

**COURSE DESCRIPTION**  
**INTRODUCTION TO LINEAR ALGEBRA - HONORS**  
**MA 260–2B**  
**FALL 2024**

DEPARTMENT OF MATHEMATICS  
UNIVERSITY OF ALABAMA AT BIRMINGHAM

**Course Instructor:** Rudi Weikard  
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**Office Hours:** TT 1:00 pm – 2:00 pm and by appointment

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**Meeting times:** TT 9:30 am — 10:45 am  
**Meeting location:** HHB 221  
**Prerequisite:** Grade of C or better in MA 125 or equivalent  
**Credits:** 3 semester hours  
**Textbook:** Elementary Linear Algebra, Applications Version by Anton, Rorres, and Kaul, 12th edition, 2019  
**Canvas:** <https://www.uab.edu/elearning/canvas/>

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**Important dates:**

**First day of classes:** August 26  
**Labor Day Holiday:** September 2  
**Midterm exam I:** September 26  
**Midterm exam II:** October 24  
**Midterm exam III:** November 21  
**Fall/Thanksgiving Break:** November 25 – December 1  
**Last day of classes:** December 6  
**Final Exam:** December 12, 8:00 am — 10:30 am  
**Grades available online:** December 18

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**Course content:**

- Systems of Linear Equations and Matrices (Sections 1.1 to 1.9)
- Determinants (Sections 2.1 to 2.3)
- Euclidean Vector Spaces (Sections 3.1 to 3.3)
- General Vector Spaces (Sections 4.1 to 4.9)
- Eigenvalues and Eigenvectors (Sections 5.1 and 5.2)
- Inner Product Spaces (Sections 6.1 to 6.3)
- Diagonalization (Sections 7.1 and 7.2)

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*Date:* August 12, 2024.

**Aims of the course:**

The course aims for students to attain *conceptual understanding* and *procedural fluency* with regard to Linear Algebra. *Conceptual understanding* is demonstrated by the ability to explain in detail the solutions of assigned problems. *Procedural fluency* is demonstrated by exercising routine tasks in an assured and timely fashion. The course also emphasizes *critical thinking* and *communication skills*, both written and verbal.

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**Methods of teaching and learning:**

- 28 class meetings of 75 minutes with presentations by the instructor as well as by students.
- A significant time commitment (certainly more than class time) is to be expected.
- Working in groups is encouraged but not required.
- Students may seek outside help (books, internet, class mates) as they see fit as long as any help is acknowledged.

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**How this class works**

*Tell me and I forget, teach me and I may remember, involve me and I learn.*  
(Chinese proverb)

In this course we will approach learning in a different way from what you are likely used to. The best way to learn mathematics is to do mathematics and while (or rather because) that may often mean struggle and sometimes failure, the benefit of actively engaging with the subject are profound.

When children learn to walk they frequently lose balance and fall only to get up again and start over. Getting up again and starting over is exactly what I hope you will do after one of your inevitable mistakes.

It is in our genes to learn walking and talking. It is also in our genes to be able to learn reading, writing, and reasoning (thinking logically). Therefore I urge you to approach the tasks at hand without fear. You can do it, but you will fall once in a while (as I do).

These are the tasks to be done before every class meeting:

- Review the recently worked problems.
- Work on several newly assigned problems; you are encouraged to collaborate.
- Write up as many solutions as you can (in a form you would be willing to share).
- Read over the assigned section(s) of the textbook.
- Make a list of questions to ask me at the beginning of the next class (very important).

During class we will typically do the following:

- I will answer your questions and present new concepts, definitions, and theorems.
- You will present your work on previously assigned problems from the book (give credit if you received any help).
- You are encouraged to ask questions of the presenter. Problems similar to the assigned ones will appear on the exams and everyone should be sure how to do each and everyone of them. Could you get up and do the problem

now yourself? If not, you still have questions. Asking questions will be easier if you have worked on the problem beforehand.

