Course Outline for 124 Linear Algebra
University of Vermont, Fall 2007

Lecture room and meeting times:
254 Votey, Tuesday and Thursday, 12:30 pm to 1:45 pm

Instructor: Prof. Peter Dodds
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Office hours: To be assigned
Course website: `http://www.uvm.edu/~pdodds/teaching/2007-08UVM-124/`
Textbook: "Introduction to Linear Algebra" (3rd edition) by Gilbert Strang (published by Wellesley-Cambridge Press)

Course Objectives: To deeply understand the equation $A\vec{x} = \vec{b}$, the Fundamental Theorem of Linear Algebra, and the following picture:
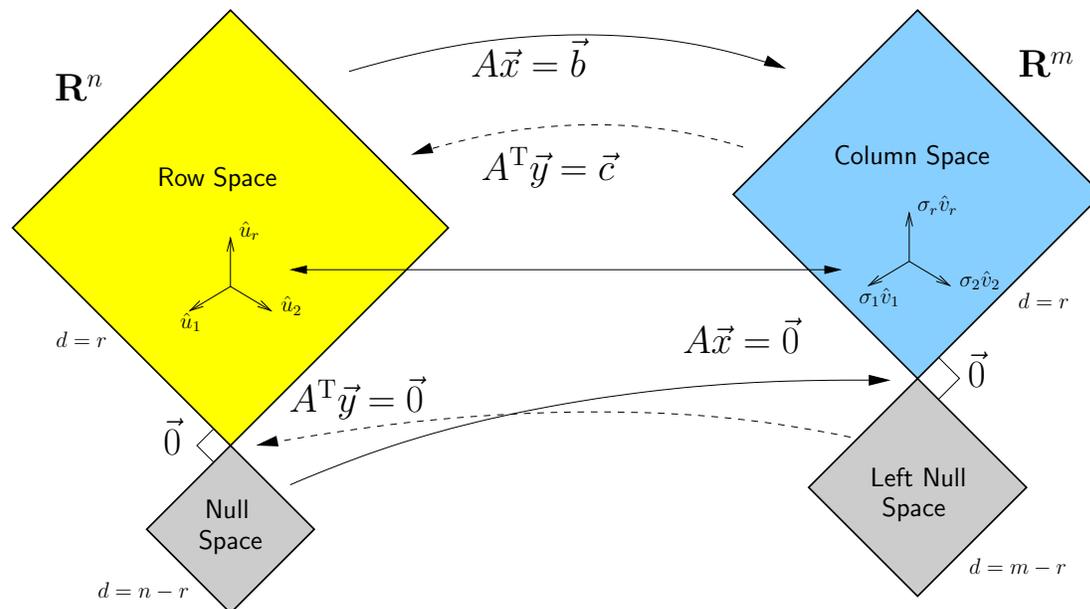
Note: The study of linear algebra may bring about happiness.

Grading breakdown:

1. **Assignments (40%)**—All assignments will be of equal weight and will be 1 week take home affairs. The lowest assignment score will be dropped and the average of the remainder taken (Note: the last assignment cannot be dropped from the average). Expect about ten of these pleasurable experiences. Clarity in writing and presentation will be taken into account in grading.

2. **Midterm exams (35%)**—Three 75 minutes tests distributed throughout the course, all of equal weighting.

3. **Final exam (25%)**—Three hours of fun with linear algebra on Tuesday, December 11th, 2007, 8 am to 11 am, in 254 Votey.

4. **Homework (0%)**—Problems will be assigned from the textbook at the end of most lectures. Doing these exercises will be most beneficial and will increase happiness. Problems presenting difficulty will be discussed in the following class as time permits, or in office hours.

5. **General attendance (0%)**—it is extremely desirable that students attend class, and class presence will be taken into account if a grade is borderline.

6. **Attendance of office hours (0%)**—students are requested to attend at least one session of office hours during the course (again, the borderline grade issue is to be kept in mind here).

