




# MATH 201: Linear Algebra

## Fall 2025

| Contact Me  | Meet with Me   | Class Info  |
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|    |                             |  |
| <b>Name:</b> Dr. Maggie Hildenmoeller (nee Rahmoeller)<br><b>Pronouns:</b> She/Her/Hers<br><b>Email:</b> rahmoeller@roanoke.edu | <b>Office:</b> Trexler 270B<br><b>Student Hours:</b><br>Tues 1:30-2:30PM<br>Wed 2:30-3:30PM<br>Thurs 10-11AM | <b>Location:</b> Lucas 207<br><b>Days:</b> MWF<br><b>Time:</b> 1:10-2:10PM          |

### Student Hours Comments:

- The given times above will be consistently available unless emergencies arise
- These are opportunities for you to ask me questions about material and/or class, including celebrations and concerns. **Please come prepared to ask your questions!**
- Scheduled office hours don't work for you? Email me! We'll figure out a plan.

### Dropping By Office OUTSIDE Of Office Hours:

It's always ok to pop by and say, "HI!" – I love getting to know you and chatting with you!

But, these have to be short, fun visits ☺ Sadly, none of us have time to sit back and chill anymore. But – please pop by any time for a short 5-10 minute hello. And – never be afraid to come by if you need help ☺

**Course Description:** Linear algebra is a course that mixes basic equation-solving, abstract theory, and deep applications. The main objects of study are matrices, vectors, and vector spaces, and we will focus on the interplay between computational and theoretical aspects. This material is used in many higher level math courses as well as in many related fields.

**Intended Learning Outcomes:** By the end of this course, you will be able to:

- State and apply each of the equivalent parts of the Invertible Matrix Theorem,
- Graphically analyze linear transforms,
- Identify vector spaces and their dimensions,

- In the context of various applications, set up systems of equations and determine the number of solutions and the implications of the form of the solution set.

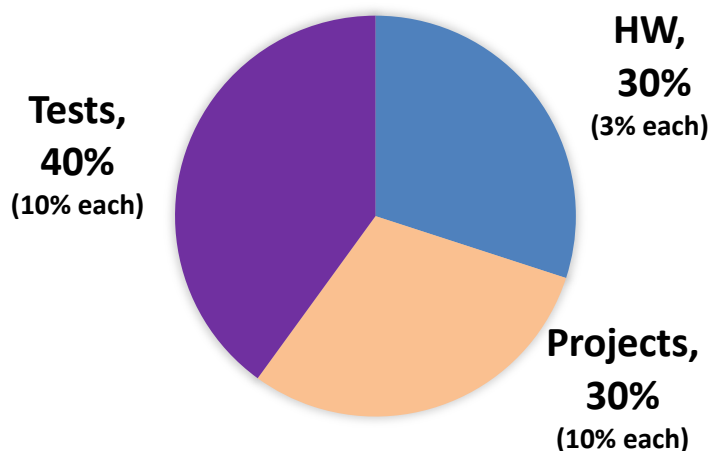
Your success in this class is important to me! We all learn differently and bring a variety of strengths and needs to the class. If there are aspects of the course that prevent you from learning or that make you feel excluded, please let me know as soon as possible. Together we'll develop strategies to meet both your needs and the requirements of the course.

### Required Materials:

- *Functional Linear Algebra*, by Hannah Robbins
- *Mathematica*, free download (to computer!) at <https://apps.roanoke.edu/mathematica/>

**Commitment Hours:** This course expects you to spend at least 12 hours of work a week inside and outside of class.

### GRADE DISTRIBUTION:



|     |        |     |       |     |       |     |          |
|-----|--------|-----|-------|-----|-------|-----|----------|
| A:  | 93-100 | B:  | 83-87 | C:  | 73-77 | D:  | 63-67    |
| A-: | 90-93  | B-: | 80-83 | C-: | 70-73 | D-: | 60-63    |
| B+: | 87-90  | C+: | 77-80 | D+: | 67-70 | F:  | Below 60 |

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## COURSE ASSIGNMENTS & LATE POLICIES

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**Interactive Textbook Reading:** Reading a math textbook must be done interactively. When you read sections covered in this course, be sure to work through examples as the author does, keep a list of terms and their definitions (with examples as needed), and work through exercises at the end of each chapter to ensure mastery of concepts. Head over to office hours when you have questions about a term, concept, or computation. I will suggest practice problems through Inquire – these will help you learn concepts and prepare for HW and Tests.

