MATH 140.005/3044 E - LINEAR ALGEBRA

Spring 2019 Syllabus

Lecture	MW 8:55am-10:45am	**Instructor**	Shizhu Liu, PhD
Classroom	GCASL 275	**Email**	shizhu.liu@courant.nyu.edu
Text	*Introduction to Linear Algebra*	**Office**	CIWW 720
Author	Gilbert Strang	**Office Hours**	TTh 5pm-6pm
Edition	5th edition	**Additional Office Hours**	by appointment [click here]

Objectives

Linear algebra is a cornerstone in any mathematics curriculum for two important reasons:

1) Because the theory of linear algebra is well understood, a first step in many areas of applied mathematics is to reduce the problem into one of linear algebra.

2) Vector spaces and linear operators studied in linear algebra are found in many different areas of mathematics, science and engineering.

Students will leave the course with a computational ability and conceptual understanding of solving linear equations, vector spaces and subspaces, orthogonality, determinants, eigenvalues and eigenvectors, linear transformations and selected applications.

Course Communication

The syllabus, course calendar, lecture slides, lecture notes, homework problem sets, solutions and any updates/announcements for this course will be communicated in class, by email and/or posted to NYU Classes.

Coursework

Lectures

Lecture slides/notes will be posted to NYU Classes before class meetings.

Participation

Questions and discussion during class are encouraged. Students may participate by answering/asking questions during class, presenting solutions on the board, leading group work, forming study groups, etc.

Homework

Homework problem sets designed to expand and solidify concepts discussed in class will be posted to NYU Classes. Your homework write-up will be evaluated based on work shown, justification, completeness and correctness. **Homework write-ups are due on Sunday evenings 11:55pm**, unless otherwise announced. Please write your answers down clearly and neatly on the clean paper (not on napkins, please!), scan and upload to NYU classes - assignment section. You may use free scanner app like [Office Lens] or any physical scanning machines, like the ones in NYU library. Failure to demonstrate all work and steps in the solution of a problem may result in zero credit for the problem. **Your lowest scored homework write-up will be dropped in the calculation of your course grade**.

While students are encouraged to form study groups and work together on homework outside of class time, homework write-ups must be written individually. **It is advised that students begin assignments soon after topics are covered in lecture**. Due dates are chosen to help students review the material discussed in a timely manner. In fairness to graders and other students in the course, **late homework will not be accepted (no exception)**.

In-class Quizzes and Exams

Calculators will not be permitted on quizzes or exams.

Please check the complete schedule for quizzes and exams on course calendar, uploaded to NYU classes. Quizzes are normally at the end of each chapter. There are no makeup quizzes for absences or latecomers. You will receive a "0" for any missed quizzes. **Your lowest scored quiz will be dropped in the calculation of your course grade**.

There will be three exams. **The midterm exams are on Wednesday, March 13th, 2019 and Monday, April 29th, 2019, during the usual class time and place. The final exam is during final exam week, Friday, May 17th, 2019, exact time and location to be assigned by university**. An excused absence for an exam requires notification to the instructor **BEFORE** the exam starts, followed by valid documentation. Otherwise, you will receive a "0" for any missed exams.

Grading Policy

Your course grade will be weighted and distributed as follows:

5% Participation	10% Homeworks	15% In Class Quizzes	40% Midterms	30% Final

A	A-	B+	B	B-	C+	C	D	F
[100,93]	(93,90]	(90,87]	(87,83]	(83,80]	(80,75]	(75,65]	(65,50]	<50

Grades will be posted to NYU Classes. **Pending student performance, a curve may be applied to course grades at the end of the semester**. But please note **there is NO extra credit** for the course.

Other Course Policies

I expect students to contribute to our positive learning environment: **arrive on time** to class, **pay attention** for the duration of the class, **participate** meaningfully during class and **learn from one another**. I request **no eating** and **no cell phone, laptop or internet use** during class time, unless instructed, as it is a distraction to me and other students in the class. Students who disrupt our learning environment may be asked to leave.

I receive many emails and your email is important to me. **Include course and section number you are enrolled in the subject of all email correspondence so that I may better assist you**. I may not respond to email requesting information that was already addressed in class or is posted on the syllabus, course calendar and/or NYU Classes. I will reply to most other emails within 24 hours. If not, please send me a reminder.

This course will abide by NYU CAS academic policies and honor code.

Resources

Do not worry about your difficulties in mathematics; I can assure you that mine are still greater. –A. Einstein

Several resources are available to help students succeed in the course. I am available during **office hours and by appointment** to review course material or address any course related concerns. Peer tutoring is available at **University Learning Center** and **Undergraduate Mathematics Tutoring Center**. Students with disabilities must consult the **Moses Center for Students with Disabilities** for accommodations.

MATH 140.005/3044-E - LINEAR ALGEBRA

Spring 2019 Monday-Wednesday Schedule

Week	lecture	date	topic	sections
1	1	28-Jan	Vectors, dot product	1.1,1.2
	2	30-Jan	Matrices	1.3
2	3	4-Feb	Linear systems/elimination	2.1,2.2
	4	6-Feb	Matrix operations	2.3,2.4
3	5	11-Feb	Inverses	2.5
	6	**13-Feb**	PA = LU factorization **(Quiz 1: mainly covers 1.1-2.5)**	2.6,2.7
4		18-Feb	Presidents' Day - No Class	
	7	20-Feb	Vector spaces	3.1
5	8	25-Feb	Nullspace	3.2
	9	27-Feb	Complete solutions	3.3
6	10	4-Mar	Independence/dimension	3.4
	11	**6-Mar**	Four subspaces and orthogonality **(Quiz 2: mainly covers 3.1-3.4)**	3.5,4.1
7	12	11-Mar	Midterm Exam 1 Review	Chapters 1-3
		13-Mar	**Midterm Exam 1**	**Chapters 1-3**
8		18-Mar	Spring Recess - No Class	
		20-Mar	Spring Recess - No Class	
9	13	25-Mar	Projections	4.2
	14	27-Mar	Least squares	4.3
10	15	1-Apr	Orthogonal basis	4.4
	16	**3-Apr**	Determinants **(Quiz 3: mainly covers Chapter 4)**	5.1,5.2
11	17	8-Apr	Applications of determinants	5.3
	18	10-Apr	Eigenvalues	6.1
12	19	15-Apr	Diagonalization	6.2
	20	17-Apr	Symmetric matrices	6.4
13	**21**	**22-Apr**	Positive definite matrices **(Quiz 4: mainly covers 5.1-6.4)**	6.5
	22	24-Apr	Midterm Exam 2 Review	Chapters 1-6
14		**29-Apr**	**Midterm Exam 2**	**Chapters 1-6**
	23	1-May	Singular value decomposition	7.1,7.2
15	24	6-May	Principal component analysis	7.3,7.4
	25	8-May	Linear transformations	8.1,8.2
16	**26**	**13-May**	Change of basis **(Quiz 5: mainly covers 7.1-8.2)**	8.2,8.3
	27	14-May	Reading Day Tuesday Final Review (Optional)	Chapters 1-8
		17-May	**Friday Final Exam** **Room & Time by university**	**Chapters 1-8**

Last updated on 1/17/2019