

Math 3A – Syllabus

Linear fun

Friday, September 27, 2019

Welcome to Math 3A, a linear adventure awaits you! This is the survival manual for this course, where you can find all the administrative info you need to know, such as office hours, grading, and other goodies. Feel free to e-mail me if you have any other questions.

- **Instructor:** Peyam (Pie-Am) Ryan Tabrizian
- **E-mail:** drpeyam@gmail.com
- **Office:** 410N Rowland Hall
- **Class meeting times:** This course meets on MWF 2-2:50 PM in HH 178. I do not take attendance, so whether you show up to class is entirely up to you. I will post lecture notes on my website, in case you want to know all the fun that you've missed
- **Office Hours:** W 12:30-1:30 PM and Th 2-3 PM, but feel free to show up whenever you want. That said, I do not take office hours by appointment.
- **TA information:**
 - Name: Deborah Tonne
 - E-mail: tonned@uci.edu
 - Office: 480 Rowland Hall
- **Discussion Section:** TuTh 8-8:50 AM in 1200 Donald Bren Hall or TuTh 6-6:50 PM in 143 Humanities Hall. Attendance is optional, but remember that you have a quiz most Thursdays during discussion section. What is covered in the discussion section is entirely up to the TA's discretion.

- **Enrollment and Waitlists: I have no control over the waitlist.** For any administrative issues such as class enrollment, please contact Jezelle Rab-bath. Her office is in 340B Rowland and her e-mail is younanj@uci.edu
- **Important Dates:**
 - ▶ Th 09/26: No discussion section/quiz (section before lecture)
 - ▶ F 10/11: Last day to add/drop a course/change the grading option.
 - ▶ **F 11/01, 2-2:50 PM: Midterm Exam** (during lecture)
 - ▶ M 11/11: No lecture (Veterans Day)
 - ▶ Th 11/28: No discussion section or quiz (Thanksgiving)
 - ▶ F 11/29: No lecture (Thanksgiving)
 - ▶ **F 12/13, 1:30-3:30 PM, 178 Humanities Hall: Final Exam**
- **Online resources you can use:**
 - ▶ Course website: This is the main course website, where you can find lecture notes, YouTube videos, suggested homework, as well as study guides and practice exams.
 - ▶ Canvas: Mainly use this to check your grades.
 - ▶ Dr Peyam: My YouTube channel; for linear algebra and other fun math videos. Feel free to subscribe to it if you want to! In particular, check out the playlists below.
- **YouTube playlists:** There are a lot of Linear Algebra videos on my YouTube channel, based on the concepts covered in this course. Check them out if you need help with a topic:

Chapter	URL
1	Linear Equations in Linear Algebra
2	Matrix Algebra
3	Determinants
5	Eigenvalues and Eigenvectors
6	Orthogonality and Least-Squares
T/F	111 Linear Algebra True/False Questions
Fun	Fun with Linear Algebra

- **Textbook:**

Required: *Linear Algebra and its Applications, 5th edition* by Lay, Lay, and McDonald, Pearson, ISBN 978-0321982384. It's actually a pretty good textbook, so read it! An older edition is fine too, as long as you do

the correct homework problems.

Recommended: *Linear Algebra, 4th edition* by Friedberg, Insel, and Spence, Pearson, ISBN 978-0130084514. This is the book they use in Math 121A, so if you want to learn more advanced linear algebra (or prep for 121A), you might want to check it out!

- **Prerequisites:** None! This is the beauty of this course, all you need for this course is to know how to add and multiply numbers. If you didn't like calculus, this is your chance to give your love of math a second chance!
- **What people make you believe this course is about:** The official description includes “Systems of linear equations, matrix operations, determinants, eigenvalues and eigenvectors, vector spaces, subspaces, and dimension.” In this course, we'll learn an efficient way of solving systems of linear equations, and we'll interpret the solutions geometrically. This course lies at the beautiful intersection between algebra and geometry, and there will be lots of miracles. This is mathematics at its finest! We will cover the following chapters in the book:

Linear Equations in Linear Algebra (Chapter 1)
 Matrix Algebra (Chapter 2)
 Determinants (Chapter 3)
 Eigenvalues and Eigenvectors (Chapter 5)
 Orthogonality and Least Squares (Chapter 6)

Note: In my lecture, I will go up to and including section 6.6 (Applications Linear Models), because it's one of the highlights of linear algebra. If you'd like a Math 3A course that only goes up to 6.2, please switch to another Math 3A section.

- **What this course is *really* about:** I highly doubt that you'll forget the techniques you'll learn in this course because they are essential to human survival. That said, as Steve Krantz puts it in his book “*How to teach Mathematics*,” there is another goal of teaching this course. Namely, *real* purpose of this course is to teach you about *mathematical discourse* and critical thought. Just like in rhetoric, philosophy or politics, mathematics has its own language and way of thinking. How do mathematicians deal with an unknown problem? What methods do they use? What do they do

when a given method doesn't work? Getting acquainted with those different types of discourses is what your college education is really about.

- **Grading:**

- ▶ 20 % Quizzes, given on Thursdays during discussion section (including the week of the midterm). The lowest 2 quizzes are dropped. No quiz on Thursday, September 26 (Week 0) and on Thursday, November 28 (Thanksgiving)
- ▶ 30 % Midterm, Friday, November 1, 2-2:50 PM in 178 Humanities Hall
- ▶ 50 % Final Exam, Friday, December 13, 1:30-3:30 PM in 178 Humanities Hall.

Note: Your final score can replace your midterm score if it is higher than your midterm score.