**HW:** In order to learn the material so that you can apply these concepts to our course applications, you need to work through exercises from the book. Again, I will suggest practice problems for you to work through, but you will also have weekly homework sets to turn in on Fridays that cover previous material. Write out more than you think necessary and keep your work neat!

**Projects:** You will have 3 projects that demonstrate applications of linear algebra throughout the semester – one will focus on fractals, the second on ranking sports teams, and the third on Google page ranking. Each of these will entail prep work (setting up the project & working through the mathematics) and writing a REPORT on your work – essentially each will culminate in a PAPER, which can be odd in a math course). Guidance will be given for how to integrate math & writing for these projects.

**Tests:** You will take 4 tests throughout this semester – each will cover material covered prior to the test. Many will seem cumulative, as you will notice topics learned early in the semester tend to keep coming back in new material. The final exam in this course won't be your typical final exam – it will focus on the last few weeks of material and be called *Test 4*. Again, some concepts from earlier in the semester may have to make an appearance on Test 4 due to the cumulative nature of math courses.

**Extra Credit: Earn  $\leq 1\%$  back on final grade each; determined by depth of reflection; max 5**

1. Attend any Roanoke College sponsored talk (MCSP Conversation Series, EPICs, Bio Seminars, etc) and reflect on the talk & how Linear Algebra relates.
2. Choose any broad topic of interest, conduct a bit of research, determine how linear algebra relates to that topic, and write a reflection on what you learned (e.g. Pixar + coding cartoons).

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## COURSE EXPECTATIONS

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**Classroom Environment:** You are expected to treat all students in the class and me with courtesy and respect. Your comments to others should be factual, constructive, and free from harassing statements. You are encouraged to disagree with other students, but such disagreements need to be based upon facts and documentation (rather than prejudices and personalities). My goal is to promote an atmosphere of mutual respect in the classroom. Please let me know if you have suggestions for improving the classroom environment. (Source: Iowa State University)

### Diversity and Inclusivity

I consider this classroom to be a place where you will be treated with respect, and I welcome individuals of all ages, backgrounds, beliefs, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientations, ability – and other visible and nonvisible differences. All members of this class are expected to contribute to a respectful, welcoming and inclusive environment for every other member of the class.

**Attendance Policy:** Our course's success depends on you attending class! If you miss class, you will miss community building, engaging conversations, and information that I deem worthy of your time! Plus, we will miss you!

However, life happens! You may get sick, have a game scheduled, or have something else come up. It will not be the end of the world if you miss a class *very occasionally*. At some point, though, missing class can be detrimental to success. So, do your best to be in class! Strive for perfect attendance!

**Communication is key. Let me know as soon as you know you will miss class.**

### **\*\*I WANT YOU TO SUCCEED IN MY CLASS\*\***

I am willing to put in as much effort to help you in my class as you put into my class. So, do the work, come to office hours, attend subject tutoring, ask questions, and do a little MATH 201 every day.

**Inquire Policy:** You are responsible for:

- **Being aware of all postings on Inquire:** Check Inquire DAILY for course information.
- **Uploading your assignments to Inquire:** Anything due on Inquire will not be accepted in any other form.
- **Making and checking successful submissions:** To receive credit for uploads, your file must be readable on the instructor's college computer.
- **Resolving technology problems:** through our Information Technology (IT) department [support@roanoke.edu](mailto:support@roanoke.edu).

