Services (`access@bu.edu`) to discuss your situation. This office can give you a letter that you can share with me outlining the accommodations you should receive.

Cheating

Boston University's policies on cheating are spelled out in the BU Academic Conduct Code, available at `http://www.bu.edu/academics/resources/academic-conduct-code/`. These policies will be followed in this class.

Last updated: May 20, 2025