

SYLLABUS FOR MA221 LINEAR ALGEBRA, FALL 2021

INSTRUCTOR: Dr. Ned Wolff

OFFICE: Boyer 111B, but for the first part of the semester reach me via email for a Zoom appointment. Note that Arcadia offers free tutoring from the LRN.

VIDEO CAMERAS: During class and while taking quizzes and exams, your video should be turned on. (Please let me know if there are reasons why you are uncomfortable doing this.)

EMAIL: wolff@arcadia.edu

TEXT: Elementary Linear Algebra 8th Edition, Cengage Learning, 2017. Note that you can rent this book for the semester for under \$40.

PREREQUISITE: Credit for MA201 Calculus I (or equivalent A.P. or transfer credit).

COURSE OVERVIEW: Linear Algebra has always been one of my favorite courses to teach. In it, you will learn a number of powerful techniques that can be applied to a wide variety of applications and, in addition, you will enjoy (I hope!) an introduction to the wonderful world of theoretical mathematics. My goal is to create a class atmosphere that is both comfortable and dynamic, where each of you will feel at ease participating fully in group and whole-class discussions.

EXAMS: There will be two exams plus a final exam. Each of the first two exams will count 100 points. The final exam will count either 100 points or 200 points, depending on which gives you the highest grade. That is, if you have a good final exam, I'll count it more. The two exams are tentatively scheduled for Friday, October 8 and Monday, November 15. The final exam will take place 1:00 P.M. on Wednesday, December 15. In addition to the above exams, there will be several quizzes given most Wednesdays. I will give your lowest quiz half weight when averaging the quizzes. The quiz average will count 100 points (same as a regular exam.) It is very important that you take exams on the scheduled dates. If an emergency arises that prevents you from taking a quiz or test at the scheduled time, you must leave me an email message *before* the scheduled time.

HOMEWORK: I will regularly assign homework and expect you to do it. I will normally not collect the homework, but will sometimes check whether you have done it on the day it's due. Those who attend class regularly and do well on the homework (both in terms of having tried it and exhibiting careful work) will be given a boost in borderline situations. Students who neglect to do the homework or who do not attend class regularly will be graded strictly on their test average and, in addition, will not be able to receive out-of-class attention. Homework is due at the beginning of the next class after it is assigned. Note that complete solutions for all of the odd numbered problems are available online at calcchat.com! No special login is needed.

CALCULATORS: **Calculators:** We will make use of TI-84/TI-89/Voyage200, NSpire graphing calculators throughout the course. If you do not own one, you have lots of options. You can rent a TI-89 for \$9.95 per month with the first month free. That will come out to about \$30 for the semester. You can also get by with a TI-84 although the way it handles matrices is a little more cumbersome. You can rent one of those for \$6.95 per month. You can also install a free TI-84 emulator called Wabbitemu. It runs on PC's, Macs, iPhones and Android devices. I will send out instructions on how to install it. UPDATE: I WILL PROVIDE TI-89'S FOR FREE FOR THOSE WHO DON'T HAVE ONE. OF COURSE, YOU WILL NEED TO RETURN IT AT THE END OF THE SEMESTER.

Email communication statement: *I will on occasion send important class-related email to your Arcadia account. It is your responsibility to log in daily to see if there are any messages from me. Thank you.*

Disability statement: *Arcadia University provides reasonable accommodations for students with documented disabilities. If you require accommodations or other academic supports due to a physical, psychological, psychiatric or learning disability, you should contact Disability Support Services by emailing Jessica Holdren: holdrenj@arcadia.edu*

Title IX statement: *Arcadia University is committed to providing a learning, living, and working environment that is free from discrimination. The University has an [Interim Policy Prohibiting Sexual Harassment and Sexual Misconduct](#) detailing our*

commitment to preventing and addressing such behavior. I understand the impact that sexual harassment and sexual misconduct can have and am committed to doing my part to foster an environment that is safe and equitable.

Please know that all faculty on campus are mandatory reporters. This means that if you disclose an experience of sexual harassment or sexual misconduct to me outside of a classroom discussion, a writing assignment, or a University-approved research project, I must share what you reported to me with Arcadia's Title IX Coordinator. This does not mean that you will have to pursue an investigation or go through a grievance process. Even if you do not choose these options, the Title IX Office can provide supportive measures and other resources to you.

If you or someone you know has experienced sexual harassment or sexual misconduct, please know that you are not alone. If you would like to speak to someone confidentially, [confidential resources](#) are provided on the [Office of Equity and Civil Rights website](#)

Assignments MA 221 Linear Algebra Fall 2021

Note that this list is tentative and is very likely to be modified during the semester.

HW #	Topic	Page	Problems
1	1.1 Intro to Systems of Lin Eq	10	1-6, 7, 9
2	1.2 Gauss-Jordan Elimination	22	15,17,25,27,29,31,33,35,37
3	1.2 More on Gauss-Jordan	22	19-24,39,41,43,49,51,52,57
4	1.3 Applications of Lin Eq	32	1,5 ,21,23,25,27,29
5	2.1 Operations with Matrices	48	1-43 odd, 53,55,59,71
6	2.2 Properties of Mat Oper	59	25,27,37,39,41,45,51,53,55,56
7	2.3 Inverses of Matrices	71	1,3,7,9,11,15,19,23,29,31,37,41,45,47,53,55,59,71,72
8	3.1 Determinants	116	1-11 odd, 19, 21, 45, 49
9	3.2 Det. via Row Operations	124	25,27,29,31, 37
10	3.3 Properties of Determinants	131	1,9,13,17,19,23,25,31,33,37,39,43,57,58,61
11	3.3 Cramer's Rule (very briefly)	142	9,17,19
12	4.1 Vectors in \mathbb{R}^n	159	7,15,27,29,39,41,43,45,47
13	4.2 Vector Spaces	166	1-37 odd,41,49,50
14	4.3 Subspaces	173	1,3, 7-27 odd, 28, 31, 33, 35, 39, 41
15A	4.4 Spanning	184	1-7 odd
15B	4.4 Linear Independence	178	9-57 Odd, 60
16	Proofs		To be given out in class
17	4.5 Basis and Dimension	193	1-45 odd
18	4.5 Basis and Dimension	193	47-79 odd, 80
19	5.1 Length & Dot Product in \mathbb{R}^n	241	1-27 odd, 35-55 odd
20	4.6 Rank, null space, etc.	205	7-33 odd, 41, 67
21	4.7 Coordinates	216	5-15 odd, 45,47
22A	6.1 Linear Transformations	306	1-17 odd, 23, 25
22B	6.1 Linear Transformations	306	33- 41 odd,67,69
23	6.2 Kernel and Range of L.T.'s	318	1-9 odd, 10, 15,33,35,41,43,45
24A	7.1 Eigenvalues/vectors	356	1,3,5,9,11,15-23 odd
24B	7.1 Eigenvalues/vectors	356	69-75, 79
25	Markov Chains		To be given out in class
26	5.2 Inner Product Spaces	251	17,19,21,29,35,39,43,45,51
27	5.2 Orthogonal Projection	251	69-77 odd, 87
28	Network connectivity		To be given out in class
29	Other applications		To be given out in class