Mathematics 110

Spring, 2020
MW 5:10-6:30PM, 155 Dwinelle Hall

Professor Kenneth A. Ribet
email: ribet@math.berkeley.edu
Telephone: 510 642 0648
Fax: (510) 642-8204
Office hours (885 Evans Hall)

Graduate student instructors

Nic Brody
Kubrat Danailov
Ian Andrei A Gleason Freidberg
Christopher Kuo
Luhang Lai
Alexander Bertoloni Meli

Catalog description

"Matrices, vector spaces, linear transformations, inner products, determinants. Eigenvectors. QR factorization. Quadratic forms and Rayleigh's principle. Jordan canonical form, applications. Linear functionals"

Textbook

Linear Algebra Done Right by Sheldon Axler. If you are in berkeley.edu, you can download a free, legal electronic copy of this book from the book's page on Springer link. This same page should display a link for you to buy a high quality softcover edition for $24.99 (including shipping). You might want to consult the author's twitter feed and especially his LADR videos.

Axler's book was based partly on ideas from his article *Down with Determinants!*, which is fun to read.

Class schedule

Date	Themes	Sections
Jan. 22	Introduction to the course Fields, vector spaces Subspaces	1.A, 1.B, 1.C
Jan. 27	Subspaces Span, linear independence The replacement lemma	1.C, 2.A
Jan. 29		
Feb. 3		
Feb. 5		
Feb. 10		
Feb. 12		
Feb. 19		
Feb. 24	**First Midterm Exam**	
Feb. 26		
Mar. 2		
Mar. 4		
Mar. 9		
Mar. 11		
Mar. 16		
Mar. 18		
Mar. 30		
Apr. 1	**Second Midterm Exam**	
Apr. 6		
Apr. 8		
Apr. 13		
Apr. 15		
Apr. 20		
Apr. 22		
Apr. 27		
May. 1		
May. 4	**Review**	
May. 6	**Questions**	

May. 15	**Final Exam, 3:00-6:00PM**

Examinations

- First midterm exam, Monday, February 24, 2020, in class;
- Last midterm exam, Wednesday, April 1, 2020, in class;
- Final examination, Friday, May 15, 2020, 3-6PM.

Please do not plan travel on the dates of these exams. If you believe that you have a conflicting obligation because of an intercollegiate sport or other extracurricular activity, please read these guidelines immediately.

For each exam, you may bring in a single 2-sided 8 1/2 x 11 sheet of paper with your notes for the exam. The opportunity to create your page of notes will likely guide your review of the material for the exam.

For practice

I seem to have taught Math 110 six times before:

- Fall, 2002: this was a fairly large course in 3 LeConte;
- Fall, 2003: this was the honors section of Math 110;
- Spring, 2005: this was a large class in 10 Evans;
- Fall, 2008: this was a class using Linear Algebra Done Right, but it was taught to a class of about 35 students;
- Spring, 2010: this was a large class in 10 Evans.
- Spring, 2014: a large class followed Axler's book as beta testers for the third edition of LADR.

Each course page should have links to problems and solutions for the exams in the course. Note that some midterms were 50 minutes long while others were 80 minutes long.

Grading

Course grades will be based on a weighted average of the exam and homework grades. In 2014, the weights were as follows: midterm exams 17% each, homework 20%, final exam 46%.

Incomplete grades will be assigned only to students for whom a documented medical, personal or family emergency precludes completion of the course. Students receiving such grades are required to have been doing work of passing quality up to the occurrence of the emergency.

In 2014, I checked the historical grade distribution for Math 110 and came up with: 36% A, 34% B, 21% C, 9% D/F. Note that many students who received an F grade had effectively abandoned the course after the add/drop deadline.

You can read the handwritten student evaluations for the spring, 2014 version of this course.

Homework

Assignments will be due in section on Fridays:

1. Due January 24
2. Due January 31:
    - §1.A, problem 11
    - §1.B, problems 1, 6
    - §1.C, problems 1cd, 3, 5, 7, 8, 9, 10, 12, 13, 15, 23
    - §2.A, problems 3, 5, 6
3. Due February 7:
    - §2.A, problems 8, 9, 10, 11, 14, 17
    - §2.B, problems 1, 3, 5, 7, 8
4. Valentine's Day:
    - §2.C, problems 1, 7, 8, 9, 10, 12, 13, 14
    - §3.A, problems 3, 4, 8, 9, 10, 11, 12, 14
    - §3.B, problems 1, 2, 5, 6
5. February 21:
    - §3.B, problems 7, 15, 19, 26
    - §3.C, problems 2, 3, 4
    - §3.D, problems 3, 4, 5, 7, 9, 10, 16, 19
    - §3.E, problems 7, 8, 9
6. February 28:
    - §3.E, problems 3, 10, 11, 12, 13, 14, 16
    - §3.F, problems 3, 4, 6
7. March 6:
    - §3.F, problems 7, 9, 11, 19, 20, 21, 22, 23, 34, 35
    - Chapter 4, problems 2, 3, 6, 7, 8, 10
8. March 13: §5.A, problems 1, 3, 6, 8, 12, 13, 15, 19, 23, 24
9. March 20:
    - §6.A, problem 11—due in class on March 16, but not to be handed in
    - §5.B, problems 1, 10, 2, 3, 4, 8, 9, 11
    - §5.C, problems 1, 3, 5, 16
10. April 3:
    - §6.A, problems 3, 4, 5, 7, 8, 12
    - §6.B, problems 2, 5, 6, 7, 8, 13
11. April 10:
    - §6.C, problems 3, 5, 6, 7, 8 (uses exercise 6.A.6)
    - §7.A, problems 2, 3 (done in class), 4, 5, 6, 9, 10, 11, 12
12. April 17:
    - §7.B, problems 3, 4, 6, 8, 10, 11, 12, 13, 14
    - §7.C, problems 1, 2, 4, 7, 8, 9, 11
13. April 24:
14. May 1:
15. May 8 (RRR period):

Each assignment after the first will be worth 10 points. Your homework grade will be the sum of your twelve highest grades and half of your next-to-lowest grade. Accordingly, the maximum possible homework grade will be 125; we are "dropping" 1 1/2 assignments in computing your score.

Last Updated: 04/10/2020 16:16:24 GMT