Course Guide Applied Linear Algebra: Fall 2025: Math 221-003, DH 4424, T-R 2:15-3:30

	Topic	My notes	Comments	Assignment Collected
T: 8-19	systems of linear equations: basic terminology, row reduction technique	9 - 26		
TH	systems of linear equations: solution sets, applications	9 - 26		
T: 8-26	matrix arithmetic: equality, addition, subtraction and multiplication	27 - 45		Practice Mission 1
TH:	simultaneous systems, linear independence, spanning and the CCP	47 – 74		
T: 9-2	Theory and calculation of inverse matrices	75 - 97		Practice Mission 2
TH:	Block matrices and interesting examples,	75 – 97		
T: 9-9	determinants, formulas and calculation	99 – 122		Practice Mission 3
TH:	determinants, application examples	99 – 122		
T: 9-16	Interesting application			Practice Mission 4
TH:	In-class group Quiz 1 [50pts] (solution to be shown at end of class)			
T: 9-23	Test 1			
TH:	nonstandard coordinates for Euclidean space, standard matrix of linear map	123 - 150		
T: 9-30	properties of linear transformations, onto vs. one-to-one maps	123 – 150		
TH:	coordinate change for linear transformations on Euclidean space	123 – 150		
T: 10-7	eigenvalues and eigenvectors, diagonalization, application	151 - 182		Practice Mission 5
	FALL BREAK (10-9 and 10-10)			
T: 10-14	complex eigenvalues and eigenvectors	151 – 182		
TH:	eigenvalues and eigenvectors, nondiagonalizable case	151 - 182		
T: 10-21	calculus of matrices, systems of DEqns, motivation for eigenvector	183 - 205		Practice Mission 6
TH:	the matrix exponential	183 – 205		
T: 10-28	projections, orthogonal complements, perpendicularity of subspaces	207 - 247		
TH:	closest vector problem and least squares analysis	207 - 247		Practice Mission 8 (omit P116-P120)
T: 11-4	orthogonal matrices, QR-decomposition, geometry	207 – 247		
TH:	conic sections and quadratic surfaces & multivariate extremal analysis	249 – 266		
T: 11-11	Inner product space and Fourier analysis	267 – 275		Practice Mission 7
TH:	In-class group Quiz 2 [50pts] (solution to be shown at end of class)			
T: 11-18	Test 2			
TH:	Quaternions			
	THANKSGIVING BREAK (11-24 to 11-28)			
T: 12-2	Wedge product and tensors			
TH:	Group representations in physics, discussion of Final Exam			
	Comprehensive Final Exam is Tuesday, December 9, 3:30-5:30			

- **Grades:** usual 1000pts with standard scale, 900 or above earns A, 801-899.99 earns B, etc.
  - Tests 1 & 2 = 400pts,
  - Final = 250pts,
  - Practice Missions = 80pts,
  - Group Quizzes 100pts,
  - Surprise Attack Missions 170pts (unannounced, given in lecture, may be at start of class, middle or end, may be takehome with short turn-around time).

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- **There are 8 Practice Missions**, I have solutions posted for the problems so it should not be too difficult to complete these. Solutions are to be handwritten and stapled in the upper left corner upon completion.
- **Surprise Attack Missions (SAM)** are possibly assigned in any class and may be collected as soon as the next class meeting. These will not be recorded in Canvas until the end of the semester since I drop the lowest keep the 3 SAM scores. (I return with scores on them, and I put a score in Canvas after the last SAM)
- Yes, the rumors are true, I will replace some test scores with the Final Exam appropriately weighted (if helpful). I will replace Tests 1 or 2 with the Final Exam score if helpful. However, whatever you earn on the other assignments is what it is (unless you have a university approved excuse, in which case I may increase the weight of your Final Exam). If you ignore the homework in my course it is very unlikely that you earn a passing grade. This would be very silly in terms of the Practice Missions since I am posting solutions to most of the problems at the start of the semester. You will need to attend class and keep up with the material to have best success on the SAM's. I also expect the SAM's will include some Matlab work.