Tufts University

Abstract Linear Algebra **Department of Mathematics** **Fall 2012**

Instructor: Genevieve Walsh

Genevieve's webpage: http://www.tufts.edu/∼gwalsh01/

Course meets: G+, Monday and Wednesday 1:30-2:45 pm, in BP5.

Office: 213 BP

Office hours: Monday, Thursday, Friday 3-4

Course webpage: We will use the Math 72-01 site on Trunk. Login to https://trunk.tufts.edu and open the Math 72-01 site. I will also post some material on my webpage above.

Text: *Linear Algebra Done Right*, 2nd edition, by Sheldon Axler. Springer (1997).

Prerequisites: Math 34 (old number 12) or 39 (old 17) or consent.

What is this course about?

This course is the honors version of linear algebra. Linear algebra arises everywhere in mathematics and is essential for many other fields. If you want to know the "why", as well as the "how", this course is for you. We will explain how to do computations as well as discuss the deep ideas behind the computations. This course will put you on firm footing as you continue into higher mathematics or other scientific fields. We will cover Vector Spaces, Solving systems of linear equations, Linear Maps, and Eigenvectors. We will also discuss inner product spaces as time permits. Throughout we will emphasize understanding, proofs, and computations. Questions and discussion are highly encouraged!

Learning Objectives: As in the Undergraduate Program learning objectives:
http://math.tufts.edu/?pid=188 Basic Understanding of Higher Mathematics: A,C,D,E. Written Communication: A,B. Oral Communication: A.

Examination Dates:

Tests: Monday, October 1 and Wednesday, November 14

Final exam: The Final Exam will be Friday, December 14 from 3:30 - 5:30, as scheduled in the final exam block schedule. It will be cumulative.

Other Important Dates:

University Holidays: October 8, 2012 (Columbus Day) November 12, 2012 (Veterans' Day) November 21 - 23, 2012 (Thanksgiving)

Last Day to Drop Classes or Declare P/F: Tuesday, October 9.

Last Day for First-Year Students to Drop Classes: Tuesday, November 13

Monday Schedule: Tuesday, October 9 will be a Monday schedule at Tufts.

Reading Period: December 11-12

Homework: Homework is assigned after each class. It will be collected each Thursday and graded. The specific homework assignments will be given in class and posted on Trunk. Occasionally, we will have students present partial solutions and thoughts on the homework assignments and it is expected that everyone will participate in the homework discussions.

Grading:

Homework: 15 %

Class Participation: 5 %

Exam: 25%

Exam: 25 %

Exam (highest score): 30 %

Students with disabilities: If you are requesting an accommodation due to a documented disability, you must register with the Disability Services Office at the beginning of the semester. To do so, call the Student Services Desk at 617-627-2000 to arrange an appointment with Sandra Baer, Program Director of Disability Services.

Math 72 (Approximate!) Schedule of Classes

Lecture 1: 9/5 Complex Numbers; Vector Spaces
Lecture 2: 9/10 Vector Spaces
Lecture 3: 9/12 Vector Spaces and Matrices
Lecture 4: 9/17 Solving Systems of Linear Equations (handout)
Lecture 5: 9/19 Gaussian Elimination (handout)
Lecture 6: 9/24 Subspaces
Lecture 7: 9/26 Subspaces and review
Exam: Monday, October 1 in class
Lecture 8: 10/3 Sums and Direct Sums
Lecture 9: 10/9 Span and Linear Independence
Lecture 10: 10/10 Span and Linear Independence
Lecture 11: 10/15 Bases
Lecture 12: 10/17 Dimension
Lecture 13: 10/22 Linear Maps
Lecture 14: 10/24 Null Spaces and Ranges
Lecture 15: 10/29 The Matrix of a Linear Map - Examples of Eigenvectors
Lecture 16: 10/31 Invertibility
Lecture 17: 11/5 Polynomials, the Determinant
Lecture 18: 11/7 Handout on Determinant and Review
Exam: Wednesday, November 14 in class
Lecture 19: 11/19 Invariant Subspaces
Lecture 20: 11/26 Invariant Subspaces and Eigenvectors
Lecture 21: 11/28 Invariant Subspaces on Real Vector Spaces
Lecture 22: 12/3 Diagonal Matrices
Lecture 23: 12/5 Inner Products; Norms
Lecture 24: 12/10 Orthonormal Bases
Exam: (During Finals Week) Friday, December 14