SPRING 2015 MATH 3A SYLLABUS

1. Introduction of this course

Linear algebra starts with the general theory of linear systems. The simplest linear system is the equation $ax = b$. When the system becomes more and more complicated (i.e., more variables and more equations), solving such a system becomes more and more difficult. In the first part of this course, we basically wanted to understand some general aspects about linear systems, where theories of matrices and vectors come into play.

In the second part of the course, we will explore the theory of matrices in more aspects, including the invertibility, the rank, the eigenvalues and eigenvectors, etc. Meanwhile more abstract concepts in linear algebra will apear. We will stop at the discussion of orthogonality, which can be applied to "non-solvable linear systems".

In this quarter, my lectures will give more weight on applications, which was almost absent previously. The applications range from basic linear equations to dynamical systems and least-squares problems.

2. Logistics

This quarter I am teaching two sections (44360 and 44365) of MATH 3A, both in MSTB 124. I will give lectures

Textbook	David C. Lay, *Linear Algebra and Its Applications*, fourth edition
Exams	One Midterm and One Final
	Calculators are allowed in exams
Office Hour	Monday 3PM–5PM in 410N Rowland Hall
Grading Policy	15% HW + 15% Quiz + 25% Midterm + 45% Final
	The lowest HW and Quiz grades are dropped
Homework	Weekly assignments, due every Tuesday or Thursday discussion
	We expect HW solutions with clear handwriting and logic
	Bad handwriting or poor logic may affect the HW grades
Quiz	Given by the TA every week
Grade Curving	Only the overral grade will be curved after the final exam
	Roughly 15% A, 25% B, 30% C, 20% D, 10% F

3. A tentative schedule

Date	Weekday	Material
03/30/15	M	1.1 Linear Systems and matrices
04/01/15	W	1.2 Row reductions and Echelon forms
04/03/15	F	1.3 Vectors and matrices
04/06/15	M	1.4 Matrix equations
04/08/15	W	1.5 Solution set
04/10/15	F	1.6 Applications
04/13/15	M	1.7 Linear independence
04/15/15	W	1.8 Linear transformations
04/17/15	F	1.9 Matrices of linear transformations
04/20/15	M	1.9 Continued + 2.1 Matrix operations
04/22/15	W	2.1 Matrix operations
04/24/15	F	2.2 Invertible matrices
04/27/15	M	2.3 Characterizations of invertible matrices
04/29/15	W	3.1 Determinants
05/01/15	F	3.2 Property of determinants
05/04/15	M	Midterm Review
05/06/15	W	Midterm
05/08/15	F	2.8 Subspaces of $\mathbb{R}^n$
05/11/15	M	2.9 Dimension and rank
05/13/15	W	5.1 Eigenvalues, eigenvectors
05/15/15	F	5.2 Characteristic equation
05/18/15	M	5.3 Diagonalization
05/20/15	W	Application of Diagonalization
05/22/15	F	6.1 Inner product
05/25/15	M	Memorial Day Break
05/27/15	W	6.2 Orthogonal sets
05/29/15	F	6.3 Orthogonal projection
06/01/15	M	6.4 Gram-Schmidt process
06/03/15	W	6.5 Least-square problems
06/05/15	F	Final Review