Math 314/814 Linear Algebra Section 7 Syllabus

Time and place: Tuesday / Thursday 12:30–1:45pm AVH 110

Hybrid style of class: Classroom capacities have been limited this semester to allow six-foot social distancing within the classroom. Our classroom will only accommodate half of the students on a given day, so *half of the students will be assigned to attend on Tuesday, and half to attend on Thursday.* All lectures will be made available on Canvas, and all students, *regardless of day to attend class*, will watch the lectures online. In-class time will be used for interactive groupwork and discussion. We will try to incorporate those who are not attending in person at all by zoom or Skype. To facilitate groupwork while maintaining a safe distance, *students will bring to class a personal whiteboard* to share your work with one another and the instructor. One economic and practical option can be found below:

https://dryerase.com/collections/math/products/whiteboard_graph?variant=18173965467721

Office Hours: Office hours will be held on zoom.

- Tuesday 11am–noon
  Meeting ID: 986 8978 6708
  Passcode: officehour
  https://unl.zoom.us/j/98689786708?pwd=ZW90S0NPYVJnTDF6OUNyck9UbzNrZz09

- Wednesday 9:30–10:30
  Meeting ID: 976 2631 3316
  Passcode: officehour
  https://unl.zoom.us/j/97626313316?pwd=d0F5NjdzOTdIMFRsUUlxSVp1VHBpUT09

- Thursday 11am–noon
  Meeting ID: 954 4586 9889
  Passcode: officehour
  https://unl.zoom.us/j/95445869889?pwd=bGhrbDZWOERJelk2ZkdBNkJnWUhrQT09

Textbook: *Linear Algebra and Its Applications*, by David C. Lay, S. R. Lay, J. J. McDonald, 5th Ed.

Lecture notes: Fill-in-the-blank lecture notes will posted on Canvas. They will be collected and graded for completion. Collection dates will be announced at least one week in advance on Canvas.

Homework: Assigned problems from the text will be collected and graded for accuracy and completion. Collection dates will be announced at least one week in advance on Canvas.

Projects: Two larger projects will be assigned to be collected and graded for accuracy, completion, and clarity of presentation. For these projects, you will work in groups of three or four. Collection dates will be announced at least two weeks in advance on Canvas.

Quizzes/exam: Five long quizzes and the final exam will be administered online. Tentative quiz dates are given on the schedule below.

Grade Breakdown: Lecture notes 5%, Homework 15%, Projects 15%, Quizzes 40%, Final 25%

ACE Outcome 3: This course satisfies ACE Outcome 3: "Use mathematical, computational, statistical, or formal reasoning (including reasoning based on principles of logic) to solve problems, draw inferences, and determine reasonableness." Your instructor will provide examples, you will discuss them in class, and you will practice with numerous homework problems. The exams will test how well you've mastered the material. The final exam will be the primary means of assessing your achievement of ACE Outcome 3.

ADA Notice: Students with disabilities are encouraged to contact the instructor for a confidential discussion of their individual needs for academic accommodation. It is the policy of the University of Nebraska-Lincoln to provide flexible and individualized accommodation to students with documented disabilities that may affect their ability to fully participate in course activities or to meet course requirements. To receive accommodation services, students must be registered with the Services for Students with Disabilities (SSD) office [www.unl.edu], 132 Canfield Administration, 472-3787 voice or TTY.

Course Evaluation: The Department of Mathematics Course Evaluation Form will be available online during the last two weeks of class. You will get an email when the form becomes available. Evaluations are anonymous and instructors do not see any of the responses until after final grades have been submitted. Evaluations are important— the department uses evaluations to improve instruction. Please complete the evaluation and take the time to do so thoughtfully.

Departmental Grading Appeals Policy: Students who believe their academic evaluation has been prejudiced or capricious have recourse for appeals to (in order) the instructor, the departmental chair, the departmental appeals committee, and the college appeals committee.

Face Coverings Policy: Beginning June 17, 2020, all University of Nebraska–Lincoln (UNL) faculty, staff, students, and visitors (including contractors, service providers, and others) will be required to use a facial covering at all times when indoors on the UNL campus, with some exception listed in `https://covid19.unl.edu/face-covering-policy`.