Some rules and tips for presentations:

- I will call for volunteers every day and will pick the person with the lowest running course average to present a given problem.
  - Let me know ahead of time (by email), when you volunteer. Precedence is given to the student volunteering first.
  - A student who has not gone to the board on a given day has precedence over a student who has gone to the board that day.
  - Ties are broken by lot.
- To present a problem at the board successfully includes to have explained your solution thoroughly and to have answered all questions regarding the problem.
- Since you will be communicating with other students on a regular basis, here are several guidelines that will help you (on the board and in the audience).
  - Most importantly, remember that the whole class is on your side and wants to see you succeed, so questions (even mine) are intended to help everyone, not to criticize you.
  - Do not be upset when you make a mistake - brush it off and learn from it.
  - As a member of the audience do not let anything go on the board that you do not fully understand. Do not say to yourself, I will figure this out at home.
  - Acknowledge any help you had when you are at the board.
  - Be polite and respectful.
  - Let people answer when they are asked a question.
- Do not use concepts we have not defined.
- Do not try to put up a problem you have not written up but prepare arguments in advance.

#### Assessment procedures:

- Student achievement will be assessed by the following measures:
  - Students' presentations contribute 40% of the course average.
  - Three in class tests (60 minutes) including short questions (Part I) as well as problems requiring in-depth understanding (Part II). Partial credit is awarded where appropriate. Each test contributes 10% to the course average.
  - A 150-minute comprehensive final examination including Part I and Part II type problems. The final contributes 30% to the course average.
- Your course performance is your properly weighted course average (including the final exam score). This is a number between 0 and 100.
- Your final grade is determined according to the following table:
 

Course performance:	90-100	75-90	60-75	50-60	below 50
Final Grade:	A	B	C	D	F

**Course policies:**

- Class attendance is mandatory. Absences from class are recorded. After each 3 absences from class 10 points will be subtracted from your presentation score.
- Please make sure that you are able to receive e-mails through your Blazer-ID account. Official course announcements may be sent to that address.
- If a test is missed due to a serious verifiable circumstance or official university business, the test grade will be replaced with the properly re-scaled final exam score. You have to advise the instructor of such circumstances at the earliest possibility.
- No laptops or phones etc. will be allowed during the exams.
- Calculators which do not have access to the internet will be allowed at the exams.
- You may use the textbook and your notes during the exams.

**Tips:**

- Help is available in the Math Learning Lab (HHB 202). For specific information on opening hours click on Math Learning Lab under the Resources tab of the department's homepage at [www.uab.edu/cas/mathematics](http://www.uab.edu/cas/mathematics).
- By working steadily and regularly, you will increase your chances to succeed in this course.
- Remember, being a full-time student is a full-time job.
- Seek help when you need it.

**Disability Support Services**

UAB is committed to providing an accessible learning experience for all students. If you are a student with a disability that qualifies under the Americans with Disabilities Act (ADA) and/or Section 504 of the Rehabilitation Act, and you require accommodations, please contact Disability Support Services for information on accommodations, registration and procedures. Requests for reasonable accommodations involve an interactive process and consist of a collaborative effort among the student, DSS, faculty and staff. If you are registered with Disability Support Services, please contact me to discuss accommodations that may be necessary in this course. If you have a disability but have not contacted Disability Support Services, please call (205)934-4205 or visit <http://www.uab.edu/dss>.

**Title IX Statement**

In accordance with Title IX, the University of Alabama at Birmingham does not discriminate on the basis of gender in any of its programs or services. The University is committed to providing an environment free from discrimination based on gender and expects individuals who live, work, teach, and study within this community to contribute positively to the environment and to refrain from behaviors that threaten the freedom or respect that every member of our community deserves. For more information about Title IX, policy, reporting, protections, resources, and supports, please visit the UAB Title IX webpage at <http://www.uab.edu/titleix>.