

CLASS TIME: MWF 10:20 – 11:10 in C 300 WH from 01/10/2000 to 04/28/2000.

INSTRUCTOR: Jan Vershelde, D 306 Wells Hall, Phone: 353 8495.

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OFFICE HOURS: On Mon 5PM, Wed 4PM, Fri 3PM, I am sure to be in my office; but feel free to stop by if you have any math questions. We can also make an appointment.

TEXT BOOK: James M. Ortega: ‘Matrix Theory. A second Course’, Third Printing, Plenum Press, 1991.

The prerequisite for this course is MTH 314. As a refresher or for more background material, you may consult the following texts: Richard O. Hill: ‘Elementary Linear Algebra with Applications’, 3rd ed., Saunders College Pub., 1996; and Steven J. Leon: ‘Linear Algebra with Applications’, 3rd ed., Macmillan, 1990.

For the computational aspects, see Gene H. Golub and Charles F. Van Loan: ‘Matrix Computations’, Third Edition, The John Hopkins University Press, 1996.

HOMEWORK: Selected homework problems are assigned with each lecture, but it is recommended that you try all homework problems.

EXAMS: During the semester, there will be three exams worth 100 points each. There will be no makeup exams given. The final exam counts for 200 points. If an exam is missed, then greater weight will be placed on the final exam, especially on the material covered on the missing exam.

MATLAB: There will be three computer assignments during the semester for which you will use MATLAB. Those assignments will count for a total of 100 points.

GRADING SCALE:

90 – 100% = 4.0, 83 – 89% = 3.5, 75 – 82% = 3.0, 68 – 74% = 2.5,

60 – 67% = 2.0, 55 – 59% = 1.5, 50 – 54% = 1.0.

Your course grade is based on a total of 600 points: 300 from the exams during the semester, 200 from the final and 100 from the computer assignments.

CLASS ATTENDANCE: Students are expected to attend all class meetings. Any changes in this syllabus or in the scheduling of exams and other assignments will be announced during class meetings.

SOME IMPORTANT DATES:

Friday, January 14 : close of computer/telephone enrollment.

Monday, January 17 : Martin Luther King Day.

Friday, February 4 : end of 100% refund period.

Wednesday, March 1 : last day to drop the course with no grade reported.

March 6–10 : Spring Break.

COURSE OUTLINE and HOMEWORK ASSIGNMENTS – subject to minor changes :

L-1	Mon Jan 10	1.1	Matrices and vectors – 1,5,6,7,8,10,14,15
L-2	Wed Jan 12	1.2	Determinants – 1,3,4
L-3	Fri Jan 14	1.3	Linear equations and inverses – 2,10,11
	Mon Jan 17		Martin Luther King Day – no classes
L-4	Wed Jan 19	1.3	Gaussian elimination – 1,4,5,7,13
L-5	Fri Jan 21	1.4	Eigenvalues and eigenvectors – 2,3,4,5,8
L-6	Mon Jan 24	1.4	Symmetric matrices and Cholesky decomposition – 9,10,12
L-7	Wed Jan 26	2.1	Linear spaces – 5,6,7,8,10,11,12
L-8	Fri Jan 28	2.2	Linear operators – 2,3,6,8
L-9	Mon Jan 31	2.3	Linear equations and rank – 1,3,4
L-10	Wed Feb 2	2.3	Inverses and eigenvalues – 6,7,11,14
L-11	Fri Feb 4	2.4	Inner product spaces – 2,3,4,5
L-12	Mon Feb 7	2.4	Orthogonalization – 7,10,11,17,18
L-13	Wed Feb 9	2.5	Normed linear spaces – 2,3,5,8,11,14
L-14	Fri Feb 11		Review of Chapters 1 and 2
L-15	Mon Feb 14		Exam 1 on Chapters 1 and 2
L-16	Wed Feb 16	3.1	Similarity transformations – 1,3
L-17	Fri Feb 18	3.1	Spectral theorems – 2,16
L-18	Mon Feb 21	3.1	Triangular form and normal matrices – 5,6,7,10,12
L-19	Wed Feb 23	3.2	The Jordan canonical form – 3,4,5
L-20	Fri Feb 25	3.2	Subspace decomposition – 6,7,8,9
L-21	Mon Feb 28	3.2	Minimal polynomials – 12,13,15
L-22	Wed Mar 1	3.3	Equivalence transformations – 1,2,4
L-23	Fri Mar 3	3.3	Singular value decomposition – 6,8,9
L-24	Mon Mar 13	4.1	Geometry of quadratic forms – 1,5,6,8,9
L-25	Wed Mar 15	4.2	Optimization problems – 3,4
L-26	Fri Mar 17	4.2	The Rayleigh quotient – 6,7
L-27	Mon Mar 20		Review of Chapter 3 and 4.1, 4.2
L-28	Wed Mar 22		Exam 2 on Chapter 3 and 4.1, 4.2
L-29	Fri Mar 24	4.3	Least square problems – 1,2,3
L-30	Mon Mar 27	4.3	Orthogonal projection – 8,9,11
L-31	Wed Mar 29	5.1	Differential equations and matrix exponentials – 1,2,11,15
L-32	Fri Mar 31	5.1	Representations of the solutions – 4,9,12,18
L-33	Mon Apr 3	5.1	Higher-order Equations – 8,13,14
L-34	Wed Apr 5	5.2	Stability – 3,4
L-35	Fri Apr 7	5.3	Difference equations – 3,4
L-36	Mon Apr 10	5.3	Iterative methods – 9
L-37	Wed Apr 12	5.4	Lyapunov's theorem – 1,3,5
L-38	Fri Apr 14		Review of 4.3 and Chapter 5
L-39	Mon Apr 17		Exam 3 on 4.3 and Chapter 5
L-40	Wed Apr 19	6.1	Nonnegative matrices
L-41	Fri Apr 21	6.2	Generalized eigenvalue problems
L-42	Mon Apr 24	6.3	Some special matrices
L-43	Wed Apr 26	6.4	Matrix equations
L-44	Fri Apr 28		Review of all course materials

Wednesday May 3, 10:00-12 Noon – Final Exam – room to be announced.