Schedule: The course will mainly cover chapters 1 through 6 of the textbook and some of chapter 7. Some topics may be omitted, others added.

Week number (dates)	Tuesday	Thursday
1 (8/28 and 8/30)	Lecture	Lecture ➤ Assignment 1
2 (9/4 and 9/6)	Lecture	Lecture ➤ Assignment 2
3 (9/11 and 9/13)	Lecture	Lecture ➤ Assignment 3
4 (9/18 and 9/20)	*Review*	*Test 1*
5 (9/25 and 9/27)	Lecture	Lecture ➤ Assignment 4
6 (10/2 and 10/4)	Lecture	Lecture ➤ Assignment 5
7 (10/9 and 10/11)	Lecture	Lecture ➤ Assignment 6
8 (10/16 and 10/18)	*Review*	*Test 2*
9 (10/23 and 10/25)	Lecture	Lecture ➤ Assignment 7
10 (10/30 and 11/1)	Lecture	Lecture ➤ Assignment 8
11 (11/6 and 11/8)	Lecture	Lecture ➤ Assignment 9
12 (11/13 and 11/15)	*Review*	*Test 3*
13 (11/20 and 11/22)	Thanksgiving	Thanksgiving
14 (11/27 and 11/29)	Lecture	Lecture ➤ Assignment 10
15 (12/4 and 12/6)	Lecture	*Review*

Final exam: 12/11, 8 am to 11 am, 254 Votey.

Topics to be covered:

- Everything about the Matrix Equation $A\vec{x} = \vec{b}$,

- The Fundamental Theorem of Linear Algebra,

- Systems of Linear Equations,

- Geometric Interpretation Thereof,

- Gauss-Jordan Elimination,

- Matrix Operations,

- Null Space, Column Space, Row Space,

- Least-Squares Approximations,

- Inverses,

- Determinants,

- Cramer's Rule,

- Cofactors,

- Singularity,

- Eigenvalues and Eigenvectors,

- Diagonalization,

- Linear Transformations,

- Inner (Dot) Products,

- Cross Products,

- Change of Basis,

- Gram-Schmidt Process,

- LU Factorization,

- QR Factorization,

- Vector Spaces,

- Projections,

- Representations of Graphs and Networks,

- The Joys of Singular Value Decomposition.

Important dates:

1. Classes run from Tuesday, August 28th to Thursday, December 6.

2. Add/Drop, Audit, Pass/No Pass deadline—Monday, September 10.

3. Last day to withdraw—Friday, October 26.

4. Reading and exam period—Friday, December 7th to Friday, December 14th.

Do check your zoo account for updates regarding the course.

Academic assistance: Anyone who requires assistance in any way (as per the AC-CESS program or due to athletic endeavors), please see or contact me as soon as possible.

Being good people: First, in class there will be no electronic gadgetry, no cell phones, no beeping, no text messaging, etc. You really just need your brain, some paper, and a writing implement here (okay, and Matlab—see below). Those who beep in an annoying fashion will be fined one Clif bar by the lecturer. Second, I encourage you to email me questions, ideas, comments, etc., about the class but request that you please do so in a respectful fashion. Finally, as in all UVM classes, **Academic honesty** will be expected and departures will be dealt with appropriately. See http://www.uvm.edu/cses/ for guidelines.

Late policy: Unless in the case of an emergency (a real one) or if an absence has been predeclared and a make-up version sorted out, assignments that are not turned in on time or tests that are not attended will be given 0%.

Computing: Students are encouraged to use Matlab to check their work. (Matlab is short for Matrix Laboratory and is the natural choice for linear algebra). I will talk about Matlab in class. Note that for any assignment problem, written details of calculations will be required.

Grades:

A+	97–100	B+	87–89	C+	77–79	D+	67–69
A	93–96	B	83–86	C	73–76	D	63–66
A-	90–92	B-	80–82	C-	70–72	D-	60–62