

Math 253 Spring 2020

Linear Algebra

MWF 9:00-9:50AM Lovejoy 212

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Office Hours: Monday 2:00-3:30PM, Tuesday 5:30-7:00PM
Thursday 7:00-8:00PM, & by appointment

Course Website: <http://personal.colby.edu/~erandles/M253.html>
Personal Website: <http://personal.colby.edu/~erandles/>

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(TA office hours are held from 7:00-9:00PM on Sunday, Monday and Tuesday in Lovejoy 215)

If people do not believe that mathematics is simple, it is only because they do not realize how complicated life is – John von Neumann

Course Description: Linear algebra is a crossroads where many important areas of mathematics meet, and it is the tool used to analyze the first approximation of complex systems. Students will learn to understand and use the language and theorems in both abstract and applied situations, gain insight into the nature of mathematical inquiry, and learn how to reason carefully and precisely about formally described situations. Topics include: vectors and subspaces in \mathbb{R}^n , linear transformations, and matrices; systems of linear equations; abstract vector spaces and the theory of linear transformations; change of basis, determinants, eigenvalues and eigenvectors, and diagonalization.

Prerequisites: Mathematics 122 or 162

Textbook: Linear Algebra and its Applications by Lay, 3rd edition.

Grading: Your grade will be calculated as follows:

Class participation:	5%
Weekly homework assignments:	15%
Writing assignments:	15%
Quizzes:	10%
Minimum of Midterms 1 and 2:	15%
Maximum of Midterms 1 and 2:	20%
Final Exam:	20%

Exams: This course will have two midterm exams and a final exam. The midterm exams will be cumulative, though they might have a stronger focus on material presented in the several preceding weeks. The final exam will be cumulative. To do well on exams (and quizzes), you will need to understand the material at a conceptual level. Though you will need to be able to calculate quickly and accurately, the exams will test your understanding of the material at a level which goes well beyond simple computation. The exams will be at the following dates and times:

Exam	Date and Times	Location
Midterm 1	Wednesday, March 4th from 7:00-9:00 PM	Keyes 105
Midterm 2	Thursday, April 9th from 7:00-9:00 PM	Keyes 105
Final Exam	Friday, May 15th from 1:30-4:30PM	TBA

It is crucial that you reserve these time slots for these exams. In the event that you are unable to attend a midterm exam, you must let me know **at least two weeks prior** to the exam date.

Quizzes: We will have weekly quizzes administered at the beginning of class on Fridays. The quizzes will be limited to one or two problems each and they will parallel, in content and style, to the problems seen in the homework. There are **no** make-up quizzes. I will, however, drop your lowest quiz score on the condition that you attend one Mathematics & Statistics Department colloquium and submit a one-page summary. Your summary needs to be submitted via email as a PDF file on or before the last day of class.

Attendance and Class Participation: As participation is a big part of this course, class attendance is required. Excuses may be granted for critical emergencies (normally verified by the Dean of Students) and illness (normally verified by the College Health Center). Absences for official Colby activities require prior approval and absences for religious reasons will be considered excused if the policy in the college catalogue is followed. To learn mathematics, it is essential to communicate it and to discuss it with others. I encourage you to ask questions! You will be required to participate in class discussion and you will frequently be called on during lecture. Failure to adhere to these policies, including missing too many classes (≥ 3), will result in grade penalties, academic warnings, and eventually dismissal from the class.

Homework: Homework is the most important part of this course. It is where you will grapple with new ideas, come up with creative solutions and communicate your thoughts and understanding to others (your peers, your TAs and me). Consequently, it is crucial that you take homework very seriously. You should start homework early, work diligently and talk to your peers and our teaching assistant. If you are having substantial difficulty with a particular problem, please email me or come talk to me during office hours. I am here to help! You are permitted and encouraged to discuss homework with your classmates and to consult other textbooks, however, I discourage you from searching for solutions on the internet – such behavior will only hinder your learning experience. What you turn in must be your own.

Homework Structure and Schedule: Assignments will be posted to the course website and are due (in class) at the beginning of class on Wednesdays, unless otherwise stated. It is crucial to keep up with the homework in this course. Therefore, short of the circumstances discussed in the attendance policy above, late homework will not be not accepted. To account for one legitimate

illness/absence, your lowest homework score will be dropped.

