

MA 2073. MATRICES AND LINEAR ALGEBRA II
COURSE SYLLABUS
C TERM, 2014

1. BASIC INFORMATION

1.1. Instructor: Elissa Ross

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Office: 405A Salisbury Laboratories

Office Hours: Monday and Thursday, 1:00pm – 2:00pm

1.2. Calendar description: This course provides a deeper understanding of topics introduced in MA 2071 and also continues the development of those topics. Topics covered include: abstract vector spaces, linear transformations, matrix representations of a linear transformation, characteristics and minimal polynomials, diagonalization, eigenvalues and eigenvectors, inner product spaces. This course is designed primarily for Mathematical Science majors and those interested in the deeper mathematical issues underlying linear algebra. Undergraduate credit may not be earned both for this course and for MA 3071. Recommended background: MA 2071.

1.3. Course materials and coordinates: .

Website: www.wpi.edu/~eross2/MA2073.html

Text: “Introduction to Linear Algebra,” 4th edition. Gilbert Strang

Class: MT-RF 3:00 – 3:50, SH106

1.4. Evaluation. Your mark will be determined as follows:

Homework: 20 %

Midterm Test 1 (Feb 3): 25%

Midterm Test 2 (Feb 24): 25%

Final Exam (Mar 7): 30%

Missed tests: There will be no make-up for missed tests. Upon presentation of documentation of a valid excuse, the corresponding percentage of the final mark will be added to the final exam. With no presentation of such documentation, a grade of zero will be entered for the missed test.

Homework. There will be weekly homework assigned. It will be collected on Friday, at the beginning of class. There will be 6 assignments in total, with the best 5 counting for 20% of your mark (each is worth 4%). Late homework will *not* be accepted. You are encouraged to work on the homework in groups, however each student must turn in his or her own solution.

1.5. Syllabus. We will cover the following sections of the text:

Chapter 2: selection of topics (review of 2071)

Chapter 3: all

Chapter 4: all

Chapter 5: all

Chapter 6: 6.1, 6.2, 6.4 – 6.7

Chapter 7: all

Chapter 8: selection of topics, time permitting

We will also cover a few additional topics which do not appear in the textbook, for example inner product spaces. Handouts or links to online resources will be provided.

1.6. Additional Resources. The following text may be useful: “Linear Algebra and its applications,” David C. Lay.

Gilbert Strang has additional materials, including online lectures and old exams (with solutions), on his course website:

<http://web.mit.edu/18.06>

1.7. Academic Honesty. Each student is expected to familiarize him/herself with WPI’s Academic Honesty policies which can be found at

<http://www.wpi.edu/offices/policies/honesty/policy.html>

All acts of fabrication, plagiarism, cheating, and facilitation of cheating will be prosecuted according to the university’s policy.

2. TENTATIVE SCHEDULE

Week 1

R	1/16	course overview	2.1
F	1/17	review of MA 2071	2.2 – 2.7

Week 2

M	1/20	NO CLASSES	
T	1/21	Vector spaces and subspaces	3.1
R	1/23	Nullspace of a matrix	3.2
F	1/24	Rank, solution to $A\mathbf{x} = \mathbf{b}$	3.3 - 3.4, Homework 1

Week 3

M	1/27	Independence, basis and dimension	3.5
T	1/28	Dimension	3.6
R	1/30	Orthogonality	4.1
F	1/31	Projections	4.2, Homework 2

Week 4

M	2/3	MIDTERM TEST 1	
T	2/4	Least squares approximation	4.3
R	2/6	Orthogonal bases, Gram-Schmidt	4.4
F	2/7	Inner Product Spaces	Homework 3

Week 5

M	2/10	Determinants and their properties	5.1
T	2/11	Permutations, cofactors, Cramer's rule	5.2 - 5.3
R	2/13	Eigenvalues	6.1
F	2/14	Diagonalizing a matrix	6.2, Homework 4

Week 6

M	2/17	Symmetric matrices	6.4
T	2/18	Positive definite matrices	6.5
R	2/20	NO CLASSES	
F	2/21	Similar matrices, Jordan form	6.6, Homework 5

Week 7

M	2/24	MIDTERM TEST 2	
T	2/25	Singular Value Decomposition	6.7
R	2/27	Linear transformations	7.1
F	2/28	Matrix of a linear transformation	7.2, Homework 6

Week 8

M	3/3	Diagonalization	7.3
T	3/4	Applications (time permitting)	Chapter 8
R	3/6	Final review	
F	3/7	FINAL EXAM	