Tentative timeline: (subject to change)

Week of	Section	Recommended exercises
August 17	*Online lectures and office hours begin*	
	1.1 Systems of Linear Equations	1, 3, 5, 9, 10, 11, 15, 18, 19, 20, 23, 24, 25, 31
	1.2 Row Reduction and Echelon Forms	1, 3, 7, 11, 13, 15, 17, 19, 21, 22, 23, 24, 25, 26
	1.3 Vector Equations	1, 3, 5, 7, 9, 11, 13, 14, 15, 17, 18, 19, 23, 24, 25, 28
August 24	*In-person instruction will begin*	
	1.4 The Matrix Equation $A\mathbf{x} = \mathbf{b}$	1, 3, 7, 9, 11, 13, 14, 15, 17, 18, 19, 20, 21, 22, 23, 24
	1.5 Solution Sets of Linear Systems	2, 5, 6, 7, 8, 9, 11, 12, 13, 15, 16, 20, 23, 24, 25, 40
	1.6 Applications	3(a,b), 7, 14
	Friday, August 28 is the last day to file a drop to remove course from student's record	
August 31	1.7 Linear Independence	1, 3, 5, 7, 8, 9, 13, 14, 15, 17, 19, 21, 22, 23, 24, 28, 30
	1.8 Introduction to Linear Transformations	1, 2, 3, 5, 7, 9, 11, 13, 14, 15, 16, 19, 21, 22, 32, 33, 34
	1.9 The Matrix of a Linear Transformation	1, 5, 7, 8, 13, 15, 17, 22–25, 38
September 7	2.1 Matrix Operations	1, 3, 5, 7–11, 15, 16, 19, 22, 24
	2.2 The Inverse of a Matrix	1, 3, 5, 7, 8, 9, 10, 13, 20, 21, 23, 24, 29, 31, 32, 33
	Quiz #1	
September 14	2.3 Characterization of Invertible Matrices	1–7(odd), 11, 12, 13, 16, 17, 19, 22, 33, 37
	2.5 Matrix Factorizations	3, 5, 9, 11, 19
September 21	3.1 Introduction to Determinants	1–13 (odd), 39, 40
	3.2 Properties of Determinants	1–8, 11, 15, 18, 19, 25, 27, 28, 31
	4.1 Vector Spaces and Subspaces	1–15, 17, 19, 20, 21, 23, 24, 25, 27
	Quiz #2	
September 28	4.2 Null Spaces, Column spaces	1, 2, 3, 5, 7, 11, 12, 15, 17, 19, 20, 21, 25–28, 30, 35, 37
	4.3 Linearly Independent Sets; Bases	1–19 (odd), 21–25, 31, 32
	4.4 Coordinate Systems	1, 3, 5, 7, 8, 11, 13, 15, 16, 27, 28, 29
	Project #1	
	Friday, October 2 is the last day to change to P/NP	
October 5	4.5 The Dimension of a Vector Space	1–5, 7–17 (odd), 19, 20, 21, 29, 30, 31
	4.6 Rank	1, 3, 4, 5–15 (odd), 17, 18, 19, 21, 25, 27–29
	4.7 Change of Basis	1–9 (odd), 11, 12, 13, 15
	Quiz #3	
October 12	5.1 Eigenvectors and Eigenvalues	1–15 (odd), 19, 21, 22, 23, 24, 25, 27, 31, 33
	5.2 The Characteristic Equation	1, 3, 7, 9, 11, 13, 17, 21, 22, 23, 24
	5.3 Diagonalization	1, 3, 5, 7, 11, 15, 16, 19, 21, 22, 23, 24, 25, 27, 29
October 19	5.4 Eigenvectors and Linear Transformations	1, 3, 5, 8, 9, 11, 13, 19, 23, 27
	5.5 Complex Eigenvalues	1, 5, 9, 13, 16
	Quiz #4	
October 26	6.1 Inner Product, Length and Orthogonality	1–19 (odd), 20, 25–31
	6.2 Orthogonal Sets	1, 5, 9, 11, 13, 15, 17, 23, 24, 27–29
	Wednesday, October 28 is the last day to withdraw from one or more courses	
November 2	6.3 Orthogonal Projections	1, 5, 7, 9, 11, 13, 15, 17, 21, 22, 23, 24
	6.6 Applications	1, 3, 7a, 9
	6.4 The Gram-Schmidt Process	1, 5, 9, 11, 15, 17, 18, 19, 22
	Project #2	
November 9	6.5 Least-Squares Problems	1, 3, 5, 7, 11, 15, 17, 18, 19, 21
	7.1 Diagonalization of Symmetric Matrices	1–19 (odd), 23, 25, 26, 28, 29, 36
	7.2 Quadratic Forms	1–13 (odd), 21, 22, 23, 24
	Quiz #5	
November 16	7.4 Singular Value Decomposition	1, 3, 5, 7, 9, 11, 12, 13, 17, 18, 23
	Catch Up and Review for Final Exam	
November 21 - 25	**Final Exam**	7:30–9:30 a.m. Wednesday, Nov. 25