I will follow the standard curve suggested by the math department, which is 20 % A, 25 % B, 30 % C, 15 % D, and 10 % F, but I will try to be as generous as I can. This course will probably be curved. If I curve, then the way I'll curve is that I'll take all your raw scores and add them up to get a raw total score, and *then* I'll curve that total score.

Curve from Math 3A Winter 2019: A = 78-100, B = 70-78, C = 50-69, D = 38-49, F = 0-37. That said, do not expect the exact same curve this quarter; it depends on how people do in the class.

- **Suggested Homework:** There are suggested homework problems on my website, which you do **NOT** have to turn in and which will **NOT** be graded. That said, the quizzes and exams will be similar to those problems, so I highly recommend you to do them!
- **Quizzes:** Quizzes are given on **Thursdays** during discussion section, and roughly cover the material from the 3 lectures prior the quiz-day, as well as the suggested homework problems. They are written by your TA, who has complete control over them, and who can give you more information about them. **No make-up quizzes will be given, but your lowest two quizzes will be dropped.** I highly recommend you to save the dropped quizzes for the time when you'll get sick or have a personal emergency. No quizzes on September 26 (Week 0) and on November 28 (Thanksgiving)

Important: Your TA reserves the right to change the content and/or date of the quizzes, so make sure to keep in touch with your TA for any announcements.

- **Midterm:** The Midterm exam will be given on Friday, November 1, 2-2:50 PM in 178 Humanities Hall (our usual lecture room), and will cover Chapters 1, 2, and 3. **No make-up midterm will be given**, but your final exam replaces your midterm score if you do better on the final.
- **Final Exam:** The final exam is cumulative and will cover Chapters 1, 2, 3, 5, 6. It is set for Friday, December 13, 1:30-3:30 PM in 178 Humanities Hall. **No make-up final will be given**, so if you cannot make it to the final, please switch to another Math 3A-lecture. Your final exam score replaces your midterm score if you do better on the final.
- **Cheating: DO NOT CHEAT!** Any form of cheating, no matter how small (e.g. even looking at your neighbor's quiz) will result in an automatic F in the course, and will be pursuant to further disciplinary sanctions. In particular, by taking this course, you agree to abide by the following academic integrity policy:
- **Academic Integrity Policy:** All students are expected to complete a course in compliance with the Instructor's standards. No student shall engage in any activity involving any Academic Integrity Policy Violations. No student shall engage in any activity that involves attempting to receive a grade by means other than honest effort, and shall not aid another student who is attempting to do so.
- **Accommodations:** Students who may need disability-related accommodations are encouraged to talk to me and the deans as soon as possible.
- **Finally:** Sit back, relax, and enjoy the show! Remember that this course is fun and enlightening! I'm really looking forward to an exciting quarter together! :) On the next page, you can find a tentative schedule of the lectures.

#		Date	Section	Lecture Title	
	Th	Sep 26		No Discussion	No Quiz
1	F	Sep 27	1.1	Systems of Linear Equations	
2	M	Sep 30	1.2	Row-Reduction and Echelon Forms	
3	W	Oct 2	1.3, 1.4	Vector Equations; The Matrix Equation $Ax = b$	
	Th	Oct 3			Quiz 1
4	F	Oct 4	1.4, 1.5	Solutions Sets of Linear Systems	
5	M	Oct 7	1.7	Linear Independence	
6	W	Oct 9	1.8	Introduction to Linear Transformations	
	Th	Oct 10			Quiz 2
7	F	Oct 11	1.9	The Matrix of a Linear Transformation	
8	M	Oct 14	2.1	Matrix Operations	
9	W	Oct 16	2.2	The Inverse of a Matrix	
	Th	Oct 17			Quiz 3
10	F	Oct 18	2.3	Characterizations of Invertible Matrices	
11	M	Oct 21	2.8	Subspaces of \mathbb{R}^n	
12	W	Oct 23	2.9	Dimension and Rank	
	Th	Oct 24			Quiz 4
13	F	Oct 25	3.1, 3.2	Introduction to Determinants; Properties of Determinants	
14	M	Oct 28	3.2, 3.3	Cramer's Rule, Volume, and Linear Transformations	
15	W	Oct 30		Catch-up/Review	
	Th	Oct 31			Quiz 5
16	F	Nov 1		Midterm	
17	M	Nov 4	5.1, 5.2	Eigenvectors and Eigenvalues; The Characteristic Equation	
18	W	Nov 6	5.3	Diagonalization	
	Th	Nov 7			Quiz 6
19	F	Nov 8	5.3	Three Applications of Diagonalization	
	M	Nov 11		No lecture (Veterans Day)	
20	W	Nov 13	5.4	Eigenvectors and Linear Transformation	
	Th	Nov 14			Quiz 7
21	F	Nov 15		Catch-up/Review of Chapter 5	
22	M	Nov 18	6.1	Inner Product, Length, and Orthogonality	
23	W	Nov 20	6.2	Orthogonal Sets	
	Th	Nov 21			Quiz 8
24	F	Nov 22	6.3	Orthogonal Projections	
25	M	Nov 25	6.4	The Gram-Schmidt Process	
26	W	Nov 27	6.5, 6.6	Least-Squares; Applications to Linear Models	
	Th	Nov 28		No Discussion	No quiz
	F	Nov 29		No lecture (Thanksgiving)	
27	M	Dec 2		Catch-up/Review	
28	W	Dec 4		Catch-up/Review	
	Th	Dec 5			Quiz 8
29	F	Dec 7		Catch-up/Review	
	F	Dec 13		Final Exam	