

Math 314 — Matrix Theory

Course Syllabus, MTWRF, Summer 2014

This syllabus shows the material expected to be covered and the suggested exercises approximately in a daily basis. Prior to each class you should determine what is to be covered and read the relevant material in the book. As soon as the material is covered in class, you should work the syllabus exercises (and additional ones if any).

Much of what is shown here is tentative; there may be changes, which will be announced in class. *Turn-in Homework* will also be announced in class daily. The final exam is comprehensive and everyone is required to take it. You must arrange your personal and work schedules to allow you to take the exam at the scheduled time.

Week	Sec. #	Topics	Recommended Exercises
1	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	1,3,5,9,11,13,15,19,23,24,25,28
	1.4	The matrix equation $A\mathbf{x} = \mathbf{b}$	1,3,7,9,11,13,14,15,17–24
	1.5	Solution sets of linear systems	2,5,6,7,9,11,12,13,17,18,20,23,24,25,39
	1.7	Linear independence	1,3,5,7,9,13,14,15,17,19,21,22,23,24,28,30
	1.8	Introduction to linear transformations	1,2,3,5,7,9,11,13–16,19,21,22,32,33,36
	1.9	The matrix of a linear transformation	1,3,7,13,15,17,22–25
	2.1	Matrix operations	1,3,5,7–11,15,16,19,22,26
2	2.2	The inverse of a matrix	1,3,5,7,8,9,10,13,20,21,23,24,29,31,33
	2.3	Characterizations of invertible matrices	1–7(odd), 11,12,13,15,16,17,19,23,33,37
	3.1	Introduction to determinants	1–13 (odd)
	3.2	Properties of determinants	1–7,11,15,17,19,25,27,28
	3.3	Cramer's Rule, Volume	11,17,18,19,20,29
	4.1	Vector Spaces and subspaces	1–12,17,19,21,23,24,25,27
	4.2	Null spaces, Column spaces	1,2,3,5,7,11,12,15,17,19,20,21,25–28,30,35
	4.3	Linearly independent sets; Bases	1–15 (odd), 19,21–25,31,33,34
3		Exam 1	Sections: TBA
	4.5	The dimension of a vector space	2,5,7,11,13,19,21,23,25,27,29,31
	4.6	Rank	1,4,5,9,11,12,18,19,25,30,31,32
	4.7	Change of basis	1,3,5,7,9,11,13,15
	4.9	Applications to Markov chains	1,3,5,9,
	5.1	Eigenvectors and eigenvalues	2,4,9,11,14,20,22,23,24,25,27,31
	5.2	The characteristic equation	1,4,10,15,18,19,20,21,23,24
4	5.3	Diagonalization	1,3,6,8,11,12,22,23,25,27,28,29
	5.6	Discrete dynamical systems	1,3,5,7,9,11
	6.1	Inner product, length and orthogonality	2,3,7,9,16,19,24,25,27,28,30
	6.2	Orthogonal sets	1,7,11,12,15,17,21,23,27,29
	6.3	Orthogonal projections	1,3,7,11,13,15,21,23
	6.4	The Gram-Schmidt process	3,7,9,11,13,14,24
	6.5	Least-squares problems	3,5,9,13,18,19,20,24
		July 4th off	
5		Exam 2	Sections: TBA
	7.1	Diagonalization of Symmetric Matrices	7,9,13,15,17,19,21,23,24,27,28
	7.2	Constrained Optimization	1, 3, 5, 9, 11
	7.4	The Singular Value Decomposition	1,3,5,7,9,11,12,13,,17,18
		Review, Catch-Up and/or Optional Topics Final Exam	TBA

ACE Outcome 3: This course satisfies ACE Outcome 3. You will apply mathematical reasoning and computations to draw conclusions, solve problems, and learn to check to see if your answer is reasonable. 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.

Final Exam date and policy: Students are expected to arrange their personal and work schedules to allow them to take the final exam at the scheduled time. Students who have conflicting exam schedules for higher or equal level courses may be allowed to take an alternate final after the regularly scheduled final. No student will be allowed to take the final exam early.

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

Students with Disabilities: 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 NebraskaLincoln 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, 132 Canfield Administration. 472-3787 voice or TTY.

University Illegal Discrimination Policy: Members of the UNL campus community who believe they have been discriminated against have formal and informal options to seek appropriate action. They may seek guidance from the instructor, the departmental chair, the Office for Student Assistance (2-3755), counseling and psychological services (2-7450), and the Office of Equity, Access and Diversity Programs (2-3417).