### **Academic Integrity / Generative Artificial Intelligence:**

I expect all of you to follow the Academic Integrity policies of Roanoke College

([https://www.roanoke.edu/inside/a-z\\_index/academic\\_integrity](https://www.roanoke.edu/inside/a-z_index/academic_integrity)). All work submitted for a grade must be your own. HOWEVER, learning doesn't always happen by yourself – in fact, most of the time, we learn from or with others! The key is to know WHEN to use help and HOW to use help.

**You may use Subject Tutoring, me, our textbook & readings, & your notes from class any time!**

**You may use the internet, generative Artificial Intelligence (gAI), and your peers for help with practice problems, studying for tests, learning concepts, and brainstorming extra credit ideas for option 2 only (see above) – as long as you cite when and how you use these tools. Be sure to use these tools interactively, not passively (no copy & paste). Do NOT use these tools for HW sets, Projects (except for gathering data on sports teams), or Tests.**

WHY? You spend a lot of money attending Roanoke College working toward a (or several) degree(s). Don't you want that degree to mean something? If RC students are only getting degrees by cheating, then does that degree actually mean anything? If we were to get a reputation for a "cheating" school...do you think you'd get a job after Roanoke College?

### **Trexler Tea Time**

Thursdays, 2:20 – 3:20PM  
Trexler 271

A chance to chill with peeps while munching on cookies and sipping tea! Often cards make an appearance – or other games! Take an opportunity to relax, have fun, and hang with other students and professors!

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## RESOURCES

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**Accessible Education Services (AES)** is located on the first floor of the **Bank Building**. AES provides reasonable accommodations to students with documented disabilities. To register for services, students must self-identify to AES, complete the registration process, and provide current documentation of a disability along with recommendations from the qualified specialist. Please contact Dustin Persinger, Assistant Director of Academic Services for Accessible Education, at 540-375-2248 or by e-mail at [aes@roanoke.edu](mailto:aes@roanoke.edu) to schedule an appointment. If you have registered with AES in the past and would like to receive academic accommodations for this semester, please contact Dustin Persinger at your earliest convenience to schedule an appointment and/or obtain your accommodation letter for the current semester. The testing center, also located on the first floor of the Bank Building, can be reached at 540-375-2247.

The **Dr. Sandee McGlaun Writing Center and Subject Tutoring**, located in the lower level of the **Fintel Library** (Room 5), offers free one-on-one support in writing, oral presentations, and course content such as Business, Economics, Mathematics, INQ 240, Modern Languages, Lab Sciences, and Social Sciences. Open Sunday–Thursday from 4–9 PM, students can stop by or schedule through Navigate by selecting “Schedule an Appointment” → “Writing Center and Subject Tutoring” → “Writing Support” or “Course Tutoring” → preferred date and tutor. Contact [subject\\_tutoring@roanoke.edu](mailto:subject_tutoring@roanoke.edu) or 540-375-2590 for more information.

**Student Health & Counseling Services** supports students through in-person health appointments, in-person counseling, 24/7 telehealth (TimelyCare), Therapy Assistance Online, as well as resources related to general wellness, LGBTQ+, sexual assault, substance abuse, and suicide prevention. Unmet health needs can negatively impact your performance in this course. Student Health & Counseling Services can help. Please see <https://www.roanoke.edu/shcs> for more information and to access services.