The homework assignments will generally be broken into two distinct parts. The first part of the homework will consist of problems you should do (and I'll expect you to do) but you needn't turn in. This group of problems will generally be computational in nature and mostly consist of textbook problems. As these problems will not be graded, if you would like help with them or just want to make sure you're doing them correctly, you should (always) feel free to come to office hours (mine or those of the TAs). The second part of the homework will be more conceptual in nature. You are expected to solve and write up all of the problems in the second part of the homework. There is an essential difference between writing up a problem and just writing down the answer. I expect your solution to each problem to be written out correctly and your work should follow a coherent logical structure making use of complete sentences whenever possible. Please do not submit solutions containing incoherent and unstructured calculations. You should be proud of the material you turn in!

Homework Policies:

1. All write-ups are to be submitted in hard copy.
2. Your write-ups should be single-sided with no more than one exercise per page.
3. If the write-up for an exercise consists of more than one page, you should staple together all pages associated to that exercise. The resulting collection of exercise write-ups should be paper clipped together and submitted as a packet.
4. Each paper you turn in should have your name and the due date printed clearly at the top.
5. It is your responsibility to make sure that your homework is complete and all pages are accounted for.
6. If you used technology in the solution of the problem, please provide the complete printout showing all code, inputs and outputs in sequence, and annotate the printout with comments explaining what is being done in each step.

Projects: In addition to homework, there will be two special projects assigned throughout the semester. For these assignments, you will practice mathematical writing while attacking longer and more challenging problems. As with the homework, I expect the solutions to the writing assignment problems to be correct, well-written, and presented in good mathematical prose. Your grade will depend on the correctness of your solutions and the quality of your writing. This means that your writing should follow a coherent logical structure which makes use of complete sentences and follows standard rules of grammar. After the beginning of the semester, you will be given a specific write-up concerning these projects, including grading policies and a thorough description of my expectations for them.

My Email Policy: I love talking about mathematics and I always prefer to do it in person. For this reason, I like to, whenever possible, reserve email for logistical things. However, when you are stuck and cannot come see me in person, please feel free to email me. I am here to help!

As my life is busy and I have many responsibilities, I usually only check and respond to email once per day and sometimes not at all on weekends. For this reason, I try to uphold the following

24-48 hour rule: If you send an email Sunday through Thursday, I will do my best to respond within 24 hours. If you send an email on Friday or Saturday, I will do my best to respond within 48 hours. If I do not respond within these windows, feel free to email me again as I may have missed it.

Academic Integrity: Honesty, integrity, and personal responsibility are cornerstones of a Colby education and provide the foundation for scholarly inquiry, intellectual discourse, and an open and welcoming campus community. These values are articulated in the Colby Affirmation and are central to this course. You are expected to demonstrate academic honesty in all aspects of this course. If you are clear about course expectations, give credit to those whose work you rely on, and submit your best work, you are highly unlikely to commit an act of academic dishonesty.

Academic dishonesty includes, but is not limited to: violating clearly stated rules for taking an exam or completing homework; plagiarism (including material from sources without a citation and quotation marks around any borrowed words); claiming another's work or a modification of another's work as one's own; buying or attempting to buy papers or projects for a course; fabricating information or citations; knowingly assisting others in acts of academic dishonesty; misrepresentations to faculty within the context of a course; and submitting the same work, including an essay that you wrote, in more than one course without the permission of the instructors.

Academic dishonesty is a serious offense against the college. Sanctions for academic dishonesty are assigned by an academic review board and may include failure on the assignment, failure in the course, or suspension or expulsion from the College.

The Colby Affirmation

Colby College is a community dedicated to learning and committed to the growth and well-being of all its members.

As a community devoted to intellectual growth, we value academic integrity. We agree to take ownership of our academic work, to submit only work that is our own, to fully acknowledge the research and ideas of others in our work, and to abide by the instructions and regulations governing academic work established by the faculty.

As a community built on respect for ourselves, each other, and our physical environment, we recognize the diversity of people that have gathered here and that genuine inclusivity requires active, honest, and compassionate engagement with one another. We agree to respect each other, to honor community expectations, and to comply with college policies.

As a member of this community, I pledge to hold myself and others accountable to these values.