Course SYLLABUS – Math 310: Applied Linear Algebra– S. Friedland, Fall 2006
9 AM, MWF, AH 310 — call# 13700

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OFFICE HOURS: M11:30-12:30; W1:30-2:30; F10-11.


Notes: Outline of Lectures in Applied Linear Algebra, Fall 2006. (see my website.)
(Those are the notes from Fall 2004, which will be updated accordingly during the course.)

Departmental course website http://www.math.uic.edu/ math310/

PREREQUISITE: A grade C or better in Math 210.

GRADING:
HW–5%
QUIZZES–10% (About 10 quizzes, 10 minutes in the end of the class.)
EXAM 1 – 20% Chapter 1- 2, §3.1-3.2 – Monday, October 2.
EXAM 2 – 20% Chapter 3, Sections 4.1,4.2,5.1–5.5 – Monday, November 6.
FINAL – 45% Sections: 5.1-5.6, 6.1-6.3, 6.4 (only symmetric matrices), 6.5, 6.7. Tuesday, December 12, 8:00-10:00 PM, 310 AH.
Cutoff for A is 90% average, 80% for B, 70% for C, 60% for D.

HOMEWORK: Below is a tentative course schedule. Homework for a given week will be collected the following Monday in the class. MATLAB homeworks should be submitted the next following Monday in the class. No assignments will be accepted late!
In parentheses are problems using the computer package MATLAB, available on the ICARUS account. (Type OCTAVE.) The commands for MATLAB are stated at the Appendix of the text on p. 485-496. One can simply follow the commands stated in MATLAB exercises for each chapter. For those with access to Maple, it is possible to use similar maple commands to solve MATLAB homeworks.

Lecture schedule and homework problems:
(The schedule and homework problems are subject to change. Consult the web page for the latest information.)

WEEK-DATE———Topics—-Section——-PROBLEMS

--- CHAPTER 1——-MATRICES AND SYSTEMS OF EQUATIONS
1——-Aug 28–Lin. Sys.; Row ops —–1.1 —-# 1ab, 3a-d, 5ab, 6ad.
1——-Aug 30–Echelon Form ————1.2 —-# 1, 2a-d, 3a-d.
1——-Sep 1–Gauss, G-Jordan———1.2+ — # 5a-d, 6ab, 10, (5a-c p’ 84)

2——-Sep 4–Labor Day———
2——-Sep 6–Applications————-1.2+ — # 13, 19, 20a.
2——-Sep 8–Matrix algebra———-1.3 ——# 2, 7, 10, 12, 29, 30, 32, (6a-d p’ 85).
********(LAST DAY TO ADD OR DROP COURSE)********

3——-Sep 11–Elem Matrices———1.4 ——# 1, 3, 6.
3——-Sep 13–inverses————1.4+ ——# 8,10a-f, 11.
3——-Sep 15–Partitioned matrices (if time permits)

--- CHAPTER 2——-DETERMINANTS
4——-Sep 18–Defn, cofactors———2.1 ——# 3ace, 4, 6.
4——-Sep 20–Properties————2.2 ——# 1, 3acef, 7, 12, (1a-f p’ 111).
———CHAPTER 3 ——— VECTOR SPACES
5—-Sep 25- Defn, examples———3.1 —-# 3,4,5,6.
5— Sep 27 – Subspace ———3.2 —-# 1ab, 2ab, 3abcd, 4abc, 5ac, 8ab.
5— Sep 29 – Span ———3.2+ —-# 9abc, 10abc, 11, 13, 14.
5 — Review - See the sample hour exams on the departmental web page.

6— Oct- 2 **EXAM 1 *************** Chapters 1,2 and §3.1-3.2 **Hour Exam 1**
6— Oct- 4 – Linear independence ———3.3 —-# 1abc, 2abc, 4,6ab, 7ab, 8, 9, 10.
6— Oct- 6 – Basis ———3.4 —-# 3, 4, 5, 7, 8.

7— Oct 9 – Dimension ———3.4+ —-# 10, 11, 12abcd, 14ab, 16.
7— Oct 11 – Row & column space ———3.6 —-# 1ab, 2ab, 3, 4cd, 8, 9, 19.
7— Oct 13 – Row & column space continuation

8— Oct 16 – Change of basis ———3.5 —-# 1ab, 2ab, 3ab, 4, 5, 6, 9, (1ab p’ 170).

———CHAPTER 4 ——— LINEAR TRANSFORMATIONS
8— Oct 18 – Lin. Transf. ———4.1 —# 4, 5ac, 6ab, 7bc, 8ac, 11ac, 17.
8— Oct 20 – Matrix rep’ns ———4.2 —# 2ab, 3ab, 4ab, 6, 14ab, 1ab, (1 p. 206).

———CHAPTER 5 ——— ORTHOGONALITY
9— Oct 23 – Scalar product ———5.1 —# 1ab, 3ab ,5, (1 p. 292).
9— Oct 25 – Orthog. subsp. ———5.2 —# 1ab, 2, 3b, 4.
9— Oct 27 – Least squares ———5.3 —# 1, 2, 3a, 5a, 6.

10— Oct 30 – Inner products ———5.4 —# 3, 4ab, 7, 8, 9.
10— Nov 1 – Orthon. sets ———5.5 —# 1, 2, 3, 7.
10— Nov 3 – Orth. sets -cont’nd ———5.5+ —# 21, 22, 23, 27.
10 — Review - See the sample hour exams on the departmental web page

11— Nov 6— **Exam 2 *************** Sec. Chap.3, 4.1,4.2,5.1 - 5.5 **** Hour Exam 2.
11— Nov 8 – Gram-Schmidt ———5.6 —# 1, 3, 4.
11— Nov 10 – QR decompp ———5.6+ —# 2, 5, 7, 12.

———CHAPTER 6 ——— EIGENVALUES
12— Nov 13 – Eigenvalues ———6.1 —# 1abefghkl, 3, 4, 10.
12— Nov 15 – Similarity ———6.3 —# 1ab, 2ab, 4, 5abc, 7.
12— Nov 17 – Diff Eq Sys ———6.2 —# 1ab, 2abc

13— Nov 22 – Diagonalizing ———6.3 —# 1abde, 2ab, 3ab, 7, 8ab.
13— Nov 24 – Thanksgiving Break——

15— Dec – Positive Definite Matrices ———6.7 —# 1, 3, 4ac, 13
15— Dec – SVD ———6.5+ —# 2abcd, 3a,b (parts b,d), 4.5.
15— Dec – Review——

16— Dec 12, (Tuesday), 8-10 AM —***FINAL EXAM - AH 310*** (Chapters 5-6)