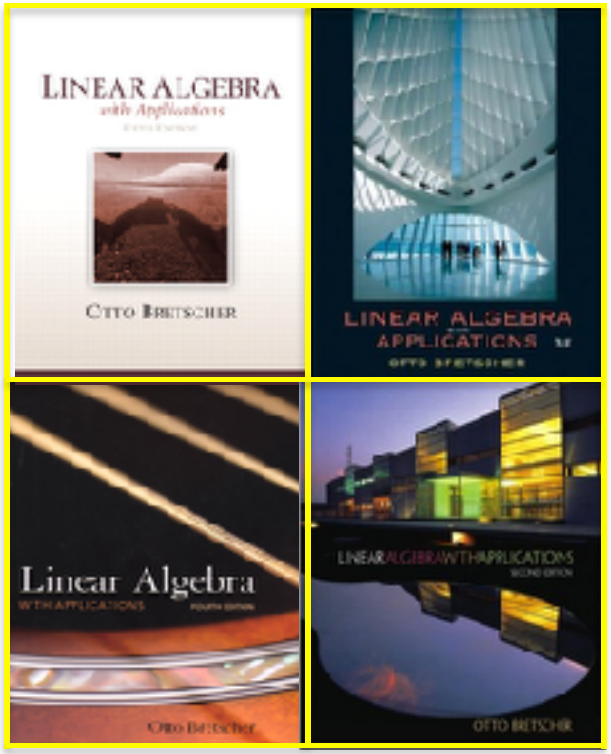
Textbook



Recommended Otto Bretscher, Linear Algebra w,Applications, Editions

2,3,4,5 work. Homework is provided independently of the book

SECTIONS

The course lectures (except reviews and intro meetings) are taught in sections. Additional problem sessions as in math21a. Sections:

MWF 9,10,11,12

TTH 10-11:30, 11:30-13:00. ‘

MQC: Sun-Thu: 309

Sectioning

Start	End	Sent
Mo Jan 22	Mon Jan 22	Wed 24
7 AM	4 PM	5 PM

More details:

http://www.math.harvard.edu/sectioning

Important Dates

Intro	1.Exam	2.Exam
22. Jan	Feb 27 (*)	April 3 (*)
8:30 AM	7 PM	7 PM
SC B	TBA	TBA

Grades

Part	Grade 1	Grade 2
1. Hourly	20	20
2. Hourly	20	20
Homework	20	20
Lab	5	
Final	35	40

Math21b

Syllabus 2018

Linear Algebra and Differential Equations is an introduction to linear algebra, including systems of **linear equations**, linear transformations, determinants, eigenvectors, eigenvalues, inner products and linear spaces. The course introduces **discrete dynamical systems** and gives a solid introduction to differential equations, **Fourier series** as well as some partial differential equations. Other highlights include applications in statistics like **Markov chains** and **data fitting** with arbitrary functions.

Prerequisites

Single variable calculus.

Math21a helpful but is not needed

Organization

Course Head: Oliver Knill

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SC 432, Tel: (617) 495 5549

Calendar

Intro Meeting Classes start

SU	MO	TU	WE	TH	FR	SA
21	22	23	24	25	26	27
28	29	30	31	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28

Exams Holidays

Day to Day Syllabus

0. Week: Introduction

Lect 1 1/26 1.1 introduction to linear systems

1. Week: Systems of Linear Equations

Lect 2 1/29 1.2 matrices and GaussJordan elimination

Lect 3 1/31 1.3 on solutions of linear systems

Lect 4 2/2 2.1 linear transformations and inverses

2. Week: Linear Transformations

Lect 5 2/5 2.2 linear transformations in geometry

Lect 6 2/7 2.3-4 matrix product and inverse

Lect 7 2/9 3.1 image and kernel

3. Week: Linear Subspaces

Lect 8 2/12 3.2 bases and linear independence

Lect 9 2/14 3.3 dimension

Lect 10 2/16 3.4 coordinates

4. Week: Dimension and Linear spaces

2/19 Presidents day, no class

Lect 11 2/21 4.1 linear spaces

Lect 12 2/23 5.1 orthonormal bases projections

5. Week: Orthogonality

Lect 13 2/26 review for first midterm

Lect 14 2/28 5.2 Gram-Schmidt and QR factorization

Lect 15 3/2 5.3 orthogonal transformations

6. Week: Datafitting

Lect 16 3/5 5.4 least squares and data fitting

Lect 17 3/7 6.1 determinants 1

Lect 18 3/9 6.2 determinants 2

Spring break 3/11-3/18

7. Week: Eigenvalues/Eigenvectors

Lect 19 3/19 7.1-2 eigenvalues

Lect 20 3/21 7.3 eigenvectors

Lect 21 3/23 7.4 diagonalization

8. Week: Stability and Symmetric Matrices

Lect 22 3/26 7.5 complex eigenvalues

Lect 23 3/28 7.6 stability

Lect 24 3/30 8.1 symmetric matrices

9. Week: Differential Equations

Lect 25 4/2 review for second midterm

Lect 26 4/4 9.1 differential equations I

Lect 27 4/6 9.2 differential equations II

10. Week: Nonlinear systems/Function spaces

Lect 28 4/9 9.4 nonlinear systems

Lect 29 4/11 4.2 linear trafos on function spaces

Lect 30 4/13 9.3 linear differential operators

11. Week: Fourier Series

Lect 31 4/16 5.5 inner product spaces

Lect 32 4/18 5.5 Fourier series

Lect 33 4/20 5.5 Parseval

12. Week: Partial Differential Equations

Lect 34 4/23 Partial differential equations

Lect 35 4/25 Overview

Reading period