Math 5051-Fall 2014

Measure theory and Functional Analysis

General information

Location: Cupples II L001
Time: MWF 10-11am
Professor: Greg Knese
Office location: Cupples I room 211A
Office hours: Tues 9:30-11am and Thurs 10-11:30am or by appointment

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Course description

An introductory graduate level course including the theory of integration in abstract and Euclidean spaces, and an introduction to the basic ideas of functional analysis. Math 5051-5052 form the basis for the Ph.D. qualifying exam in analysis. Prerequisites: Math 4111, 417, and 418. You should be proficient in undergraduate real analysis: naive set theory, epsilon-delta proofs, topology of R^n, and topology of metric spaces (and some general topology).

Official Textbook

Real analysis for graduate students, 2nd ed., by Richard F. Bass.
Available at http://homepages.uconn.edu/~rib02005/real.html. See the errata there.

Exams

There will be one midterm and a final exam. The midterm will be in class on October 10. The final is scheduled for December 15 10:30am-12:30pm.

Homework

There will be weekly homework assignments. These should be written up nicely and you are encouraged to type your solutions in LaTeX. You may discuss the homework with other students provided you have already given the homework a serious attempt and provided anything written down during your discussion is destroyed immediately after your discussion. In particular, homework should be written up independently and it should not be possible to tell who worked with whom.

Grade breakdown

Grades will be computed according to the following breakdown:

Homework: 40%
Midterm exam: 20%
Final exam: 40%

Course outline

The initial plan is to cover chapters 2-19. This is probably too ambitious but we can play it by ear. Some of this material may drift into Math 5052.

Supplementary References

The following are some good alternative references for this course. I will try to put some of these on reserve in the library.

Real analysis: modern techniques and their applications by Folland
Real and complex analysis by Rudin
Real analysis: measure theory, integration, and Hilbert spaces by Shakarchi and Stein
Functional analysis: an introduction to further topics in analysis by Shakarchi and Stein
A course in abstract analysis by John B. Conway
A course in functional analysis by John B. Conway

Some other standard references which I am not as familiar with are below.

Real analysis by Royden
Analysis by Lieb and Loss
Analysis by DiBenedetto
Measure theory and integration by Taylor
Measure and integral by Wheeden and Zygmund