## TENTATIVE COURSE SCHEDULE

| Day                  | Date    | Topic  | Due Dates of Assignments  |
|----------------------|---------|--|---------------------------|
| Wed                  | Aug 27  | Chapter 0: Intro & Motivation                                |                           |
| Fri                  | Aug 29  | Section 1.1: Vector Operations                               | <b>HW 1</b>               |
| Mon                  | Sept 1  | Section 1.2: Span  |                           |
| Wed                  | Sept 3  | Section 1.3: Linear Independence                             |                           |
| Fri                  | Sept 5  | Section 2.1: Linear Functions                                | <b>HW 2</b>               |
| Mon                  | Sept 8  | Section 2.2: Matrices  |                           |
| Wed                  | Sept 10 | Sections 2.2/2.3: Matrices & Matrix Operations               |                           |
| Fri                  | Sept 12 | Section 2.3: Matrix Operations                               | <b>HW 3</b>               |
| Mon                  | Sept 15 | <b>Review</b>  |                           |
| Wed                  | Sept 17 | <b>Test 1 (Ch 0, Ch 1, Sections 2.1-2.3)</b>                 |                           |
| Fri                  | Sept 19 | <b>Project 1 - Fractals</b>                                  |                           |
| Mon                  | Sept 22 | Section 2.4: Matrix Vector Spaces                            |                           |
| Wed                  | Sept 24 | Section 2.5: Kernel & Range                                  |                           |
| Fri                  | Sept 26 | Section 2.5: Kernel & Range                                  | <b>Project 1<br/>HW 4</b> |
| Mon                  | Sept 29 | Section 2.6: Row Reduction                                   |                           |
| Wed                  | Oct 1   | Section 2.7: Applications of Row Reduction                   |                           |
| Fri                  | Oct 3   | <b>Review</b>  | <b>HW 5</b>               |
| Mon                  | Oct 6   | <b>Test 2 (Sections 2.4-2.7)</b>                             |                           |
| Wed                  | Oct 8   | <b>Project 2 - Sports Ranking</b>                            |                           |
| Fri                  | Oct 10  | Section 2.8: Solution Sets                                   |                           |
| <b>FALL BREAK!</b>   |         |  |                           |
| Mon                  | Oct 20  | Section 2.10: Invertibility                                  |                           |
| Wed                  | Oct 22  | Section 2.11: Invertible Matrix Theorem                      |                           |
| Fri                  | Oct 24  | Section 3.1: Basis & Coordinates                             | <b>HW 6</b>               |
| Mon                  | Oct 27  | Section 3.1: Basis & Coordinates                             | <b>Project 2</b>          |
| Wed                  | Oct 29  | Section 3.2: Polynomial Vector Spaces                        |                           |
| Fri                  | Oct 31  | Section 3.3: Other Vector Spaces                             | <b>HW 7</b>               |
| Mon                  | Nov 3   | <b>Review</b>  |                           |
| Wed                  | Nov 5   | <b>Test 3 (Sections 2.8-2.11, Ch 3)</b>                      |                           |
| Fri                  | Nov 7   | <b>Project 3 – Google</b>                                    |                           |
| Mon                  | Nov 10  | Section 4.1: Eigenvalues & Eigenvectors                      |                           |
| Wed                  | Nov 12  | Section 4.2: Determinants                                    |                           |
| Fri                  | Nov 14  | Section 4.3: Eigenspaces                                     | <b>Project 3<br/>HW 8</b> |
| Mon                  | Nov 17  | Section 4.4: Diagonalization                                 |                           |
| Wed                  | Nov 19  | Sections 4.4/4.5: Diagonalization & Change of Basis Matrices |                           |
| Fri                  | Nov 21  | Section 4.5: Change of Basis Matrices                        | <b>HW 9</b>               |
| Mon                  | Nov 24  | Section 5.1: Length  |                           |
| <b>T-DAY BREAK!!</b> |         |  |                           |
| Mon                  | Dec 1   | Section 5.2: Orthogonality                                   |                           |
| Wed                  | Dec 3   | Section 5.3: Orthogonal Projection                           | <b>HW 10</b>              |
| Fri                  | Dec 5   | <b>Review</b>  |                           |
| Wed                  | Dec 10  | <b>Test 4 (Ch 4 &amp; Sections 5.1-5.3)</b>                  | <b>2PM-5PM</b>            |