Analysis I
MWF 1-1:50pm
CB 345
Spring 2011

Instructor: Russell Brown
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and by appointment.

Text: *Real Analysis: Measure Theory, Integration, and Hilbert Spaces,* E.M. Stein and Rami Shakarchi, ISBN-13: 978-0691113869.
This course will introduce students to Lebesgue integration. The content of this course will be examined in the real analysis portion of the analysis preliminary examination. We begin by defining Lebesgue measure and making this definition will require a careful study of what we mean by the area of a subset in $\mathbf{R}^2$. We will need to ask fundamental questions such as whether or not it is possible to define the area of every subset of the plane.
The Lebesgue integral is an important tool students with an interest in advanced work in analysis as this integral is used to define complete vector spaces of functions known as the L^p-spaces. These spaces are found throughout modern analysis.

Homework: You should endeavor to write out your homework clearly. Use complete sentences. Give specific references to results from lecture or the text. It will not be acceptable to give a reference such as "I heard that Nick Kirby said it was true." Note that homework is a substantial fraction of your grade.
The homework will be of two types. Exercises which are more routine and will generally not be collected. Problems will be more interesting and will be collected and graded. In addition, there will be a few assignments that require students to attend lectures or other events on campus.
Be aware that your instructor is old and cranky. Late homework will not be accepted. You may only write on one side of each sheet of paper. Leave generous margins. I may use the margins and the back of each sheet for comments. Handwritten solutions are preferred.
There will be approximately 10 written assignments and they will be due every fourth lecture.

Grading: Your grade will be determined as follows.

Homework	100
Exam	100
Final	200
Total	400

Exams: There will be one midterm exam and a final. The final will be cumulative. The final exam is at 1–3 pm on Wednesday, May 4, 2011,
A number of other textbooks cover the material of this course. Three[1] of my

[1]This reminds me of a joke: There are three kinds of mathematicians, those who know how to

favorites are:

- *Lebesgue integration on Euclidean spaces,* BF Jones.
- *Real Analysis*, H. Royden
- *Real and Complex Analysis*, W. Rudin.
- *Inequalities,* Hardy, Littlewood and Polya.
- *Measure and integral*, R. Wheeden and A. Zygmund.
- *Analysis*, E. Lieb and M. Loss.

Schedule: I hope to cover Chapters 1 to 3 and perhaps part of Chapter 4 of Stein and Shakarchi. Below is a tentative schedule. It will be amusing to see if we can follow it.

Chapter	Topics	Dates
1	Measure theory	1/12–2/7
2	Integration theory	2/9–3/9
	Exam	3/11 (tentative)
3	Differentiation and integration	3/21–4/15
	Additional topics or Chapter 4	4/18–4/29

Academic integrity: Students are encouraged to collaborate on homework, however you should write up your solutions independently. Students may not collaborate on exams.

Academic Accommodations: If you have a documented disability that requires academic accommodations, please see me as soon as possible. In order to receive accommodations in this course, you must provide me with a Letter of Accommodation from the Disability Resource Center (Room 2, Alumni Gym, 257-2754, jkarnes@uky.edu) for coordination of campus disability services available to students with disabilities. We can then collaborate on the best solution.

March 28, 2011

count and those who don't.